DRAFTENVIRONMENTAL IMPACT ASSESSMENT

AND

ENVIRONMENTAL MANAGEMENT PLAN

OF

SAND MINING PROJECT (CLUSTER) AT SON RIVER PATNA CLUSTER SON-11(SONE-11, 12, 13 & 14) SAND) GHAT

SAND BLOCK	**(Sone-11, 12, 13 & 14)**	
PROPOSAL NO	**SIA/BR/MIN/408619/2022**	
ToR No	**SIA/1(A)/2064/2022**	
AREA	**Sone 11**	**19.48 Ha**
	Sone 12	**4.01 Ha**
	Sone 13	**8.29 Ha**
	Sone 14	**10.31 Ha**
	Total	**42.09 Ha**
PRODUCTION	**Sone 11**	**757620 cum/year or 1303107 TPA**
	Sone 12	
	Sone 13	
	Sone 14	
LOCATION	**Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara Ii, Tehsil-Bikram & Dulhin Bazar, District Patna, (Bihar)**	
KHATA No	**1915, 46, 259**	
KHASRA No	**12092(P), 12094(P), 12096 (P), 1508(P), 2098(P), 2096(P).**	

APPLICANT

M/s Rana Enterprises

Pro – Rana Saurav

S/O – Rana Uday Pratap Singh

Add : - Vill – Karsa Kothi, P.O + P.S – Bikram,

Dist – Patna (Bihar) Pin – 821104

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1.0 PURPOSE OF THE REPORT

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

River plays an important role in the lives of the people. The river systems provide irrigation, potable water, transportation, electricity, and the livelihoods for a large number of people all over the country and to rural areas. Apart from this, river is also a good source of construction grade material as sand. As transportation and construction infrastructure expanded since last few decades, the demand for construction grade sand also increased exponentially. The market demand of river sand is high throughout the nation. Sand is extracted directly from the river channel and it doesn't require processing other than size grading. But it is now well understood that continued and indiscriminate sand mining can cause serious environmental impacts, particularly if the river being mined is eroded.

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

Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from SEIAA, Bihar under EIA notification of the MoEF & CC dated 14th September, 2006 and its subsequent amendment there-off and also the EIA Guidance Manual for Mining of Minerals

of MoEF & CC, Govt. of India, for seeking environmental clearance for mining of Sand in the applied mining lease area.

Son River: Son River originates from the Maikals range of Amarkantak high lands in the elevated plateau of central India. After flowing northerly and easterly directions for about 592 km in a hilly terrain, it debouches onto the Gangetic alluvial plains. The river flows in northeast direction in a NE-SW trend and confluences with Ganga in the northeast corner of the Bhojpur district at Babura.

1.1 IDENTIFICATION OF PROJECT, PROJECT PROPONENT & CLUSTER APPROCH

The Proposed Sand Mining Project is located on Son River at Patna Cluster Son-11(Sone-11, 12, 13 & 14) Sand Ghat at Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara II, Tehsil-Bikram & Dulhin Bazar, District Patna, (Bihar).

The Proposed Production is 757620 CUM or 1303107 TPA and Area of the project site is 42.09 ha in cluster.

Cluster Situation: As per District Survey Report Patna the Proposed sand Ghats of (Patna Sone-11, 12, 13 & 14) Sand Ghat are comes in cluster situation whose combined cluster area is 42.09 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

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

The Details of cluster is given below:

Sand Block Name	Area (Ha)	Production in TPA	Applicant/Address
Sone 11	19.48	946728	M/s Rana Enterprises Pro – Rana Saurav S/O – Rana Uday Pratap
Sone 12	4.01	194886	
Sone 13	8.29	402894	

Sone 14	10.31	501066	Singh Add : - Vill – Karsa Kothi, P.O + P.S – Bikram, Dist – Patna (Bihar) Pin – 821104
Total	**42.09**	**2045574**	

The proposed project is of River bed sand mining and falls under Category- "B1" as per EIA Notification 2006 and its subsequent amendments by Ministry of Environment Forests & Climate Change, GOI.

The details of the project are given below:

Name & Address of the Mine	Patna Cluster Son-11(Sone-11, 12, 13 & 14)	Sand Mining Project on Son River at Patna Cluster Son-11(Sone-11, 12, 13 & 14) Sand Ghat at Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara II, Tehsil-Bikram & Dulhin Bazar, District Patna, (Bihar)
River	Son	
Mineral	Sand	
Area (ha)	Sone 11	19.48 Ha. (Mauza -Kab)
	Sone 12	4.01 Ha. (Mauza - Lahladpur)
	Sone 13	8.29 Ha. (Mauza - Janpara I)
	Sone 14	10.31 Ha. (Mauza - Janpara II)
	Total Cluster Area	**42.09** Ha.
Production	Patna Cluster Son-11(Sone-11, 12, 13 & 14)	757620 CUM or 1303107 TPA
Postal Address	Patna Cluster Son-11(Sone-11, 12, 13 & 14)	M/s Rana Enterprises Pro – Rana Saurav S/O – Rana Uday Pratap Singh Add : - Vill – Karsa Kothi, P.O + P.S – Bikram, Dist – Patna (Bihar) Pin – 821104
Status of Mine	Fresh application for Environmental Clearance.	

Project Cost	Rs- 60,87,21,400 /-
CER Cost	CSR cost will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is 60,87,21,400 x 2% = Rs. 1,21,74,428/-.

1.2 BRIEF DESCRIPTION OF PROJECT

The proposed project is open cast semi-mechanized mining of sand with a proposed production of 757620 CUM or 1303107 TPA . Detail has been given below:

The proposed project is over an area 10 ha. Details are summarized in Table no 1.1

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

Table: 1.1 Project cost break-up & Production

Sand Ghat Block	Area (Ha.)	Khata No	Khasra No	Production (in TPA)	Auction Cost
Sone 11	19.48	1915	12092(P), 12094(P), 12096 (P),	1303107	60,23,07,900/-
Sone 12	4.01	46	1508(P),		
Sone 13	8.29	259	2098(P),		
Sone 14	10.31	259	2096(P).		
Total	**42.09**			**1303107 TPA**	**60,23,07,900/-**

The proposed mining lease area falls in Survey of India Toposheet 72 C/10, 72 C/11, 72C/14, 72C/15

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

Table: 1.2(a) Mine lease Pillar Co-ordinates (Sone 11)

Pillar No.	Latitude /Longitude	
1	25.4108048	84.76375812
2	25.41272392	84.76515328
3	25.41392464	84.76510723
4	25.4173491	84.76639802

5	25.41942682	84.76840242
6	25.42045689	84.76893111
7	25.42411352	84.76938504
8	25.425944	84.7701536
9	25.42543953	84.77101562
10	25.41763436	84.76852498
11	25.4129551	84.7662398
12	25.41146776	84.76505301
13	25.41094096	84.76429313

Table: 1.2(b) Mine lease Pillar Co-ordinates (Sone 12)

Pillar No.	Latitude /Longitude	
1	25.43290394	84.77524573
2	25.43304366	84.77496578
3	25.43397955	84.77535911
4	25.43470331	84.77588399
5	25.43509721	84.77654562
6	25.43714623	84.77798932
7	25.43758269	84.77808495
8	25.43747098	84.77871285
9	25.43673083	84.77839512
10	25.43479929	84.77716448

Table: 1.2(c) Mine lease Pillar Co-ordinates (Sone 13)

Pillar No.	Latitude /Longitude	
1	25.44728437	84.78069489
2	25.44718873	84.78078351
3	25.44650365	84.78141834
4	25.44546538	84.78143779
5	25.44402535	84.78121801
6	25.44391148	84.78115536
7	25.44283717	84.77976851
8	25.44272432	84.77950054
9	25.44240832	84.77957033
10	25.44241844	84.77822087
11	25.44265508	84.77799867
12	25.44518656	84.77977885

Table: 1.2(d) Mine lease Pillar Co-ordinates (Sone 14)

Pillar No.	Latitude /Longitude	
1	25.46983285	84.76993348
2	25.46996451	84.77014975
3	25.46997958	84.7701745
4	25.46908019	84.77101713
5	25.46889769	84.77107393
6	25.46872096	84.77171681
7	25.46816599	84.77243387
8	25.46714795	84.77306155
9	25.46639639	84.77315627
10	25.46552281	84.77386647
11	25.46453347	84.77515274
12	25.46360115	84.77689795
13	25.46175602	84.77703658
14	25.46158368	84.77631935
15	25.46198175	84.77583543
16	25.46869675	84.77081098

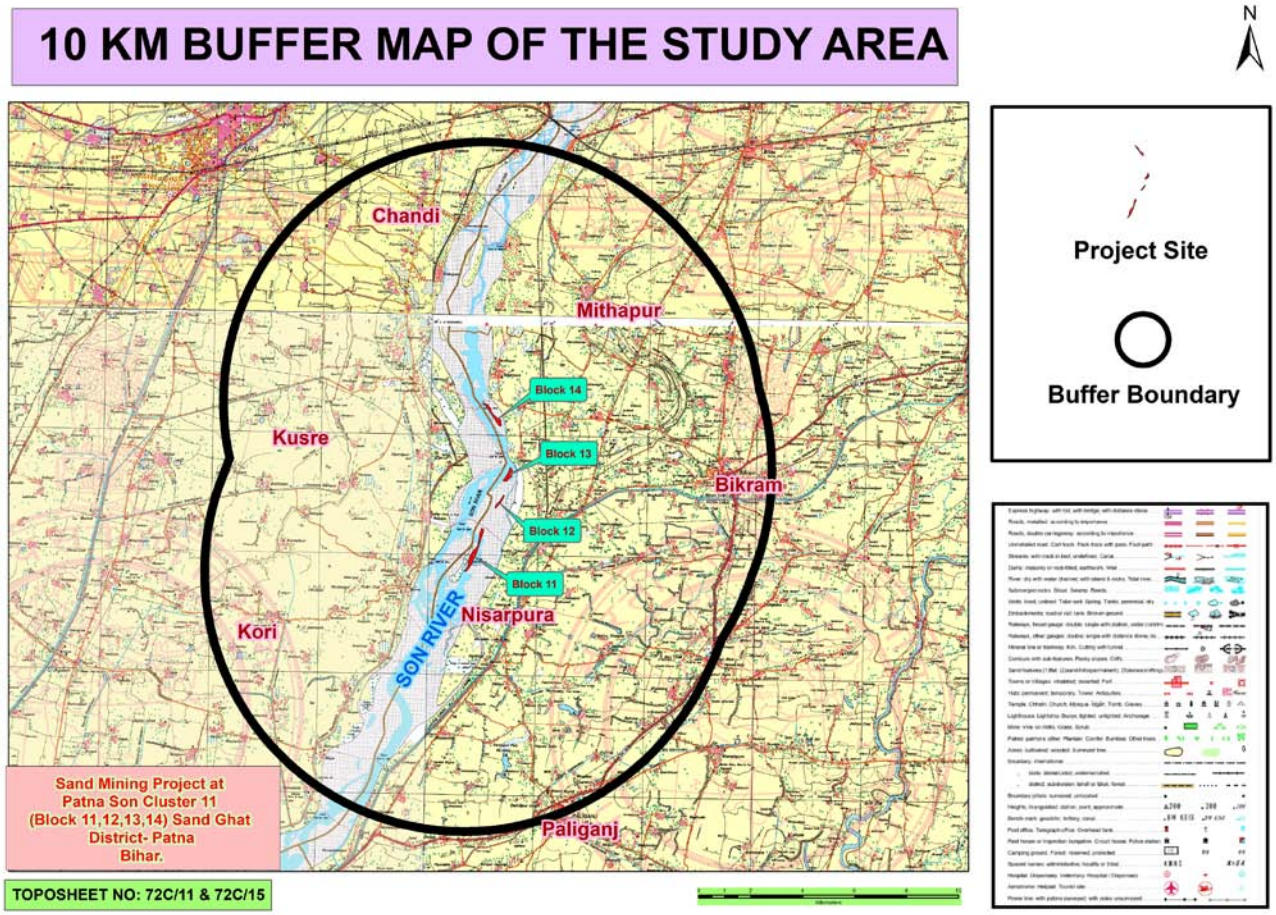

Figure 1.1, 10 km cluster buffer map

Table: 1.3, Connectivity Details given below

	Blocks	Village	Distance (Km) Direction
Nearest Habitation/ town	Sone 11	Gona Lahladpur	approx. 1.90 Km in W direction. approx.1.90 Km in ENE direction.
	Sone 12	Kanpa Lahladpur	approx. 3.10 Km in E direction. approx.1.50 Km in E direction.
	Sone 13	Dullahpur Donrapur	approx. 3.10 Km in E direction. approx.3.60 Km in E

		Janpara	direction. approx.1.0 Km in NE direction.
	Sone 14	Berar Birdhaur	approx.1.80 Km in E direction. approx.1.15 Km in ENE direction.

Nearest Railway Station

Blocks	**Railway Station**	**Distance (Km) Direction**
Sone 11	Koelwar Railway Station,	approx. 16.80 km towards N direction
Sone 12	Koelwar Railway Station,	approx. 14.80 km towards N direction
Sone 13	Koelwar Railway Station,	approx. 13.75 km towards N direction
Sone 14	Koelwar Railway Station,	approx. 11.60 km towards N direction

Nearest Airport

Blocks	**Airport**	**Distance (Km) Direction**
Sone 11	Patna Airport	Patna Airport, 35 km towards ENE
Sone 12	Patna Airport	Patna Airport, 35.30 km towards ENE
Sone 13	Patna Airport	Patna Airport, 36.20 km towards ENE
Sone 14	Patna Airport	Patna Airport, 37.80 km towards ENE

Nearest Highway

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Blocks	**Nearest Highway**	**Distance (Km) Direction**
Sone 11	NH-139 SH-81	approx, 2.80 km towards E direction approx, 2.0 km towards W direction
Sone 12	NH-139 SH-81	approx, 3.0 km towards E direction approx, 3.0 km towards W direction

	Sone 13	NH-139 SH-81	approx, 3.50 km towards ESE direction. approx, 3.10 km towards W direction
	Sone 14	NH-139 SH-81	approx, 5.0 km towards SE direction. approx, 2.42 km towards W direction

1.3, Details of environmental settings

Sl. No.	Particulars	Details
2	Ecological Sensitive Areas (National Park, Wildlife Sanctuaries)	There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area.
3	Nearest water body	The mine site lies on the dry bed of Son river.
4	Seismic Zone	Zone- IV *Source BMTC 2nd edition https://www.bmtpc.org/disaster%20resistnace%20technolgies/ZONE%20IV.htm*

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

Project's importance to the country and the region

Sands are ubiquitous material; available everywhere and is being used from the time immemorial for wide applications in our daily life; infrastructures, building construction, highways, roads, townships, multiplexes, foundations of buildings and industrial units etc. and is an integral part of development. Life without sand is unthinkable. Over the millennia, the weathering effect, the flow of water at high

velocities in rivers and the pressure of water from the high mountainous reservoirs converted and pushed the hard ground underneath into sands, etc. which travelled as sediments with the flow. This sand got deposited along the river course wherever conditions were favorable. In the deep past this settled sand was not extracted in a quantity in which it deposited; since due to less population the requirements was not enough. As a result of continuous deposit of sand , the rivers went on changing their course, widening by itself, eroding the fields and expanding, resulting in flooding, inundation and breaking their banks, causing devastation of property and loss of life. There has been a severe impact on every aspect of the environment. The rivers thus, needed channelization and therefore, extraction of these minor minerals through mining was expedient. The haphazard mining of sands being practiced now for long, through unregulated, uncontrolled and illegal way added almost an irreversible damage to the environment, which became a cause of serious concern to everyone. Though sands are very important mineral source for development, its mining through scientific methods has also become equally imperative.

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

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

1.4 SCOPE OF THE STUDY

The project proposal was submitted to State Level Environment Impact Assessment Authority-Bihar for its appraisal. Based on which, presentation was held for Terms of Reference (TOR). Based on the data provided and presentation made, the SEIAA-Bihar has issued the Terms of Reference attached as **Annexure-1.**

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

Table: 1.5 Point wise compliance for TOR of Patna Cluster Son-11 (Sone-11, 12, 13 & 14)

(ToR File No- File No. SIA/1(a)/2064/2022)

S. No	TOR	Compliance	Reference in

			the Report
1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	This is fresh LOI, Mine is yet to be opened. It will open only after getting environmental clearance.	--
2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	State Govt. has given consent for mining vide letter no. 2834 dated 08.11.2022 for (Sone-11, 12, 13 & 14)	**Annexure II, LOI**
3	All documents including approved mine plan, EIA and public hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management and mining technology and should be in the name of the lessee.	The documents including mine plan and EIA report submitted are compatible with one another w.r.t. to following information: Mining Lease Area- Sone – 11 – Area – 19.48 Hect. Sone – 12 – Area – 4.01 Hect. Sone – 13 – Area – 8.29 Hect. Sone - 14 – Area – 10.31 Hect. Lessee (Patna Sone Cluster 11 (Sone – 11, Sone – 12, Sone – 13, Sone -14): M/s Rana Enterprises Pro – Rana Saurav S/O – Rana Uday Pratap	**Annexure- III** Mine plan All details has been complied in chapter-2

		Singh Add : - Vill – Karsa Kothi, P.O + P.S – Bikram, Dist – Patna (Bihar) Pin – 821104 Waste generation- No waste will be generated. Mining Method-Opencast semi-mechanized method	
4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery /toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All Corner Coordinates of mining lease area superimposed on Toposheet Map has been incorporated in EIA/EMP Report.	Refer Chapter 2 Fig: 2.1, Corner Coordinates map
5	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	The land use map showing salient features of the area is given in the report. The geological map of the mine lease area is also given in the report showing geomorphology	Land-use of the study area Figure 3.1.
6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The Lease area is dry part of River bed. This is a barren land. The mining process will be done by land use policy of the State & no land	Chapter II & III

		diversion has been proposed.	
7	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating processes /procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions?. The hierarchical system or administrative order of the company to deal with the environmental issues and for insuring compliances with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.	Yes, the proponent Company has a well laid down Environment Policy. The hierarchical system or administrative order of the company has been given in the EIA report.	Chapter VIII Section 8.1 Corporate Environment Policy
8	Issues relating to Mine safety ,including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	Issue related to mine safety has been given in of chapter 7.	
9	The study area will comprise of l0 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine/lease period.	The 10 km zone from periphery of the lease has been considered as the study area. The Buffer map of the study area is	Chapter I Figure 1.1

		attached with report. All the details in the EIA report are for the life of the mine period. The details of mining & production have been given in the report.	
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 Son River. There is no any Wild Life sanctuary & National Park, protected forest within the study area.	Land-use of the study area Figure 3.1 , Table 3.1 10 km buffer map enclosed in Chapter I of EIA Report.
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 outside the mine lease area.	
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	There is no forest land within the lease area.	---

	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 recognition of forest rights under the schedule tribes and other traditional forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated"	There is no forest land involved in the leased out area. Hence, this act is not applicable for this project.	
15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given	There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area. However, the vegetation details of the study area are incorporated with the report.	Chapter III Section 3.1.6 Biological Environment
16	A study shall be got done to ascertain the impact	The details Impacts &	Chapter IV

	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.	there mitigation measures are given in chapter IV of EIA/EMP Report.	
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger / Elephant Reserves / (existing as well as proposed), if any, within 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.	No National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger / Elephant Reserves / (existing as well as proposed) are found within 10 km of the study area. MAP showing eco sensitive zone is attached in Chapter III (Fig 3.4)	Chapter III Section 3.1.6 Biological Environment
18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be	Detailed biological study of core zone and buffer zone within 10 km radius of the periphery of the mine lease has been carried out for the project. The same has been incorporated in the report	Chapter III Section 3.1.6 Biological Environment

	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 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.	Proposed project does not come under 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)	There is no R & R involved in this project.	
21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their	There is no R & R involved in this project.	

	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.	Base line study was carried out for winter season Dec 2022 -Feb 2023 Details are provided in EIA/EMP Report. The locations of the monitoring stations were decided on the basis of prevailing meteorological conditions (Wind direction & wind speed) of the study area. The wind rose has been given in chapter III of EIA/EMP Report. One location has been selected in downwind direction within 500 m from the lease boundary.	Chapter III Section 3.1.2 Air Environment

		The location of the monitoring sites has been shown in map.	
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 Modelling has been used detail has been given in chapter 4.	
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 Sand Block Patna Sone Cluster 11 is 30.50 KLD for drinking, dust suppression and green belt development. A detailed water balance is being provided in the report.	Chapter –II Section 2.7.4 Water Requirement
25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water	Water requirement will be fulfilled by private water	Chapter II

	for the Project should be provided.	tanker. So, no clearance is required.	
26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the project, if any required should be provided.	The project do not consume any process water except for drinking, dust suppression & plantation. Plantation is proposed, which will increase the water holding capacity & help in recharging of ground water. No artificial rainwater harvesting is proposed for the present project in lease area, however if any such project proposed by State Government PP will help out for the above.	
27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided".	Mining activity will be done on Dry Bed of River so there is no impact on surface water. Mining will be up to 3 m below ground level or above the ground water table whichever comes first. This will not intersect the ground water	Chapter II

		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.	The mining will be done only upto 3.0 m depth. The detailed impact and control measure w.r.t the quality of water in the surrounding area is discussed under Chapter 4.	
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 Son River. No diversion is proposed.	
30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	The mining will be done as per the approved mining plan and 3 meter bgl whichever is 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	Plantation/afforestation will be done as per program i.e along the road sides and near civic	Chapter VIII Section 8.2

	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.	amenities, as per mine plan. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. List of Plant species selected for green belt is detailed in the EIA report. The plant species selected for green belt have a greater ecological value and are of good utility value to the local population. The plant species are selected by giving emphasis on local and native species and the species which are tolerant to pollution	
32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State	The projection has been done based on the mineral transportation. The details of traffic analysis are discussed in the report.	Chapter IV Section 4.6 Traffic Analysis Fig 4.2, Table 4.3(i), 4.3(ii)

	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	A temporary rest shelter will be provided for the workers near to the site with provisions of water, first aid facility, protective equipments, etc. Details are given in the EIA/EMP Report.	Chapter II Section 2.12.2
34	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections)should be given in the EIA report.	Conceptual plans and Sections are given in Chapter 2.	
35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational health impact mainly is expected due air pollution due to fugitive dust emission because of movement of vehicles. However appropriate mitigation measures for air pollution control have been given in the report, discussed in Chapter-4. Each labour will undergo pre-placement medical	Chapter VII Section 7.2 Chapter VIII Section 8.3

		examination. Thereafter periodical heath check up will be arranged as stated in the report. About 4.0 lakh for each lease for cluster situation has been earmarked for occupational health.	
36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	The proposed project being a small scale semi-mechanized mining project, there will be hardly any process related health implication on the population of the nearby villages except fugitive dust emissions due to transportation. Budgetary allocation is given in Chapter-VIII.	Chapter VII Section 7.2 Chapter VIII Section 8.3
37	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time to time for implementation.	Socio-economic significance provided to the local community i.e. to the nearby villagers is given in the EIA/EMP Report.	Chapter VI Section 6.4 Chapter VII Section 7.2

38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project	The detailed environmental management plan to mitigate the environmental impacts has been mentioned in of the EIA/EMP Report.	Chapter VIII
39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	This is a draft EIA report. Public hearing is yet to be conducted.	--
40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending against the project.	
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	The capital cost & recurring cost for has been earmarked for EMP. Chapter IX For Patna Sone Cluster 11 Capital Cost **15.735 lakh** Recurring Cost **5.5 lakh**	Chapter IX
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report".	A Disaster management Plan has been given in EIA report.	Chapter VI

43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	2% of the total cost of the project has been earmarked towards the Enterprise Social Commitment which will be used for the development of village.	
44	**Besides the above, the below mentioned general points are also to be followed:-**		
a	All documents to be properly referenced with index and continuous page numberings.	All the documents 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.	Compiled With EIA report.	
c	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	Compiled With EIA report.	
d	Where the documents provided are in a language other than English, an English translation should be provided.	Compiled With EIA report.	

e	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Compiled With EIA report.	
f	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	Compiled With EIA report.	
g	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	Agreed	
h	As per the circular no. J-11011/618/2010-IA. II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	This is new case for Mining. No certified compliance is required.	

i	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	Compiled With EIA report.	

ADDITIONAL TERMS OF REFERENCE

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.	ISCST3 modelling has been used detail has been given in 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 be furnished duly certified from the concerned District Mining Officer.	No mining lease is overlapping with the previously allotted mining lease.	
3	The Satellite imageries (high resolution) of last three years in succession for summer, rainy and winter seasons of each proposed mining lease must be submitted. A map on appropriate scale to show extraction	Noted it will be submitted with Final EIA report. Traffic plan has been discussed in Chapter-4.	

	paths to be used outside the mining lease boundary to approach major public roads (Rural/District road or State/National Highway).		
4	Alternatives route be explored if extraction path is passing through dense population/human settlements.	Alternative route has been examined and has been discussed in chapter-4.	Figure 4.1 & Figure 4.2 of Chapter-4.
5	A cumulative traffic management plan for cluster sand mining proposal must be submitted.	Agreed.	
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 structures (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.	Noted it will be submitted with Final EIA report.	
7.	A report of the cumulative EIA/EMP study for the cluster sand mining blocks of the proposed mining site.	The proposed mining site does not fall in cluster situation.	

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2.0 TYPE OF PROJECT

The project is proposed is for sand Ghat Patna Cluster Son-11(Sone-11, 12, 13 & 14) for the excavation of sand from the bed of river Son. The proposed project is opencast semi-mechanized/OTFM mining project.

2.1 NEED FOR THE PROJECT

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

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

2.2 LOCATION DETAILS

The Proposed Sand Mining Project is located on Son River at Patna Cluster Son-11(Sone-11, 12, 13 & 14) Sand Ghat at Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara II, Tehsil-Bikram & Dulhin Bazar, District Patna, (Bihar).

The Proposed Production is 757620 CUM or 1303107 TPA and Area of the project site is 42.09 ha in cluster.

Cluster Situation: As per District Survey Report Patna the Proposed sand Ghats of (Patna Sone-11, 12, 13 & 14) Sand Ghat are comes in cluster situation whose combined cluster area is 42.09 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

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

The Details of cluster is given below:

Sand Block Name	Area (Ha)	Production in TPA	Applicant/Address
Sone 11	19.48	946728	M/s Rana Enterprises Pro – Rana Saurav S/O – Rana Uday Pratap Singh Add : - Vill – Karsa Kothi, P.O + P.S – Bikram, Dist – Patna (Bihar) Pin – 821104
Sone 12	4.01	194886	
Sone 13	8.29	402894	
Sone 14	10.31	501066	
Total	**42.09**	**2045574**	

The proposed project is of River bed sand mining and falls under Category- "B1" as per EIA Notification 2006 and its subsequent amendments by Ministry of Environment Forests & Climate Change, GOI.

Geo Coordinate of Lease Area:

Table 2.1, Mine lease Pillar Co-ordinates Patna Cluster Son-11(Sone-11, 12, 13 & 14)

Mine lease Pillar Co-ordinates (Sone 11)

Pillar No.	Latitude /Longitude	
1	25.4108048	84.76375812
2	25.41272392	84.76515328
3	25.41392464	84.76510723
4	25.4173491	84.76639802
5	25.41942682	84.76840242
6	25.42045689	84.76893111
7	25.42411352	84.76938504
8	25.425944	84.7701536
9	25.42543953	84.77101562
10	25.41763436	84.76852498
11	25.4129551	84.7662398
12	25.41146776	84.76505301
13	25.41094096	84.76429313

Mine lease Pillar Co-ordinates (Sone 12)

Pillar No.	Latitude /Longitude	
1	25.43290394	84.77524573
2	25.43304366	84.77496578
3	25.43397955	84.77535911
4	25.43470331	84.77588399
5	25.43509721	84.77654562

6	25.43714623	84.77798932
7	25.43758269	84.77808495
8	25.43747098	84.77871285
9	25.43673083	84.77839512
10	25.43479929	84.77716448

Mine lease Pillar Co-ordinates (Sone 13)

Pillar No.	Latitude /Longitude	
1	25.44728437	84.78069489
2	25.44718873	84.78078351
3	25.44650365	84.78141834
4	25.44546538	84.78143779
5	25.44402535	84.78121801
6	25.44391148	84.78115536
7	25.44283717	84.77976851
8	25.44272432	84.77950054
9	25.44240832	84.77957033
10	25.44241844	84.77822087
11	25.44265508	84.77799867
12	25.44518656	84.77977885

Mine lease Pillar Co-ordinates (Sone 14)

Pillar No.	Latitude /Longitude	
1	25.46983285	84.76993348
2	25.46996451	84.77014975
3	25.46997958	84.7701745
4	25.46908019	84.77101713
5	25.46889769	84.77107393
6	25.46872096	84.77171681
7	25.46816599	84.77243387
8	25.46714795	84.77306155
9	25.46639639	84.77315627
10	25.46552281	84.77386647
11	25.46453347	84.77515274
12	25.46360115	84.77689795
13	25.46175602	84.77703658
14	25.46158368	84.77631935
15	25.46198175	84.77583543
16	25.46869675	84.77081098

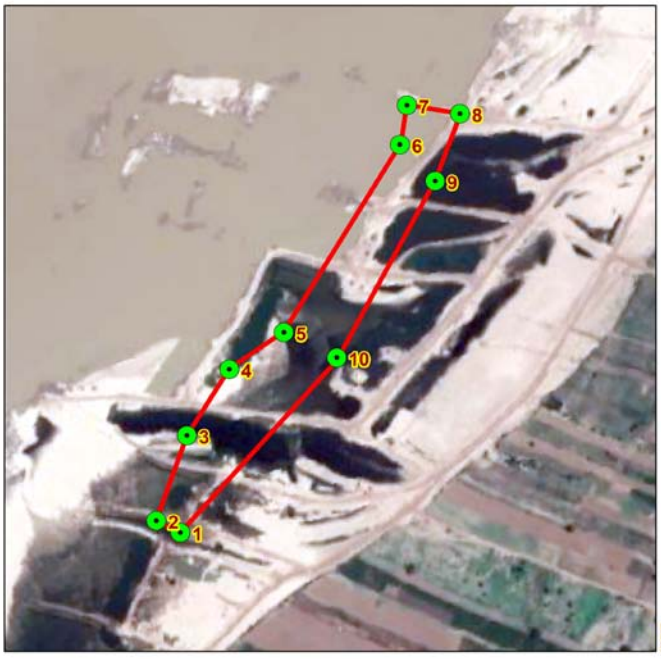
Patna Cluster Son-11(Sone-11, 12, 13 & 14) Sand Ghat is well connected by NH-139

PILLAR CO-ORDINATES MAP OF THE STUDY AREA

Patna Block 11		
Pillar No	Latitude	Longitude
1	25.4108048	84.76375812
2	25.41272392	84.76515328
3	25.41392464	84.76510723
4	25.4173491	84.76639802
5	25.41942682	84.76840242
6	25.42045689	84.76893111
7	25.42411352	84.76938504
8	25.425944	84.7701536
9	25.42543953	84.77101562
10	25.41763436	84.76852498
11	25.4129551	84.7662398
12	25.41146776	84.76505301
13	25.41094096	84.76429313

Pillar Coordinate map of Patna Son-11

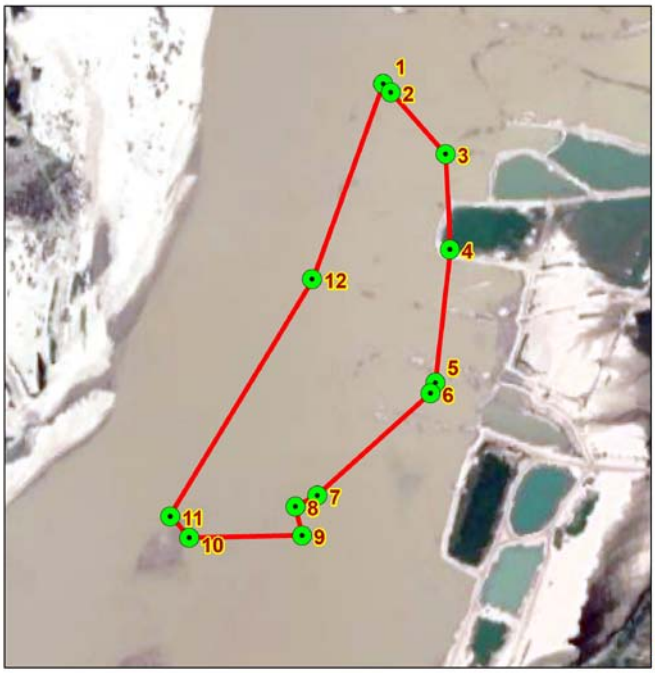
PILLAR CO-ORDINATES MAP OF THE STUDY AREA



Patna Block 12		
Pillar No	Latitude	Longitude
1	25.43290394	84.77524573
2	25.43304366	84.77496578
3	25.43397955	84.77535911
4	25.43470331	84.77588399
5	25.43509721	84.77654562
6	25.43714623	84.77798932
7	25.43758269	84.77808495
8	25.43747098	84.77871285
9	25.43673083	84.77839512
10	25.43479929	84.77716448

Pillar Coordinate map of Patna Son-12

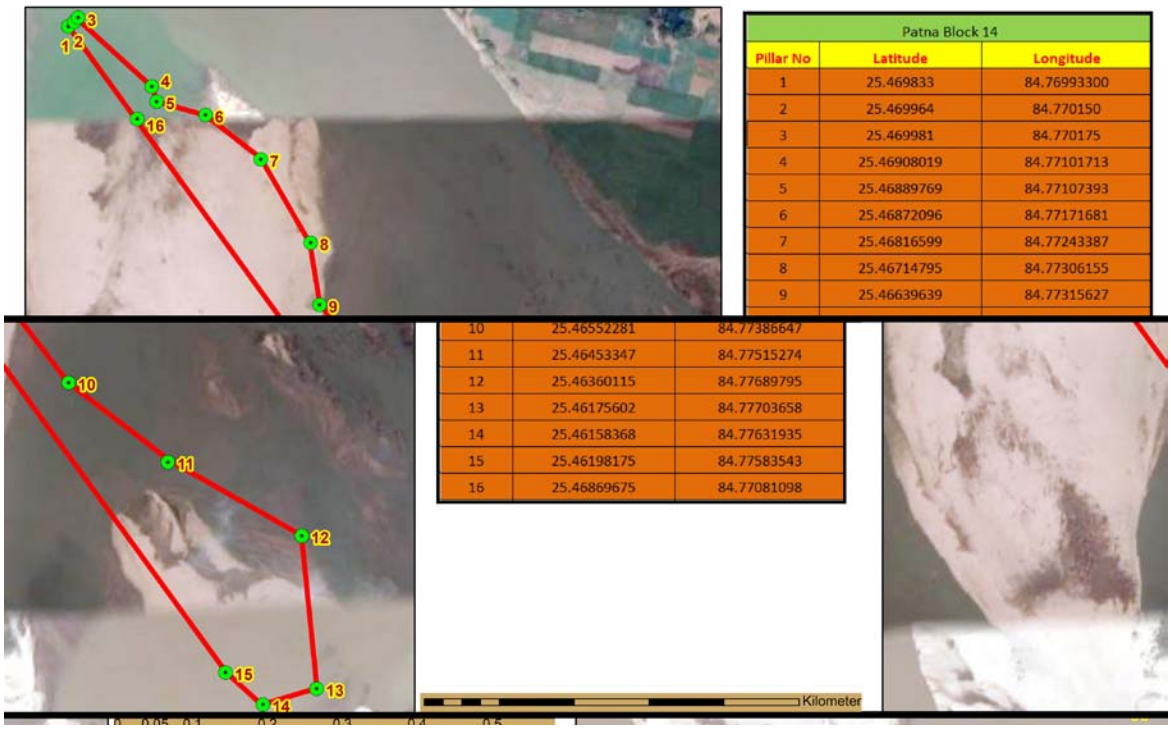
PILLAR CO-ORDINATES MAP OF THE STUDY AREA



Patna Block 13		
Pillar No	Latitude	Longitude
1	25.44728437	84.78069489
2	25.44718873	84.78078351
3	25.44650365	84.78141834
4	25.44546538	84.78143779
5	25.44402535	84.78121801
6	25.44391148	84.78115536
7	25.44283717	84.77976851
8	25.44272432	84.77950054
9	25.44240832	84.77957033
10	25.44241844	84.77822087
11	25.44265508	84.77799867
12	25.44518656	84.77977885

Pillar Coordinate map of Patna Son-13

PILLAR CO-ORDINATES MAP OF THE STUDY AREA



Patna Block 14		
Pillar No	Latitude	Longitude
1	25.469833	84.76993300
2	25.469964	84.770150
3	25.469981	84.770175
4	25.46908019	84.77101713
5	25.46889769	84.77107393
6	25.46872096	84.77171681
7	25.46816599	84.77243387
8	25.46714795	84.77306155
9	25.46639639	84.77315627
10	25.46552281	84.77386647
11	25.46453347	84.77515274
12	25.46360115	84.77689795
13	25.46175602	84.77703658
14	25.46158368	84.77631935
15	25.46198175	84.77583543
16	25.46869675	84.77081098

Pillar Coordinate map of Patna Son-14

Figure 2.1:- Pillar Coordinate map of Patna Cluster Son-11(Sone-11, 12, 13 & 14)

2.2.1 Lease / Block Area

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

Sand Ghat Block	Area (Ha.)	Khata No	Khasra No	Production (in TPA)	Auction Cost
Sone 11	19.48	1915	12092(P), 12094(P), 12096 (P),	1303107	60,23,07,900/-
Sone 12	4.01	46	1508(P),		
Sone 13	8.29	259	2098(P),		
Sone 14	10.31	259	2096(P).		
Total	**42.09**			**1303107 TPA**	**60,23,07,900/-**

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

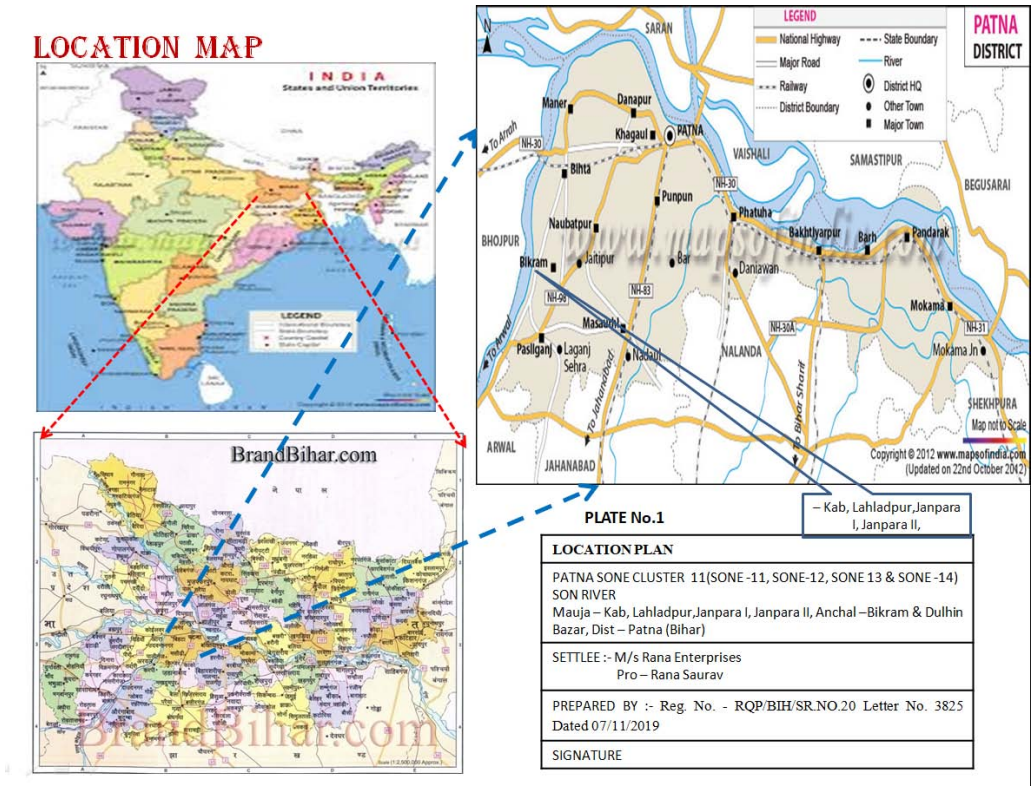


Figure 2.2:- Location map of the project site Patna Cluster Son-11

2.3 TOPOGRAPHY & GEOLOGY

2.3.1 Topography

The sand deposits of Patna district of Bihar broadly form part and parcel of the flood plains of Ganga River as whole formed since geological ages.

The State of Bihar is transecting by a no. of rivers. The individual river basins and their catchment areas is shown in Fig. no. 1 below.

The various sand mining lease areas (also referred to as sand ghats) lie in the river bed of river Sone which is a major tributary of river Ganga. They are formed in the Quaternary period of central Bihar Plains- the OAG (Older Alluvium Group) forming the highest terrace, in the Sone-Ganga alluvial tract, and NAG (Newer Alluvium Group) forming younger terraces, as Older Flood Plains, are exposed all along the Alluvial Upland.

Source: Mining plan

2.3.2 GEOMORPHOLOGY

The district forms a part of the Ganga basin and is characterized by a monotonously flat relief with elevation In general, the western part of the district is sloping due north and north-east, with elevation of the land surface varying from 68 m in the south to 48 m in the north, and from 67 m in the west to 45 m in the east. A notable geomorphic feature is the strong natural levee formation or upland all along the southern bank of the Ganga which acts as a natural barrier thereby causing many of the streams flowing from south to run parallel to the course of Ganga before finally joining it further east of the district boundary.

Source: *http://cgwb.gov.in/district_profile/Bihar/Patna.pdf*

2.3.3 REGIONAL GEOLOGY

Regional Geology

Regionally the area constitutes a part of the Ganga River Basin. The Sone originates near Amarkantak in Anuppur district of Madhya Pradesh, just east of the headwater of the Narmada River, and flows north-northwest through Shahdol district in Madhya Pradesh state before turning sharply eastward where it encounters the southwest-northeast-Kaimur Range. The Sone parallels the Kaimur hills, flowing east-northeast through Uttar Pradesh, Jharkhand and Bihar states to join the Ganges just west of Patna. Geologically, the lower valley of the Sone is an extension of the Narmada Valley, and the Kaimur Range an extension of the Vindhya range. Anuppur, Chopan, Deori, Rohtasgarh, Dehri, Sonebhadra and Bihta are the major cities situated on Sone River.

Table 2.2 Showing the Geological Succession and their Occurrences distribution

Age	Geology	Occurrences
Quaternary	Alluvial Deposits (Sand, Clay, Silt, Fragments)	North Bihar Plain & Central Bihar Plain
Tertiary	Sand Stones & Clay Stones	North Champaran Hills
Gondwana	Coal Measures, Forming a series of Small outlier basins	Banka District
Vindhyans	Sandstones, Shales, Limestones, etc.	Parts of Bahbhua and Rohtas dist
Satpura	Schist, Phyllite, Quartzite	Part of Aurangabad, Gaya, Nawada, Nalanda, Sheikhpura and Munger

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

2.3.4 LOCAL GEOLOGY OF THE AREA

The Sone parallels the Kaimur hills, flowing east-northeast through Uttar Pradesh, Jharkhand and Bihar states to join the Ganges just west of Patna. Geologically, the lower valley of the Sone is an extension of the Narmada Valley, and the Kaimur Range an extension of the Vindhya Range.

The sand exposed in the River bed of Sone and surrounding areas is the product of the deposition of the sediments brought and deposited in the flood plains of River Ganga. These sediments are of recent geological formation. The litho-units exposed within the river and surrounding areas have formed as water borne sediments brought by flood water during rainy season every year and deposited in riverbed.

The litho units encountered in the riverbed and surrounding areas belongs to the Shivalik super groups. The size of the sediments towards the source i.e. host rock is course and at the tale end of the river the grain size is reduced to smaller sizes resulted in the formation of clay beds. The following sequences have been observed in the area, i.e. Top soil/ Alluvium followed by sand deposition.

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 0.60m m constitute the top horizons in the area suitable for agriculture. River Ganga meanders through the area exposing the alluvium and soil at the banks. Sand is found in the river bed upto a depth of more than 3.0 m. The major part of bed remains dry as water flows in a single stream

during the non-monsoon season. Only during rainy season the entire flood plain has water, when there will be no mining done.

Source: *Mining Plan*

2.3.5 CLIMATE

The climate of the district is somewhat extreme in nature, i.e., quite hot during the summer and fairly cold during the winter. January is the coldest month. The temperature starts rising from March and reaches its peak in May. Rain starts sometime in mid June and lasts till mid September. Maximum rains occur during the monsoon months of July and August. Sometimes winter rains occur in Jan-February. The normal annual rainfall in the district is around 1076 mm.

Source http://cgwb.gov.in/district_profile/Bihar/Patna.pdf

2.4 GEOLOGICAL RESERVE

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

Proved Mineral Reserves (111): All quantities of sand occurring up to depth of 3m from surface has been considered as proved reserves.

Table-2.3:- Proved Mineral Reserves Patna Cluster Son-11(Sone-11, 12, 13 & 14)

Sone 11

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	584400
Total		584400

Geological Reserve = 584400 cum. Or 1005168 tonnes.

Sone 12

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	120300
Total		120300

Geological Reserve = 120300 cum. Or 206916 tonnes.

Sone 13

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	248700
Total		248700

Geological Reserve = 248700 cum. Or 427764 tonnes

Sone 14

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	309300
Total		309300

Geological Reserve = 309300 cum. Or 531996 tonnes.

Total Geological Reserve = 1262700 cum or 2171844 tonnes

Source Mining Plan

2.4.1 Mineable Reserves:

Mineable reserves have been computed up to 3m depth from surface. Benches having height 1.5m & width 6.0m drawn from the ultimate pit limit. Area of each benches have been calculated multiplied by strike influence to get the volume. The volume multiplied by bulk density (**1.72 g/cm^3**) to get the tonnage.

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

.

Table-2.4:- Summary of minable reserves of Patna Sone Cluster 11 Sand Ghat as below (the bulk density multiply by 1.72)

Table 2.5 Patna Cluster Son-11(Sone-11, 12, 13 & 14)

Sone 11

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
63-61.5	1757	95	1.5	250373	430642
61.5-60	1747	85	1.5	222743	383118
Total				473115	813758

Mineable Reserve = **473115 CUM or 813758 Tonnes**

Sone 12

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
61-59.5	586	51	1.5	44829	77106
59.5-58	876	41	1.5	53874	92664
Total				98703	169769

Mineable Reserve = **98703 CUM or 169769 Tonnes**

Sone 13

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
60-58.5	541	134	1.5	108741	187035
58.5-57	531	124	1.5	98766	169878
Total				207507	356912

Mineable Reserve = **207507 CUM or 356912 Tonnes**

Sone 14

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
60-58.5	1113	76	1.5	126882	218237
58.5-57	1103	66	1.5	109197	187819
Total				236079	406056

Mineable Reserve = **236079 CUM or 406056 Tonnes**

Total Mineable Reserve (Sone 11 + Sone 12 + Sone 13 + Son 14) = 1015404 CUM or 1746495 Tonnes

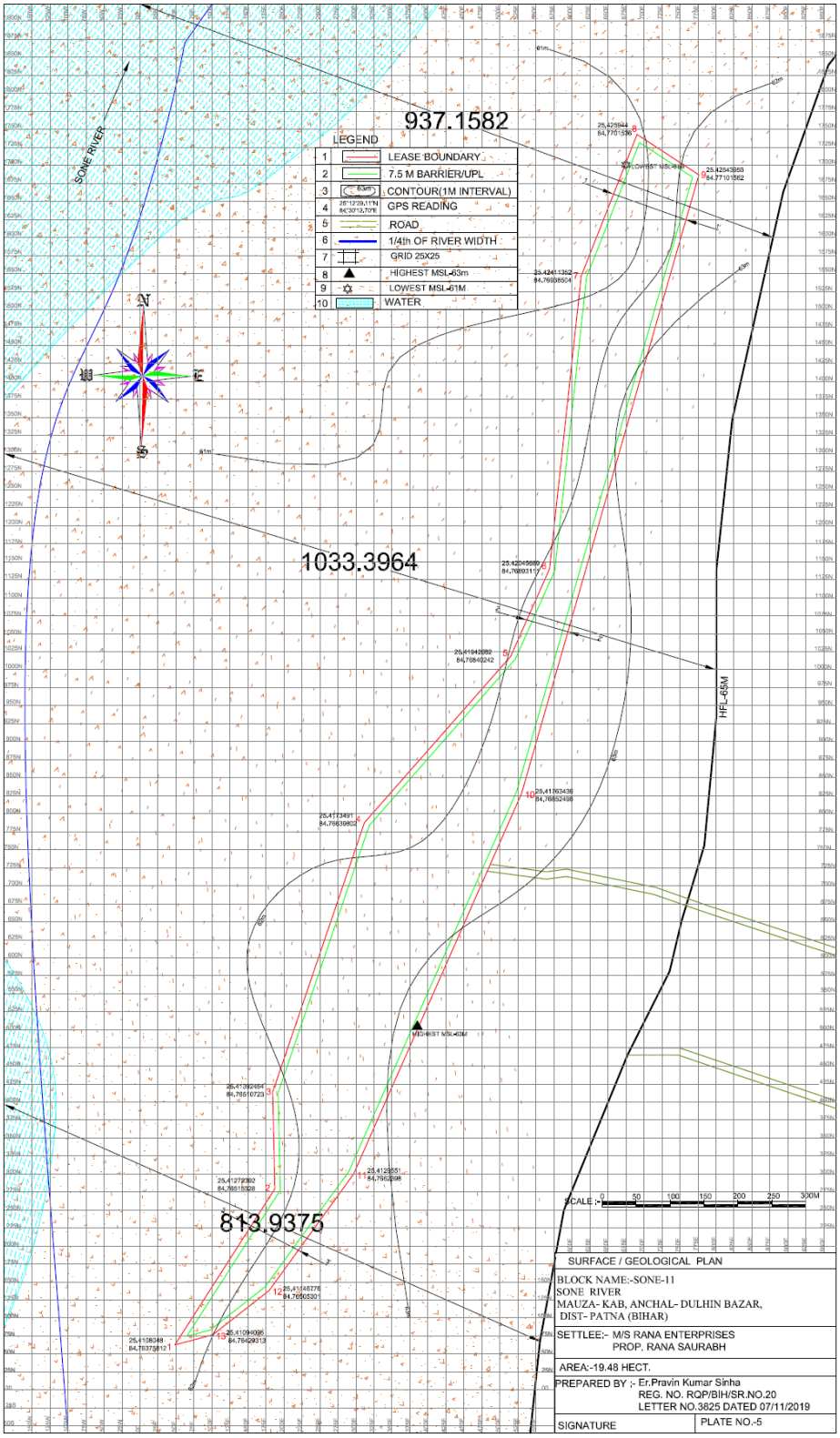


Figure 2.3(a):- Surface cum Geological Section of Patna Sone 11

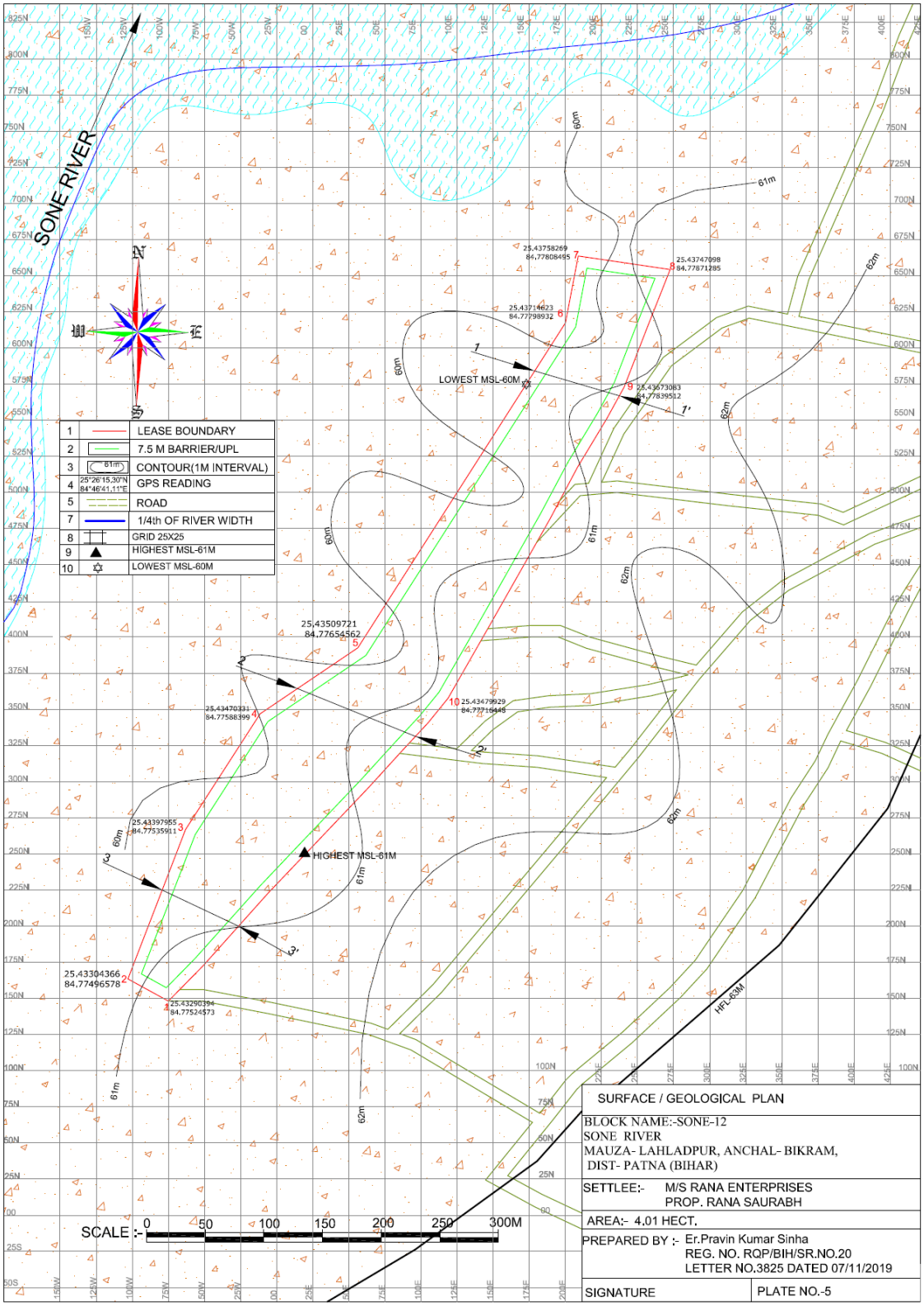


Figure 2.3(b):- Surface cum Geological Section of Patna Sone 12

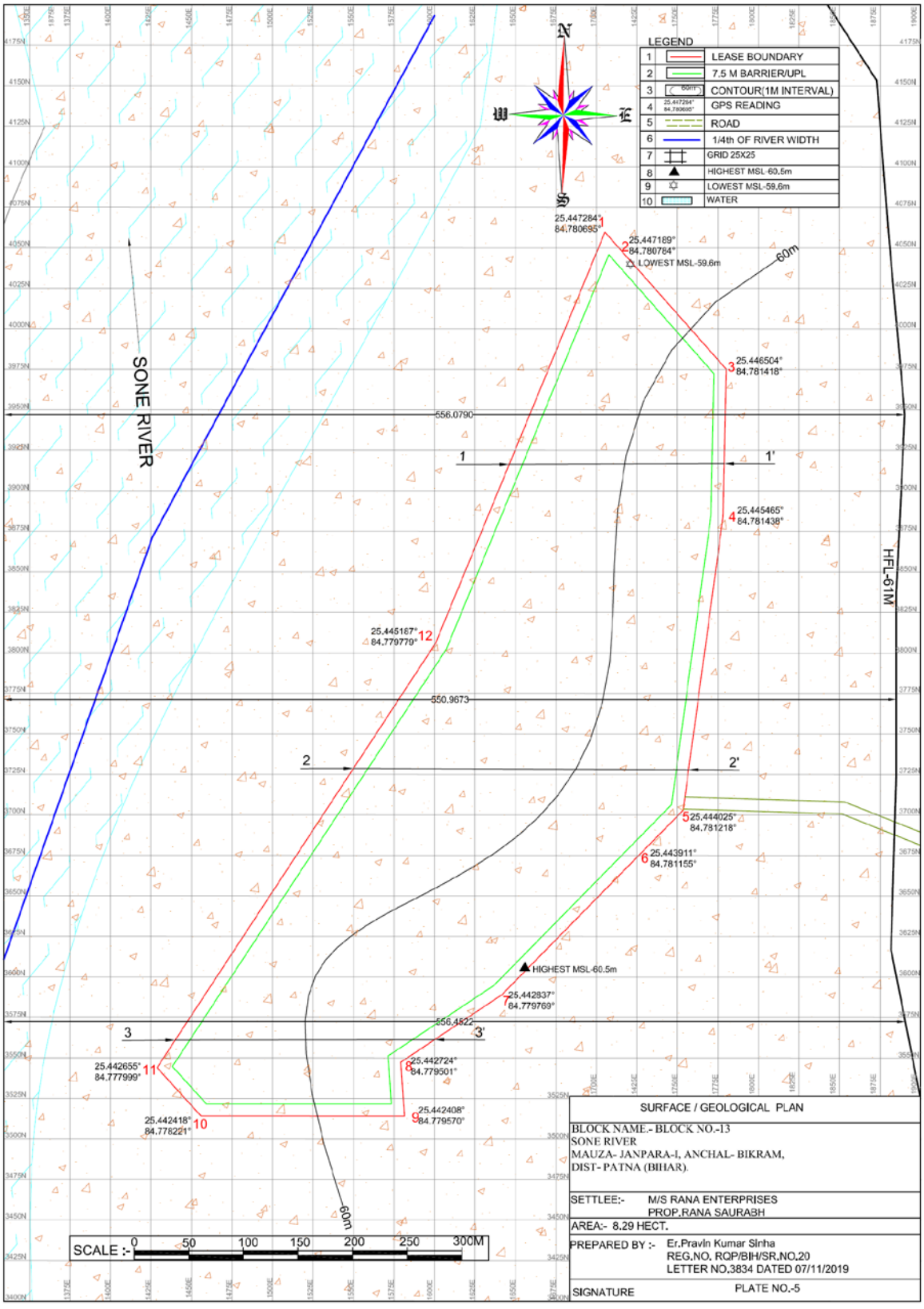


Figure 2.3(c):- Surface cum Geological Section of Patna Sone 13

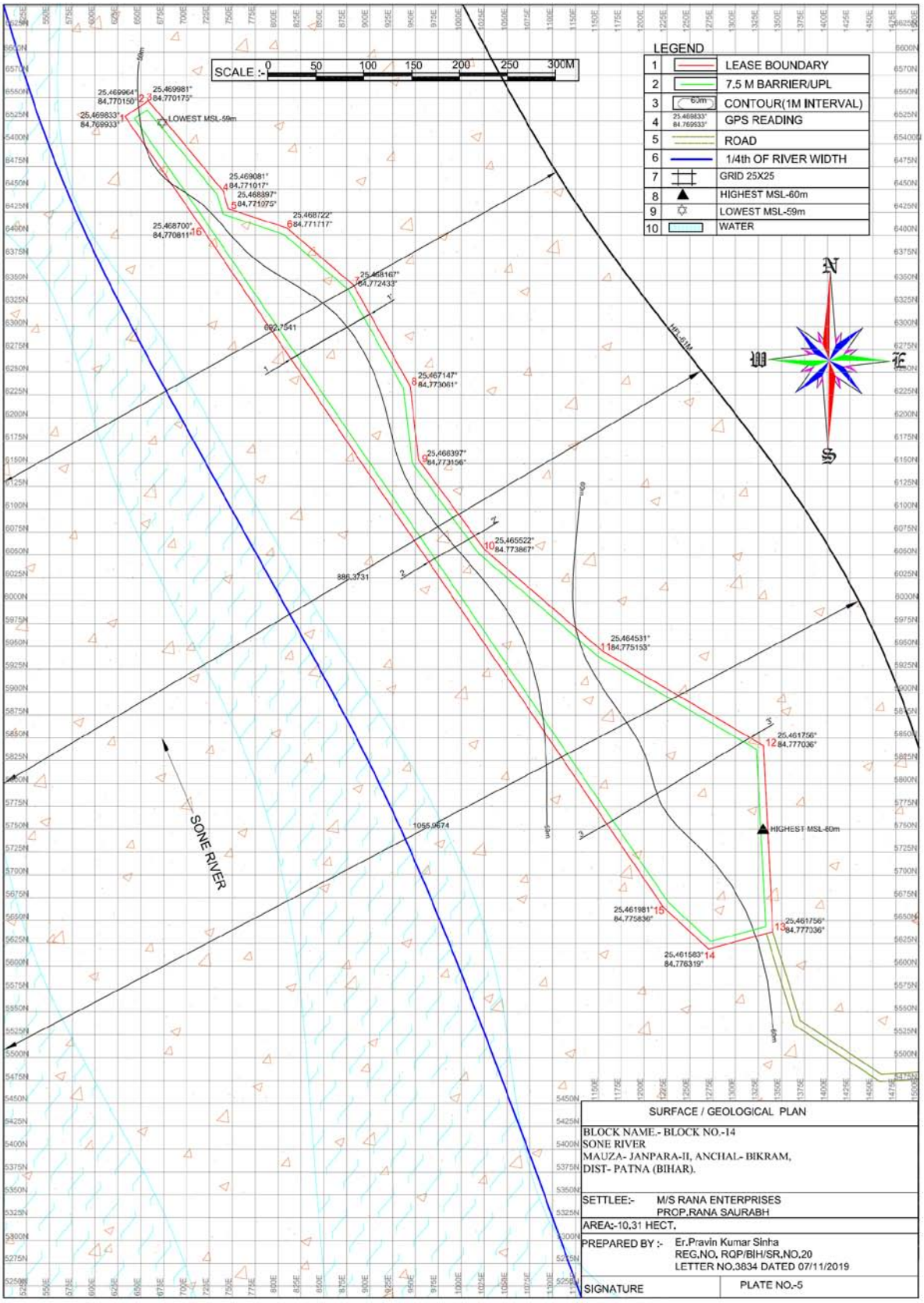


Figure 2.3(d):- Surface cum Geological Section of Patna Sone 14

2.4.2 Type Of Mining

- Mining will be done as per the guidelines of Bihar Mineral (Concession Prevention of illegal Mining Transportation & Storage) Rules, 2019.
- This is an open-cast mining project. The operation will be semi-mechanized/OTFM with use of excavators/JCBs truck /tractors combination or Manually etc. The sand will be collected in its existing form.
- Sand Mining will be carried out only upto a depth of 3 m bgl or above ground water level (whichever is less), for river bed block.
- No drilling /blasting are required as the material is loose in nature.
- Proper benching of 1.5 m height and 6m width will be maintained for mining blocks as per guideline M.M.R-2019, under rule 115(1).
- Mining will be done only during the day time and completely stopped during the monsoon season.

2.4.3 Year Wise Production Schedule:

The bench wise annual exploitation of sand from **Patna Sone Cluster 11** Sand Ghat are given below :-

Table 2.7: Year wise Production Details of Patna Sone Cluster 11

YEAR	ROM sand (cum)
1st Year	757620
2nd Year	757620
3rd Year	757620
4th Year	757620
5th Year	757620
Total	**3,788,100**

The annual extractable RBM comes to **757620 CUM or 1303107 Tonnes**. It will be replenished after rainy season every year.

Source: Mining Plan

2.5 Conceptual Mining Plan

Mine Applied Area will be worked for Patna Sone Cluster 11 Sand Ghat. However, as the digging depth will be restricted to 3.0 m only. This will be further replenished during rainy season. Sand Ghat will be worked systematically as the width is limited while length is much more. As the lease period is only 5 (Five) years, some of the area will be left un-worked at the end of lease period.

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

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

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

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

2.6.0 Anticipated life of mine

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

2.6.1 Waste –disposal arrangement

No waste as such will be generated at the site as all materials are saleable. If, at all silt clay will be generated along with the minerals will be used to dispose off in the low lying areas as spread, where plantation will be done after spreading top soil on it.

2.7 GENERAL FEATURES

2.7.1 Land-use pattern

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

2.7.2 Surface drainage pattern

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

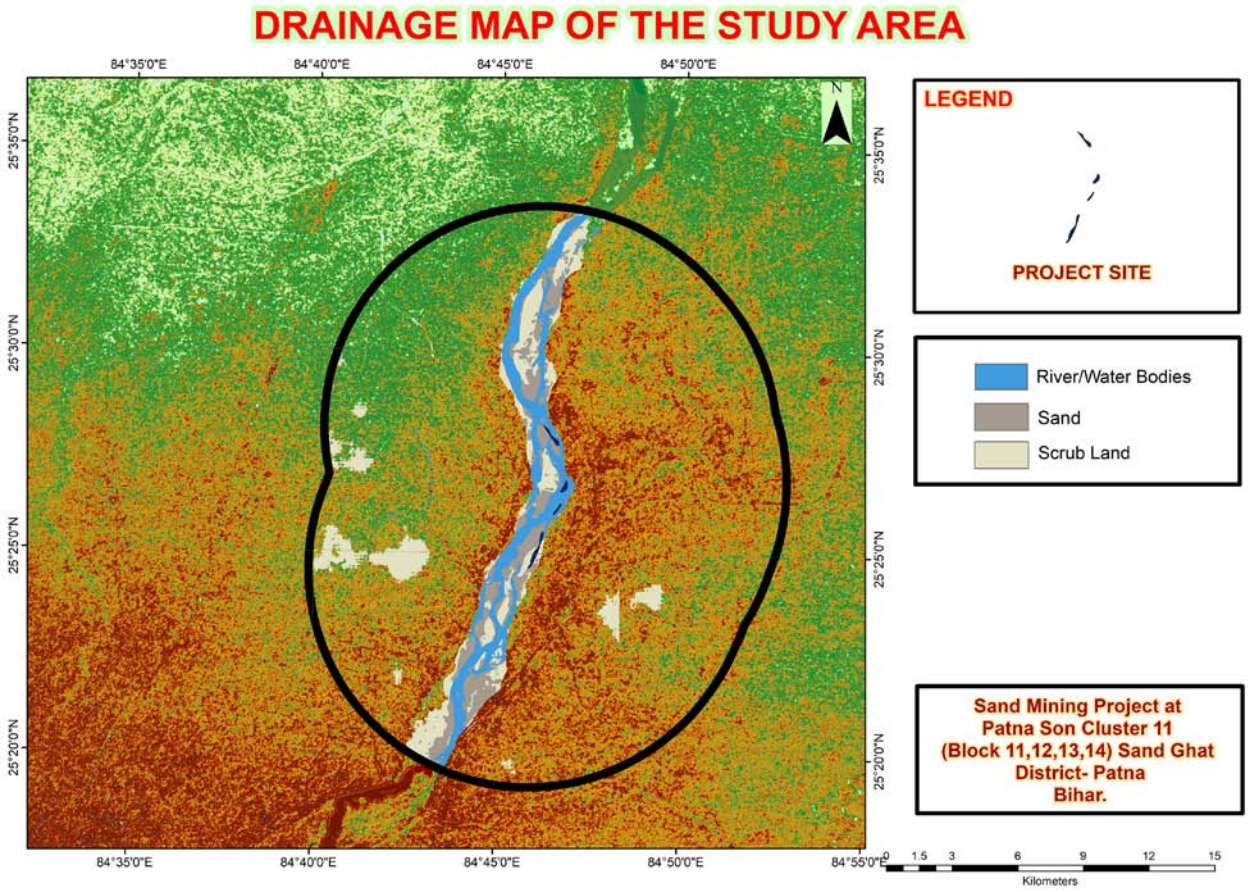


Fig-2.5, Drainage map

2.7.3 Man power requirement

The manpower requirement for the proposed project will be around 67 who will be utilized for excavation & loading of minerals into trucks or tractor-trolleys. Break-up of Man-power requirement is given in below **Table 2.8.**

Table 2.9 Manpower Requirement in Patna Sone Cluster 11

S. No.	Category	Numbers
1.	Administration	1
2.	Supervisor	4
3.	Skilled	16
4.	Un-skilled	46
TOTAL		**67**

2.7.4 Water supply

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

TABLE 2.10 Patna Sone Cluster 11 (Sone-11, 12, 13 & 14)

Activity	Calculation	Round off Figure in KLD
Drinking	@ 10 lpcd per labor 10*67/1000= 0.67 KLD	0.67
Dust Suppression	**Total approach road to be water sprinkled** = 4610 m for **Patna Sone Cluster 11 (Sone-11, 12, 13 & 14)** Patna – Sone 11 (1.23 km) Patna – Sone 12 (1.35 km) Patna – Sone 13 (1.50 km) Patna – Sone 14 (0.53 km) 4610 m*6m*0.5 *2 times 27660/1000= 27.66 KLD	27.66
Plantation	429 plant (during plan period) @ 5 L/per plant= 429*5lts= 2145/1000= 2.145 KLD	2.145
Total		**30.47 or 30.50 KLD**

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

2.7.5 Site services

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

- A temporary rest shelter will be provided for the workers near to the site for rest.
- Provisions will also be made for following in the rest shelter:

❖ First aid box will be made available at the site. In emergency worker.

❖ Sanitation facility i.e. septic tank or community toilet facility will be provided for the workers.

❖ Mask and gloves distribution to the workers.

2.7.6 Extent of mechanization

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

2.7.7 Statutory requirements

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

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

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

****

3.0 General

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

3.0.1 Study area & study period

The proposed project as a center, a radial distance of 10 km is considered as study area for baseline data collection and environmental monitoring. The baseline environment quality was carried out over a radial distance of 10 km around the mining lease area during the months of Dec 2022,Jan-Feb 2023.

3.0.2 Methodology

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

- ✓ By setting up meteorological station near project site
- ✓ Collection of site specific meteorological data at the mine site.
- ✓ Installation of respiratory dust samplers (for PM_{10}, $PM_{2.5}$) at different location in the study area for the collection of primary air pollutant and analyze the existing air conditions.
- ✓ Carrying out a detailed biological study for the Core and Buffer Zone

- ✓ Soil sample were collected from various location in the study area to analyze physical and chemical characteristics for assessment of impact on soil.
- ✓ Surface and Ground water samples were also collected from the various locations in the study area for analysing the existing water quality in the study area.
- ✓ Noise measurement has been done in core zone as well as buffer zone to analyze the existing situation in the study area.
- ✓ Literature review that includes identification of relevant data and articles from various publications, various government agencies and other sources for socio-economy, demography has been done with primary data collection in 10 km of the study area.
- ✓ Existing pollution load has been also identified in the buffer zone due to similar activities.
- ✓ Accordingly, field studies were carried out during the study period (Dec 2022, Jan-Feb 2023) to establish the existing baseline conditions.

3.1 Land Environment of the Study area

Land use

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

Land cover

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

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

Table 3.1: Land Use Cover of the Project Study Area

Landuse Type	Area (Ha)	Area (%)
Scrub Land	2543.29	5.56
Forest	435.50	0.95
River/Water Bodies	1935.32	4.23
Settlement	5357.15	11.70
Sand	1443.44	3.15
Agriculture	34058.10	74.41
AREA	**45772.80**	**100.00**

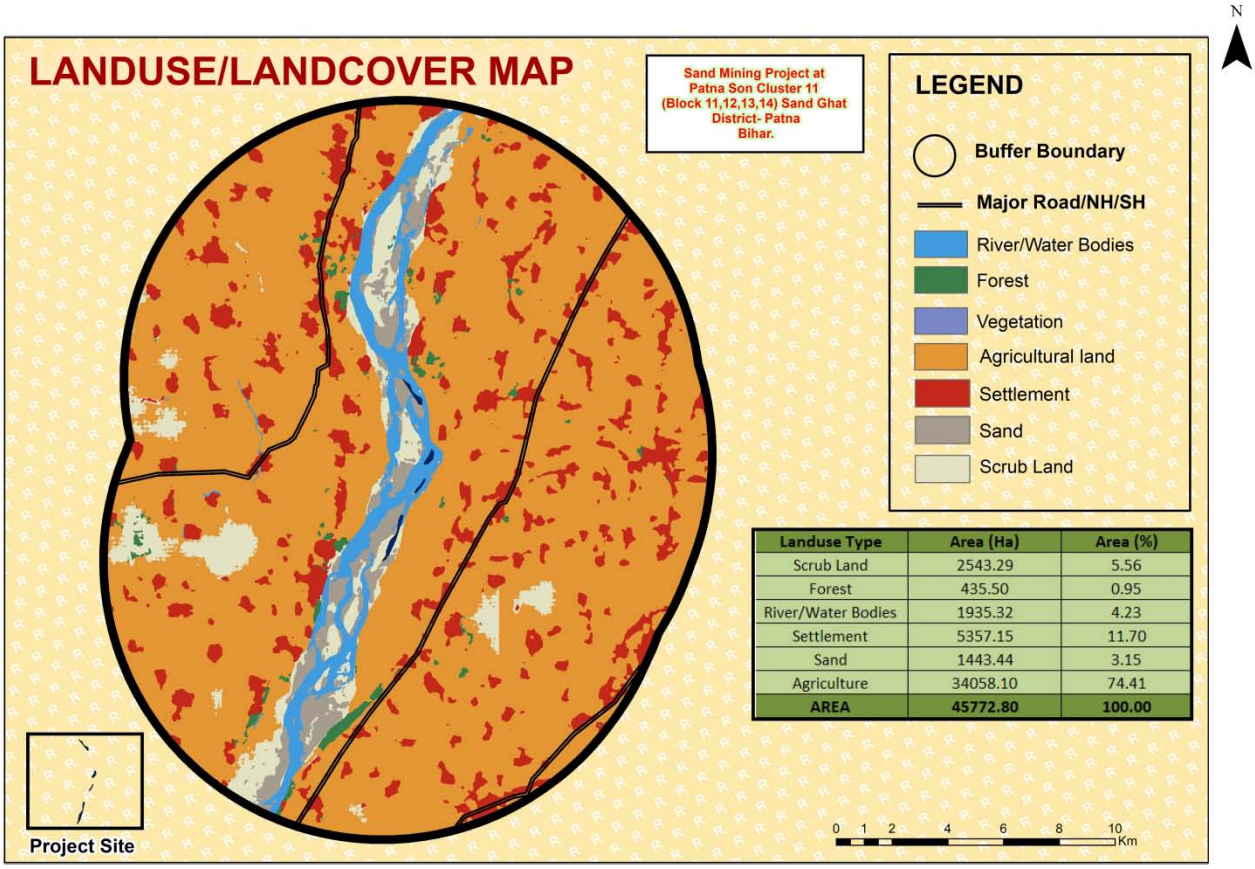


FIGURE 3.1: LAND USE COVER OF THE PROJECT STUDY AREA

3.2 Water Environment

Water quality assessment is one of the essential components of EIA study. Such assessment helps in evaluating the existing health of water body and suggesting appropriate mitigation measures to minimize the potential impact from development projects. Water quality of ground water has been studied in order to assess proposed water-uses in construction, drinking, cooling and horticulture purpose.

The water quality at the site and other locations within the 10 km impact zone was monitored during Dec 2022 to February 2023. The water sampling locations marked within the study are presented in **Table 3.2** and **Figure 3.2** and the result of the monitoring and analysis are presented in the **Table 3.3** showing Water Quality Monitoring Locations marked within the Study Area.

Table 3.2: WaterSampling Locations

Water (Ground) Monitoring Locations		
GW 1	Project site (Project site near village Lahladpur)	-
GW 2	Bikram village	8.83 Km East
GW 3	Mithapur	6.21 Km NE
GW 4	Jamuaon	7.56 Km W
GW 5	Kori	10.00 Km SW

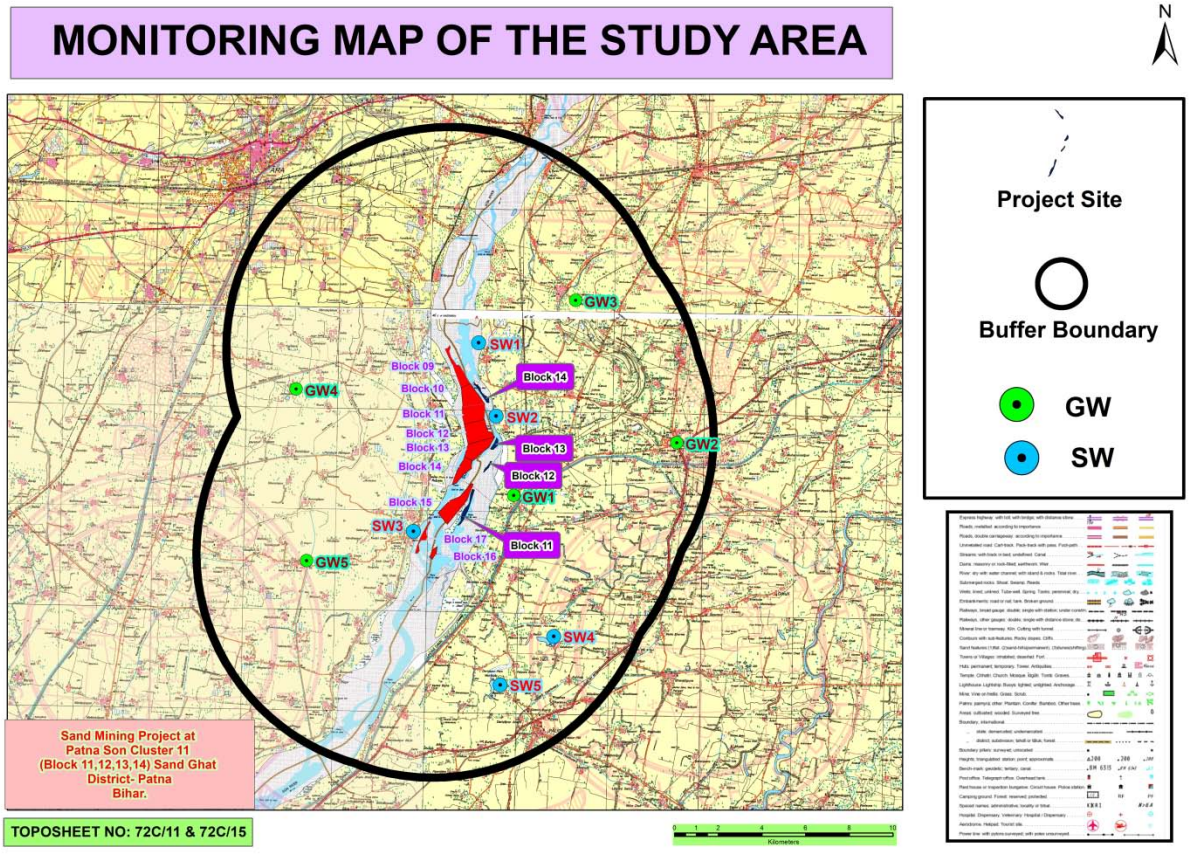


Figure 3.2 Water Sampling Location Map

Table 3.3 Ground Water Quality Monitoring Result

S. No.	Parameter	Unit	Limit (as per IS:10500)		GW1	GW2	GW3	GW4	GW5
			Desirable	Permissible					

1	Colour	Hazen	5	25	<2	<2	<2	<2	<2
2	Odour	-	Un	-	Un	Un	Un	Un	Un
3	Taste	-	Agreeable	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	10	<1	<1	<1	<1	<1
5	pH	-	6.5-8.5	No Relaxation	7.38	7.42	7.61	7.82	7.68
6	Total Hardness (as CaCO3)	mg/l	300	600	308	232	340	328	436
7	Iron (as Fe)	mg/l	0.3	1	0.11	0.09	0.07	0.06	0.07
8	Chlorides (as Cl)	mg/l	250	1000	106	92	114	76	112
9	Fluoride (as F)	mg/l	1	1.5	0.5	0.5	0.7	0.6	0.6
10	TDS	mg/l	500	2000	426	438	505	535	621
11	Calcium(as Ca2+)	mg/l	75	200	66	52	72	70	94
12	Magnesium (as Mg2+)	mg/l	30	100	34	24	38	36	48
13	Copper (as Cu)	mg/l	0.05	1.5	<0.01	<0.01	<0.01	<0.01	<0.01
14	Manganese(as Mn)	mg/l	0.1	0.3	0.02	0.03	0.04	0.02	0.02
15	Sulphate (as SO4)	mg/l	200	400	20	32	26	19	28
16	Nitrate(as NO3)	mg/l	45	No Relaxation	6	5	6	4	5
17	Phenolic Compounds (as C6H5OH)	mg/l	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
18	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	<0.001	<0.001	<0.001	<0.001
19	Cadmium (as Cd)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01
20	Selenium (as Se)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01
21	Arsenic (as As)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01
22	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01
23	Lead (as Pb)	mg/l	0.05	No Relaxation	0.01	0.02	0.02	0.02	0.01
24	Zinc (as Zn)	mg/l	5	15	0.06	0.04	0.05	0.05	0.09
25	Anionic Detergent (as MBAS)	mg/l	0.2	1	<0.01	<0.01	<0.01	<0.01	<0.01
26	Chromium (as Cr6+)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01
27	Mineral oil	mg/l	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
28	Alkalinity as CaCO3	mg/l	200	600	168	185	218	286	328
29	Aluminium (as Al)	mg/l	0.03	0.2	0.04	0.03	0.03	<0.02	<0.02
30	Boron (as B)	mg/l	1	5	0.2	0.2	0.4	<0.1	<0.1
	Microbiological Parameter								
31	Total Coliform	MPN /100ml	10 , Max	-	<2	<2	<2	<2	<2
32	*E. coli*	E.coli /100ml	Absent	-	Absent	Absent	Absent	Absent	Absent

Observation:

Analysis of results of ground water reveals the following: -

- pH varies from **7.38at to 7.82**.
- Total hardness varies from **232 mg/l to 436 mg/l** .
- Total dissolved solids vary from **426 mg/l to 621 mg/l**.

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

3.2 (b) SURFACE WATER

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

Table 3.4: Surface water sampling locations

Surface Water Monitoring Locations		
SW1	Downstream Near village Nisarpura	-
SW 2	Project site	-
SW 3	Upstream near village Sandesh	-
SW 4	Pond Near Kalyanpur	8.39 SE
SW 5	Murakhar Tal	7.54 SE

Table 3.5: Physio-chemical properties of surface water

S.No.	Parameter	Unit	S.W. 1	S.W. 2	S.W. 3	S.W. 4	S.W. 5
1	pH	-	8.21	8.29	8.25	8.16	8.21
2	Dissolved Oxygen	mg/l	6.4	6.7	6.5	6.8	7.0
3	BOD (3 Days at 27 °C)	mg/l	3	2	3	2	2
4	Free Ammonia (as N)	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1
5	Sodium Adsorption Ratio	-	0.42	0.45	0.49	0.46	0.59
6	Boron	mg/l	0.3	0.2	0.2	0.1	0.1
7	Conductivity	µmhos/cm	410	436	472	389	417
8	Turbidity	NTU	4	2	3	3	3
9	magneesium hardness (as CaCO3)	mg/l	91	102	96	83	99
10	Total Alkalinity (as CaCO3)	mg/l	159	174	184	140	162
11	Chloride (as Cl)	mg/l	25	28	30	26	23
12	sulphate (as SO4)	mg/l	13	11	12	11	14
13	Nitrate (as NO3)	mg/l	2.8	3.1	3.4	2.1	2.5

14	Fluoride (as F)	mg/l	0.6	0.4	0.5	0.7	0.6
15	Sodium (as Na)	mg/l	13	14	16	13	18
16	Potassium (as K)	mg/l	3.3	3.8	3.6	4.1	3.5
17	TKN (as N)	mg/l	3.5	2.4	2.8	2.3	2.7
18	Total Phosphorous (as P)	mg/l	0.14	0.11	0.12	0.13	0.11
19	COD	mg/l	14	10	12	12	10
20	Phenolic compounds (as C6H5OH)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
21	Iron (as Fe)	mg/l	0.34	0.22	0.28	0.28	0.33
22	Zinc (as Zn)	mg/l	0.04	0.03	0.04	0.06	0.04
23	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
24	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
25	Total Dissolved Solids (TDS)	mg/l	251	267	285	235	252
Microbiological Parameters							
1	Total Coliform	MPN/100ml	1200	1900	1100	1600	1400
2	Faecal Coliform	MPN/100ml	1700	2000	1700	1800	2000

3.2.1 Sampling frequency

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

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

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

Designated-Best-Use	Class of water	Criteria

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

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

3.2.2 Result & Conclusion:

Surface water Observation:

- The analysis results indicate that the pH ranges between **8.16 and 8.29.**
- Dissolved Oxygen (DO) was observed in the range of **6.4 to 7.0 mg/l** against the minimum requirement of 4 mg/l.
- BOD values were observed to be in the range of **2.0to 3.0mg/l.**
- Total Coliform examination of surface water samples revealed the presence of total coliform in range of 1100 MPN/100 ml to 1900 MPN/100 ml .

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

3.3 Air Environment

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

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

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

- Wind speed
- Wind Direction
- Air Temperature

Table-3.7, Summarized project site meteorological data for Winter Season

Month	Temperature °C		Wind Speed (Km/Hr)	
	Min	Max	Min	Max
DEC 2022	10	20	1	24
JANUARY 2023	05	19	1	26
FEBRUARY 2023	12	22	2	32

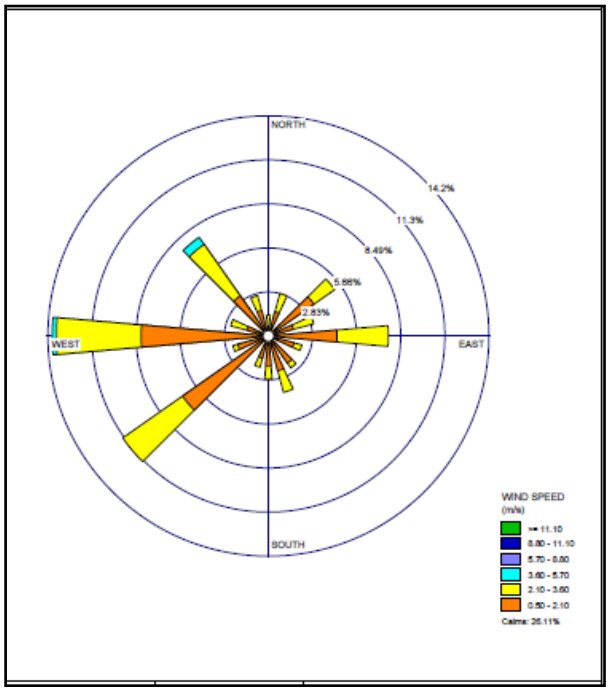


Figure 3.3: Wind Rose Diagram (at site)

3.3.1 Secondary Data Collected from IMD

Secondary data from IMD- Patna been collected for temperature, relative humidity, rainfall, wind speed and direction. The data at IMD is usually measured twice a day viz., at 0830 and 1730 hr.

The meteorological data is collected from the IMD- Patnais about 40 km from project site, which is the nearest operating IMD station to the project site. The data collected from IMD includes wind speed, wind direction, temperature, relative humidity and rainfall for the year 1981-2010. The monthly maximum, minimum and average values are collected for all the parameters except wind speed and direction. The collected data is tabulated in **Table-3.6**

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

3.3.2 Comparison of primary and secondary data

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

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

3.3.3 Ambient Air Quality

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

METHOD OF MONITORING

The Central Pollution Control Board (CPCB) has published comprehensive document on emission testing regulations ("Emission Regulations Part-3, 1985"). Those procedures relevant to the particulate monitoring are summarized in Table

Methods adopted for PM2.5, PM10, SO2 and NOX (as NO2)

Parameters	Technique	Technical Protocol	Minimum Detectable Limit
PM2.5	Gravimetric method	US EPA Method	5 (µg/m3)
PM10	Gravimetric method	IS 5182 (Part-XXIII)	5 (µg/m3)
Sulphur Dioxide	West and Gaeke	IS-5182 (Part-II)	3 (µg/m3)
Nitrogen Oxide	Jacob & Hochheiser	IS-5182 (Part-VI)	7 (µg/m3)

i. Particulate Matter (PM):-

The CPCB method and IS 5182 (Part-XXIII) adopt a very similar approach to particulate sampling. There are some differences in the expressions used, but they are generally of no practical significance. It is recommended that CPCB method is adapted.

ii. Equipment calibration:

For accurate testing of emission sources, the components of the sampling train is calibrated by outsource and supplier (Master Calibrator) standards and solutions are used, calibrated under certified reference material.

3.3.4 Selection criteria for monitoring location

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

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

Ambient Air Quality Monitoring (AAQM) stations were set up at 14 locations with due consideration to the above mentioned points. AAQM locations were selected in downwind, upwind as well as crosswind direction of the proposed mining lease area covering core and buffer zones. The details of the monitoring stations are given in **Figure 3.4** and shown in **Table-3.7**

Ambient air quality monitoring was carried out twice a week with a frequency of 24 hours for three months during the study period. The common air pollutant namely Particulate Matter-10 (PM_{10}) & $PM_{2.5}$, Sulphur-dioxide (SO_2) and Oxides of Nitrogen (NO_2) has been measured through a planned field monitoring.

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

Table 3.8: Ambient Air Quality Monitoring Stations

Air Monitoring Locations		
Location ID	**Location name**	**Distance (Km) and Direction**
AAQ 1	Narainpur Village	1.08 Km West
AAQ 2	Project site (Project site near village Lahladpur) for block 11 & 12	-
AAQ 3	Bikram village	8.83 Km East
AAQ 4	Andehri	6.60 Km East
AAQ 5	Mithapur	6.21 Km NE
AAQ 6	Fatehpur	7.00 Km SE
AAQ 7	Kori	10.00 Km SW
AAQ 8	Jamuaon	7.56 Km W
AAQ 9	Jahanpur	6.23 Km WNW

AAQ 10	Alipur	9.31 Km NW
AAQ 11	Berar	2.64 Km NNE
AAQ 12	Achhua	8.70 Km SE
AAQ 13	Bichhiaon	7.97 Km West
AAQ 14	Megharia	8.75 Km SW

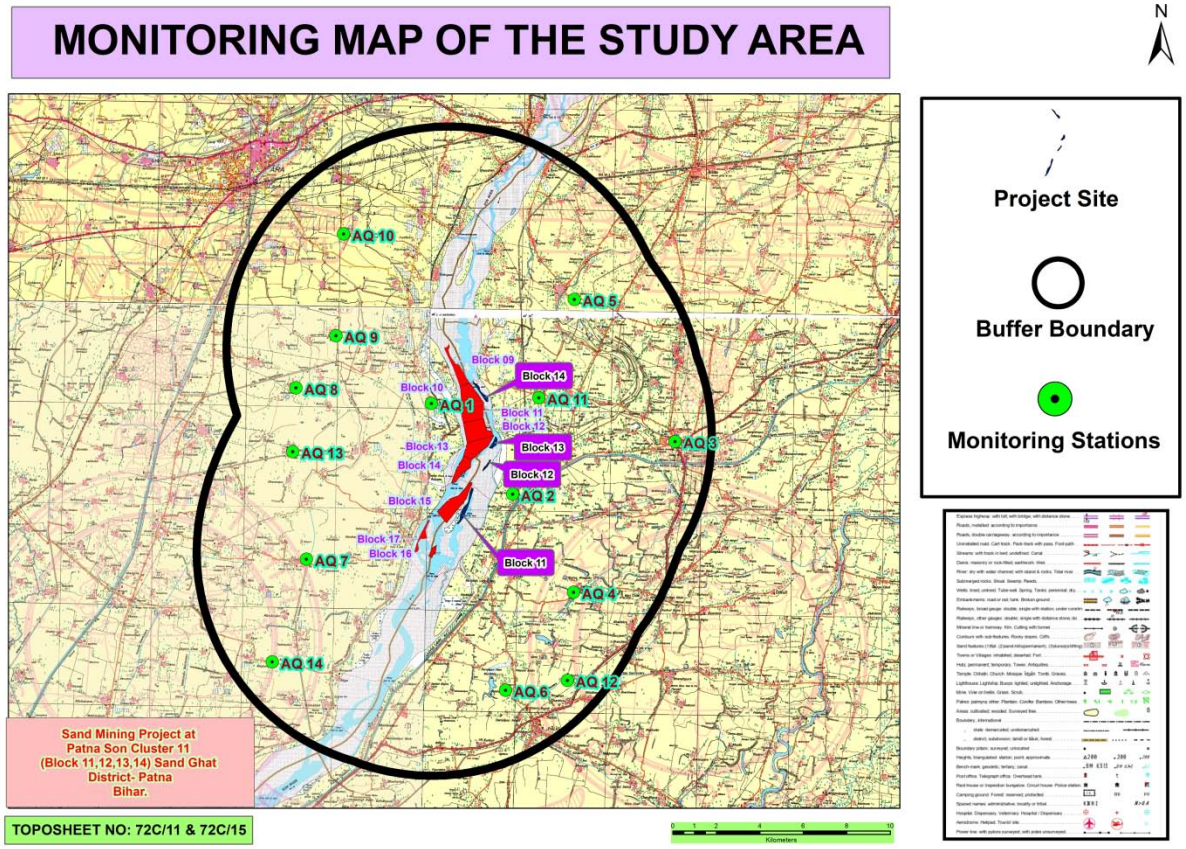


Figure 3.4 Ambient Air Quality Monitoring Stations

Table-3.9: Ambient Air Quality in the Study Area PM2.5

Location Code	PM2.5 (µg/m^3)				
	Name of the station	**Min**	**Max**	**Average**	**98th Percentile**
AAQ1	Narainpur Village	27.53	44.09	33.46	43.08
AAQ2	Project site (Project site near village Lahladpur) for block 11 & 12	28.03	42.56	33.63	42.47
AAQ3	Bikram village	28.03	43.23	33.65	42.31
AAQ4	Andehri	28.88	47.6	39.32	47.60
AAQ5	Mithapur	27.6	44.2	33.54	43.19
AAQ6	Fatehpur	29.5	44.8	35.40	44.71

AAQ7	Kori	29.5	45.5	35.42	44.53
AAQ8	Jamuaon	30.4	**50.1**	41.39	**50.10**
AAQ9	Jahanpur	30.5	46.9	35.52	45.93
AAQ10	Alipur	30.9	49.2	37.48	48.37
AAQ11	Berar	27.4	43.3	**32.86**	42.29
AAQ12	Achhua	29	48.3	37.38	47.75
AAQ13	Bichhiaon	**27.2**	43.7	33.09	42.69
AAQ14	Megharia	30.2	50	38.76	49.45

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

Location Code	PM10 (µg/m^3)				
	Name of the station	Min	Max	Average	98th Percentile
AAQ1	Narainpur Village	56.66	83.85	68.23	82.21
AAQ2	Project site (Project site near village Lahladpur) for block 11 & 12	53.76	84.86	66.31	83.63
AAQ3	Bikram village	**52.03**	76.22	**62.23**	75.60
AAQ4	Andehri	53.57	77.09	67.16	77.09
AAQ5	Mithapur	57.3	84.8	69.00	83.14
AAQ6	Fatehpur	56	88.4	69.08	87.11
AAQ7	Kori	54.2	79.4	64.82	78.76
AAQ8	Jamuaon	55.8	80.3	69.96	80.30
AAQ9	Jahanpur	56.6	74.9	62.83	74.53
AAQ10	Alipur	56.6	82.9	67.31	82.30
AAQ11	Berar	58.1	83	67.80	81.34
AAQ12	Achhua	56.8	89.4	69.99	88.02
AAQ13	Bichhiaon	55.7	83.8	67.35	82.14
AAQ14	Megharia	59.3	**92.5**	72.60	**91.21**

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

Location Code	SO2 (µg/m^3)				
	Name of the station	Min	Max	Average	98th Percentile
AAQ1	Narainpur Village	3.33	7.02	5.19	6.76
AAQ2	Project site (Project site near village Lahladpur) for block 11	**3.16**	6.88	**4.64**	**6.41**

	& 12				
AAQ3	Bikram village	3.53	7.35	4.77	6.88
AAQ4	Andehri	3.72	6.51	5.31	6.51
AAQ5	Mithapur	3.5	7.4	5.47	7.12
AAQ6	Fatehpur	3.4	7.4	4.99	6.89
AAQ7	Kori	3.8	7.9	5.12	7.39
AAQ8	Jamuaon	4	7	5.71	7.00
AAQ9	Jahanpur	4.3	**8.6**	**5.81**	8.09
AAQ10	Alipur	4	8.5	5.42	**8.18**
AAQ11	Berar	3.4	6.7	4.96	6.42
AAQ12	Achhua	3.4	7.6	5.52	7.32
AAQ13	Bichhiaon	3.9	7.1	5.34	7.01
AAQ14	Megharia	3.8	7.6	5.78	7.51

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

Location Code	NO2 (µg/m^3)				
	Name of the station	Min	Max	Average	98th Percentile
AAQ1	Narainpur Village	7.99	17.57	12.00	16.75
AAQ2	Project site (Project site near village Lahladpur) for block 11 & 12	**4.79**	13.07	**8.51**	**12.29**
AAQ3	Bikram village	6.49	12.97	8.82	12.50
AAQ4	Andehri	6.58	12.31	9.87	12.31
AAQ5	Mithapur	8.1	17.8	12.16	16.97
AAQ6	Fatehpur	5.1	13.9	9.05	13.07
AAQ7	Kori	6.9	13.8	9.38	13.29
AAQ8	Jamuaon	7	13.1	10.50	13.10
AAQ9	Jahanpur	7.6	15.1	10.52	14.59
AAQ10	Alipur	8.1	16.3	10.39	15.52
AAQ11	Berar	7.2	16.1	11.13	15.27
AAQ12	Achhua	7.8	**18.2**	11.96	**17.42**
AAQ13	Bichhiaon	8.5	15.5	11.56	15.41
AAQ14	Megharia	8	17.9	**12.47**	17.30

3.3.4.1 Baseline Scenario

Particulate Matter (PM2.5)

Fine particles include all types of combustion, including motor vehicles, power plants, residential wood burning, forest fires, agricultural burning, and some industrial processes. In

general some of the important sources of particulate matter are mines. The following sources of particulate matter in the study area are identified:

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

PM2.5 recorded within the study area was in the range of **27.2 µg/m^{3}to 50.1 µg/m^3.** Table 3.3 were compared with the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations recorded in the study area are within the applicable limits i.e., 60µg/m^3 for $PM_{2.5}$ for industrial, residential, rural and other areas.

Suspended Particulate Matter (PM10)

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

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

The minimum and maximum level of PM10 recorded within the study area was in the range of 52.03 µg/m^{3}to 92.5µg/m^3. The 24 hourly average values of PM10 were compared with the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations recorded in the study area are within the applicable limits i.e., 100 µg/m^3 for PM10 in industrial, residential, rural and other areas.

Sulphur Dioxide (SO2)

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

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

Sulphur dioxide in atmosphere is significant because of its toxicity; Sulphur dioxide is capable of causing illness and lung injury. Further it can combine with water in the air to form toxic acid aerosols that can corrode metal surfaces, fabrics and the leaves of plants. Sulphur dioxide is an irritant to the eyes and respiratory system. Excessive exposure to Sulphur dioxide causes breathing related diseases as it affects the lungs.

The minimum and maximum concentration of SO_2 recorded within the study area was **3.16 µg/m^{3}to 8.6 µg/m^3.**

The 24 hourly average values of SO_2 were compared with the National Ambient Air Quality Standards (NAAQS) and it was found that all sampling stations recorded values are below the applicable limits 80 µg/m^3 for Residential, Rural and other areas.

Oxides of Nitrogen (NO2)

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

- Emissions from vehicular movements in the study area.

Oxides of Nitrogen in the presence of sunlight will undergo reactions with a number of organic compounds to produce all the effects associated with photochemical smog. NO2 has inherent ability to produce deleterious effects by themselves like toxicity. It causes asphyxiation when its concentration is great enough to reduce the normal oxygen supply from the air. The minimum and maximum level of NO2 recorded within the study area was in the range of was **4.79 µg/m^{3}to 18.2 µg/m^3.**

The 24 hourly average values of NO_2 were compared with the National Ambient Air Quality Standards (NAAQS) and it was found that all sampling stations recorded values are below the applicable limits 80 µg/m^3 for Residential, Rural and other areas.

Ambient Air Quality in the Study Area, Free Silica

Location Code	Free silica (µg/m^3)		
	Name of the station	Min	Max
AAQ1	Narainpur Village	1.35	1.66
AAQ2	Project site (Project site near village Lahladpur) for block 11 & 12	1.45	1.75
AAQ3	Bikram village	1.45	1.69
AAQ4	Andehri	1.51	1.75
AAQ5	Mithapur	1.59	1.92
AAQ6	Fatehpur	1.33	1.42

AAQ7	Kori	1.61	1.89
AAQ8	Jamuaon	1.35	1.63
AAQ9	Jahanpur	1.39	1.65
AAQ10	Alipur	1.22	1.56
AAQ11	Berar	1.35	1.63
AAQ12	Achhua	1.38	1.66
AAQ13	Bichhiaon	1.21	1.52
AAQ14	Megharia	1.26	1.48

3.4 SOIL ENVIRONMENT

Soil may be defined as a thin layer of earth's crust, a medium for the growth of plants. The soil characteristics include both physical and chemical properties. The soil survey and soil sample were carried out / collected to assess the soil characteristics of the study area. Soil samples were collected from10 locations and analyzed as per CPCB norms. The soil sampling locations are marked in **Figure 3.5**and shown in **Table 3.12.** Thephysico-chemical characteristic of these soil samples is given in **Table 3.13.**

Table 3.13: Description of soil sampling locations

Soil monitoring locations		
SQ 1	Project site (Project site near village Lahladpur) for block 11 & 12	-
SQ 2	Bikram village	8.83 Km East
SQ 3	Andehri	6.60 Km East
SQ 4	Mithapur	6.21 Km NE
SQ 5	Fatehpur	7.00 Km SE
SQ 6	Kori	10.00 Km SW
SQ 7	Jamuaon	7.56 Km W
SQ 8	Jahanpur	6.23 Km WNW
SQ 9	Achhua	8.70 Km SE
SQ 10	Bichhiaon	7.97 Km West

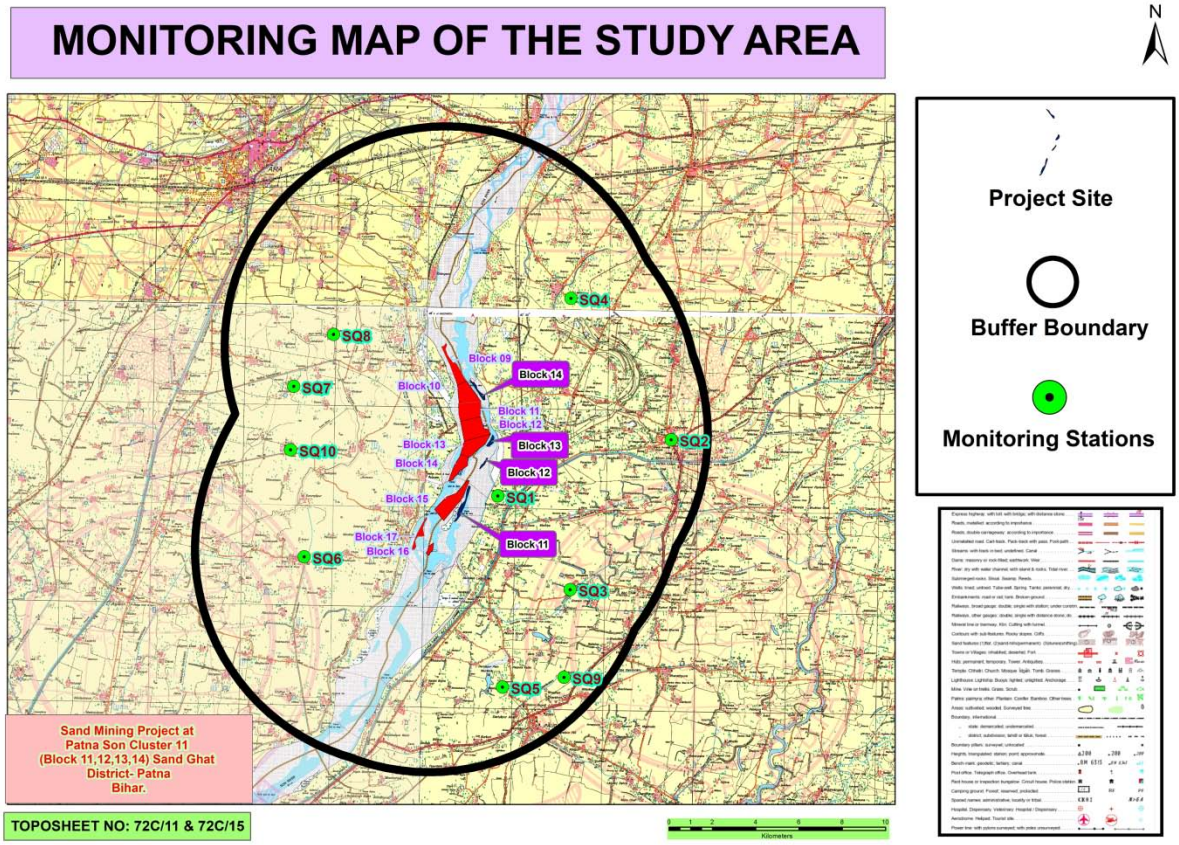


Figure 3.5, Soil Sampling Locations

Table 3.14 (a) :Physico-chemical properties of soil (SQ1-SQ5)

S.No	Parameter	Unit	SQ-1	SQ-2	SQ-3	SQ-4	SQ-5
1	Silt	%	8.8	18.4	21.3	12.8	19.0
2	Clay	%	7.7	32.5	33.5	18.1	35.7
3	Sand	%	83.5	49.1	45.2	69.1	45.3
4	pH	-	7.28	7.45	8.12	6.71	7.45
5	Electrical Conductivity	µmhos/cm	154	250	378	158	364
6	Cation exchange capacity	meq/100 gm	10.5	17.9	14.4	11.55	18.1
7	Exchangeable Potassium	mg/kg	102	116.2	134.2	124	142
8	Exchangeable Sodium	mg/kg	97.5	134	192	138	187
9	Exchangeable Calcium	mg/kg	1542	2010	2165	1542	2279
10	Exchangeable Magnesium	mg/kg	264	304	387	234	327

11	Sodium Absorption Ratio	-	0.26	0.36	0.43	0.24	0.41
12	Nitrogen	% by mass	0.0281	0.0322	0.0134	0.0281	0.0221
13	Phosphorus(P2O5)	mg/kg	5.35	7.21	5.95	7.48	6.75
14	Zinc (Zn)	mg/kg	12.45	15.21	12.54	12.4	14.50
15	Water Holding Capacity	%	24.2	41.3	38.4	25.4	39.4
16	Porosity	%	47.3	29.4	32.5	26.1	32.4

Table 3.14 (B) :Physico-chemical properties of soil (SQ6-SQ10)

S.No	Parameter	Unit	SQ-6	SQ-7	SQ-8	SQ-9	SQ-10
1	Silt	%	24.2	21.0	26.5	28.9	13.1
2	Clay	%	20.3	36.7	33.2	31.2	20.1
3	Sand	%	55.5	43	40.3	39.9	66.8
4	pH	-	7.35	7.35	8.25	8.55	5.65
5	Electrical Conductivity	µmhos/cm	155	368	304	344	175
6	Cation exchange capacity	meq/100 gm	11.5	17.1	19.9	15.4	10.56
7	Exchangeable Potassium	mg/kg	104	141	126.2	120.2	144
8	Exchangeable Sodium	mg/kg	98.6	181	124	182	185
9	Exchangeable Calcium	mg/kg	1625	2280	1910	2162	1642
10	Exchangeable Magnesium	mg/kg	255	335	285	388	254
11	Sodium Absorption Ratio	-	0.22	0.43	0.31	0.45	0.26
12	Nitrogen	% by mass	0.0271	0.0231	0.0414	0.0124	0.0271
13	Phosphorus(P2O5)	mg/kg	5.45	6.71	6.21	6.15	6.48
14	Zinc (Zn)	mg/kg	11.95	14.51	17.21	13.54	12.9
15	Water Holding Capacity	%	23.2	39.3	45.6	39.4	24.4

16	Porosity	%	46.3	32.1	30.4	30.5	30.1

Observations:

Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from**5.65 to 8.55**, which shows that the soil is alkaline in nature.

3.5NOISE ENVIRONNENT

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

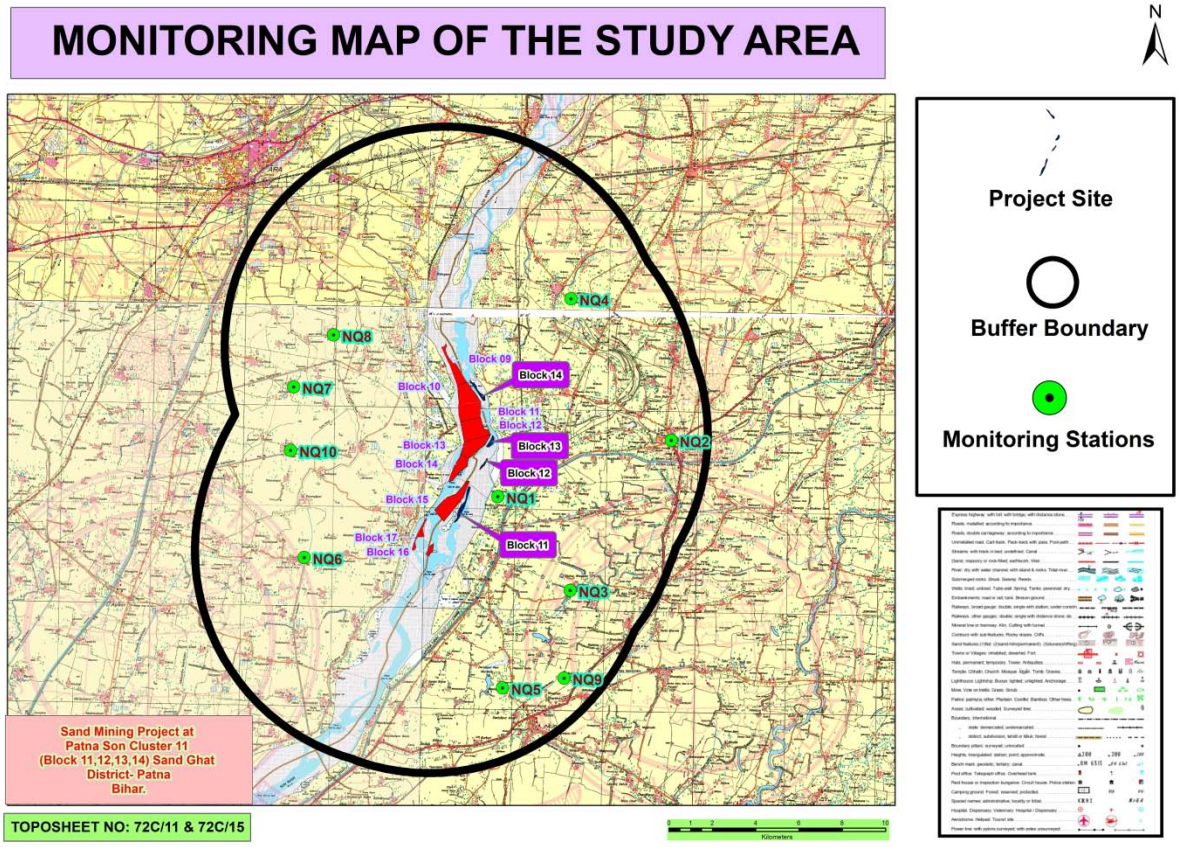


Figure 3.6 Noise Monitoring Stations

Table 3.15: NoiseQuality Monitoring Stations

Noise Monitoring Locations		
NQ 1	Project site (Project site near village Lahladpur) for block 11 & 12	-
NQ 2	Bikram village	8.83 Km East

NQ 3	Andehri	6.60 Km East
NQ 4	Mithapur	6.21 Km NE
NQ 5	Fatehpur	7.00 Km SE
NQ 6	Kori	10.00 Km SW
NQ 7	Jamuaon	7.56 Km W
NQ 8	Jahanpur	6.23 Km WNW
NQ 9	Achhua	8.70 Km SE
NQ 10	Bichhiaon	7.97 Km West

Table 3.16: NoiseMonitoring Results

S. No.	Locations		Equivalent Noise Level, dB (A)			
			Limit (as per CPCB Guidelines),Leq, dB(A)		Observed value Leq, dB(A)	
			DAY*	NIGHT*	DAY*	NIGHT*
1	Project site (Project site near village Lahladpur) for block 11 & 12	Residential Zone	55	45	42.7	34.3
2	Bikram village	Residential Zone	55	45	43.16	**39.45**
3	Andehri	Residential Zone	55	45	42.88	36.67
4	Mithapur	Residential Zone	55	45	44.11	35.56
5	Fatehpur	Residential Zone	55	45	41.67	34.57
6	Kori	Residential Zone	55	45	42.81	33.4
7	Jamuaon	Residential Zone	55	45	41.54	31.2
8	Jahanpur	Residential Zone	55	45	**52.1**	36.4
9	Achhua	Residential Zone	55	45	43.5	31.5
10	Bichhiaon	Residential Zone	55	45	**41.5**	**30.5**

Results

Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as **41.5dB(A) to 52.1dB(A**) respectively. The minimum&maximum noise levels at night time were found to be**30.5dB (A) &39.45dB**(A) respectively.

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

3.6 BIOLOGICAL ENVIRONMENT

3.6.1.1 Introduction

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

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

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

The main objective of the ecological survey is aimed to find out the baseline status of flora and fauna (terrestrial and aquatic ecosystem) of the study area before the start of Sand Mining Project, On Son River At Son Patna Cluster Son-11(Sone-11, 12, 13 & 14) Sand Ghat.

3.6.2 Description of the study area

The Proposed Sand Mining Project is located on Son River at Patna Cluster Son-11(Sone-11, 12, 13 & 14) Sand Ghat at Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara II, Tehsil-Bikram & Dulhin Bazar, District Patna, (Bihar).

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

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

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

3.6.3 Drainage /Water Bodies of the Study Area

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

Scope and Objectives of the Study

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

- Survey of terrestrial & aquatic flora & fauna for core & buffer zone separately.
- Details of endemic species found in the study area and their IUCN status, Schedule status (as per WPA, 1972).
- Survey of the study area in terms of features like breeding &spawning grounds, habitats, flight paths, and the migratory path of the animals.
- Survey of flora covering types e.g. agriculture crop, commercial crop, plantation, natural vegetation/forest type, grass land. The endangered & endemic species of flora & fauna beside any other flora, if present are also to be identified.
- The survey has been coveringa total listing of the faunal population. The survey has also covered endangered, endemic, migratory & detail of aquatic fauna.
- The assessment of potential damage to terrestrial & aquatic flora and fauna. The impact should be categorized as primary & secondary, temporary and long term, unavoidable & risk transboundary impacts, possible irreversible change.

3.6.4 Methodology/ Data Collection

A primary field survey was carried out within a 10 km radius of the proposed project in winter period (Dec2022-Feb 2023). Both terrestrial and aquatic ecosystems have been studied to understand the biological environment. Secondary data were collected from authentic

sources like the Forests Department, Fisheries Department, Agriculture Department of Son , and available published literature.

3.6.5 Flora (Aquatic and Terrestrial)

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

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

3.6.6 Fauna (Aquatic and Terrestrial)

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

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

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

3.6.7 Sampling Sites

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

3.6.8Flora of the Study Area

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

A major part of the core and buffer zone of the project is agricultural land having some major vegetation in the form of agro forestry. Vegetation patterns in villages and surrounding areas are slightly different from the rest of the areas in the Patna District. The common species grown near the villages are mostly edible, fruits bearing or useful plants. Purposely planted tree patches (mostly fruit-bearing) are available nearby several villages in the study area. The most dominant tree species in the study area are *Aegle marmelos* (Bel), *Azadirachta indica* (Neem), *Emblica officinalis* (Amla), *Dalbergia sissoo* (Sisam), *Ficus bengalensis* (Bargad), *Musa paradisiacal* (Kela), *Syzygiumcumini* (Jamun), *Cassia siamea* (Kasod/Siris), *Litchi chinensis* (Litchi), *Mangifera indica* (Aam) and in case of shrubs *Antigonum leptopus*, *Ricinus communis*, *Lantana camara*, *Jatropha gossipifolia* and *Cassia auriculata* etc. The most dominant species in the study area of both the district was *Mangifera indica* (Aam) and its different varieties.

3.6.9 Flora of Core zone

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

There is no flora found in the core zone

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

Details of the agricultural vegetation and commercial crops were collected from the 09 selected sites of the core (Patna district)and the details are given in table 4. These crops are similar to the crops of buffer zone also. So, the same information is applicable for the core and buffer zone.

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

S.No.	**Botanical Name**	**Local/Trade Name**	**Family Name**
1	*Zey mays*	Makkha/Maize	Poaceae

2	*Triticum aestivum*	Wheat	
3	*Oryza sativa*	Paddy	
4	*Cicer arietinum*	Channa	Fabacea
5	*Coriander sativum*	Dhaniya	Apiaceae
6	*Abelmoschus esculentus*	Bhendi	Amaranthacea
7	*Mamordica charanta*	Karela	Cucurbiataceae
8	*Capsicum annum*	Mirchi	Solanaceae
9	*Lycopersicon lycopersicum*	Tomato	
10	*Solanum melongena*	Brinjal	
11	*Capsicum annuum*	Mirchi	
12	*Solanum tuberosum*	Potato	
13	*Allium cepa*	Onian	Amaryllidaceae
14	*Cajanus cajan*	Pigeon pea	Fabaceae
15	*Carica papaya*	Papaya	Caricaceae
16	*Okra*	Ladyfinger/ Bhindi	Malvaceae
17	*Lagenaria siceraria*	Bottle gourd/ Lauki	Cucurbitaceae
	Source: Present Survey Data Supported by District Agriculture Department, Patna		

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

Aquatic floral details of the core zone were collected from 08 selected sites of the study area.Some sites were located buffer zone adjacent to the present alignment, however some were located in the core & buffer zone. Details of phytoplankton and macrophytic vegetation of the core and the buffer zone are given in tables3.19, 3.20 & 3.21, and Figures3.10 & 3.11.

Phytoplankton: Most of thethe phytoplankton species recorded from the core zone was similar to the buffer zone also. So, the same information is applicable for the core and buffer zone. Phytoplankton species were collected and identified from 08 selected sampling sites of the study area. A total of 69 phytoplankton species were recorded from the different water bodies of the study area, out of which 27 species were of class Chlorophyceae, 17 species of Cyanophyceae, 19 species of Bacillariophyceae, and 6 species of Euglenophyceae. Details of Phytoplankton species are given in table 3.19.

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

S.N.	Taxonomic Details	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Schedule Status in WPA (1972)	IUCN Status
	Chlorophyceae									NA	NA
1	*Arthrodesmus* sp.	+		+	+		+		+	NA	NA
2	*Ankistrodesmus falcatus*		+	+			+	+	+	NA	NA
3	*Chlorococcum* sp.	+	+	+			+		+	NA	NA
4	*Closteriopsis* sp.	+	+		+	+		+		NA	NA
5	*Cosmarium formii*	+	+	+	+	+	+		+	NA	NA
6	*Cosmarium margaritatum*	+		+	+		+	+		NA	NA
7	*Crucigenia* sp.	+	+	+	+		+			NA	NA
8	*Chlorella vulgaris*	+		+	+	+			+	NA	NA
9	*Oocystis crassa*	+	+			+	+	+	+	NA	NA
10	*Pediastrum simplex*			+	+	+				NA	NA
11	*Scenedesmus armatus*	+	+	+		+	+	+	+	NA	NA
12	*Scenedesmus bijugatus*	+		+	+	+	+		+	NA	NA
13	*Spirogyra* sp.	+	+	+		+	+	+		NA	NA
14	*Tetraedron trigonum*				+		+		+	NA	NA
15	*Tetrastrum* sp.	+	+	+		+	+		+	NA	NA
16	*Ulothrix* sp.	+	+	+	+	+	+	+		NA	NA
17	*Ulothrix zonata*	+		+		+	+		+	NA	NA
18	*Volvox* sp.	+	+	+		+	+			NA	NA
	Total	19	**15**	**23**	**16**	**17**	**24**	**12**	**17**		
	Cyanophyceae									NA	NA
1	*Anabaena* sp.		+	+	+	+	+		+	NA	NA
2	*Anabaena circinalis*	+	+	+	+	+	+	+		NA	NA
3	*Aphanocapsa* sp.	+		+	+	+	+	+	+	NA	NA
4	*Aphanothece* sp.	+	+		+	+			+	NA	NA
5	*Chroococcus* sp.	+		+	+	+	+	+		NA	NA
6	*Gloeocapsa* sp.	+	+	+			+		+	NA	NA

7	*Lyngbya* sp.	+	+		+	+	+	+	+	NA	NA
8	*Merismopedia* sp.	+	+	+		+	+	+	+	NA	NA
9	*Merismopedia tenuissima*	+		+	+	+	+			NA	NA
10	*Microcystis* sp.		+		+			+	+	NA	NA
11	*Microcystis aeruginosa*	+		+			+			NA	NA
12	*Nostoc* sp.		+		+	+	+	+	+	NA	NA
	Total	**12**	**11**	**11**	**12**	**13**	**15**	**9**	**12**		
	Bacillariophyceae									NA	NA
1	*Amphora ovalis*	+				+	+		+	NA	NA
2	*Amphora* sp.	+	+	+	+	+		+		NA	NA
3	*Cyclotella* sp.			+		+	+	+	+	NA	NA
4	*Cymbella affinis*	+		+	+		+		+	NA	NA
5	*Eunotia major*	+	+		+	+		+		NA	NA
6	*Fragillaria pinnata*		+	+		+	+		+	NA	NA
7	*Gomphonema* sp.	+			+		+	+	+	NA	NA
8	*Gomphonema lanceolatum*	+	+	+	+	+			+	NA	NA
9	*Melosira* sp.	+	+	+	+	+	+			NA	NA
10	*Navicula similis*	+	+	+	+		+	+	+	NA	NA
11	*Navicula subrhyncocephala*	+	+		+		+		+	NA	NA
12	*Nitzschia palea*	+	+		+	+	+			NA	NA
13	*Pinnularia sp.*	+	+	+				+	+	NA	NA
14	*Synedra acus*	+				+	+		+	NA	NA
15	*Synedra ulna*		+		+	+	+	+	+	NA	NA
	Total	**16**	**12**	**9**	**13**	**11**	**15**	**10**	**13**		
	Euglenophyceae									NA	NA
1	*Euglena acus*	+	+	+	+	+	+	+	+	NA	NA
2	*Euglena* sp.	+			+	+	+		+	NA	NA
3	*Euglepha* sp.	+	+	+	+	+	+	+	+	NA	NA
4	*Phacus* sp.		+				+			NA	NA
5	*Phacus caudatus*	+			+	+	+	+	+	NA	NA
6	*Trachelomonas* sp.	+	+	+	+	+	+	+		NA	NA
	Total	**5**	**4**	**3**	**5**	**5**	**6**	**4**	**4**		
	Source: Primary Survey Data of P&M Solution Pvt. Ltd., Noida										

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

Class	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
Chlorophyceae	19	15	23	16	17	24	12	17
Bacillariophyceae	16	12	9	13	11	15	10	13
Euglenophyceae	5	4	3	5	5	6	4	4
Total No. of Species	**52**	**42**	**46**	**46**	**46**	**60**	**35**	**46**

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

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

S.No.	Name of the Taxa	Family Name	IUCN Status	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
1	*Azolla pinnata*	Salviniaceae	LC	+	+	+	+	+	+	+	+
2	*Cyperus alopecuroides*	Cyperaceae	LC	+	+			+	+	+	+
3	*Cyperus difformis*	Cyperaceae	LC	+		+	+		+	+	+
4	*Eichhornia crassipes*	Pontederiaceae	LC	+	+	+		+	+		+
5	*Hydrilla verticillata*	Hydrocharitaceae	LC				+			+	+
6	*Ipomea aquatica*	Convolvulaceae	LC		+	+	+	+	+		+
7	*Ipomea carnea*	Convolvulaceae	LC	+	+	+	+		+	+	+
8	*Lemna minor*	Araceae	LC	+	+			+	+	+	+
9	*Ludwigia parviflora*	Onagraceae	LC	+	+	+	+		+	+	+
10	*Nelumbo sp.*	Nelumbonaceae	LC		+			+			
11	*Nymphoides aquatica*	Menyanthaceae	LC	+		+		+	+	+	+
12	*Phragmites karka*	Poaceae	LC						+		

13	*Pistia stratiotes*	Araceae	LC		+		+			+	+
14	*Polygonum glabrum*	Polygonaceae	LC	+	+	+		+	+	+	+
15	*Typha latifolia*	Typhaceae	LC						+		+
16	*Typha orientalis*	Typhaceae	LC		+		+	+	+	+	
Total No. of Species				**9**	**8**	**8**	**8**	**9**	**13**	**11**	**13**

3.6.10 Flora of Buffer zone

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

During the present survey,a total of 77 species of plant species were observed from the study area. Out of 77 plant species,42species of tree, 18 species of shrubs/herbs, 6 species of climbers, and 10 species of Grass species were recorded from the buffer zone of the present study area. The below-mentioned vegetation details have been collected from the Core as well as Buffer zone of the present study area. All the details have been furnished based on the field survey at different locations and data supported by the Department of Forest, Patna of Bihar. The details of vegetation of the buffer zone is given in Table 3.22.

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

S.No.	Botanical Name	Common/ Hindi Name	Name of family
	Trees		
1	*Acacia nilotica*	Babool	Mimosaceae
2	*Acacia nilotica*	Desi babool	Fabaceae
3	*Acacia leucophloea*	Safed babul	Mimosaceae
4	*Aegle marmelos*	Bel	Rutaceae
5	*Ailanthus excels*	Adusa	Simaroubaceae
6.	*Albizzia amara*	Siris	Mimosoideae
7	*Albizzia lebbeck*	Sirish	Mimosaceae
8	*Alstonia scholaris*	Saptaparni	Apocynaceae
9	*Anogeissus latifolia*	Dhaura,	Combretaceae
10	*Anthocephalus cadamba*	Kadamb	Rubiaceae
11	*Artocorpus heterophyllus*	Jack fruit	Moraceae
12	*Azadirachta indica*	Neem	Meliaceae
13	*Bauhinia racemosa*	Apta	Leguminosae

14	*Bauhinia variegata L.*	Kachnar	Leguminosae
15	*Bombax ceiba*	Semal	Malvaceae
16	*Bombax malabaricum*	Semal tree	Malvaceae
17	*Borassus flabellifer*	Nariyal	Palmae
18	*Butea monosperma*	Palas	Leguminosae
19	*Dalbergia latifolia*	Shisam	Leguminosae
20	*Dalbergia sissoo*	Shisam	Leguminosae
21	*Delonix regia*	Gulmohar	Fabaceae
22	*Dendrocalamus strictus*	Bamboo	Poaceae
23	*Diospyros melanoxylon*	Tendu	Ebenaceae
24	*Ficus benghalensis*	Bargad	Moraceae
25	*Ficus religiosa*	Pipal	Moraceae
26	*Madhuca longifolia*	Mohua tree	Sapotaceae
27	*Magnifera indica*	Aam	Anacardiaceae
28	*Melia azedarach*	Bukkam Neem	Meliaceae
29	*Moringa olerifera*	Munga	Moringanaceae
30	*Nerium oleamder*	Kaner	Apocynaceae
31	*Phoenix sylvestris*	Date palm	Arecaceae
32	*Phyllanthus emblica*	Awla	Euphorbiaceae
33	*Pisidium guava*	Guava	Myrtaceae
34	*Pongamia pinnata*	Karanj	Leguminosae
35	*Prosopis juliflora*	Vilayati babool	Fabaceae
36	*Sarracca indica*	Ashok	Annonaceae
37	*Shorea robusta*	Sal	Depterocarpaceae
38	*Syzygium cumini*	Jamun	Myrtaceae
39	*Tectona grandis*	Sagwan	Verbenaceae
40	*Terminalia arjuna*	Arjun	Combretaceae
41	*Terminalia chebula*	Harhar	Combretaceae
42	*Zizyphus jujube*	Ber	Rhamnaceae
Shrub & Herbs			
43	*Acanthospermum hispidum*	Kanti	Asteraceae
44	*Acheranthus aspera*	Aghada	Amaranthaceae
45	*Argemone mexicana*	Pila dhtura	Papaveraceae

46	*Baugainvellia glabra*	Paper flower	Nyctaginaceae
47	*Calotropis procera*	Aakra	Asclepiadaceae
48	*Cassia auriculata*	Tarwar	Fabaceae
49	*Cassia tora*	Tarota /Takla	Caesalpiniaceae
50	*Chenopodium album*	manure weed	Amaranthaceae
51	*Dalura metel*	Dhotra	Solanaceae
52	*Ipomoea carnea*	Besharam	Convolvulaceae
53	*Jatropha gossipifolia*	cotton-leaf	Euphorbiaceae
54	*Lantana camara*	Ghaneri	Verbenaceae
55	*Mimosa pudica*	Chui Mui	Mimosaceae
56	*Ocimum sanctum*	Tulsi	Labiatae
57	*Parthenium hysterophorus*	Gajar grass	Asteraceae
58	*Ricinus communis*	Arand	Euphorbiaceae
59	*Ricinus communis*	castor oil plant	Euphorbiaceae
60	*Tridax procumbens*	Kambarmodi	Asteraceae
Grasses			
61	*Apluda mutica*	Mauntian grass	Poaceae
62	*Commelina benghalensis*	Bokna	Commelinaceae
63	*Cynodon dactylon*	Doob	Poaceae
64	*Cyperus rotundus*	Motha	cyperaceae
65	*DactylSeptemberenum aegyptium*	Crow foot grass	Poaceae
66	*Pennisetum purpureum*	Elephant grass	Poaceae
Climbers			
67	*Antigonon leptopus*	Anantalata	Polygonaceae
68	*Bougainvillea glabra*	Booganbel	Nyctaginaceae
69	*Celastrus paniculata*	Kujari	Celastraceae
70	*Cissampelos pareira*	Khariya lata	Menispermaceae
71	*Clitoria ternatea*	Blue pea	Fabaceae
72	*Coccinia grandis*	Jungli Kundru	Cucurbitaceae
73	*Combretum indicum*	Madhu Malati	Combretaceae
74	*Cuscuta reflexa*	Amarbel	Convolvulaceae
75	*Cuscuta reflexa*	Amar bel	Convolvulaceae
76	*Ipomoea cairica*	Neeli Bel	Convolvulaceae

77	*Tilospora cordifolia*	Giloy	Menispermaceae

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

3.6.10.2 Agricultural vegetation/ Commercial vegetation of the Buffer zone.

The variety of Crops and cropping patternsin the core and the buffer zone was the same in the study area. Vegetation details of the buffer zone were collected from 05 selected sites (TS-1 to TS-05)and the details are given in Table 3.17.

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

Phytoplankton: The diversity of Phytoplankton species was similar in the core and buffer zone. The details of macrophytic vegetation of the buffer zone are given in Table 3.19 & 3.20 and Figure 3.10.

Macrophytes: The diversity of aquatic macrophytes was similar in both core and buffer zone. The details of macrophytic vegetation of the buffer zone are given in Table 3.21 and Figure 3.11.

3.6.11 Fauna of the Study Area

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

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

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

3.6.12 Fauna of the Core Zone

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

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

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

S. No.	Common Name	Scientific Name	Family	Schedule status (as per WPA-1972)	IUCN status
Mammals					
1.	Jungle cat	*Fellis chaus*	Felidae	II	LC
2.	Five striped palm squirrel	*Funambulus pennanti*	Sciuridae	IV	LC
3.	Indian Fulvous Fruit-Bat	*Rousettus leschenaultia*	Pteropodidae	V	LC
4.	Indian Field Mouse	*Mus booduga*	Muridae	V	LC
5.	Common House Rat	*Rattus rattus*	Muridae	V	LC
6.	Bandicoot Rat	*Bandicotabengalensis*	Muridae	V	LC
7.	Indian Grey Mongoose	*Herpestesedwardsi edwardsi*	Herpestidae	II	LC
Reptiles & Amphibians					
8.	Garden lizard	*Calotes versicolor*	Agamidae	IV	NE
9	King cobra	Ophiophagus hannah	Elapidae	II	LC
10	Cobra	Naja naja	Elapidae	II	LC
11.	Pit viper	Crotolus sp	Viperadae	II	LC
12	Garden lizard	Calotes versicolor	Agamidae	IV	NE
Bird Species					
1	*Acridotheres tristis*	Myna	Sturnidae	IV	LC
2	*Acridotheres tristis*	Common myna	Sturnidae	IV	LC
3	Amandava amandava	Red munia	Estrildidae	IV	LC

4	*Ardea cinerea*	Grey heron	Ardeidae	IV	LC
6	Bubulcus ibis	Cattle egret	Ardeidae	IV	LC
7	*Columba livia*	Pigeon	Columbidae	IV	LC
5	*Corvus macrorhynchos*	Jungle crow	Corvidae	IV	LC
6	*Corvus splendens*	Crow	Corvidae	V	LC
7	*Gallinule chloropus*	Common moorhen	Rallidae	IV	LC
8	*Milvus migrans*	Black Kite	Accipitridae	IV	LC
9	*Passer domesticus*	House sparrow	Passeridae	IV	LC
10	*Pycnonotus cafer*	Red-vented bulbul	Pycnonotidae	IV	LC
11	Saxicoloides fulicatus	Indian robin	Psittaculidae	IV	LC
12	*Turdoides caudate*	Common babbler	Leiothrichidae	IV	LC
IUCN Status =LC: Least Concern**, NE:** Not Evaluated.					
Source: Primary Survey data of P&M Solution, Noida and the data supported by Department of Forest, Patna district of Bihar					

Table 3.24: Butterflies observed in the Core zone

S. No.	Common Name	Scientific Name	Family	IUCN Status
1.	Plain Tiger	*Danaus chrysippus*	Nymphalidae	LC
2.	Common emigrant	Catopsilia pomona	Pieridae	LC
3.	Common crow	*Euploea core*	Nymphalidae	LC
4.	Small grass yellow	Eurema brigitta	Pieridae	LC
Source: Primary Survey data of P&M Solution, Noida and the data supported by Department of Forest, Patna district of Bihar				

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

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

3.6.12.4 Fauna of Buffer zon

To prepare a detailed report on the status of faunal biodiversity of the present study area (1 km buffer) of Patna district of Bihar and to assess the impacts due to digging/ leveling of alignment route/ construction of bridge/ operational activity which evolves suitable mitigation measures to protect & conserve biodiversity following components were studied: terrestrial biodiversity, wildlife survey (diversity), habitat study (feeding, breeding, roosting areas), distribution of birds, rare & endangered species of the study area.

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

(i) Aquatic fauna and

(ii) Terrestrial fauna.

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

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

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

i. Mammals and Reptiles/ Amphibians

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

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

S. No.	Common Name	Scientific Name	Family	Status as per	IUCN status

				WPA-1972	
Mammals					
1	*Bandicota bengalensis*	Bandicoot Rat	Sciuridae	IV	LC
2	*Canis aurius*	Jackal	Pteropodidae	V	LC
3	*Fellis chaus*	Jungle cat	Soricidae	IV	LC
4	*Funambulus palmarum*	Three-striped Squirrel	Suidae	III	LC
5	*Funambulus pennanti*	Five striped palm squirrel	Hyaenidae	III	LC
6	*Herpestes edwardsi*	Indian Grey Mongoose	Canidae	II	LC
7	*Hyaena hyaena*	Stripped hyena	Leporidae	V	LC
8	*Lepus nigricollis*	Indian Hare	Canidae	II	LC
9	*Mus booduga*	Indian Field Mouse	Sciuridae	IV	LC
10	*Presbytis entellus*	Common langur	Cercopithecidae	II	LC
11	*Pteropus giganteus*	Indian Flying Fox	Pteropodidae	V	LC
12	*Rattus rattus*	Common House Rat	Muridae	V	LC
13	*Rousettus leschenaultia*	Indian Fulvous Fruit- Bat	Muridae	V	LC
14	*Suncus murinus*	Grey musk Shrew	Muridae	V	LC
15	*Sus scrofa*	Wild Boar	Canidae	III	LC
16	*Vulpes bengalensis*	Indian fox	Felidae	II	LC
Reptiles and Amphibians					
1	*Bufo melanostictus*	Common toad	Bufonidae	IV	LC
2	*Bungarus caeruelus*	Krait	Elapidae	IV	NE
3	*Calotes versicolor*	Garden lizard	Agamidae	IV	NE
4	*Crotolus* sp.	Pit viper	Viperadae	II	LC
5	*Enhydris enhydris*	Smooth water snake	Homalopsidae	IV	LC
6	*Euphlyctis hexadactyla*	Common frog	Dicroglossidae	IV	LC
7	Hemidactylus	House Gecko	Gekkonidae	--	NE

	flaviviridis				
8	*Naja naja*	Cobra	Elapidae	II	LC
9	Ophiophagus hannah	King cobra	Elapidae	II	LC
10	Ptyas mucosa	Rat Snake	Colubridae	II	NE
11	Rana temporaria	Common frog	Ranidae	IV	LC
12	Varanus sp.	Monitor lizzard	Varanidae	II	LC

IUCN Status =LC: Least Concern**, VU:** Vulnerable. **NT:** Near Threatened**, NE:** Not Evaluated**,**
Source: Primary Survey data of P&M solution, Noida and the data supported by Department of Forest, Patna District.

ii. Avian Fauna

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

S.No	Scientific Name	Common Name	Family	Schedule Status (WPA-1972	IUCN Status
1	*Acridotheres tristis*	Myna	Sturnidae	IV	LC
2	*Acridotheres tristis*	Common myna	Sturnidae	IV	LC
3	Alcedo atthis	Small blue kingfisher	Alcedinidae	IV	LC
4	Amandava amandava	Red munia	Estrildidae	IV	LC
5	*Ardea cinerea*	Grey heron	Ardeidae	IV	LC
6	Ardeola grayii	Indian pond heron	Ardeidae	IV	LC
7	Athene brama	Spotted Owlet	Strigidae	IV	LC
8	Bubulcus ibis	Cattle egret	Ardeidae	IV	LC
9	*Centropus sinensis*	Crow pheasant	Cuculidae	IV	LC
10	*Ceryle rudis*	Pied kingfisher	Alcedinidae	IV	LC
11	*Charadrius dubius*	Little ringed plover	Charadriidae	IV	LC
12	*Ciconia episcopus*	White-necked stork	Ciconidae	IV	NT
13	Cinnyris asiaticus	Purple Sunbird	Psittaculidae	IV	LC
14	*Columba livia*	Pigeon	Columbidae	IV	LC
15	*Corvus macrorhynchos*	Jungle crow	Corvidae	IV	LC

16	*Corvus splendens*	Crow	Corvidae	V	LC
17	*Dicrurus adsimilis*	Black drango	Dicruridae	IV	LC
18	Egretta alba	Larger egret	Ardeidae	IV	LC
19	*Egretta garzetta*	Little egret	Ardeidae	IV	LC
20	*Francolinus pondicerianus*	Titar	Phasianidae	IV	LC
21	*Gallinule chloropus*	Common moorhen	Rallidae	IV	LC
22	*Gallus gallus*	Jungle hen	Phasianidae	IV	LC
23	*Halcyon smymensis*	White-throated kingfisher	Alcedinidae	IV	LC
24	*Milvus migrans*	Black Kite	Accipitridae	IV	LC
25	*Passer domesticus*	House sparrow	Passeridae	IV	LC
26	*Phalacrocorax carbo*	Great cormorant	Phalacrocoracidae	IV	LC
27	*Phalacrocorax niger*	Little cormorant	Phalacrocoracidae	IV	LC
28	*Pluvialis fulva*	Pacific golden plover	Charadriidae	IV	LC
29	*Pseudibis papillosa*	Red-naped ibis	Threskiornithidae	IV	LC
30	*Psittacula krameri*	Rose ringed Parakeet	Psittacidae	IV	LC
31	*Pycnonotus cafer*	Red-vented bulbul	Pycnonotidae	IV	LC
32	Saxicoloides fulicatus	Indian robin	Psittaculidae	IV	LC
IUCN Status =LC: Least Concern**, VU:** Vulnerable.					
Source: Primary Survey data of P&M Solution and the data supported by Department of Forest, Son, Bihar.					

iii. Butter Flies

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

S.No.	Scientific Name	Common Name	Family	IUCN Status
1	*Catopsilia pomona*	Common emigrant	Pieridae	LC
2	*Chlosyne lacinia*	Sunflower/Bordered Patch	Nymphalidae	LC
3	*Danaus chrysippus*	Plain Tiger	Nymphalidae	LC
4	*Danaus genutia*	Stripped Tiger	Nymphalidae	LC
5	*Euploea core*	Common crow	Nymphalidae	LC
Source: Primary Survey data of P&M Solution and the data supported by Department of Forest,				

Son, Bihar.

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

Aquatic fauna is referred to as any form of an animal that has adapted to living in the aquatic environments such as rivers, lakes, ponds, dams, streams, etc.). Son River and its adjoining streams are formed the drainage in the study area. Few other seasonal water bodies like village ponds, streams, and nallas are also present in the study area. In general, faunal account of any water bodies can be divided into following categories, *i.e.*,

(i) zooplankton,

(ii) Macro-invertebrates/Insects/Benthos

(iii) Fishes

(iv) Amphibians/ Reptiles/ etc.

Details of Zooplankton; Macro-invertebrates/insects/benthos; Amphibians/Reptiles and Fishes recorded from the different water bodies of the study area (Patna district) are given in Tables 3.28 to 3.31.

i. Zooplankton

Zooplankton is commonly found in all types of aquatic habitats. These are recognized as secondary producers and considered as one of the best tools for the environmental monitoring program. During the present study period, a total of 49 zooplankton species was recorded and identified comprising of class Protozoa (8 species), Rotifera (20 species), Cladocera (10 species), Copepoda (8 species), and Ostracoda (3 species). The details of the zooplankton diversity of different habitats are given in Table 3.28 and Fig 3.12.

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

S.No.	Name of the Taxa	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Schedule Status in WPA (1972)	IUCN Status
	Protozoa										
1	*Arcella* sp.	+	+	+		+	+		+	NA	NA
2	*Arcella discoides*	+	+	+	+	+	+	+	+	NA	NA
3	*Arcella vulgaris*	+	+	+	+	+	+	+	+	NA	NA

4	*Centropyxis* sp.	+	+	+	+	+	+	+		NA	NA
5	*Centropyxis ecornis*		+			+	+		+	NA	NA
6	*Euglypha* sp.	+		+	+	+	+	+	+	NA	NA
7	*Metopus* sp.		+	+	+		+			NA	NA
8	*Opercularia* sp.	+	+	+		+			+	NA	NA
	Total	**8**	**9**	**8**	**7**	**8**	**9**	**5**	**8**		
	Rotifera										
1	*Anuraeopsis*sp.	+		+	+	+	+	+	+	NA	NA
2	*Anuraeopsis fissa*				+	+	+	+	+	NA	NA
3	*Asplanchna* sp.	+	+	+		+	+	+	+	NA	NA
4	*Asplanchna brightwelli*		+		+	+	+	+	+	NA	NA
5	*Brachionus* sp.	+		+	+	+	+	+		NA	NA
6	*Brachionus angularis*		+						+	NA	NA
7	*Brachionus calyciflorus*	+	+	+	+		+	+	+	NA	NA
8	*Brachionus quadridentata*		+	+	+		+	+		NA	NA
9	*Brachionus falcatus*	+			+	+	+	+		NA	NA
10	*Brachionus forficula*	+		+		+	+		+	NA	NA
11	*Cephlodella gibba*	+	+		+	+	+	+		NA	NA
12	*Filinia* sp.	+					+	+	+	NA	NA
13	*Filinia longiseta*		+	+		+		+	+	NA	NA
14	*Keratella* sp.	+		+		+			+	NA	NA
15	*Keratella Cochlearis*	+	+	+	+	+	+	+	+	NA	NA
16	*Monostyla quadridentatus*		+	+						NA	NA
17	*Mytilina* sp.	+			+	+	+	+	+	NA	NA
18	*Polyarthra vulgaris*	+		+		+			+	NA	NA
19	*Testudinella patina*		+		+		+	+		NA	NA
20	*Trichocerca* sp.	+		+		+	+		+	NA	NA
	Total	**15**	**11**	**13**	**13**	**15**	**18**	**16**	**16**		
	Cladocera										
1	*Alona* sp.	+	+	+	+	+	+	+	+	NA	NA
2	*Alona intermediate*		+		+		+	+		NA	NA
3	*Bosmina* sp.	+		+	+	+	+	+	+	NA	NA
4	*Bosmina longirostris*	+		+			+	+		NA	NA

5	*Ceriodaphnia* sp.		+	+		+	+		+	NA	NA
6	*Chydorus sphaericus*	+	+		+		+	+		NA	NA
7	*Daphnia* sp.	+		+	+		+	+		NA	NA
8	*Leydgia* sp.		+	+		+	+		+	NA	NA
9	*Moina daphnia*	+			+		+	+	+	NA	NA
10	*Simocephalus* sp.	+	+	+		+			+	NA	NA
	Total	**9**	**7**	**8**	**7**	**6**	**11**	**8**	**7**		
	Copepoda										
1	*Cyclops* sp.	+	+	+	+	+	+	+	+	NA	NA
2	*Diaptomus* sp.	+	+	+	+	+	+		+	NA	NA
3	*Eucyclops* sp.	+	+	+			+	+	+	NA	NA
4	*Heleodiaptomus viduus*	+	+			+	+			NA	NA
5	*Mesocyclops* sp.	+	+		+		+	+	+	NA	NA
6	*Nauplius larvae*	+	+	+	+	+	+	+	+	NA	NA
7	*Neodiaptomus* sp.		+		+		+		+	NA	NA
8	*Nitzii amphibia*	+	+	+	+	+	+	+		NA	NA
	Total	**10**	**10**	**8**	**9**	**7**	**11**	**7**	**9**		
	Ostracoda										
1	*Cyprinotus* sp.	+		+	+	+	+	+	+	NA	NA
2	*Cypris sp.*	+	+	+	+		+	+	+	NA	NA
3	*Stenocypris malcolmsoni*	+	+	+	+	+	+		+	NA	NA
	Total	**4**	**3**	**4**	**4**	**3**	**4**	3	**4**		

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

ii. Macro-invertebrates (Insects/Benthos)

Macro-invertebrates are commonly found in all types of aquatic habitats such as streams, rivers, wetlands, lakes, and ponds. The term macro-invertebrate is used for those animals that have no backbone and can be seen with the naked eye. These animals generally include insects, crustaceans, mollusks, and annelids. They are significant within the food chain as larger animals such as fish and birds rely on them as a food source. None of the macro-invertebrate species have been observed under the of Rare, Endangered, and threatened category. Various macro-invertebrate species were collected and identified from the present study area and listed in Table 3.29.

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

	Insecta										
1	*Baetis nymph*		+	+	+	+	+	+	+	NA	NE
2	*Caenid mayfly*	+			+		+			NA	NE
3	*Chironomus plumosus*	+	+	+	+	+	+	+	+	NA	NE
4	*Chironomus* sp.	+	+	+	+	+	+	+	+	NA	NE
5	*Damsel flies nymphs*	+			+		+			NA	NE
6	*Hirudineria sp.*	+	+	+			+	+	+	NA	NE
7	*Limnodrillus hoffmeisteri*	+					+			NA	NE
8	*Mayflies nymphs*		+		+		+	+	+	NA	NE
9	*Mosquitos larvae*	+	+	+	+	+	+	+	+	NA	NE
10	*Ranatra elongata*	+	+			+	+	+	+	NA	NE
	Total	**12**	**10**	**10**	**11**	**9**	**16**	**11**	**11**		
	Mollusca										
1	*Bellamya bengalensis*	+		+	+	+	+	+	+	NA	NE
2	*Corbicula fluminalis*		+	+	+	+	+	+	+	NA	NE
3	*Corbicula sp.*	+	+	+	+	+	+			NA	NE
4	*Gyraulus convexiculus*	+		+			+	+	+	NA	NE
5	*Gyraulus sp.*	+	+		+	+	+		+	NA	NE
6	*Lymnaea acuminata*	+		+		+		+	+	NA	NE
7	*Lymnaea sp.*	+	+	+	+	+	+	+		NA	NE
8	*Melanoides lineatus*		+	+			+		+	NA	NE
9	*Pila globosa(apple snail)*		+		+		+		+	NA	NE
10	*Unio tigridis*			+	+		+	+	+	NA	NE
	Total	**9**	**8**	**12**	**10**	**8**	**13**	**9**	**11**		
	Source: Primary Survey data of P&M Solution, Noida.										

iii. Amphibians

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

Table 3.30: Amphibians and Reptilesrecorded from the Core and Buffer zone

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

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

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

(iii) Fishes

The study area of the present Project development project has several lentic and lotic water bodies in which few are perennial and most of the water bodies are seasonal or monsoon fed. Jammuaririver is a major lotic system in the study area. Some private ponds are also present in the study area which are mainly used for the culture of fishes. All these water bodies support fish species. Fishes found in the study area are listed in Table 3.31 and their site wise species variation is shown in Fig. 3.14.

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

S.No.	Name of the Taxa	Family Name	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	IUCN Status	Schedule Status in WPA (1972)
1	*Catla catla*	Cyprinidae	+	+	+	+		+		+	VU	NA
2	*Channa stiatus*	Chandadae					+	+	+		LC	NA

3	*Channa punctatus*	Chandadae			+	+	+		+	+	LC	NA
4	*Labeo bata*	Cyprinidae		+		+				+	LC	NA
5	*Labeo rohita*	Cyprinidae	+		+	+		+			LC	NA
6	*Macrobrachium malcomsoni*	Palaemonidae	+		+	+	+	+	+	+	LC	NA
7	*Mystus bleekri*	Bagridae		+			+	+			LC	NA
8	*Mystus tengara*	Bagridae	+	+	+	+	+	+	+	+	LC	NA
9	*Puntius sarana*	Cyprinidae			+			+	+	+	LC	NA
10	*Puntius sophore*	Cyprinidae	+	+	+		+			+	LC	NA
11	*Puntius stigma*	Cyprinidae			+	+		+			LC	NA
12	*Puntius ticto*	Cyprinidae		+	+	+			+	+	LC	NA
		Total	7	7	10	9	7	10	6	9		

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

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

3.6.13 Observations of Present Study (Flora & Fauna)

3.6.13.1 Flora

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

3.6.13.2Fauna

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

3.7Socio-Economic Environment

Demography& Socio-Economic Features

Demography

Demography is one of the important indicators of environmental health of an area. It includes population, sex ratio, number of households, literacy, population density, etc. In order to assess the Demographic & Socio-economic features of the area, Census data 2011, for 2major districts named Patna and Bhojpur of Biharstate was compiled and placed in the form of tabulation and graphical representation.

Demography of the Patna District

As per the census records 2011, Patna district has a population of 5,838,465 persons followed by 3,078,512 males and 2,759,953 females respectively. Out of the total population of the district, about 43.0% population lived in urban areas while 57.0% live in rural areas. The decadal Variation of the district has been seen at 23.7% during the decade 2001-11. The Urban area of the district has attained a higher decadal Variation of 28.2% as compared to that of rural area at 20.6%.

As per 2011 census sex ratio of the district is 897 females per 1,000 males. The same for rural and urban areas of the district stands at 904 and 887 respectively. As per the census records 2011, the sex ratio of population in the age group 0-6, which works out to 909, is much higher than the sex ratio of the total population as 897 for the district of Patna. While the sex ratio of (0-6) population in the rural areas of the district is 923, the sex ratio of (0-6) population for the urban areas is only 883 females per 1000 males.

The district occupies an area of 3,202 square kilometres. As per the census records 2011, it is observed that the proportion of scheduled castes and scheduled tribe's population to the total population of the district is found to be only 15.77 and 0.16% respectively. For rural areas, the respective proportion of scheduled castes and scheduled tribes to the total population of the district comes out to be 19.98 and 0.06% respectively. Similarly,in urban areas, the percentage of scheduled castes and scheduled tribe's population to the total population of the district comes out to 10.21 and 0.27% respectively.

It is also observed from the census records 2011, that the district has registered a literacy rate of 70.68%. As regards to rural and urban areas of the district the literacy rates have been registered 62.38 & 80.98% respectively. The gap in the male-female literacy rates has been 16.52% point as it is 78.48% male and 61.96% female respectively. For the district as a whole, the literacy rate of males is much higher than that of females.

Census data 2011 shows that the work participation rate (WPR) in the district is 23.49% for main workers and 8.75% for marginal workers. Proportion of non workers in the district is 67.77%.

Mother Tongue

As per the census records for Patna district, Hindi is the main mother tongue of the district was returned by 91.7% of the population. The corresponding percentage for the Urdu, the second most prominent language spoken in Patna district, was 6.5%. Speakers of other Scheduled languages were very thin in number than the two described above.

Religion

The population of the Patna district during 2011 was 5,838,465. Hindus constitute 91.74% (5,356,075 persons) of the population in the district followed by Muslims 7.54% (439,952 persons). All other four major religious communities have almost negligible percentages.

Methodology

In order to assess the Demographic & Socio-economic features along with the 10km distance based on field surveys and public consultations undertaken during the baseline field study period and Census records 2011, for 2 majorconcerned districts named Patnaand Bhojpur of Bihar state respectively was compiled and placed in the form of tabulation and graphical representation. Entire study area is observed predominantly ruraland no town was found in the study area.

Purpose of the Study

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

Description of Social Environment

As per the Census Records 2011, the study area has a total of 150villagesand one town named Bikram (NP)of Bikram tehsil of Patna district lying under Patna and BhojpurDistricts respectively in Bihar state. Overall study area villages are falling mainly underSeven (07) tehsils namelyBihta (17 villages), Bikram (37 villages), Dulhin Bazar (21 villages), Paliganj (12 villages), Barhara (01 village), Koilwar (11 villages) and Sandesh (52 villages) of Patna and Bhojpur district respectivelyin Bihar state.There are eight (08) villagesof 2major concerned districtsnamed Patna and Bhojpur in Biharstate found as uninhabited villages in the study area.

There is only one town named Bikram (NP) / 14 Wards under Bikram tehsil of Patna district was found in the 10km radial study zone. There are Six towns named Bihata, Bikram (NP), Masaurhi, Jehanabad of Patna and Arrah & Koilwar of Bhojpur district available in the distance range of 5 to 40km from the villages of study zone.

Population Distribution (10 km)

As per the Census Records 2011, the total population of 10 km study zone was recorded as 3, 89,500persons of 151villagesof 2 main concerned districts named Patna and BhojpurinBihar state. Male-female wise total population was recorded as 2,03,283 males (52.2%) and 1, 86,217(48.0%) females respectively.

Total number of 'Households' was observed as 62,035in the 10 km radius study zone. Scheduled Caste ('SC') population was observed as 64,815persons consisting of 33,643males (52.0%) and 31,172 females (48.0%) in the 10km study zone. Scheduled Tribes ('ST') population was also observed as 380 persons (0.1%) consisting of 186 males (49.0%) and 194females (51.0%) in the 10 km study zone.The child population (0-6 Age) of the study area is recorded as 65,654 (17.0%) and comprising of 34,090 (52.0%)males&31,564 (48.0%) females respectively. Village wise details of population distributionare given as follows in**Table 3.32 & 3.33 .**

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

Name of Village/Town	No of Households	Total Population			Child Population (0-6 Years)		
		Persons	Male	Female	Persons	Male	Female
1. District Patna, Bihar							
Doghra	450	3199	1704	1495	531	263	268
Etwa	228	1381	733	648	250	130	120
Bindaul	487	3668	1993	1675	587	318	269
Taregna	147	1017	532	485	195	97	98
Mahuar	265	1587	849	738	318	160	158
PandeChak	98	695	364	331	145	67	78

Kelhanpur	349	2260	1183	1077	473	252	221
Nagabihta	116	658	337	321	89	46	43
Mathura Pur	47	372	187	185	63	30	33
Mithapur	113	596	301	295	61	38	23
Akhtiarpur	263	1511	732	779	262	132	130
Babhanlai	562	3627	1870	1757	558	290	268
Ghoratap	272	1920	1009	911	332	183	149
Dihri	252	1567	797	770	270	140	130
Dalelganj 1	130	732	396	336	157	86	71
Sikaria	292	1798	957	841	300	159	141
Tarvan	112	718	360	358	143	74	69
Pakrandha	385	2040	1093	947	311	162	149
Patut	1415	9111	4787	4324	1558	783	775
Barah	1104	7364	3917	3447	1188	601	587
Katari	327	2032	1046	986	355	170	185
Birdhaur	575	3702	1978	1724	510	272	238
Berar	541	3052	1562	1490	455	231	224
Janpara	302	1765	946	819	306	153	153
Lahladpur	284	2047	1086	961	322	172	150
Dullahpur	112	836	423	413	83	46	37
Donrapur	205	1251	643	608	182	89	93
Wazirpur	1131	6929	3640	3289	1203	640	563
Raghunathpur	474	3026	1593	1433	482	256	226
Kanpa	480	3194	1713	1481	560	297	263
Saidabad	556	3730	1933	1797	564	288	276
Anharipur	77	568	302	266	97	52	45
Gona	516	3500	1816	1684	545	292	253
Habaspur	509	2893	1493	1400	531	269	262
Chandni	51	345	188	157	64	35	29
Barda	203	1517	769	748	284	146	138
Gopalpur	192	1008	540	468	166	95	71
Bara	347	1776	922	854	302	157	145
BeniBigha	461	2330	1256	1074	363	212	151
Chihunta	393	2146	1120	1026	378	191	187
Shahjahanpur	232	1216	620	596	207	105	102
Baigawan	158	891	451	440	150	78	72
Hathsar	59	461	244	217	30	16	14
Painapur	282	1927	999	928	334	165	169
Chichourha	206	1005	528	477	182	87	95
Jamalpur	373	1983	1012	971	296	170	126
Akhtiarpur	618	3346	1731	1615	594	323	271
Nagahra	616	3926	1995	1931	601	307	294
Faridpur	195	1130	565	565	270	127	143
Baghakol	288	1804	954	850	288	152	136
Gorakhri	1000	6347	3298	3049	888	474	414
Moriawan	415	2835	1473	1362	456	220	236
Shivgarh	328	1819	949	870	275	144	131
Bikram (NP)/14 Wards	3681	22486	11657	10829	3194	1690	1504
Baijalpur	100	778	420	358	138	78	60
Nisarpura	543	3458	1791	1667	629	334	295
Kab	1658	10141	5277	4864	1656	831	825
Dorwan	363	2521	1300	1221	369	190	179
KasimChak	237	1521	828	693	229	122	107
Belhauri	599	3873	1963	1910	638	330	308
Silhouri	640	4051	2091	1960	664	333	331
ChhotkaKharwa	628	4030	2123	1907	661	357	304
Raksia	346	1849	939	910	311	166	145
Khapuri	180	1099	578	521	174	88	86
Ganipur	Uninhabited Village						

Bhadsara	1436	8834	4633	4201	1525	756	769
GulalChak	82	528	285	243	100	59	41
Bhalua	232	1331	696	635	213	116	97
Sadawe	823	4762	2501	2261	798	458	340
Andehri	183	1125	527	598	212	96	116
Baduri	158	895	447	448	146	76	70
Paipura Khurd	183	1088	553	535	205	115	90
Rajipur	765	4509	2315	2194	859	418	441
Saraiya	452	2670	1392	1278	581	310	271
Achhua	534	3052	1556	1496	525	285	240
Kalyanpur	517	3450	1866	1584	583	321	262
Jalpura 1	216	1570	828	742	245	140	105
Masaurha	442	2413	1203	1210	397	207	190
Udaipur	367	2130	1073	1057	391	191	200
Mohbalipur	1251	6863	3466	3397	1273	640	633
Mohabbatpur	110	634	336	298	117	54	63
Ranipur	258	1584	828	756	263	140	123
Fatehpur	276	1630	856	774	265	143	122
Hasanpur	62	269	128	141	40	20	20
DariapurPem	302	1697	880	817	290	142	148
Paipura Kalan	304	1783	877	906	295	137	158
Ijarta	186	1117	536	581	182	78	104
2. District Bhojpur, Bihar							
Saraiya	1888	12464	6654	5810	2022	1078	944
Khangaon	1784	10711	5617	5094	2097	1083	1014
Guri	130	865	441	424	137	61	76
Manpur	120	822	423	399	136	71	65
Kusihan	155	913	481	432	143	75	68
Gopalpur	289	1753	903	850	299	141	158
Lodipur 1	264	1753	889	864	289	146	143
Jalpura 2	1615	12168	6432	5736	2069	1047	1022
Bhagwatpur	272	1792	947	845	312	166	146
Bishunpur	389	2128	1134	994	348	175	173
Sundra	221	1314	674	640	265	127	138
Jahanpur	308	1934	1013	921	364	187	177
SarimpurBachri	554	3433	1782	1651	589	309	280
Lodipur 2	29	182	77	105	29	13	16
Narainpur	416	2711	1441	1270	415	215	200
Nansagar	54	328	163	165	58	29	29
Nasratpur	548	3279	1734	1545	511	271	240
Chilhauns	782	5054	2596	2458	1018	520	498
Turkaul	591	3817	2066	1751	663	352	311
Jansara	100	1018	542	476	168	83	85
Ahpura	531	3321	1752	1569	563	300	263
Salempur	139	543	291	252	85	50	35
Sandesh	1037	6874	3573	3301	1219	616	603
Panpura	54	483	255	228	82	35	47
Kanharpur	209	1319	729	590	182	110	72
Chela	377	2139	1115	1024	365	188	177
Panrepur	97	594	335	259	66	36	30
Basauri	69	484	254	230	74	38	36
Gaighat	Uninhabited Village						
Bhanpura	Uninhabited Village						
Dihra	489	3371	1786	1585	608	317	291
Maniach	419	2578	1347	1231	466	247	219
Bichhiaon	476	2994	1519	1475	540	273	267
Dharampur	318	1942	1015	927	343	168	175
Surungapur	252	1756	900	856	282	140	142
Chauria	Uninhabited Village						

Dalelganj 2	225	1802	939	863	360	192	168
Parura Rampur	417	2522	1336	1186	537	306	231
Kusra	343	2462	1332	1130	503	263	240
Parura	535	3739	1955	1784	621	332	289
Deoar	255	1809	946	863	402	211	191
Akhgaon	443	3094	1626	1468	515	289	226
Partappur	287	1552	769	783	233	120	113
Kholpur	320	2429	1314	1115	414	207	207
Dehri	280	2183	1118	1065	421	225	196
Bardiha	190	1283	698	585	226	121	105
Jamuaon	694	4261	2297	1964	803	446	357
Udaibhanpur	23	156	86	70	19	11	8
Bara	171	997	514	483	166	92	74
Bartiar	305	1788	942	846	330	184	146
Kosdihra	116	766	394	372	149	74	75
Kori	1067	6821	3434	3387	1208	589	619
Baranhpur	18	84	45	39	12	7	5
Khandaul	846	5179	2686	2493	791	429	362
Phulari	762	5036	2682	2354	762	387	375
Bhatauli	431	2482	1324	1158	345	169	176
Chanchar	Uninhabited Village						
Raman Sanrh	837	5613	3003	2610	890	478	412
Patkhaulia	85	552	273	279	103	54	49
Mahadeopur	Uninhabited Village						
AhimanChak	230	1457	736	721	282	131	151
Khemkaranpur	Uninhabited Village						
Baga	472	2697	1316	1381	473	243	230
Balra	Uninhabited Village						
TOTAL (10km)	**62035**	**389500**	**203283**	**186217**	**65654**	**34090**	**31564**
Source-Census of India, 2011							

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

Name of Village/Town	Total Population	Scheduled Castes			Scheduled Tribes		
		Persons	Males	Females	Persons	Males	Females
1. District Patna, Bihar							
Doghra	3199	336	178	158	0	0	0
Etwa	1381	337	172	165	0	0	0
Bindaul	3668	420	233	187	1	1	0
Taregna	1017	0	0	0	0	0	0
Mahuar	1587	380	204	176	0	0	0
PandeChak	695	333	173	160	0	0	0
Kelhanpur	2260	0	0	0	0	0	0
Nagabihta	658	82	42	40	0	0	0
Mathura Pur	372	0	0	0	0	0	0
Mithapur	596	0	0	0	0	0	0
Akhtiarpur	1511	350	175	175	0	0	0
Babhanlai	3627	702	378	324	1	1	0
Ghoratap	1920	210	93	117	1	0	1
Dihri	1567	181	94	87	0	0	0
Dalelganj 1	732	5	3	2	0	0	0
Sikaria	1798	593	324	269	0	0	0
Tarvan	718	163	78	85	0	0	0
Pakrandha	2040	14	7	7	0	0	0
Patut	9111	1563	822	741	1	0	1
Barah	7364	1667	872	795	2	1	1
Katari	2032	371	185	186	0	0	0

Birdhaur	3702	296	161	135	0	0	0
Berar	3052	135	67	68	24	12	12
Janpara	1765	63	34	29	0	0	0
Lahladpur	2047	261	152	109	0	0	0
Dullahpur	836	0	0	0	0	0	0
Donrapur	1251	517	274	243	10	6	4
Wazirpur	6929	2106	1085	1021	3	2	1
Raghunathpur	3026	130	71	59	0	0	0
Kanpa	3194	838	434	404	1	0	1
Saidabad	3730	649	325	324	25	13	12
Anharipur	568	0	0	0	0	0	0
Gona	3500	918	460	458	0	0	0
Habaspur	2893	749	390	359	0	0	0
Chandni	345	0	0	0	0	0	0
Barda	1517	577	283	294	0	0	0
Gopalpur	1008	314	163	151	0	0	0
Bara	1776	319	156	163	1	0	1
BeniBigha	2330	253	141	112	0	0	0
Chihunta	2146	532	269	263	0	0	0
Shahjahanpur	1216	187	93	94	0	0	0
Baigawan	891	400	209	191	1	0	1
Hathsar	461	0	0	0	0	0	0
Painapur	1927	27	18	9	0	0	0
Chichourha	1005	485	246	239	0	0	0
Jamalpur	1983	442	243	199	0	0	0
Akhtiarpur	3346	1336	699	637	25	10	15
Nagahra	3926	375	210	165	2	0	2
Faridpur	1130	674	336	338	0	0	0
Baghakol	1804	191	101	90	0	0	0
Gorakhri	6347	936	487	449	1	0	1
Moriawan	2835	814	412	402	9	5	4
Shivgarh	1819	258	141	117	0	0	0
Bikram (NP)/14 Wards	22486	3247	1691	1556	6	3	3
Baijalpur	778	0	0	0	0	0	0
Nisarpura	3458	775	394	381	1	0	1
Kab	10141	2234	1139	1095	2	1	1
Dorwan	2521	166	94	72	0	0	0
KasimChak	1521	155	89	66	0	0	0
Belhauri	3873	175	86	89	0	0	0
Silhouri	4051	1073	551	522	4	1	3
ChhotkaKharwa	4030	243	122	121	0	0	0
Raksia	1849	834	416	418	0	0	0
Khapuri	1099	302	152	150	0	0	0
Ganipur	Uninhabited Village						
Bhadsara	8834	1413	744	669	8	3	5
GulalChak	528	0	0	0	0	0	0
Bhalua	1331	262	136	126	0	0	0
Sadawe	4762	664	350	314	0	0	0
Andehri	1125	238	103	135	0	0	0
Baduri	895	96	48	48	0	0	0
Paipura Khurd	1088	253	129	124	0	0	0
Rajipur	4509	1281	654	627	0	0	0
Saraiya	2670	984	525	459	0	0	0
Achhua	3052	385	204	181	1	1	0
Kalyanpur	3450	329	177	152	0	0	0
Jalpura 1	1570	91	45	46	0	0	0
Masaurha	2413	600	310	290	0	0	0
Udaipur	2130	75	44	31	0	0	0
Mohbalipur	6863	1729	878	851	2	2	0

Mohabbatpur	634	0	0	0	0	0	0
Ranipur	1584	198	110	88	1	1	0
Fatehpur	1630	803	413	390	1	0	1
Hasanpur	269	54	23	31	0	0	0
DariapurPem	1697	853	438	415	1	0	1
Paipura Kalan	1783	307	151	156	0	0	0
Ijarta	1117	374	160	214	0	0	0
2. District Bhojpur, Bihar							
Saraiya	12464	1150	606	544	103	56	47
Khangaon	10711	1624	843	781	100	49	51
Guri	865	67	35	32	0	0	0
Manpur	822	45	21	24	0	0	0
Kusihan	913	569	297	272	0	0	0
Gopalpur	1753	118	55	63	0	0	0
Lodipur 1	1753	12	10	2	0	0	0
Jalpura 2	12168	1216	637	579	0	0	0
Bhagwatpur	1792	247	118	129	0	0	0
Bishunpur	2128	435	245	190	0	0	0
Sundra	1314	211	110	101	0	0	0
Jahanpur	1934	0	0	0	0	0	0
SarimpurBachri	3433	665	347	318	0	0	0
Lodipur 2	182	54	25	29	4	1	3
Narainpur	2711	173	88	85	25	12	13
Nansagar	328	37	18	19	0	0	0
Nasratpur	3279	335	176	159	0	0	0
Chilhauns	5054	946	473	473	0	0	0
Turkaul	3817	335	193	142	0	0	0
Jansara	1018	0	0	0	0	0	0
Ahpura	3321	695	364	331	0	0	0
Salempur	543	293	153	140	0	0	0
Sandesh	6874	1826	929	897	1	0	1
Panpura	483	0	0	0	0	0	0
Kanharpur	1319	96	51	45	0	0	0
Chela	2139	723	399	324	0	0	0
Panrepur	594	0	0	0	0	0	0
Basauri	484	0	0	0	0	0	0
Gaighat	Uninhabited Village						
Bhanpura	Uninhabited Village						
Dihra	3371	793	431	362	0	0	0
Maniach	2578	686	374	312	0	0	0
Bichhiaon	2994	527	272	255	0	0	0
Dharampur	1942	329	171	158	0	0	0
Surungapur	1756	0	0	0	0	0	0
Chauria	Uninhabited Village						
Dalelganj 2	1802	180	89	91	0	0	0
Parura Rampur	2522	740	382	358	0	0	0
Kusra	2462	377	205	172	0	0	0
Parura	3739	413	218	195	9	3	6
Deoar	1809	44	24	20	0	0	0
Akhgaon	3094	439	236	203	3	2	1
Partappur	1552	32	17	15	0	0	0
Kholpur	2429	278	157	121	0	0	0
Dehri	2183	91	42	49	0	0	0
Bardiha	1283	78	45	33	0	0	0
Jamuaon	4261	881	477	404	0	0	0
Udaibhanpur	156	0	0	0	0	0	0
Bara	997	0	0	0	0	0	0
Bartiar	1788	402	214	188	0	0	0
Kosdihra	766	0	0	0	0	0	0

Kori	6821	1098	554	544	0	0	0
Baranhpur	84	0	0	0	0	0	0
Khandaul	5179	231	115	116	0	0	0
Phulari	5036	586	297	289	0	0	0
Bhatauli	2482	540	275	265	0	0	0
Chanchar	Uninhabited Village						
Raman Sanrh	5613	887	476	411	0	0	0
Patkhaulia	552	257	126	131	0	0	0
Mahadeopur	Uninhabited Village						
AhimanChak	1457	77	44	33	0	0	0
Khemkaranpur	Uninhabited Village						
Baga	2697	295	140	155	0	0	0
Balra	Uninhabited Village						
TOTAL (10km)	**389500**	**64815**	**33643**	**31172**	**380**	**186**	**194**
Source-Census of India, 2011							

Sex Ratio

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

The '*Sex Ratio'* was observed as 897females per 1000 males in the District. The same was recorded as 916females for every 1000 males in the study area. The child (0-6 yr age) sex ratio of the stud area was observed as 926 female children per 1000 male children.

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

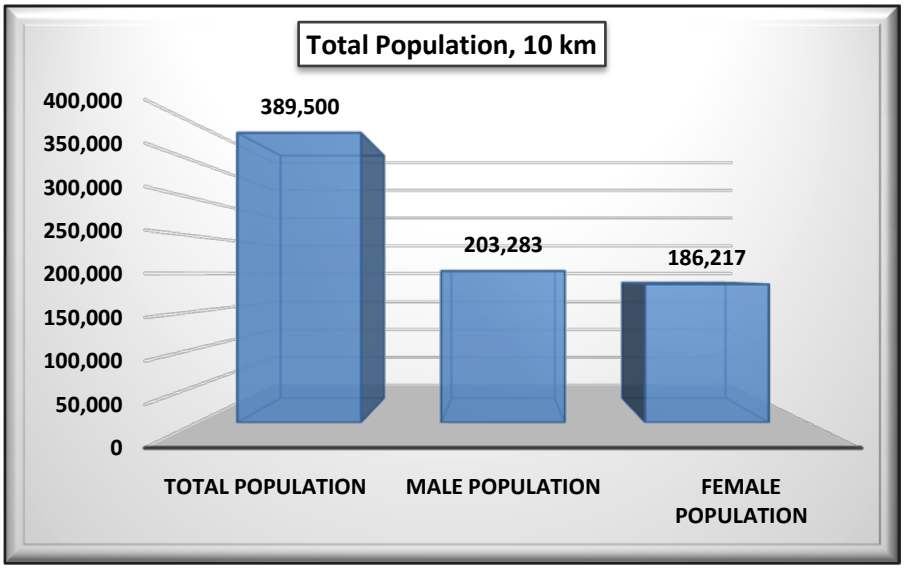


Figure 3.8 :Male-Female Wise Population Distribution

Scheduled Caste & Scheduled Tribe Population

On the basis of the village wise SC & ST population distribution of the study area during 2011, the *'Scheduled Castes'*population was observed as 64,815persons consisting of 33,645 males and 31,172females respectively in the study area which accounts as 16.6% to the total population (3,

89,500persons) of the study area. Scheduled Tribes ('ST') population was observed as 380 persons,accounts as 0.1% to the total population of the study zone consisting of 186males and 194females in the 10 km radius study zone.It implies that the rest 83.3% of the total population belongs to the general category.

Male-female wise distribution of '*SC*' & '*ST*'population in the study area is graphically shown in**Figure 3.9 & 3.10** as follows.

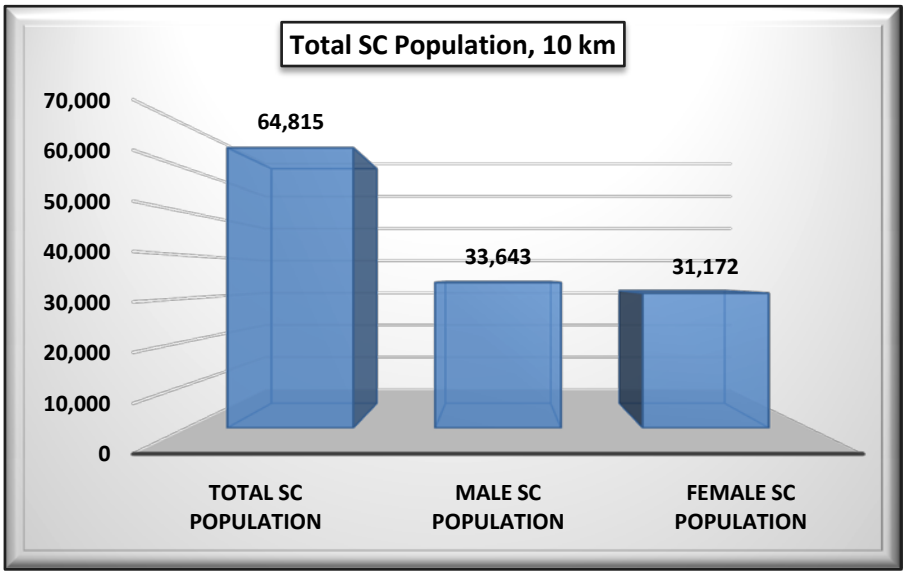


Figure 3.9 :Scheduled Caste Population in the Study Area

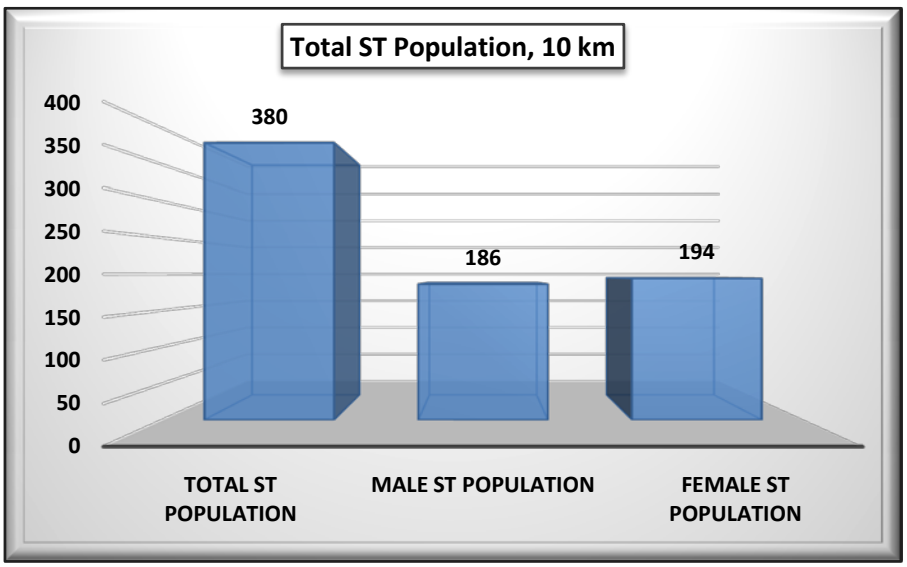


Figure 3.10:Scheduled Tribes Population in the Study Area

Literacy Rate

Literacy level is quantifiable indicator to assess the development status of an area or region. Male-Female wise literates and illiterate's population is represented in**Table3.34** Total literate's population was recorded as2,22,465 persons (57.0%) in the study area.**Table 3.34** reveals that Male-Female wise literates are observed as 1,36,450&86,015 persons respectively, implies that the 'Literacy Rate' is recorded as 57.0% with male-female wise percentages being 35.0% &22.0% respectively.

The Male-Female wise graphical representation of literates &illiterate's population in study area villages/town is shown in**Figure 3.11**

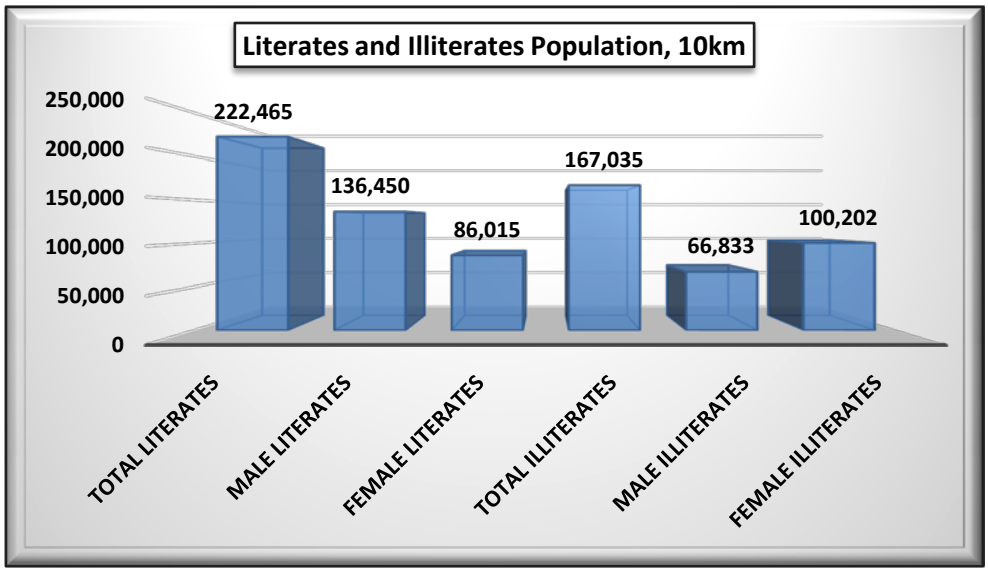


Figure3.11 :Male-Female Wise Distribution of Literates & Illiterates

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

Name of Village/Town	Total Population	Literates			Illiterates		
		Persons	Males	Females	Persons	Males	Females
1. District Patna, Bihar							
Doghra	3199	1631	1078	553	1568	626	942
Etwa	1381	822	506	316	559	227	332
Bindaul	3668	2111	1340	771	1557	653	904
Taregna	1017	413	292	121	604	240	364
Mahuar	1587	800	518	282	787	331	456
PandeChak	695	320	213	107	375	151	224
Kelhanpur	2260	987	671	316	1273	512	761
Nagabihta	658	437	257	180	221	80	141
Mathura Pur	372	194	114	80	178	73	105
Mithapur	596	460	251	209	136	50	86
Akhtiarpur	1511	771	447	324	740	285	455
Babhanlai	3627	2005	1212	793	1622	658	964
Ghoratap	1920	1126	693	433	794	316	478
Dihri	1567	967	556	411	600	241	359
Dalelganj 1	732	376	242	134	356	154	202
Sikaria	1798	973	578	395	825	379	446
Tarvan	718	353	231	122	365	129	236
Pakrandha	2040	1338	813	525	702	280	422
Patut	9111	5178	3134	2044	3933	1653	2280
Barah	7364	4586	2764	1822	2778	1153	1625
Katari	2032	1067	678	389	965	368	597
Birdhaur	3702	2329	1430	899	1373	548	825
Berar	3052	1650	977	673	1402	585	817
Janpara	1765	1004	648	356	761	298	463
Lahladpur	2047	1241	783	458	806	303	503
Dullahpur	836	657	351	306	179	72	107
Donrapur	1251	721	414	307	530	229	301
Wazirpur	6929	3842	2391	1451	3087	1249	1838
Raghunathpur	3026	1861	1176	685	1165	417	748
Kanpa	3194	1843	1148	695	1351	565	786

Saidabad	3730	2454	1461	993	1276	472	804
Anharipur	568	301	201	100	267	101	166
Gona	3500	2101	1275	826	1399	541	858
Habaspur	2893	1510	950	560	1383	543	840
Chandni	345	177	119	58	168	69	99
Barda	1517	724	437	287	793	332	461
Gopalpur	1008	530	313	217	478	227	251
Bara	1776	982	598	384	794	324	470
BeniBigha	2330	1482	909	573	848	347	501
Chihunta	2146	1291	773	518	855	347	508
Shahjahanpur	1216	708	427	281	508	193	315
Baigawan	891	524	328	196	367	123	244
Hathsar	461	354	201	153	107	43	64
Painapur	1927	1254	761	493	673	238	435
Chichourha	1005	442	269	173	563	259	304
Jamalpur	1983	1130	685	445	853	327	526
Akhtiarpur	3346	1754	1063	691	1592	668	924
Nagahra	3926	2150	1271	879	1776	724	1052
Faridpur	1130	619	369	250	511	196	315
Baghakol	1804	1119	651	468	685	303	382
Gorakhri	6347	4055	2430	1625	2292	868	1424
Moriawan	2835	1667	1000	667	1168	473	695
Shivgarh	1819	1071	668	403	748	281	467
Bikram (NP)/14 Wards	22486	14751	8537	6214	7735	3120	4615
Baijalpur	778	428	288	140	350	132	218
Nisarpura	3458	1688	1058	630	1770	733	1037
Kab	10141	6091	3611	2480	4050	1666	2384
Dorwan	2521	1417	855	562	1104	445	659
KasimChak	1521	925	569	356	596	259	337
Belhauri	3873	2319	1282	1037	1554	681	873
Silhouri	4051	2480	1471	1009	1571	620	951
ChhotkaKharwa	4030	2893	1626	1267	1137	497	640
Raksia	1849	1138	615	523	711	324	387
Khapuri	1099	651	385	266	448	193	255
Ganipur	Uninhabited Village						
Bhadsara	8834	4868	3013	1855	3966	1620	2346
GulalChak	528	305	205	100	223	80	143
Bhalua	1331	810	476	334	521	220	301
Sadawe	4762	2834	1684	1150	1928	817	1111
Andehri	1125	598	367	231	527	160	367
Baduri	895	500	303	197	395	144	251
Paipura Khurd	1088	637	366	271	451	187	264
Rajipur	4509	2403	1489	914	2106	826	1280
Saraiya	2670	1099	697	402	1571	695	876
Achhua	3052	1706	999	707	1346	557	789
Kalyanpur	3450	1731	1136	595	1719	730	989
Jalpura 1	1570	1085	622	463	485	206	279
Masaurha	2413	1425	831	594	988	372	616
Udaipur	2130	1066	693	373	1064	380	684
Mohbalipur	6863	3804	2316	1488	3059	1150	1909
Mohabbatpur	634	342	243	99	292	93	199
Ranipur	1584	917	555	362	667	273	394
Fatehpur	1630	842	513	329	788	343	445
Hasanpur	269	133	83	50	136	45	91
DariapurPem	1697	720	481	239	977	399	578
Paipura Kalan	1783	1031	620	411	752	257	495
Ijarta	1117	557	320	237	560	216	344
2. District Bhojpur, Bihar							
Saraiya	12464	7525	4566	2959	4939	2088	2851

Khangaon	10711	6057	3690	2367	4654	1927	2727
Guri	865	450	297	153	415	144	271
Manpur	822	502	290	212	320	133	187
Kusihan	913	408	243	165	505	238	267
Gopalpur	1753	1030	624	406	723	279	444
Lodipur 1	1753	1138	651	487	615	238	377
Jalpura 2	12168	6504	4305	2199	5664	2127	3537
Bhagwatpur	1792	1207	681	526	585	266	319
Bishunpur	2128	1208	749	459	920	385	535
Sundra	1314	712	440	272	602	234	368
Jahanpur	1934	995	640	355	939	373	566
SarimpurBachri	3433	1924	1157	767	1509	625	884
Lodipur 2	182	110	56	54	72	21	51
Narainpur	2711	1804	1078	726	907	363	544
Nansagar	328	200	121	79	128	42	86
Nasratpur	3279	1719	1072	647	1560	662	898
Chilhauns	5054	2585	1763	822	2469	833	1636
Turkaul	3817	2201	1396	805	1616	670	946
Jansara	1018	511	385	126	507	157	350
Ahpura	3321	2040	1247	793	1281	505	776
Salempur	543	253	154	99	290	137	153
Sandesh	6874	4021	2453	1568	2853	1120	1733
Panpura	483	304	196	108	179	59	120
Kanharpur	1319	866	520	346	453	209	244
Chela	2139	1037	672	365	1102	443	659
Panrepur	594	176	132	44	418	203	215
Basauri	484	316	201	115	168	53	115
Gaighat	Uninhabited Village						
Bhanpura	Uninhabited Village						
Dihra	3371	1951	1253	698	1420	533	887
Maniach	2578	1457	874	583	1121	473	648
Bichhiaon	2994	1562	993	569	1432	526	906
Dharampur	1942	1016	611	405	926	404	522
Surungapur	1756	977	636	341	779	264	515
Chauria	Uninhabited Village						
Dalelganj 2	1802	953	636	317	849	303	546
Parura Rampur	2522	1266	780	486	1256	556	700
Kusra	2462	968	667	301	1494	665	829
Parura	3739	2052	1251	801	1687	704	983
Deoar	1809	861	569	292	948	377	571
Akhgaon	3094	1834	1099	735	1260	527	733
Partappur	1552	1065	598	467	487	171	316
Kholpur	2429	1237	886	351	1192	428	764
Dehri	2183	1147	766	381	1036	352	684
Bardiha	1283	654	444	210	629	254	375
Jamuaon	4261	2042	1346	696	2219	951	1268
Udaibhanpur	156	57	43	14	99	43	56
Bara	997	678	393	285	319	121	198
Bartiar	1788	1009	640	369	779	302	477
Kosdihra	766	353	246	107	413	148	265
Kori	6821	3549	2261	1288	3272	1173	2099
Baranhpur	84	59	38	21	25	7	18
Khandaul	5179	2624	1657	967	2555	1029	1526
Phulari	5036	3194	1990	1204	1842	692	1150
Bhatauli	2482	1427	928	499	1055	396	659
Chanchar	Uninhabited Village						
Raman Sanrh	5613	3301	2080	1221	2312	923	1389
Patkhaulia	552	318	189	129	234	84	150
Mahadeopur	Uninhabited Village						

AhimanChak	1457	727	475	252	730	261	469
Khemkaranpur	Uninhabited Village						
Baga	2697	1668	948	720	1029	368	661
Balra	Uninhabited Village						
TOTAL (10km)	**389500**	**222465**	**136450**	**86015**	**167035**	**66833**	**100202**
Source-Census of India, 2011							

Economic Profile of Patna District:

Patna has long been a major agricultural hub and centre of trade.It's most active exports are grain, sugarcane, sesame, and medium-grained Patna rice. There are several sugar mills in and around Patna. It is an important business and luxury brand centre of eastern India.

The economy of Patna has seen sustained economic growth since 2005. The economy has been spurred by growth in the Fast-Moving Consumer Goods industry, the service sector, along with Green revolution businesses. In 2009, the World Bank stated Patna as the second best city in India to start up a business. As of 2015, GDP per capita of Patna is ₹1, 06,000 and its GDP growth rate is 7.29%.

Patna is the 21st fastest growing city in the world, and the fifth fastest growing city in India, and is expected to grow at an average annual rate of 3.72%.

Workers Scenario:

Occupational studied to assess the skills of people in the study area. Occupational pattern helps in identifying major economic activities of the area. In the study area the Main and Marginal Workers population was observed as 85,529(22.0%) and 51,723(13.0%) to the total population (3, 89,500), while the remaining 2,52,248(65.0%) persons were recorded as non-workers. Thus it implies that the semi-skilled and non-skilled work-force required in study area for the project is available in aplenty.

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

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

Name of the Village/Town	MAIN WORK_P	MAIN_CL_P	MAIN_AL_P	MAIN_HH_P	MAIN_OT_P	MARG WORK_P	MARG_CL_P	MARG_AL_P	MARG_HH_P	MARG_OT_P
1. District Patna, Bihar										
Doghra	450	16	304	73	57	904	49	432	215	208
Etwa	335	183	125	1	26	104	27	74	0	3
Bindaul	868	239	400	18	211	154	12	132	0	10
Taregna	291	10	219	9	53	115	5	15	4	91
Mahuar	251	64	48	97	42	328	64	209	2	53
PandeChak	155	25	25	0	105	40	10	27	0	3
Kelhanpur	612	88	373	0	151	42	9	27	4	2
Nagabihta	197	63	107	2	25	11	3	3	0	5
Mathura Pur	97	17	75	0	5	105	5	99	0	1
Mithapur	110	81	0	0	29	14	3	11	0	0
Akhtiarpur	153	29	49	1	74	283	15	231	4	33
Babhanlai	819	539	168	17	95	656	239	314	35	68
Ghoratap	387	133	128	18	108	141	15	82	25	19
Dihri	161	120	5	0	36	253	79	159	1	14
Dalelganj 1	148	102	42	0	4	38	3	34	0	1
Sikaria	249	110	74	7	58	364	15	345	0	4
Tarvan	89	80	2	0	7	112	2	107	3	0
Pakrandha	139	47	33	41	18	523	31	332	26	134
Patut	2428	533	1224	131	540	979	76	483	79	341
Barah	1567	209	709	73	576	1087	96	780	33	178
Katari	363	158	88	8	109	589	13	425	3	148
Birdhaur	808	115	305	47	341	179	7	84	9	79
Berar	685	262	239	41	143	463	55	155	52	201
Janpara	517	60	241	19	197	414	30	339	2	43
Lahladpur	432	202	99	5	126	587	105	388	9	85
Dullahpur	329	235	24	17	53	172	9	21	2	140
Donrapur	328	103	195	10	20	158	15	136	1	6
Wazirpur	1657	801	676	50	130	418	219	155	7	37
Raghunathpur	572	247	223	34	68	696	175	317	129	75
Kanpa	767	242	319	45	161	461	26	278	78	79
Saidabad	413	82	203	14	114	702	102	353	51	196
Anharipur	124	2	61	1	60	5	0	1	0	4

Gona	912	194	195	49	474	435	23	235	17	160
Habaspur	709	392	223	16	78	670	230	259	152	29
Chandni	85	37	48	0	0	89	0	83	6	0
Barda	485	122	212	51	100	356	43	164	115	34
Gopalpur	291	158	40	7	86	121	2	107	5	7
Bara	392	148	55	109	80	238	24	171	17	26
BeniBigha	401	126	167	32	76	519	10	434	48	27
Chihunta	712	385	206	7	114	100	30	47	6	17
Shahjahanpur	371	51	178	26	116	257	15	105	4	133
Baigawan	343	8	148	106	81	127	5	1	89	32
Hathsar	44	4	4	6	30	120	3	37	5	75
Painapur	625	309	127	118	71	144	28	61	3	52
Chichourha	156	0	8	80	68	100	1	37	55	7
Jamalpur	571	77	240	106	148	168	3	67	34	64
Akhtiarpur	455	25	263	46	121	916	54	592	132	138
Nagahra	1324	378	607	198	141	576	31	309	96	140
Faridpur	214	19	176	4	15	197	24	135	20	18
Baghakol	443	228	91	7	117	280	37	213	2	28
Gorakhri	1273	425	241	183	424	1334	330	617	132	255
Moriawan	512	161	138	64	149	637	32	237	98	270
Shivgarh	228	115	31	7	75	600	55	463	10	72
Bikram (NP)/14 Wards	3880	515	1022	276	2067	4124	145	1559	551	1869
Baijalpur	392	105	27	146	114	38	2	1	16	19
Nisarpura	1020	357	354	152	157	567	143	389	12	23
Kab	3344	1042	1174	101	1027	865	167	389	74	235
Dorwan	521	82	230	8	201	175	7	98	4	66
KasimChak	452	67	140	8	237	84	11	66	1	6
Belhauri	812	166	283	29	334	257	16	108	36	97
Silhouri	1048	229	549	24	246	334	36	271	6	21
ChhotkaKharwa	795	120	207	101	367	427	66	298	38	25
Raksia	724	14	666	2	42	80	31	43	0	6
Khapuri	158	56	28	6	68	163	3	106	29	25
Ganipur	Uninhabited Village									
Bhadsara	1816	630	901	26	259	1270	622	473	29	146
GulalChak	131	3	122	1	5	18	0	5	0	13
Bhalua	441	116	262	5	58	113	29	53	8	23

Sadawe	1556	445	363	37	711	448	43	187	31	187
Andehri	459	17	309	26	107	76	8	27	4	37
Baduri	227	10	46	0	171	49	14	10	3	22
Paipura Khurd	552	302	204	32	14	77	1	34	26	16
Rajipur	1230	39	287	4	900	387	32	281	9	65
Saraiya	845	385	399	19	42	138	10	87	23	18
Achhua	805	206	503	7	89	577	79	474	6	18
Kalyanpur	877	155	665	1	56	318	11	236	1	70
Jalpura 1	166	89	20	1	56	240	160	42	1	37
Masaurha	404	183	137	22	62	597	98	360	70	69
Udaipur	240	48	64	33	95	542	38	436	39	29
Mohbalipur	993	386	249	52	306	967	94	725	51	97
Mohabbatpur	93	80	6	0	7	27	17	9	0	1
Ranipur	402	126	201	4	71	130	26	82	1	21
Fatehpur	304	28	230	5	41	331	1	316	5	9
Hasanpur	38	17	13	0	8	52	8	41	0	3
DariapurPem	354	84	221	12	37	481	35	245	13	188
Paipura Kalan	540	211	298	1	30	10	8	2	0	0
Ijarta	178	35	87	8	48	216	2	207	2	5
2. District Bhojpur, Bihar										
Saraiya	2737	781	588	272	1096	1374	257	548	34	535
Khangaon	2534	1112	992	25	405	545	73	340	101	31
Guri	240	79	110	6	45	49	13	19	7	10
Manpur	369	5	110	24	230	17	4	2	0	11
Kusihan	293	38	204	15	36	30	1	22	0	7
Gopalpur	443	61	330	0	52	74	1	70	0	3
Lodipur 1	447	100	187	47	113	13	1	10	1	1
Jalpura 2	2853	1174	840	93	746	1491	102	1156	37	196
Bhagwatpur	708	164	108	1	435	81	5	70	0	6
Bishunpur	574	133	270	8	163	39	3	32	0	4
Sundra	90	0	78	1	11	595	4	587	1	3
Jahanpur	295	119	158	0	18	605	16	586	1	2
SarimpurBachri	708	353	283	5	67	102	16	84	0	2
Lodipur 2	23	6	12	0	5	1	0	1	0	0
Narainpur	633	149	287	34	163	23	2	10	3	8
Nansagar	57	35	21	1	0	0	0	0	0	0

Nasratpur	438	76	281	15	66	359	202	90	33	34
Chilhauns	556	118	184	10	244	660	82	340	8	230
Turkaul	501	120	256	40	85	432	11	334	55	32
Jansara	425	12	385	5	23	105	3	19	2	81
Ahpura	1022	119	699	101	103	111	25	41	16	29
Salempur	16	0	4	0	12	244	43	200	0	1
Sandesh	1591	106	507	344	634	684	42	290	66	286
Panpura	123	1	111	0	11	5	0	4	0	1
Kanharpur	240	68	105	0	67	109	10	72	0	27
Chela	368	186	113	3	66	365	135	212	4	14
Panrepur	138	24	80	17	17	16	6	2	2	6
Basauri	128	95	32	0	1	0	0	0	0	0
Gaighat	Uninhabited Village									
Bhanpura	Uninhabited Village									
Dihra	484	242	83	29	130	469	15	446	0	8
Maniach	188	128	9	1	50	648	37	535	6	70
Bichhiaon	389	178	38	9	164	559	80	341	14	124
Dharampur	161	113	15	7	26	493	24	449	3	17
Surungapur	431	123	273	4	31	465	176	170	1	118
Chauria	Uninhabited Village									
Dalelganj 2	287	99	131	6	51	163	41	105	3	14
Parura Rampur	336	27	267	10	32	883	10	806	26	41
Kusra	1036	347	565	107	17	113	49	40	15	9
Parura	944	155	497	157	135	579	70	324	34	151
Deoar	245	193	16	1	35	457	8	423	4	22
Akhgaon	527	44	292	26	165	166	12	82	16	56
Partappur	195	101	23	10	61	265	18	228	0	19
Kholpur	494	155	246	6	87	518	91	313	14	100
Dehri	546	294	28	14	210	205	24	99	6	76
Bardiha	81	46	2	8	25	308	42	70	61	135
Jamuaon	814	161	341	41	271	665	139	393	24	109
Udaibhanpur	24	24	0	0	0	1	1	0	0	0
Bara	329	144	93	54	38	53	0	6	38	9
Bartiar	539	132	163	158	86	211	14	119	23	55
Kosdihra	154	125	8	0	21	38	4	30	1	3
Kori	2100	166	1545	52	337	154	4	131	4	15

Baranhpur	15	8	5	0	2	11	2	9	0	0
Khandaul	783	329	331	7	116	767	26	632	11	98
Phulari	912	150	515	5	242	658	200	294	11	153
Bhatauli	239	39	147	20	33	335	27	276	11	21
Chanchar	Uninhabited Village									
Raman Sanrh	1313	452	596	77	188	549	124	171	36	218
Patkhaulia	113	30	70	0	13	5	0	2	1	2
Mahadeopur	Uninhabited Village									
AhimanChak	223	37	91	46	49	269	14	208	17	30
Khemkaranpur	Uninhabited Village									
Baga	233	12	123	3	95	328	66	232	9	21
Balra	Uninhabited Village									
TOTAL (10km)	**85529**	**24195**	**34296**	**5075**	**21963**	**51723**	**6832**	**30657**	**3669**	**10565**
Source-Census of India, 2011										

ABBREVIATIONS:

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

MARGINAL WORKERS POPULATION:

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

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

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

Occupation Class	Year, 2011
Main Workers	**85,529 (22.0%)**
Male	65,342(76.4%)
Female	20,187(23.6%)
Marginal Workers	**51,723(13.0%)**
Male	30270(58.5%)
Female	21,453(41.5%)
Non-Workers	**2,52,248(65.0%)**
Male	1,07,671 (42.7%)
Female	1,44,577(57.3%)
Total Population (10km)	**3,89,500**
Source: Census of India Records, 2011	

Graphical representation of Workers Scenario is given below as**Figure 3.12**

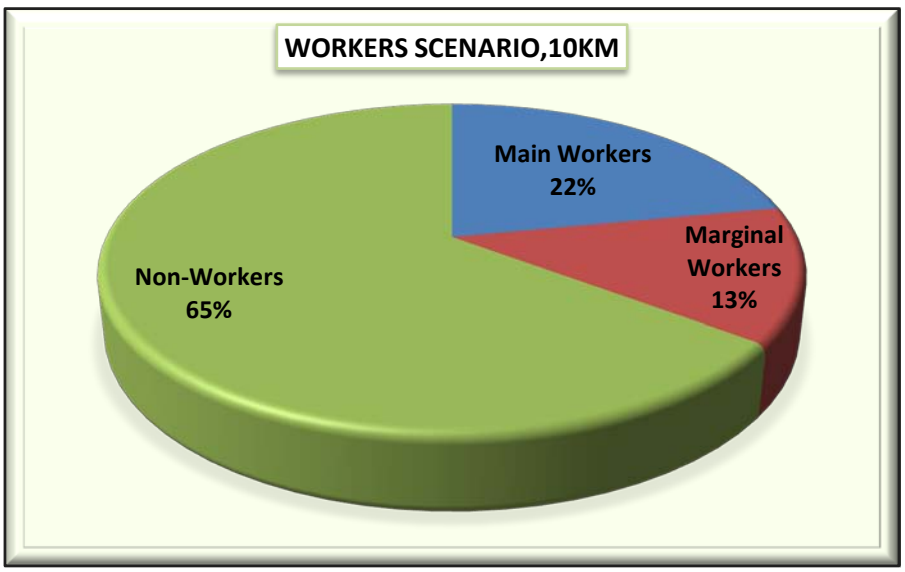


Figure 3.12 :Workers Scenario of Study Area

Composition of Main Workers:

The 'Main Workers' were observed as 85,529persons (22.0%) to the total population (3, 89,500) of the study area and its composition is made-up of Casual laborers as 24,195 (28.0%), Agricultural laborers as 34,296(40.0%), Household workers 5,075(6.0%) and other workers as 219,63(26.0%) respectively.

Composition of Main workers is shown below as**Figure 3.13**

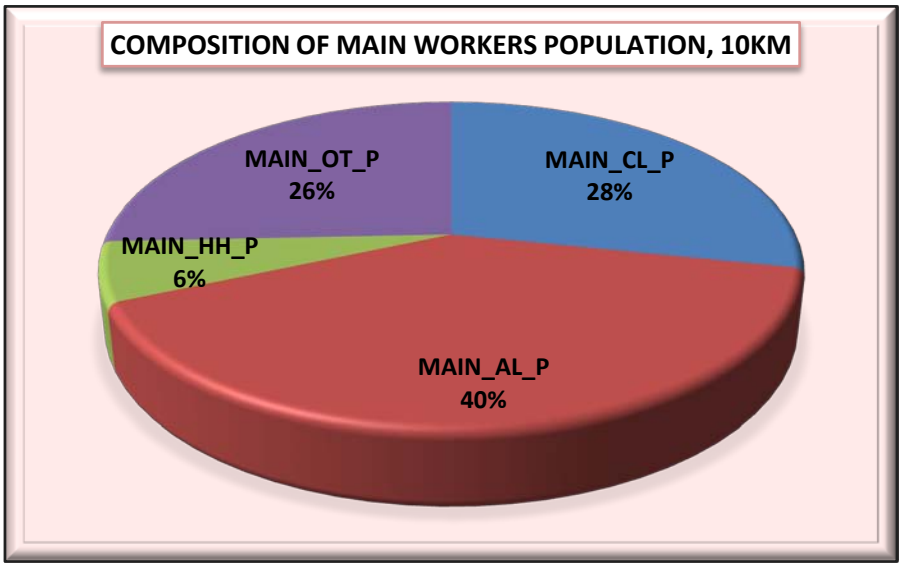


Figure 3.13 :Composition of Main Workers Population

Composition of Marginal Workers:

The total marginal workers are observed as 51,723 which constitute 13.0% to the total population (3, 89,500) comprising of Marginal Casual Laborers as 6,832 (13.0%), Marginal Agricultural Laborers as 30,657(59.0%), Marginal Household laborers as 3,669 (7.0%) and marginal other workers were also observed as 10,565 (21.0%) of the total marginal workers respectively.

Details about marginal workers in the study area are tabulated inTableComposition of Marginal workers is shown in**Figure 3.14** as follows.

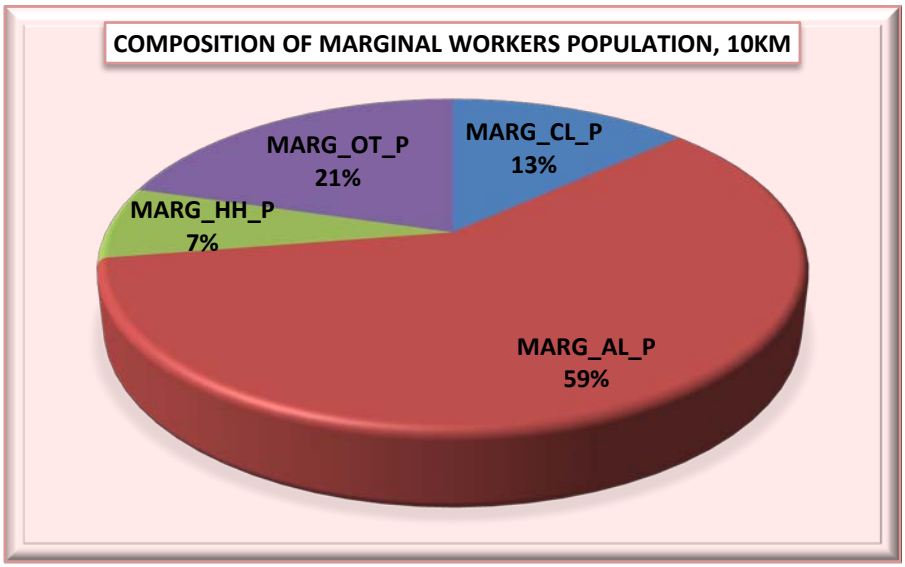


Figure 3.14 :Composition of Marginal Workers

Composition of Non-Workers:

The total Non-worker's population was observed as 2, 52,248 which accounts65.0% to the total population (3, 89,500) of the study area. Male-female wise Non-worker's population was recorded as 1, 07,671 Males (42.7%) and 1, 44,577Females (57.3%) respectively.

Details about Total Non-workers in the study area are compiled in**Table 3.38** Graphical representation of Non-worker's population is shown as follows in**Figure 3.15**

Table 3.38 :Composition of Non-Workers

Non-Workers Population		
Persons	**Males**	**Females**
2,52,248	1, 07,671 (42.7%)	1,44,577(57.3%)

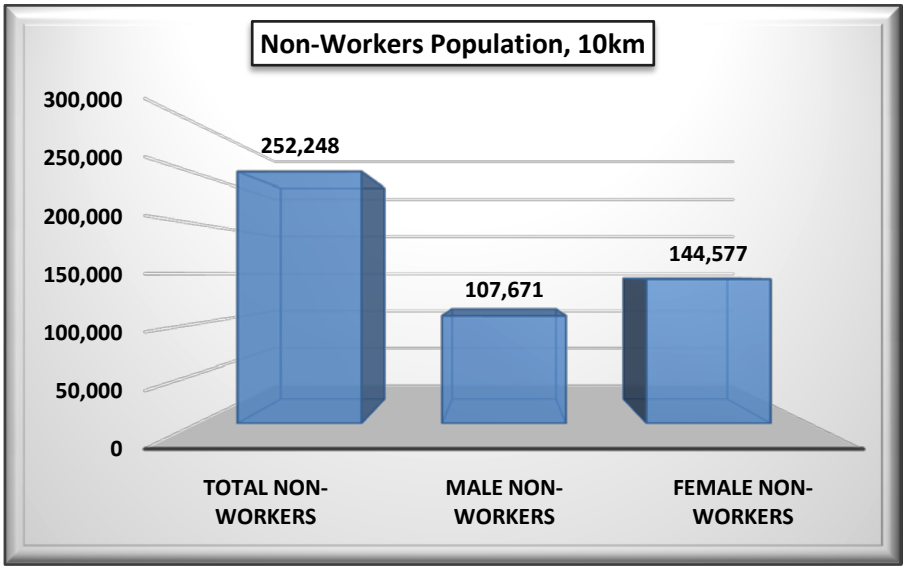


Figure 3.15: Composition of Non-Workers

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

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

As per the Census Records 2011, the study area has a total of 150 villages and one town named Bikram (NP) of Bikram tehsil of Patna district lying under Patna and Bhojpur Districts respectively in Bihar state. Overall study area villages are falling mainly under Seven (07) tehsils namely Bihta (17 villages), Bikram (37 villages), Dulhin Bazar (21 villages), Paliganj (12 villages), Barhara (01 village), Koilwar (11 villages) and Sandesh (52 villages) of Patna and Bhojpur district respectively in Bihar state. There are eight (08) villages of 2 major concerned districts named Patna and Bhojpur in Bihar state found as uninhabited villages in the study area.

There is only one town named Bikram (NP) / 14 Wards under Bikram tehsil of Patna district was found in the 10km radial study zone. There are Six towns named Bihata, Bikram (NP), Masaurhi, Jehanabad of Patna and Arrah & Koilwar of Bhojpur district available in the distance range of 5 to 40km from the villages of study zone.

Educational Facilities

There isa total no. of180 Primary schools existing in the 10km radius study area.About 143 no of Middle schools are foundin the study area. About120Higher Secondary School (SS) andsixteen (16)Senior Secondary School (SSS) facility is available in the study area. The educational facilities

have been further strengthening now and a number of private public schools and colleges are also functioning in the surroundings of the study area. Besides, there are Engineering and Medical colleges available in Towns and District headquarters only. Higher education facilities are available in Towns of the district. There is a considerable improvement in educational facility. The villages of the study area have no such facilities can reach within 5to 10km range.No town was found in the 10 km radial study area.

Availability of University Education in Bhojpur District

University education facility is available in the district. Many courses are studied in these universities. These universities are Patna University, Chankaya Law University, Extension center of Magadh University, Regional Study Center of Indira Gandhi Open University, Regional Center of Maulana Azad Urdu University, Nalnda Open University etc.

Medical Facilities

The medical facilities are provided by different agencies like Govt. & Private individuals and voluntary organizations in the study area. As per the census 2011, only 27primary health centersexistin the study area; most of the study area villages depend upon the towns & district HQ of the study area having such facility. No community health centre exists in the study area. Only fourty-seven (47)Primary Health Sub-Centers exists in the villages of the study area. Only twenty-seven(27) no of Mother & Child Welfare Centersarefound in the study area. Noallopathic hospitalexists in the study area. Only nineteen (19)medical dispansaries are found in the study area. Only twenty-seven (27) Family Welfare Centersare found in the study area. Overall study area villages are served by average medical facilities. Specialized medical facilities are available only in towns and District Headquarter (HQ) only.

Potable Water Facilities

Potable water facility is available in most of the villages of the study area. The entire study area has average level of potable water facilities. Hand Pump(HP) water facility is commonly observed in the study area as potable water facility. Out of the total 151 villages/town,only58 villages (38.7%)are served with River/Canal water in the study area. As per the census records 2011, about8(5.3%) villagesare being served with Tank/Pond/Lake as potable water facility in the study area.

Communication, Road & Transport Facilities

Apart from Post &Telegraph Office (PTO) services, transport is the main communication linkage in the study area. Compiled census 2011, data shows that the study area has good postal facilities in the 10km radius zone. About 56 villages(37.3%) were foundserving with Post Office facilities in the study area, remaining villages are depending upon towns of the study area. The study area has average rail and road network, passes from the area. Only 08villages werefound with railway station facility in the study area.

The proposed sand mine project is situated at Mauza Kab, Lahladpur, Janpara-I, Janpara-II, Anchal Bikram &Dulhin Bazar, District Patna, Bihar, over an area of 42.09 ha.The proposed project activity will be carried out in the bed of the River Son.

The mine site is well connected via an approach road of 2 km which further connects NH-139, approx. 3 km towards East direction. Bihta Railway Station is at approx. 15 km towards NE direction from site. Nearest Airport is JPN International Airport at a distance of 35 km in NE direction.

Communication

Roads **-** The district of Patna is well served by a network of roads. Road communication is the main mode of transportation in this district. The roads are classified as the National Highways, State Highways, Major district roads and other district roads. They are maintained by the Public Works Department, the Rural Engineering Organisation, the Zila Parishad and Municipalities. It is also connected with the interior of the district by metalled road. Five National Highway (NH) and Three State Highway (SH) cross the district. NH-2, NH-19, NH-30, NH-31 and NH-83 pass through the district. SH-1, SH-2 and SH-4 also pass through the district.

Railways **-** The district of Patna has a railway communication system. It is served by East Central Railway.

The main line of the East Central Railway passes through the entire length of the district running parallel to the Ganges. There are two railway lines running across the district from north to south, viz., the Patna - Gaya Branch and Bakhtiyarpur- Rajgir line. The third Fatuha - Islampur line is under construction. All three are branches of the East Central Railway. With the opening of the famous Patna-Hajipur Bridge (Mahatma Gandhi Setu), the ferry service connecting the capital with the North-Eastern Railway System has ceased to function.

Airways **-** Patna is connected by air to Calcutta, Delhi and Mumbai and a few other places by daily flights. There is an aerodrome near Phulwarisharif and another at Bihta.

Boats **–** The Ganges is navigable throughout the year and there is considerable boat traffic for transporting cargo. The smaller rivers, e.g., Punpun and Dardha become navigable only during the rains when they are used for transporting agricultural produce to the grain market at Fatuah. A ferry service has been started from Haldiya to Allahabad for transportation. The National Waterway-1 also passes through the district.

Banking Facility

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

Trade and Commerce - The development of the means of communication has had a great impact on the trade and commerce of the district. The district may now be said to be fairly well- connected by Road and Rail. Patna town is the hub of commercial activities of the district. Its central position at the junction of the three great rivers, viz., the Sone, the Gandak and the Ganges gives it an additional advantage for the purpose of transport by river. The city proper comprises the large business quarters such as Marufganj, Mansurganj, the *Chawk*with Mirchaiganj, Maharajganj and other petty *bazars.* Marufganj is by far the most important of any of the marts in the city. Besides the city of Patna, other important trade centres in the district are Dinapur, Barh, Mokameh, Fatwah and Masaurhi. In Patna district, trade consists mainly of export of pulses, dry chilies, castor seed, milk products and vegetables and import of cotton textiles, iron and steel products, cement, coal and consumer goods.

Power Supply

It is revealed from the compiled information on amenities availability as per the census record of 2011; most of the villages and towns are electrified for Domestic, Agriculture, and Commercial& for allpurposes. About 71villages (47.3%) of the study area are electrified for domestic purpose, 39villages (26.0%) for agricultural purpose,and 27villages (18.0%) for commercial purpose and for all purposes in the study area.Out of 151 villages/towns in the study area, 78villages (51.7%) including 8uninhabited villages (5.3%)are not electrified for any purpose in the study area.

The district Patna receives its entire power supply from the Barauni Thermal Power Station, the Patratu Thermal Power Station and NTPC. All the 12 towns of Patna district have electricity. In rural areas also, the pace of electrification has been comparatively fast. In terms of proportion Patna is, better provided with electricity than many other districts of the State. The Government is paying full attention to provide electricity to villages under the Rural Electrification Scheme. The main consumption of electricity in the rural areas is for agricultural purposes. Total numbers of villages electrified in the district are 1012.

Village/town wise Basic Infrastructure and Amenities availabilities data for the entire study area is compiled and presented in**Table 3.39**as follows;

Table 3.39 :Village wise Basic Amenities Availability

Name of the Village/Town	Educational				Medical							Drinking Water						CT	Communication & Transport				Approach to the Village				Power Supply				Nearest Town & Distance, km
	P	M	SS	SSS	CHC	PHC	PHSC	MCWC	H	D	FWC	T	W	HP	TW	R	Tk		PO	PTO	BS	RS	PR	KR	NW	FP	ED	E Ag.	EC	EA	
1. District Patna, Bihar																															
Doghra	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	1	1	2	2	Bihata,11km
Etwa	2	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	2	2	2	1	1	1	2	2	Bihata,10km
Bindaul	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	2	1	1	1	1	1	1	1	Bihata,10km
Taregna	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	Bihata,11km
Mahuar	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	1	1	1	2	2	2	Bihata,11km
PandeChak	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Bihata,11km
Kelhanpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	Bihata,11km
Nagabihta	1	1	1	1	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	1	1	1	1	2	1	1	1	1	1	Bihata,20km
Mathura Pur	1	1	1	1	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	1	1	1	1	2	1	1	1	1	1	Bihata,20km
Mithapur	1	1	1	1	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	1	1	1	1	2	1	1	1	1	1	Bihata,20km
Akhtiarpur	1	1	1	1	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	1	1	1	1	2	1	1	1	1	1	Bihata,20km
Babhanlai	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	1	2	2	2	2	2	2	2	2	1	1	2	2	2	Bihata,10km
Ghoratap	1	1	1	0	0	1	1	1	0	1	1	2	2	1	1	1	2	2	2	2	2	2	1	1	1	1	1	2	2	2	Bihata,10km
Dihri	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Bihata,8km
Dalelganj 1	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	Bihata,8km
Sikaria	1	1	1	0	0	0	1	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Bihata,7km
Tarvan	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	Bihata,6km
Pakrandha	1	1	1	0	0	1	1	1	0	1	1	2	2	1	1	2	2	2	2	2	2	1	1	1	2	1	1	1	1	1	Bihata,8km
Patut	1	1	1	2	0	0	1	0	0	0	0	2	1	1	1	2	2	2	1	2	2	2	1	1	2	1	1	2	2	2	Bihata,5km
Barah	1	1	1	0	0	1	1	1	0	1	1	2	1	1	2	2	2	2	1	2	2	2	1	2	2	1	1	1	2	2	Bihata,10km
Katari	2	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	2	2	1	2	1	2	2	Bihata,10km
Birdhaur	1	1	1	0	0	1	1	1	0	1	1	2	2	1	1	1	2	2	1	2	2	2	2	2	2	1	1	2	2	2	Bihata,6km
Berar	2	2	2	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Bihata,8km
Janpara	1	1	1	0	0	1	1	1	0	1	1	2	2	1	1	2	2	2	2	2	2	2	1	2	2	1	1	1	2	2	Bihata,15km
Lahladpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	2	2	2	1	2	2	2	2	Bihata,15km
Dullahpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	1	1	1	1	2	2	Bihata,10km
Donrapur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	2	2	Bihata,8km
Wazirpur	1	1	1	1	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	2	1	1	2	2	2	Bihata,5km
Raghunathpur	3	3	3	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	Bihata,6km

Kanpa	1	1	1	0	0	0	1	0	0	0	0	2	1	1	2	2	2	2	2	2	1	2	1	2	2	1	2	2	2	2	Bihata,7km
Saidabad	2	2	2	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	1	2	1	1	2	1	2	2	2	2	Bihata,8km
Anharipur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	2	1	1	2	2	2	Bihata,10km
Gona	1	1	1	0	0	1	1	1	0	1	1	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Bihata,10km
Habaspur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	1	1	1	2	2	2	Bihata,7km
Chandni	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	Bihata,10km
Barda	1	1	1	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Bihata,7km
Gopalpur	1	1	1	0	0	1	1	1	0	1	1	2	2	1	1	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Bihata,7km
Bara	1	1	1	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	2	2	1	2	2	1	2	1	1	1	1	1	Bihata,7km
BeniBigha	1	1	1	0	0	0	1	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	1	1	1	1	2	2	Bihata,8km
Chihunta	1	1	1	0	0	1	1	1	0	1	1	2	2	1	1	1	1	2	2	2	2	2	2	1	1	1	2	2	2	2	Bihata,8km
Shahjahanpur	1	1	1	0	0	1	1	1	0	1	1	2	2	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	2	2	Bihata,7km
Baigawan	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Bihata,7km
Hathsar	1	1	1	0	0	1	1	1	0	1	1	2	2	1	1	1	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Bihata,7km
Painapur	1	1	1	0	0	0	1	0	0	0	0	2	2	1	1	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	Bihata,3km
Chichourha	1	1	1	0	0	1	1	1	0	1	1	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Bihata,3km
Jamalpur	1	1	1	0	0	1	1	1	0	1	1	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Bihata,3km
Akhtiarpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	1	1	1	2	1	2	2	2	2	Bihata,4km
Nagahra	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Bihata,5km
Faridpur	3	3	3	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	1	2	1	2	2	1	2	2	2	2	Bihata,5km
Baghakol	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Bihata,5km
Gorakhri	1	1	1	1	0	0	1	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Bihata,4km
Moriawan	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	2	2	Bihata,6km
Shivgarh	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Bihata,5km
Bikram (NP)/14 Wards	Urban Part																														Bikram (NP),0km
Baijalpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Masaurhi,24km
Nisarpura	1	2	2	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Masaurhi,27km
Kab	1	1	1	2	0	1	1	1	0	1	1	2	1	1	1	2	2	2	1	2	1	2	1	2	1	1	1	1	1	1	Masaurhi,24km
Dorwan	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	1	1	1	2	2	2	Masaurhi,21km
KasimChak	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Masaurhi,19km
Belhauri	3	3	3	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	1	2	1	1	2	1	1	1	1	1	Masaurhi,19km
Silhouri	4	4	4	0	0	0	0	0	0	0	0	2	1	1	2	1	2	1	2	2	2	2	1	1	2	1	1	1	1	1	Masaurhi,19km
ChhotkaKharwa	1	1	1	0	0	1	1	1	0	1	1	2	2	1	2	2	2	2	1	2	1	2	1	1	2	1	1	1	1	1	Masaurhi,19km
Raksia	2	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Masaurhi,21km
Khapuri	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	1	1	1	2	2	2	Masaurhi,22km
Ganipur	Uninhabited Village																														Masaurhi,22km
Bhadsara	5	5	5	2	0	0	1	0	0	0	0	2	1	1	1	2	2	2	1	2	1	2	1	1	2	1	1	1	1	1	Masaurhi,20km
GulalChak	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	1	1	1	2	2	2	Masaurhi,20km

Bhalua	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	1	1	1	2	2	2	Masaurhi,21km
Sadawe	1	1	1	0	0	0	1	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	1	1	1	2	2	2	Masaurhi,21km
Andehri	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Masaurhi,23km
Baduri	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	2	1	2	1	1	1	1	1	Masaurhi,23km
Paipura Khurd	2	2	2	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	1	1	1	1	2	1	1	1	1	1	Masaurhi,24km
Rajipur	1	1	1	1	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	2	1	1	1	1	1	1	1	Masaurhi,25km
Saraiya	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Masaurhi,27km
Achhua	1	1	1	0	0	0	1	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Masaurhi,22km
Kalyanpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	2	Jehanabad,25km
Jalpura 1	1	1	1	0	0	1	1	1	0	1	1	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jehanabad,28km
Masaurha	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Jehanabad,28km
Udaipur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jehanabad,30km
Mohbalipur	4	4	4	1	0	0	1	0	0	0	0	2	1	1	2	1	2	2	1	2	1	2	1	1	1	1	1	2	2	2	Jehanabad,28km
Mohabbatpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jehanabad,27km
Ranipur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Jehanabad,27km
Fatehpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	2	1	2	1	2	2	2	2	Jehanabad,25km
Hasanpur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	2	1	1	2	2	2	Jehanabad,25km
DariapurPem	2	2	2	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Jehanabad,26km
Paipura Kalan	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	1	1	2	2	2	2	Jehanabad,25km
Ijarta	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	2	Jehanabad,25km
2. District Bhojpur, Bihar																															
Saraiya	5	2	1	0	0	1	1	1	0	0	1	2	2	1	1	2	1	2	1	2	1	2	1	1	2	1	1	1	1	1	Arrah,14km
Khangaon	7	3	2	1	0	1	1	1	0	0	1	2	2	1	1	2	2	2	1	2	2	2	1	1	1	1	1	1	1	1	Koilwar,9km
Guri	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	1	1	2	1	2	2	2	2	Koilwar,14km
Manpur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	1	2	2	1	2	2	2	2	Koilwar,14km
Kusihan	1	0	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	1	1	2	1	2	2	2	2	Koilwar,14km
Gopalpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	1	2	1	1	2	1	2	2	2	2	Koilwar,14km
Lodipur 1	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	1	1	1	1	1	1	1	1	Koilwar,14km
Jalpura 2	5	2	2	0	0	1	1	1	0	0	1	2	2	1	1	2	2	2	1	2	2	2	1	1	1	1	2	2	2	2	Koilwar,10km
Bhagwatpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	1	1	1	1	2	2	2	2	Koilwar,14km
Bishunpur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	1	1	1	1	2	2	2	2	Koilwar,14km
Sundra	2	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	2	1	1	2	2	2	2	Koilwar,16km
Jahanpur	2	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Koilwar,16km
SarimpurBachri	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	1	2	1	1	2	1	2	2	2	2	Arrah,30km
Lodipur 2	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arrah,30km
Narainpur	1	1	0	0	0	1	1	1	0	0	1	2	2	1	2	2	2	2	2	2	1	2	1	1	2	1	2	2	2	2	Arrah,30km
Nansagar	0	0	0	0	0	1	1	1	0	0	1	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arrah,30km
Nasratpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	1	2	1	1	2	1	2	2	2	2	Arrah,26km

Chilhauns	2	1	1	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	1	2	1	2	1	1	2	1	2	2	2	2	Arrah,30km
Turkaul	2	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	1	2	1	1	2	1	1	2	2	2	Arrah,30km
Jansara	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	1	1	2	1	2	2	2	2	Arrah,30km
Ahpura	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	1	2	1	1	2	1	1	1	2	2	Arrah,30km
Salempur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arrah,32km
Sandesh	1	0	1	1	0	1	1	1	0	1	1	2	2	1	2	1	1	2	1	2	1	2	1	1	2	1	1	2	2	2	Arrah,30km
Panpura	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arrah,30km
Kanharpur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	1	1	2	1	2	2	2	2	Arrah,32km
Chela	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	1	1	2	1	2	2	2	2	Arrah,30km
Panrepur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arrah,30km
Basauri	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arrah,30km
Gaighat	Uninhabited Village																													Arrah,30km
Bhanpura	Uninhabited Village																													Arrah,30km
Dihra	1	1	0	0	0	1	1	1	0	1	1	2	2	1	1	1	2	2	1	2	2	2	1	1	1	1	2	2	2	2	Arrah,22km
Maniach	2	2	0	0	0	1	1	1	0	0	1	2	2	1	1	2	2	2	1	2	2	2	1	1	1	1	2	2	2	2	Arrah,22km
Bichhiaon	1	1	0	0	0	1	1	1	0	0	1	2	2	1	2	2	2	2	1	2	2	2	1	1	1	1	2	2	2	2	Arrah,22km
Dharampur	2	1	0	0	0	1	1	1	0	0	1	2	2	1	1	2	2	2	1	2	2	2	1	1	1	1	2	2	2	2	Arrah,22km
Surungapur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arrah,30km
Chauria	Uninhabited Village																													Arrah,30km
Dalelganj 2	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Arrah,30km
Parura Rampur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	1	1	1	1	1	1	2	2	2	2	Arrah,25km
Kusra	1	0	1	0	0	0	0	0	0	0	0	2	1	1	1	1	1	2	1	2	2	2	1	1	1	1	2	2	2	2	Arrah,30km
Parura	1	1	0	0	0	0	1	0	0	1	0	2	2	1	2	1	1	2	1	2	1	2	1	1	1	1	2	2	2	2	Arrah,30km
Deoar	1	1	0	0	0	0	1	0	0	0	0	2	2	1	2	1	1	2	1	2	2	2	1	1	1	1	2	2	2	2	Arrah,30km
Akhgaon	1	1	1	0	0	1	1	1	0	0	1	2	2	1	2	2	2	2	1	2	1	2	1	1	2	1	1	2	2	2	Arrah,30km
Partappur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	2	1	1	2	2	2	Arrah,30km
Kholpur	1	0	0	0	0	0	1	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	1	1	2	2	2	2	Arrah,30km
Dehri	1	1	0	0	0	0	1	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Arrah,30km
Bardiha	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arrah,30km
Jamuaon	2	1	1	0	0	1	1	1	0	0	1	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Arrah,30km
Udaibhanpur	0	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Arrah,25km
Bara	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	1	2	2	2	2	2	1	1	1	1	2	2	2	2	Arrah,24km
Bartiar	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Arrah,24km
Kosdihra	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Arrah,30km
Kori	1	1	1	0	0	0	1	0	0	0	0	2	2	1	1	2	2	2	1	2	1	2	1	1	2	1	1	2	2	2	Arrah,30km
Baranhpur	0	0	0	0	0	0	0	0	0	0	0	2	1	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arrah,28
Khandaul	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	1	2	1	1	2	1	1	1	2	2	Arrah,30km
Phulari	3	1	1	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	1	2	1	2	1	1	2	1	1	2	2	2	Arrah,30km

Bhatauli	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Arrah,20km
Chanchar	Uninhabited Village																													Arrah,20km
Raman Sanrh	1	1	1	0	0	0	1	0	0	1	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Arrah,20km
Patkhaulia	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arrah,30km
Mahadeopur	Uninhabited Village																													Arrah,30km
AhimanChak	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	1	2	1	1	2	1	2	2	2	2	Arrah,30km
Khemkaranpur	Uninhabited Village																													Arrah,30km
Baga	2	1	0	0	0	0	1	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Arrah,30km
Balra	Uninhabited Village																													Arrah,30km
TOTAL (10km)	**180**	**143**	**120**	**16**	**0**	**27**	**47**	**27**	**0**	**19**	**27**	Status for Availability and Non-Availability is shown as A (1) & NA (2) respectively																		
Source-http://www.censusindia.gov.in/2011census/dchb/DCHB.html																														

Abbreviations:
Educational Facilities: P-Primary School, M-Middle School, SS-Higher Secondary Schools, SSS-Senior Secondary School
Medical Facilities: CHC-Community Health Centre, PHC-Primary Health Centre, PHSC-Primary Health Sub-Centre, MCWC-Maternity and Child Welfare Centre, H-Hospital, D-Dispensary, FWC-Family Welfare Centre
Drinking Water Facilities: T-Tap Water, W-Well Water, HP-Hand Pump, TW-Tube Well Water, R-River Water, Tk-Tank Water, O-Other Drinking Water Facility, CT-Community Toilet
Communication & Transport Facilities: PO-Post Office, SPO-Sub-Post Office, PTO-Post & Telegraph Office, Tel. -Telephone Connection, Mob. -Mobile Phone Coverage, BS-Bus Services, RS-Railways Services
Approach to Village: PR-Paved Roads, KR-Kuchha Road, FP-Foot Path
Power Supply: ED-Power Supply for Domestic use, E Ag. -Power Supply for Agricultural use, EC- Power supply for Commercial use, EA-Electricity for All Purposes
Nearest Town & Distance, km : a for < 5 Km, b for 5-10 Km and c for 10+ km of nearest place where facility is available is given.

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

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

Baikatpur -It is a village in Fatwah block, situated on the southern bank of the Ganges. It is noted for its Shiva temple said to have been built by Raja Man Singh, the famous General of Akbar's army. Weekly fairs are held on every Monday in the month of Shravana (July-August) and an annual fair on the occasion of Shivaratri.

Banarsi-The village lies on the southern bank of the Ganges about 3 km north of Barh railway station. It is noted for its old temple of Umanath. A large annual fair is held on the occasion of Shivaratri.

Bharatpura -The village is situated 14 km south of Bikram on the Bihta- Pali road. It is noted for its old library which has about 2,500 rare and old books, manuscripts and Tamraptras (copper plates).

Bihta -The village lies on the main line of the Eastern Railway about 25 km west of Patna. It is the headquarters of the block bearing the same name and has a large rice market. A large annual fair is held on the occasion of Shivaratri at Bihta.

Bijpura - It is a village situated about 14 km east of Taregna railway station. It is famous for its Kanhaiya-asthan built in the beginning of the 19th century.

BirOiara - The village is situated about 10 km east of Nadwan railway station. It is noted for its Shiva temple containing a four feet high image. Large fairs are held here on the occasion of Shivaratri and Basant Panchmi

Goraila - The village is situated 5 km south of the block headquarters at Naubatpur. It is famous for the tomb of the father of MakhdumSaheb of Biharsharif. It is a place of pilgrimage for the Muslims.

Naubatpur - The village is the headquarters of the block bearing the same name. It has an Arya Samaj temple, built in thebeginning of this century.

Nawada - A village situated about 6 km NE of Barh railway station. It contains an old tomb of a Muslim saint whichis held in high reverence not only by the Muslims but also by the Hindus.

Nisarpura - It is a village situated on the bank of river Punpun about 1.5 kmsouth of the block headquarters at Naubatpur. Itis noted for its large fairs held on the occasion of Makar Sankranti.

Pakri- The village, situated on the river Punpun, is the headquarters of Punpun block. A large number of Hindu pilgrimscongregate here during Pitripaksh, the second fortnight of Bhadrapad (September-October) to offer oblation totheir deceased ancestors.

Seonar- The village is situated about 1.5 km west of Mokameh. It is famous for its temple of Nilkanth Mahadeo. Anannual fair is held in the village on the occasion of Shivaratri.

Rehabilitation & Resettlement (R & R)

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

4.0 GENERAL

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

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

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

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

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

4.1 LAND ENVIRONMENT

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

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

Anticipated Impacts:

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

Mitigation measures:

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

- Excavated pits will get replenished annually in monsoon itself & will be restored to original.
- The mine working will remain confined to allotted river bed only, so it will not disturb any surface area outside the mine lease area which may affect topography or drainage.
- Solid waste will not be stacked on the bank side as it will hinder the flow of water in monsoon season.

4.2 WATER ENVIRONMENT

Anticipated Impacts:

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

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

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

Mitigation measures

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

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

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

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

4.3 AIR ENVIRONMENT

Impact On Air Quality

The proposed project includes various activities like development of benches, approach roads, haul roads, excavation and transportation of mineral and waste materials. These operations generally result in generation of dust and thereby pose health hazards. However, it is proposed that adequate control measures will be provided at every stage of operation such as, water sprinkling at loading, unloading points and on haul roads before transportation to reduce the fugitive dust emissions.

The mining is proposed to be carried out by opencast manual method. The air borne particulate matter (PM10) generated by ore and waste handling operations, transportation and screening of ore is the main respirable air pollutant. The emissions of Sulphur dioxide (SO2), Nitrogen Oxides (NO2) contributed by vehicles plying on haul roads will be marginal. Prediction of impacts on air environment has been carried out taking into consideration proposed production and net increase in emissions.

4.3.1 Emissions Details

Loading - unloading and transportation of sand material, wind erosion of the exposed area and movement of light vehicles will be the main polluting source in the proposed mining activities releasing Particulate Matter (PM10) affecting Ambient Air of the area. Emission during, Loading and unloading was calculated by the area sources. Details of emission during loading/unloading and transportation on the haul road, wind erosion of the exposed area and road maintenance were discussed and combined impact was predicted in the worst case scenario under worst meteorological condition given as follows:

Loading and Unloading - US EPA, 2008, revision of emission factor for AP-42 was used to calculate emission of particulate matter released into the atmosphere during loading and unloading separately. Emission during loading was found more than during unloading. Emission of PM10 during loading was calculated and found to be 1.92 x 10-3 g/s/m^2 based on moisture content 10-20% mine. It is assumed that moisture content was 10% and further moisture content will be increased to 10-20% to reduce emission of PM10 during unloading and average wind speed was 0.92 m/s as observed with site data as shown in wind rose and discussion of local meteorology of the area.

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

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

4.3.2 Meteorological Data

The meteorological data recorded at hourly interval during the month of Dec to feb 2023 on wind speed 0.92 m/s, wind direction, dry & wet bulb temperature, humidity, cloud cover and rainfall was processed to extract hourly mean meteorological data as per the guidelines of CPCB/MoEF for prediction of impacts from the area source. Stability was computed by Turner's method and mixing height was obtained from publication of IMD "Atlas of Hourly Mixing Height in India, 2008.

Data recorded from authorized source/Govt. agency were used as meteorological input for Dispersion Model which was stored in the computer for further analysis and interpretation to study the local meteorology of the study area. It was observed that westerly & north westerly was pre-dominant wind during summer as shown in wind rose (Figure 4.1) with low wind speed and 13.6 % calm condition was observed during study period at the site which was very much close and cumbersome with long term meteorological data of IMD. Average wind speed was 0.92m/s. Impact of the pollutants was anticipated in southeast sector under influence of northeasterly & westerly winds. Ambient air quality locations were selected based on the long term wind rose pattern of the area. Air quality sampling locations were finalized to study the baseline status around the proposed site and to study impact at various locations. 24-h maximum impact of PM10 was envisaged in southeast sector at very short distance from the site due to moderate to low wind speed.

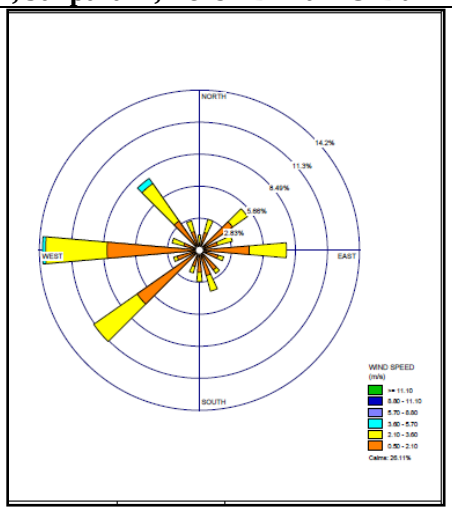


Figure 4.1: Wind Rose Diagram

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

4.3.3 Frame work of Computation & Model details

By using the above-mentioned inputs, ground level concentrations due to the mining activities have been estimated to know the incremental rise in ambient air quality and impact in the study area. The effect of air pollutants upon receptors are influenced by concentration of pollutants and their dispersion in the atmosphere. Air quality modeling is an important tool for prediction, planning and evaluation of air pollution control activities besides identifying the requirements for emission control to meet the regulatory standards and to apply mitigation measures to reduce impact caused by mining activities.

PM10 was the major pollutant occurred during mining activities. Impact of area source emission was considered and prediction of impact was made on various monitoring locations in the study area due to i) loading and unloading and iii) transportation of vehicles on the haul road in the

mining area. Impact was predicted in the worst case scenario due to combined impact of loading and unloading and emission due to transportation of vehicles on mine on haul road of mining area and other mining activities will occur simultaneously.

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

4.3.4 Model Results

The Air Quality Impact Prediction has been done by using "Industrial Source Complex Short Term version 3 (ISCST3), of USEPA". The main sources of air pollution with regard to the proposed project for the purpose of estimation of increase in PM10 are identified due to –

(i) Loading/unloading of ore

(ii) Transportation of ore by trucks on the Haul roads from mining benches.

Combined impact of PM10 was considered due to mining activities occurred simultaneously on various sampling locations is given in below table:

Table 4.1 Incremental Concentration of PM10 in the Study Area

Location ID	Location name	Distance (Km) and Direction	98th Percentile	Incremental Value	Total Value
AAQ 1	Narainpur Village	1.08 Km West	82.21	9.0	91.21
AAQ 2	Project site (Project site near village Lahladpur) for block 11 & 12	-	83.63	<0.001	83.63

AAQ 3	Bikram village	8.83 Km East	75.60	2.8	78.4
AAQ 4	Andehri	6.60 Km East	77.09	<0.001	77.09
AAQ 5	Mithapur	6.21 Km NE	83.14	<0.001	83.14
AAQ 6	Fatehpur	7.00 Km SE	87.11	<0.001	87.11
AAQ 7	Kori	10.00 Km SW	78.76	<0.001	78.76
AAQ 8	Jamuaon	7.56 Km W	80.30	5.2	85.5
AAQ 9	Jahanpur	6.23 Km WNW	74.53	<0.001	74.53
AAQ 10	Alipur	9.31 Km NW	82.30	<0.001	82.30
AAQ 11	Berar	2.64 Km NNE	81.34	<0.001	81.34
AAQ 12	Achhua	8.70 Km SE	88.02	<0.001	88.02
AAQ 13	Bichhiaon	7.97 Km West	82.14	<0.001	82.14
AAQ 14	Megharia	8.75 Km SW	91.21	<0.001	91.21

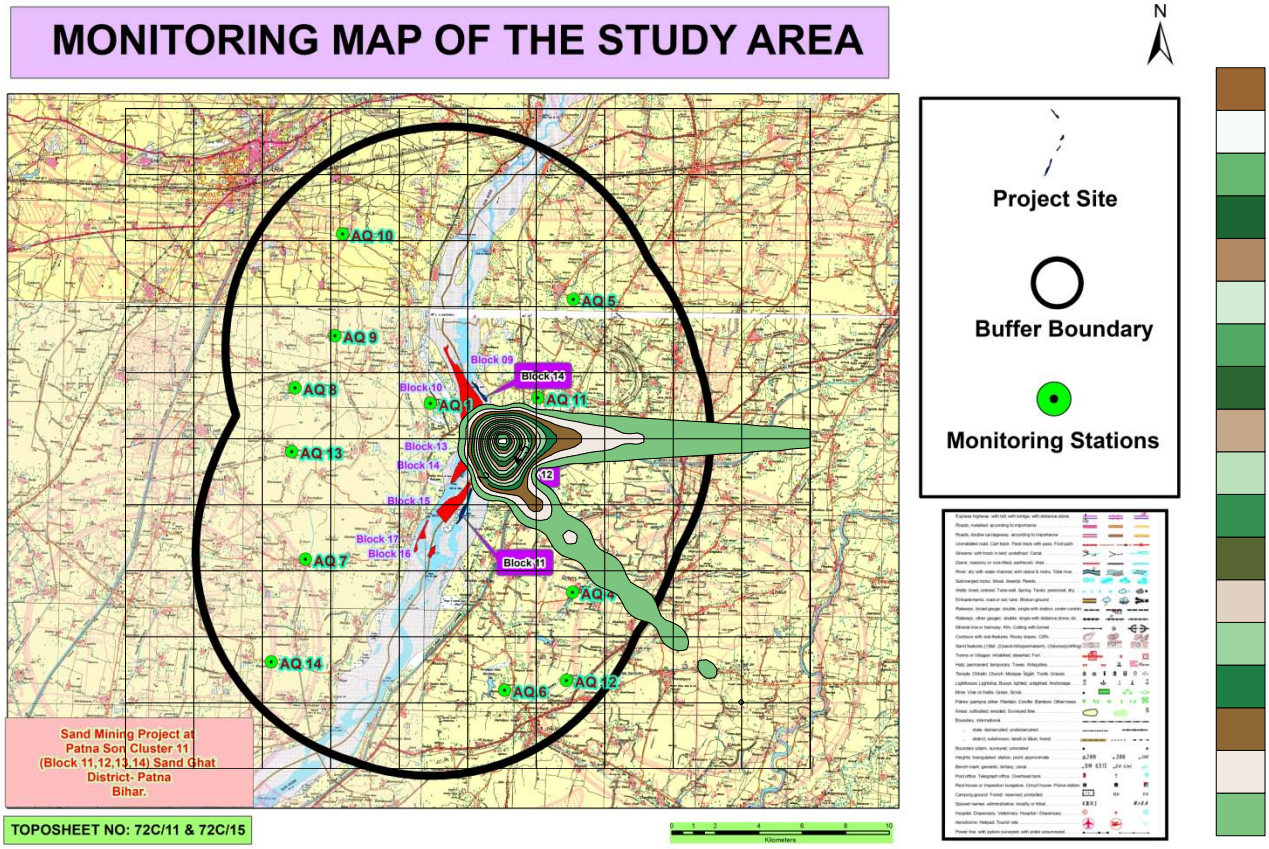


Figure 4-1, Iso-pleth of PM10

(Iso-pleth of PM10 is 9.0 µg/m^3 occurred near the project site at 2000 m x2000 m grid network during

i) ii) loading and unloading and

ii) iii) Transportation of ore over the haul road.

Mitigation measures

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

- ✓ Water sprinkling will be done on the haul roads twice in a day.
- ✓ Deploying PUC certified vehicles to reduce their emissions
- ✓ Proper tuning of vehicles to keep the gas emissions under check
- ✓ Monitoring to ensure compliance with emission limits would be carried out during operation
- ✓ There is no major source of emissions except emission from combustion of fuels from the Transportation Vehicles and Material Handling.
- ✓ Besides this, to control the emissions further regular preventive maintenance of Equipment / Transportation Vehicles will be carried out on contractual basis.
- ✓ It will be ensured that all transportation vehicles carry a valid PUC certificate.
- ✓ Plantation will be carried out along the approach road, river banks & at all strategic places in the vicinity area.
- ✓ Periodic air quality monitoring will be done to assess the quality and for timely corrective actions.
- ✓ Water sprinkling will be done on the haul roads twice in a day. This will reduce dust emission further.
- ✓ Speed limits will be enforced to reduce airborne fugitive dust from vehicular traffic.
- ✓ Spillage from the trucks will be prevented by covering tarpaulin over the trucks.

4.4 NOISE ENVIRONMENT

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

Anticipated Impacts:

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

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

Table 4.1, Damage risk criteria for hearing loss OSHA regulations

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

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

a. Mitigation measures

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

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

4.5 BIOLOGICAL ENVIRONMENT

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

Anticipated Impacts:

Flora

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

Fauna

Animals are sensitive to noise and avoid human territory. The project stretch of the river isnot 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 themining activities, as there will not be any damming or diverting of water. Hence, no significant impact is anticipated from the proposed project.

Mitigation measures

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

Flora

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 minedmaterials will be covered with tarpaulin during transportation.

Fauna

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

4.6 TRAFFIC ANALYSIS

Transportation Route:

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

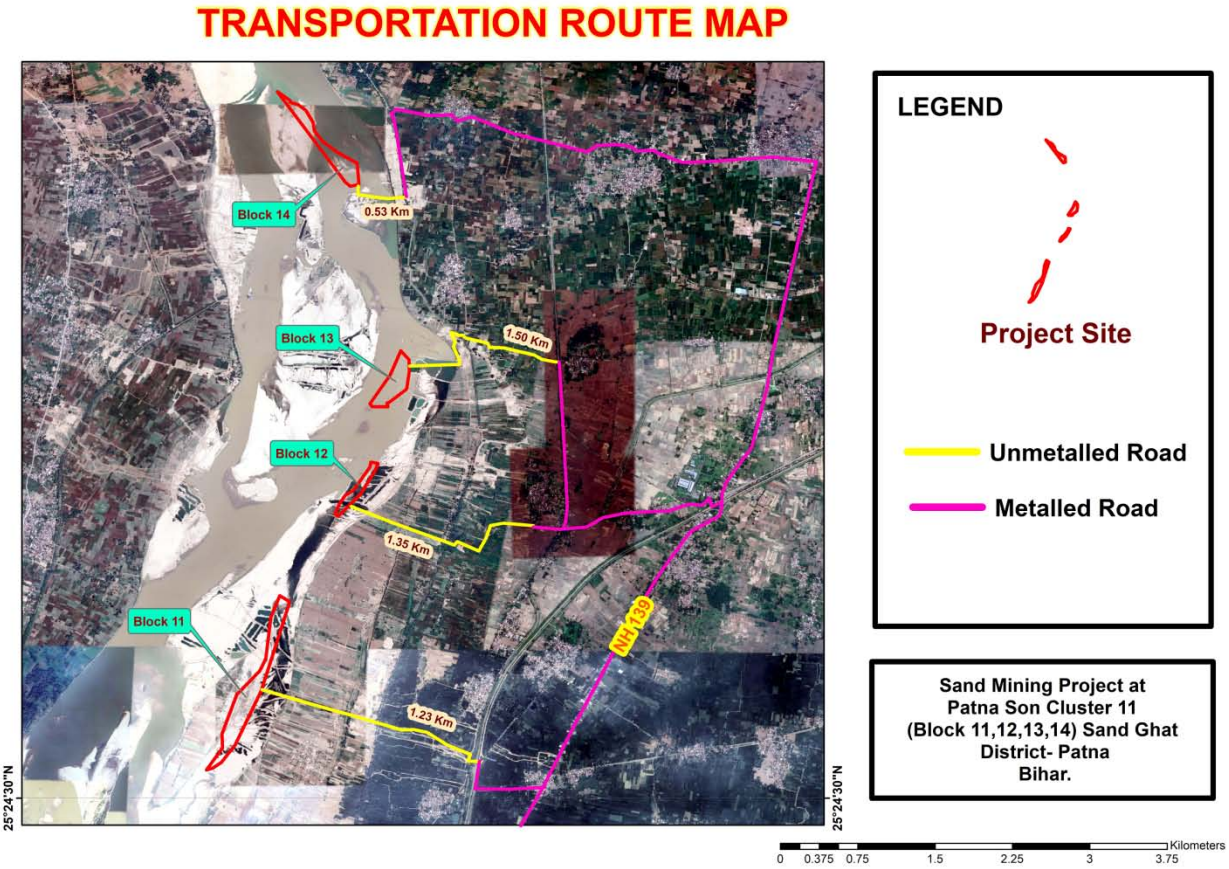


FIGURE 4.1 MAP SHOWING EVACUATION ROUTE FOR PATNA CLUSTER SON-11

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

Table 4.2 (i): Existing Traffic Scenario & LOS for Patna Cluster Son-11

Road	V	C	Existing V/C Ratio	LOS
National Highway (NH-139)	2500	15,000	0.16	A

Source: Capacity as per IRC: 64-1990

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

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

V/C	LOS	Performance

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

Reference: ENVIS Technical Report, IISc, Bangalore.

During Mine operation for Sand **Block Patna Cluster Son-11 (Sone-11, 12, 13 & 14)**

Proposed Capacity of Mine/annum : **1303107 TPA**

No. of working days : 250 days

Proposed Capacity of mine/day : 5212.42

Truck Capacity : 16 tonnes

No. of trucks deployed/day : 325.77or 326

Increase in PCU/day (326*3) : 978

Table 4.2 (ii): Modified Traffic Scenario & LOS

Road	V	C	Modified V/C Ratio	LOS
National Highway (NH-139)	2500+978=2731	15000	0.23	B

Results

From the above analysis it can be seen that the LOS has changed from 0.16 to 0.23 at Highway intersection that is remain ‘B’ i.e ' Very Good '. Hence, there will not so muchadverse affect on the proposed evacuation roads due to additional traffic. Traffic management has been proposed as given in below

Traffic Management:

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

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5.0 ANALYSIS OF ALTERNATIVE TECHNOLOGY AND SITE

5.1 Site Alternatives under Consideration

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

5.2 Analysis of Alternative Technology

5.2.1 Choice of Method of Mining

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

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

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

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

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

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6.0 INTRODUCTION

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

Environmental Monitoring Program will be implemented once the project activity commences. Environmental monitoring program includes (i) Environmental surveillance, (ii) analysis & interpretation of data, (iii) Preparation of reports to support environmental management system and (iv) Organizational set up responsible for the implementation of the programme.

6.1 ENVIRONMENTAL MONITORING AND REPORTING PROCEDURE

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

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

The key aims of environment monitoring are:

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

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

6.2 MONITORING METHODOLOGIES AND PARAMETERS

Air quality monitoring

Air Quality monitoring is essential for evaluation of the effectiveness of abatement programmes and to develop appropriate control measures. Suspended Particulate Matter (SPM), Sulphur Dioxide (SO_2) and Nitrogen Dioxide (NO_2) will be monitored at the workplace i.e. core zone. The methodology proposed for is shown below:

Table 6.1, Monitoring methodologies and parameters

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

Water quality monitoring

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

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

Soil quality monitoring

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

Noise level monitoring

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

a) To compare sound levels with the values specified in noise regulations

b) To determine the need and extent of noise control of various noise generating sources

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

Socio-economic Survey

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

Plantation Monitoring Programme

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

6.3 MONITORING SCHEDULE

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

Table 6.2, Details of monitoring schedule

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

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

6.4 MONITORING SCHEDULE - IMPLEMENTATION

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

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

a) Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.

b) Collection of soil samples at strategic locations once every two years and analysis thereof with regard to deleterious constituents, if any.

c) Measurement of water level fluctuations in the nearby ponds dug wells and bore wells and to assess if mining has got any impact on it or not.

d) Measurement of noise levels at mine site and adjacent villages will be done twice a year for first two years and thereafter once a year.

e) Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people should also be involved.

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

6.5 BUDGET ALLOCATION FOR MONITORING

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

Table 6.3, Budget for monitoring

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

6.6 REPORTING SCHEDULES OF THE MONITORING DATA

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

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7.0 PUBLIC CONSULTATION

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

7.1 HAZARD IDENTIFICATION AND RISK ASSESSMENT METHODOLOGY

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

Step I: Hazard Identification

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

Step II: Risk Assessment

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

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

Step III:Risk Control

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

Step IV: Implementation of risk controls

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

The most effective methods of control are:

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

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

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

Step V: Monitor and Review

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

A) RISK ANALYSIS

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

a) Initial Site Evaluation,

b) Detailed Site Evaluation,

c) Priority Site Investigations and Recommendations.

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

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

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

Risk analysis is done for:

- Forecasting any unwanted situation

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

Table 7.1, Risk Likelihood Table for Guidance

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

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

Table7.2, Qualitative Risk Assessment

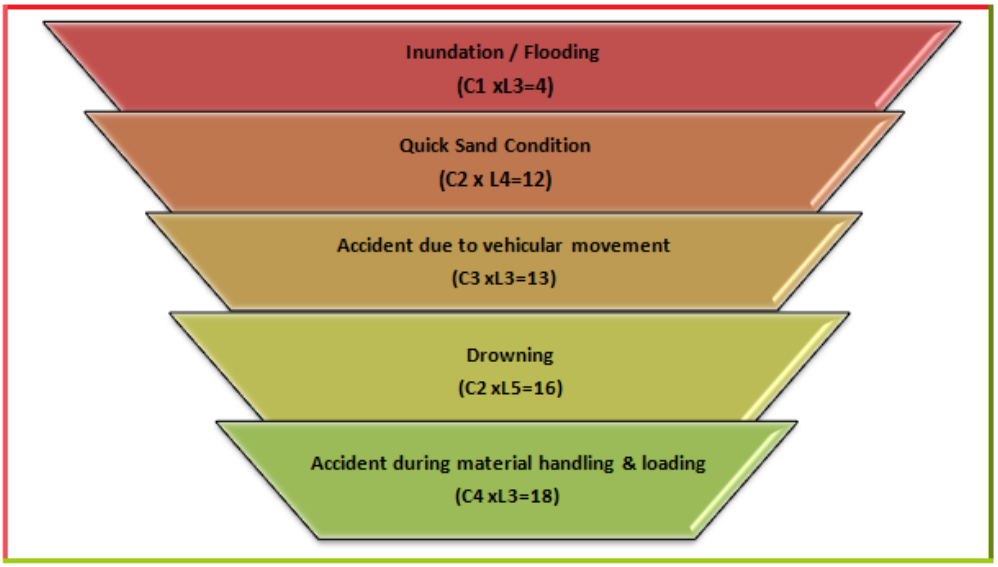
Risk Rank **Likelihood Consequence**	**L1** **Almost certain**	**L2** **Likely**	**L3** **Possible**	**L4** **Unlikely**	**L5** **Rare**
C1 **Catastrophic**	**1**	**2**	**4**	**7**	**11**
C2 **Major**	**3**	**5**	**8**	**12**	**16**

C3 Moderate	**6**	**9**	**13**	**17**	**20**
C4 Minor	**10**	**14**	**18**	**21**	**23**
C5 Insignificant	**15**	**19**	**22**	**24**	**25**

RISK RATING:

HIGH RISK 1-6	**MEDIUM RISK 7-15**	**LOW RISK 16-25**

7.2 RISK ASSESSMENT



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

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

TheRisk rating of such hazards is as follows:

7.2.1 INUNDATION/FLOODING

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

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

Measures to prevent consequences of inundation/flooding

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

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

7.2.2 Quick Sand Condition

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

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

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

Measures to Prevent Quick Sand Condition

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

7.2.3 ACCIDENT DUE TO VEHICULAR MOVEMENT

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

Measures to Prevent Accidents during Transportation

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

7.2.4 DROWNING

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

Measure to Prevent Drowning

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

7.2.5 ACCIDENT DURING MATERIAL HANDLING & LOADING

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

Measures to Prevent Accidents during material handling & loading

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

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

7.3 DISASTERS & ITS MANAGEMENT

7.3.1 Anticipated Disaster

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

7.3.2 Disaster Management Plan & Strategy

The Disaster Management Plan has three components:

(A) Risk Analysis and Vulnerability Assessment:

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

(B) Response Plan:

The response plan presents an organizational structure of the District to effectively handle the disaster in a coordinated and quickest possible manner to mitigate the impact of disaster. It identifies functional areas such as relief, restoration, communication, information, transport, emergency health services etc and proposes assignments to various departments; including identifying lead and supporting departments. The response plan also lays down preparedness checklists and standing operating procedure (SOP) guidelines.

(C) Mitigation Strategy:

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

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

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

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

7.4 SOCIO-ECONOMIC IMPACT OF THE PROJECT & SAFETY MEASURES

INTRODUCTION

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

mix, Socio-economic Impact Assessment is mandatory. The Socio-economic impact assessment focuses the effect of the project on social and economic well-being of the community. The impact may be direct or indirect. Further, the impact may be positive or negative.

OBJECTIVES OF SEIA

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

SCOPE

The Scope of the study is as follows:

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

SOCIO-ECONOMIC IMPACT OF THE PROJECT

Impact on Demographic Composition

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

Employment Opportunities

The proposed Projectwill provide employment to the local people. The number of workers to be deployed in the mining project will depend upon the quantity of minerals to be extracted from the mine by the lease holder. Both the miners and the unskilled workers will be recruited locally. It has estimated that around **67 people** will get employment in this mining project for a period of ten months in a year. It is a positive impact of the project since it is providing employment opportunities to the local people. The project will not affect the vulnerable groups of people.

Increased supply of sand in the market

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

Impact on agriculture

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

Impact on road development

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

Income to Government

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

Impact on Law & Order

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

Impact on Health

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

Few safety measures are outlined below:

a) **Safe Working Environment**: The project proponent shall ensure health and safety of all the employees at work. Efforts will be made to provide and maintain a safe work environment and ensure that the machinery and equipment in use is safe for employees. Further, it will be ensured that working arrangements are not hazardous to employees.

b) **Provision of First Aid**: The first aid treatment reflects the hazards associated with the mining of minerals. The first-aiders will be well trained in handling patients working in the Project.

c) **Regular Health Examination:** For all mine workers regular health examination will be made compulsory. Treatment of serious back injury; existing asthma or respiratory diseases, existing skin diseases, lung function test (pre and post ventolin), Audiograms, Chest X- ray etc. will also be taken care of.

d) **Health Education:** Adequate health education and information related to the job will be provided to the workers. Baseline health information will be recorded for future references.

e) **Tie-up with the Nearest Hospital for Medical Assistance:** To meet the medical needs of the mine workers tie-up with nearest hospitals will be made. Efforts will be made to reserve few beds in the above hospitals for the workers of the mining project. This will ensure timely medical aid to the affected persons.

f) **Supply of Mask and Gloves:**The workers in the Sand mining project are subject to respiratory diseases. For protection from dust it will be made compulsory for all workers to wear masks and gloves, while working in the mine.

g) **Administration of Anti-venom Injections:** Provision of Anti-venom therapy will be made available for administration to the workers in case of snake, spider and insect bites, while working in the mine.

h) **Special Telephone Number:** A special telephone number will be made available to the workers in case of emergency so that they can dial the same for–medical assistances. Further, efforts will be made to provide vehicles to the patients in short duration for shifting to a hospital.

i) **Special Group Insurance Scheme:** All the mine workers will be covered under a Group Insurance Scheme of LIC or any other Insurance company.

CONCLUSION

The commissioning of the Sand Mining Project on Son River at Patna Cluster Son-11(Sone-11, 12, 13 & 14) Sand Ghat at Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara II, Tehsil- Bikram & Dulhin Bazar, District Patna, (Bihar) provides employment to local people who are in search of the same. The granting of environment clearance to make mining of sand legally valid and it will generate revenue for the state. It is expected that prospective entrepreneurs will venture to set up industrial units in the vicinity in the near future making the area a mixed society, dependent on industry, trade and business. With the implementation of the project the occupational pattern of the people in the area will change making more people engaged in mining, industrial and business activities rather in agriculture only. The study area is still lacking in health and educational facilities. It is expected that same will improve to a great extent with opening of the project and associated industrial & business activities.

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8.0 GENERAL

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

8.1 PHYSICAL BENEFITS

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

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

8.2 SOCIAL BENEFITS

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

Table-8.1, Budget for Public Health

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

d) **Educational attainments**: Educational activities will be promoted by the lessee. Awareness program will be arranged covering basic issues related to primary level education, environment, health and hygiene etc.

e) **Strengthening of existing community** facilities through the Community Development Programme.

Table 8.2, Budget for Occupational Health

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

8.3 ENVIRONMENTAL BENEFITS

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

8.4 CORPORATE ENVIRONMENTAL RESPONSIBILITY

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

CSR cost will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is 60,87,21,400 x 2% = Rs. 1,21,74,428/-.

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

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9.0 INTRODUCTION

The environmental management must be integrated into the process of mine planning so that ecological balance of the area is maintained and adverse effects are minimized. The Environmental Management Plan (EMP) consists of a set of monitoring programme, mitigation measures, and management control strategies to minimize adverse environmental impacts.

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

9.1 ENVIRONMENTAL MANAGEMENT CELL (EMC)

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

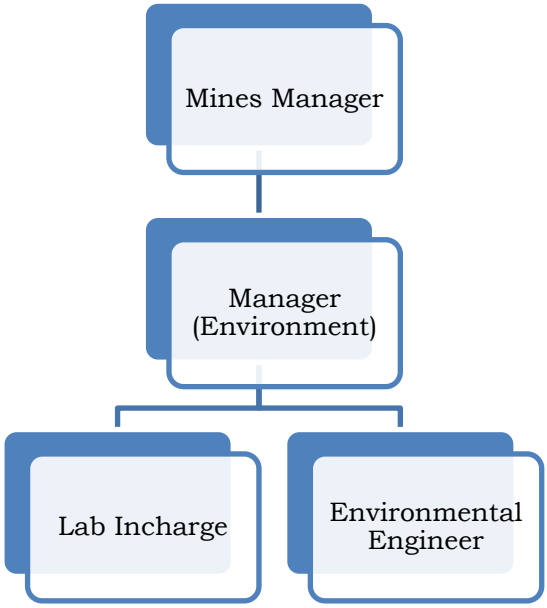

Figure 9.1 Environment Management Cell

The EMC will perform the following activities:

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

9.2 AIR POLLUTION CONTROL MEASURES

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

- Plantation will be done along the road-sides and also the vacant land present under Gram Panchayat after consultation with local villagers/authority.
- Dust mask provided to the workers engaged at dust generation points like excavations, loading and unloading points.
- The only air pollution sources are the road transport network of the trucks. The dust suppression measures like water spraying will be done on the roads.
- Utmost care will be taken to prevent spillage of sand and stone from the trucks.

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

9.3 WATER POLLUTION CONTROL MEASURES

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

- Water requirements for drinking, plantation and dust suppression will be met by tanker supply on the daily basis.
- Local people will be employed and no permanent housing will be done so no permanent drainage pattern for sewerage system is required as domestic sewage shall be disposed off into septic tank followed by soak pits.
- Mining in the area will be done up to depth of 3.0mmaximum from the surface level well above the ground water table, therefore impact on water regime is not anticipated.
- Monitoring of water quality of nearby surface water, ground water and domestic water will be conducted once in every season except monsoon to evaluate the performance of the mitigation measures.

9.4 NOISE POLLUTION CONTROL MEASURES

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

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

9.5 BIOLOGICAL ENVIRONMENT

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

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

- **Greenery development:** The project will not lead to any tree cutting. However, asocial responsibility, greenery will be developed along the both sides of road and the bank of river. Community services will be deployed in raising theseplantations. Trees of economic importance and native origin such as fruit treesshall be planted.
- Approx. 421 trees will be planted around haul road during the plan period.
- The trees proposed for plantation are:
- As per Sustainable Sand Management & Mining Guidelines 2016,minimum5 plant per hectare will be proposed for development of greenbelt but in this cluster of projects 10 plants per hectare will be proposed for better condition of environment.
- Total Number of plants for cluster of Sand Blocks are given below.

Sand Ghat	Area (Ha)	Plants
Patna Cluster Son 11 (Sone-11, 12, 13 & 14)	Sone 11 (19.48 Ha.) Sone 12 (4.01 Ha.) Sone 13 (8.29 Ha.) Sone 14 (10.31 Ha.)	19.48*10 Plants= 195 plants 4.01*10 Plants= 40 plants 8.29*10 Plants= 83 plants 10.31*10 Plants= 103 plants
Total Plants		421 plants

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

	Agro-climatic zone & Sub zone	**Middle Genetic Plains, North west alluvial sub zone**	
S/n	**Scientific name**	**Common Name**	**Pollution control features**
1	*Ficusreligiosa*	Peepal	Dust particles absorbance
2	*Acacia nilotica*	Babul	Tolerant to SO_2
3	*Mangiferaindica*	Aam	Tolerant to Dust control
4	*Tectonagrandis*	Sagon	Tolerant to Dust control
5	*Azadirachtaindica*	Neem	Tolerant to SO_2
6	*Pithecolibiumducle*	Jungle jalebi	Tolerant to SO_2 and Dust control
7	*Ficusbenghalensis*	Bargad	Tolerant to Dust control
8	*Scigiumcumuni*	Jamun	To stop river bank erosion

9	*Terminaliaarjuna*	Arjun	To stop river bank erosion
10	*Populus ciliate*	Popular	Fast growing, broad leaf

9.6 LAND USE PLANNING

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

- Mineral will be mined out after leaving sufficient safety zone from the bank as per sustainable sand mining guidelines-2016 for bank stability.
- The pits from where the material will be picked should not get deeper than 3.0 meter& shall follow the normal channel direction of the river.
- No foreign material shall be allowed to remain/spill in river bed and catchment area, or no pits/pockets will be allowed to be filled with such material.
- The mining is planned in non-monsoon seasons only, so that the excavated area gets replenished during the monsoon each year.
- Pits will get replenished naturally every year after monsoon.

9.7 OCCUPATIONAL HEALTH & SAFETY

Occupational safety and health is very closely related to productivity and good employer-employee relationship. The factor of occupational health in Sand Ghat of M/s Rana Enterprises, Pro – Rana Saurav S/O – Rana Uday Pratap Singh Add : - Vill – Karsa Kothi, P.O + P.S – Bikram, Dist – Patna (Bihar) Pin – 821104, Bihar for (Patna Cluster Son-11(Sone-11, 12, 13 & 14) is mainly dust. Safety of employees during operation and maintenance etc. shall be as per Mines rules and regulations.

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

- Provision of rest shelters for mine workers with amenities like drinking water, portable toilets etc.
- All safety measures like use of safety appliances, such as dust masks, shoes, non breakable goggles as the case may be, shall be ensured. Safety awareness programs, awards, posters, slogans related to safety etc. will be encouraged.
- Training of employees for use of safety appliances and first aid in vocational training center.
- Regular maintenance and testing of all equipment as per manufacturers' guidelines.
- Periodical Medical Examination (PME) of all workers by a Medical Officer.
- First Aid facility will be provided at the mine site.
- Close surveillance of the factors in working environment and work practices which may affect environment and worker's health.
- Working of mine as per approved mining plan and environmental plans.

9.8 SOCIO-ECONOMIC ENVIRONMENT

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

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

9.9 ENVIRONMENT POLICY

M/s Rana Enterprises, Pro – Rana Saurav S/O – Rana Uday Pratap Singh Add : - Vill – Karsa Kothi, P.O + P.S – Bikram, Dist – Patna (Bihar) Pin – 821104, Bihar. Patna Cluster Son-11(Sone-11, 12, 13 & 14) of Sand Ghat believes that responsible environmental stewardship comprises diligent application of well-established natural resource management, controls and

practices for the protection of the mined out land, preservation of biodiversity and proper disposal of waste if any following the best environmental practices during the process of mining.

Environmental policy prescribed for standard operating process to bring into focus any violation/deviation of the environment and forest norms/conditions that the company operations will implement operational and risk management practices that provide for maximum protection of people and the environment. To this end, the owner resolves that company will follow the below mentioned practices:

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

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

9.10 BUDGET ALLOCATION FOR EMP IMPLEMENTATION

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

Table 9.2, Budget of EMP (Patna Cluster Son-11(Sone-11, 12, 13 & 14)

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	**Nil**	**1.5**
2	Pollution Monitoring i) Air pollution ii) Water pollution iv) Soil Pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	4.21	0.5
4	Haul road Maintenance Cost	11.525	1.5
TOTAL		**15.735**	**5.5**

Note: *421 plants * 1000 Rs (for each plants including hedges and fences) =Rs 421000/-

- Salary of Labour for haul road maintenance 2 labor*300=600 per day
- 600* 250= 1,50,000/-
- * 2.5 lakh per kilometer (2,50,000 *4.61km haul road) = 11,52,500/-

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10.0 INTRODUCTION

10.1 Purpose of the Report

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

10.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

10.2.1 Identification of Project

The Proposed Sand Mining Project is located on Son River at Patna Cluster Son-11(Sone-11, 12, 13 & 14) Sand Ghat at Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara II, Tehsil-Bikram & Dulhin Bazar, District Patna, (Bihar).

The Proposed Production is 757620 CUM or 1303107 TPA and Area of the project site is 42.09 ha in cluster.

Cluster Situation: As per District Survey Report Patna the Proposed sand Ghats of (Patna Sone-11, 12, 13 & 14) Sand Ghat are comes in cluster situation whose combined cluster area is 42.09 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

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

The Details of cluster is given below:

Sand Block Name	Area (Ha)	Production in TPA	Applicant/Address
Sone 11	19.48	946728	M/s Rana Enterprises Pro – Rana Saurav S/O – Rana Uday Pratap Singh Add : - Vill – Karsa Kothi, P.O + P.S – Bikram, Dist – Patna (Bihar) Pin – 821104
Sone 12	4.01	194886	
Sone 13	8.29	402894	
Sone 14	10.31	501066	
Total	**42.09**	**2045574**	

10.3 BRIEF DESCRIPTION OF PROJECT

The proposed project is Open Cast Semi-Mechanized Mining of Sand with a proposed production of **757620 CUM or 1303107 TPA .**The project has been proposed by M/s Rana Enterprises Pro – Rana Saurav S/O – Rana Uday Pratap Singh Add : - Vill – Karsa Kothi, P.O + P.S – Bikram, Dist – Patna (Bihar) (for Sand Block Patna Cluster Son-11).

The proposed project is over an area 42.09 ha on Son River at Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara II, Tehsil-Bikram & Dulhin Bazar, District Patna, (Bihar)over an area of 10 hectares. As per MoEF, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project is categorized as **Category 'B-1'.** The estimated project cost for the proposed project is Sand Block Patna Cluster Son-11 Rs - 60,87,21,400 /- (including auction cost).

The proposed mining lease area falls in Survey of India Toposheet 72 C/10, 72 C/11, 72C/14, 72C/15.

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

Table: 10.1 Mine lease Co-ordinates Patna Cluster Son-11(Sone-11, 12, 13 & 14)

Mine lease Pillar Co-ordinates (Sone 11)

Pillar No.	Latitude /Longitude	
1	25.4108048	84.76375812
2	25.41272392	84.76515328
3	25.41392464	84.76510723
4	25.4173491	84.76639802
5	25.41942682	84.76840242
6	25.42045689	84.76893111
7	25.42411352	84.76938504
8	25.425944	84.7701536
9	25.42543953	84.77101562
10	25.41763436	84.76852498
11	25.4129551	84.7662398
12	25.41146776	84.76505301
13	25.41094096	84.76429313

Mine lease Pillar Co-ordinates (Sone 12)

Pillar No.	Latitude /Longitude	
1	25.43290394	84.77524573
2	25.43304366	84.77496578
3	25.43397955	84.77535911

4	25.43470331	84.77588399
5	25.43509721	84.77654562
6	25.43714623	84.77798932
7	25.43758269	84.77808495
8	25.43747098	84.77871285
9	25.43673083	84.77839512
10	25.43479929	84.77716448

Mine lease Pillar Co-ordinates (Sone 13)

Pillar No.	Latitude /Longitude	
1	25.44728437	84.78069489
2	25.44718873	84.78078351
3	25.44650365	84.78141834
4	25.44546538	84.78143779
5	25.44402535	84.78121801
6	25.44391148	84.78115536
7	25.44283717	84.77976851
8	25.44272432	84.77950054
9	25.44240832	84.77957033
10	25.44241844	84.77822087
11	25.44265508	84.77799867
12	25.44518656	84.77977885

Mine lease Pillar Co-ordinates (Sone 14)

Pillar No.	Latitude /Longitude	
1	25.46983285	84.76993348
2	25.46996451	84.77014975
3	25.46997958	84.7701745
4	25.46908019	84.77101713
5	25.46889769	84.77107393
6	25.46872096	84.77171681
7	25.46816599	84.77243387
8	25.46714795	84.77306155
9	25.46639639	84.77315627
10	25.46552281	84.77386647
11	25.46453347	84.77515274
12	25.46360115	84.77689795
13	25.46175602	84.77703658
14	25.46158368	84.77631935
15	25.46198175	84.77583543
16	25.46869675	84.77081098

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

Table-10.2: Details of Environmental Setting

<table>
<tr><th>Sr. No.</th><th>Particulars</th><th>Details</th></tr>
<tr><td>1</td><td colspan="2">Location</td></tr>
<tr><td>a</td><td>Village</td><td>Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara II</td></tr>
<tr><td>b</td><td>Tehsil</td><td>Tehsil-Bikram & Dulhin Bazar</td></tr>
<tr><td>c</td><td>District</td><td>Patna</td></tr>
<tr><td>d</td><td>State</td><td>Bihar</td></tr>
<tr><td>2</td><td>Elevation above</td><td>Patna Sone Cluster 11 Sand Ghat
Patna – Sone 11 (63 ASML to 61 ASML)
Patna – Sone 12 (61 ASML to 60 ASML)
Patna – Sone 13 (60.5 ASML to 59.6 ASML)
Patna – Sone 14 (60 ASML to 59 ASML)</td></tr>
<tr><td>3</td><td>Nearest National Highway/State Highway</td><td>
<table>
<tr><th>Blocks</th><th>Nearest Highway</th><th>Distance (Km) Direction</th></tr>
<tr><td>Sone 11</td><td>NH-139
SH-81</td><td>approx, 2.80 km towards E direction
approx, 2.0 km towards W direction</td></tr>
<tr><td>Sone 12</td><td>NH-139
SH-81</td><td>approx, 3.0 km towards E direction
approx, 3.0 km towards W direction</td></tr>
<tr><td>Sone 13</td><td>NH-139
SH-81</td><td>approx, 3.50 km towards ESE direction.
approx, 3.10 km towards W direction</td></tr>
<tr><td>Sone 14</td><td>NH-139
SH-81</td><td>approx, 5.0 km towards SE direction.
approx, 2.42 km towards W direction</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>Nearest Railway station</td><td>
<table>
<tr><th>Blocks</th><th>Railway Station</th><th>Distance (Km) Direction</th></tr>
<tr><td>Sone 11</td><td>Koelwar Railway Station,</td><td>approx. 16.80 km towards N direction</td></tr>
<tr><td>Sone 12</td><td>Koelwar Railway Station,</td><td>approx. 14.80 km towards N direction</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Particulars</th><th>Details</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>Sone 13</td><td>Koelwar Railway Station,</td><td>approx. 13.75 km towards N direction</td></tr>
<tr><td>Sone 14</td><td>Koelwar Railway Station,</td><td>approx. 11.60 km towards N direction</td></tr>
</table>
</td></tr>
<tr><td>5</td><td>Nearest Airport</td><td>
<table>
<tr><th>Blocks</th><th>Airport</th><th>Distance (Km) Direction</th></tr>
<tr><td>Sone 11</td><td>Patna Airport</td><td>Patna Airport, 35 km towards ENE</td></tr>
<tr><td>Sone 12</td><td>Patna Airport</td><td>Patna Airport, 35.30 km towards ENE</td></tr>
<tr><td>Sone 13</td><td>Patna Airport</td><td>Patna Airport, 36.20 km towards ENE</td></tr>
<tr><td>Sone 14</td><td>Patna Airport</td><td>Patna Airport, 37.80 km towards ENE</td></tr>
</table>
</td></tr>
<tr><td>6</td><td>Ecological Sensitive Areas (Wildlife Sanctuaries)</td><td>There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area.</td></tr>
<tr><td>7</td><td>Seismic Zone</td><td>Zone- IV
Source BMTC 2nd edition https://www.bmtpc.org/disaster%20resistnace%20technolgies/ZONE%20IV.htm</td></tr>
</table>

10.4 PROJECT DESCRIPTION

10.4.1 Salient features of mine lease

The salient features of mine lease are given below:

Table-10.3: Salient features of mine lease

Sr. No.	Parameter	Description
1	Name of the Mine	Sand Mining Project on Son River at Patna Cluster Son-11(Sone-11, 12, 13 & 14) Sand Ghat at Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara II, Tehsil-Bikram & Dulhin Bazar, District Patna, (Bihar)
2	Mining Capacity	757620 CUM or 1303107 TPA in cluster

Sr. No.	Parameter	Description
3	Method of mining	Open cast semi-mechanized mining/OTFM
4	Total ML area	Sone 11 (19.48 Ha.) Sone 12 (4.01 Ha.) Sone 13 (8.29 Ha.) Sone 14 (10.31 Ha.) **Total Cluster Area 42.09 Ha.**
5	Depth of mining	3.0 m depth
6	Manpower	67 persons
9	Water Requirement	30.45~30.50 KLD
10	Source of Water	Tanker/ Nearby village.

10.4.2 Mineral Reserves and production

Slices of height 1.5m & width 6.0 m has been drawn in geological sections to calculate the mineable reserves. The area of each bench level has been calculated & multiplied by strike influence to get the volume. Volume is multiplied by bulk density (1.72 kg/m3) to get Tonnes.

Table 10.4 Classification Mineral Reserves Patna Cluster Son-11(Sone-11, 12, 13 & 14)

Sand Ghat	Area (Hect)	Geological Reserves (m3)	Mineable Reserves(m3)
Patna Sone 11	19.48	584400	473115
Patna Sone 12	4.01	120300	98703
Patna Sone 13	8.29	248700	207507
Patna Sone 14	10.31	309300	236079
Total	**42.09**	**1262700**	**1015404**

In the lease area the river flow being reduced and sediment load get deposited. During flood season, the area gets replenished with sediments and source of erosion at this location. It is a river bed deposit and mined out area shall be replenished each year during monsoon period and depth of quarry shall be filled back by river sand each year and area will restore its original topography.

10.4.3 Conceptual Plan

Mine Applied Area will be worked for Patna Cluster Son-11(Sone-11, 12, 13 & 14) Sand Ghat. However, as the digging depth will be restricted to 3.0 m only. This will be further

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

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

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

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

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

10.4.4 Method of Mining

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

10.5 AFFORESTATION PROGRAMME

Topsoil if any would be utilized for intensive plantation and greenbelt development, all along the bank of the river. The details of plantation and number of saplings to be planted are given below. Approx. 421 trees will be planted around haul road during the plan period.

10.6 LAND USE PATTERN

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

10.7 BASELINE ENVIRONMENTAL STATUS

10.7.1 Soil Quality

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

10.7.2 Meteorology

Meteorological data at the site was monitored during Dec 2022 to Jan-Feb 2023 representing winter season. It was observed that the during study period, temperature ranged from 06 ^{0}C to 25.0 ^{0}C.

10.7.3 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) has been carried out at 10 locations. The Particulate Matter (PM_{10}) conc. ranged of 52.03 µg/m^{3}to 92.5 µg/m^3. The Particulate Matter ($PM_{2.5}$) ranged from **27.2 µg/m^{3}to 50.1 µg/m^3.** Sulphur dioxide (SO_2) between **3.16 µg/m^{3}to 8.6 µg/m^3**.Oxides of Nitrogen (NO_2) between **4.79 µg/m^{3}to 18.2 µg/m^3.**The results thus obtained indicate that the concentrations of PM10, SO_2 and NO_2 in the ambient air are well within the National Ambient Air Quality (NAAQ) standards for Residential and Rural areas.

10.7.4 Water quality

To assess the physical and chemical properties of water in the region, water samples from 05 locations were collected from various water sources around the mine lease area. The pH was varying for ground waters from 7.46 to 7.70.The total dissolved solids are varying from **351.38 mg/l to 436 mg/l.**

The Ground water sampling was taken from 5 locations The analysis results indicate that the pH ranges between 7.38 and 7.82. Total hardness varies from 232 mg/l to 436 mg/l .Total dissolved solids vary from 426 mg/l to 621 mg/l

The Ground water sampling was taken from 5 locations The analysis results indicate that the pH ranges between 8.16 and 8.29**,** Dissolved Oxygen (DO) was observed in the range of 6.4 to 7.0 mg/l against the minimum requirement of 4 mg/l. BOD values were observed to be in the range of 2.0 to 3.0 mg/l.

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

10.7.5 Noise Quality

Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as **41.5 dB(A) to 52.1dB(A**) respectively. The minimum & maximum noise levels at night time were found to be **30.5 dB (A) & 39.45 dB**(A) respectively.

10.7.6 Ecological Environment

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

10.8 ANTICIPATED ENVIRONMENTAL IMPACTS

10.8.1 Impact on Air Environment

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

10.8.2 Impact on Water Environment

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

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

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

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

10.8.3 Impact on Water Quality

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

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

10.8.4 Impact on Noise Environment

The proposed mining activity is semi-mechanized/OTFM in nature. No drilling & blasting is envisaged for the mining activity. Hence, the only impact is anticipated is due to movement of vehicles deployed for transportation of minerals. The vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.

10.8.5 Impact on Land Environment

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

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

10.8.6 Impact on flora and fauna

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

10.8.7 Impact on Socio - Economic Aspects

The mine area does not cover any habitation. Hence the mining activity does not involve any displacement of human settlement. No public buildings, places, monuments etc exist within the lease area or in the vicinity. The mining operation will not disturb/ relocate any village or need resettlement. Thus no adverse impact is anticipated. The impact of mining activity in the area is positive on the socio-economic environment of the region. Sand mining will be providing employment to local people whenever there is requirement of manpower.

10.9 ENVIRONMENTAL MANAGEMENT PLAN

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

10.10 ENVIRONMENTAL MONITORING PROGRAM

Table 10.5: Post project environmental monitoring

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

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

10.11 ENVIRONMENTAL PROTECTION COST

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

Table 10.6: Cost of Environmental Protection Measures

Table 10.6 (a), Budget of EMP (Patna Cluster Son-11(Sone-11, 12, 13 & 14)

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	**Nil**	**1.5**
2	Pollution Monitoring i) Air pollution ii) Water pollution iv) Soil Pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	4.21	0.5
4	Haul road Maintenance Cost	11.525	1.5
TOTAL		**15.735**	**5.5**

Note: *421 plants * 1000 Rs (for each plants including hedges and fences) =Rs 421000/-

- Salary of Labour for haul road maintenance 2 labor*300=600 per day
- 600* 250= 1,50,000/-
- * 2.5 lakh per kilometer (2,50,000 *4.61km haul road) = 11,52,500/-

10.12 ADDITIONAL STUDIES

10.12.1 Risk Assessment

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

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

10.12.2 Disaster Management Plan

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

10.12.3 Public Consultation

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

10.13 PROJECT BENEFITS

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

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

Environmental Benefits:

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

Corporate Social Responsibility

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

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

CSR cost will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is 60,87,21,400 x 2% = Rs. 1,21,74,428/-.

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

10.14 CONCLUSIONS

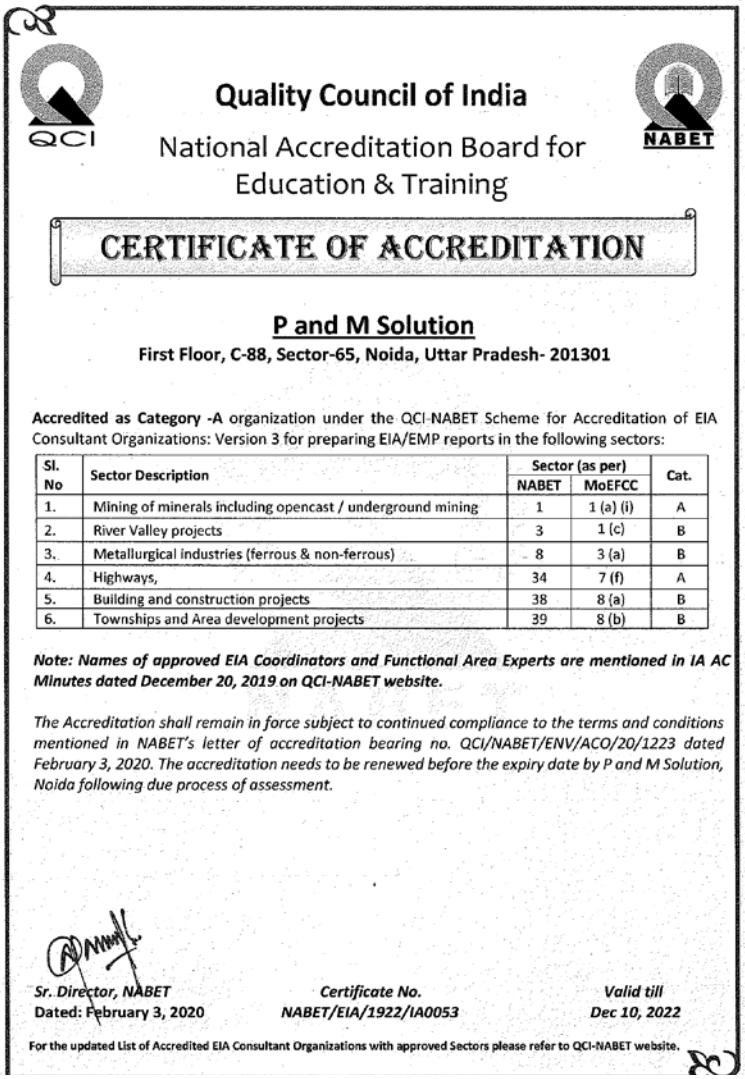
- The mining operations will meet the compliance requirements of MoEF&CC;
- Community impacts will be beneficial, as the project will generate significant economic benefits for the region;
- Monitoring program will be followed till the mining operations continue.
- With the effective implementation of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

****

CONSULTANT

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

Consultant accreditation details are given below:



Quality Council of India

National Accreditation Board for Education & Training

CERTIFICATE OF ACCREDITATION

P and M Solution

First Floor, C-88, Sector-65, Noida, Uttar Pradesh- 201301

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

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

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

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

Sr. Director, NABET
Dated: February 3, 2020

Certificate No.
NABET/EIA/1922/IA0053

Valid till
Dec 10, 2022

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

National Accreditation Board for Education and Training

QCI/NABET/ENV/ACO/23/2698 March 07, 2023

To

P and M Solution
C-88, Sector-65 Noida
Noida, UP

Sub.: Extension of Validity of Accreditation till June 06, 2023 – regarding
Ref.. Certificate no. NABET/EIA/1922/IA0053

Dear Sir/Madam

This has reference to the accreditation of your organization under the QCI-NABET EIA Scheme, the validity of **P and M Solution** is hereby extended till June 06, 2023 or completion of the assessment process, whichever is earlier.

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

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

With best regards.

(A K Jha)
Sr. Director, NABET

Institute of Town Planners India, 6th Floor, 4-A, Ring Road, I.P Estate, New Delhi-110 002, India
Tel. : +91-11-233 23 416, 417, 418, 419, 420, 421, 423 E-mail : ceo.nabet@qcin.org Website : www.qcin.org

Project: Sand Mining Project on Son River at Patna Cluster Son-11(Sone-11, 12, 13 & 14) Sand Ghat at Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara II, Tehsil-Bikram & Dulhin Bazar, District Patna, (Bihar)

Consultant Contact Details:

P and M Solution

Address –C-88, Sector 65 Noida

Mobile no. - +8377871554, 8826287364

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

****

ANNEXURE - I

TOR

सत्यमेव जयते

F. No. - SIA/1(a)/2064/2022

STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY, BIHAR

2nd Floor, Beltron Bhawn
Shastri Nagar
Patna - 800 023
E-mail:- seiaabihar@gmail.com
seiaa.ms.br@gmail.com
Telephone No.:- 0612 - 2281255

Dated:- 12/01/2023

To,

M/s-Rana Enterprises,
Pro-Rana Saurav,
S/o-Rana Uday Pratap Singh,
Vill-Karsa Kothi, PO+PS-Bikram,
Dist-Patna, Pin-821104, (Bihar)
Mob. No.-7677111151,
Email id:-ranasaurav7251@gmail.com

Sub: **Proposed Sand Mining Project on Son River at Patna Cluster Son-11(Sone-11, 12, 13 & 14) Balu Ghat, Mauza+Vill-Kab, Lahladpur, Janpara I, Janpara II, Tehsil-Bikram & Dulhin Bazar, District:- Patna, State:- Bihar; with proposed production Capacity-757620 cum per annum, Area- 42.9 Ha - Terms of Reference regarding.**

Ref:

1. Online Application - SIA/BR/MIN/408445/2022
2. Scrutiny fee submission dated- 14-12-2022.
3. Minutes of the SEAC meeting held on 26-12-2022.

4. Minutes of the SEIAA meeting held on 05-01-2023.

Sir/Madam,

This has reference to your online proposal submitted in the State Level Environment Impact Assessment Authority 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, you have submitted online information in the prescribed format (Form - I) along with a Pre-feasibility Report. The details of the proposal as described in the application are as follows:-

1.	**Online Proposal No.**		SIA/BR/MIN/408445/2022
2.	**File No.:**		SIA/1(a)/2064/2022
3.	**Name of the Proposal**		Son River at Patna Cluster Son-11(Sone-11, 12, 13 & 14) Balu Ghat,Mauza+Vill-Kab,Lahladpur, Janpara I, Janpara II, Tehsil-Bikram & Dulhin Bazar, District:- Patna, State:- Bihar;
4.	**Category of the Proposal:**		Mining of Minerals.
5.	**Project/Activity applied for**		1(a) Mining of Minerals.
6.	**Name of River**		Son River
7.	**Area of the Project**		42.9 Ha.
8.	**Khata, Khesra and Thana No.**		Khata No.- 1915, 46, 259, Khesra No.- 12092, 12094, 12096, 1508, 2098, 2096,
9.	**Proposed Production**		57620 cum per annum,

In this regard, under the provisions of the EIA Notification, 2006 as amended from time to time Sustainable Sand Management Guidelines 2016 and Enforcement & Monitoring Guidelines for Sand Mining" (EMGSM-2020) for the sand mining-2020 the ToR for the purpose of preparing Environment Impact Assessment report and Environment Management Plan for obtaining prior Environmental Clearance is prescribed as follows:-

STANDARD TERMS OF REFERENCE (TOR)

1. Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.

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

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

4. All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area(core and buffer zone).

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

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

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

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

9. The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA.

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 encompasspre operational, 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 are aand details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.

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

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

19. Proximity to Areas declared as 'Critically Polluted' or the Project areas 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. 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, anteed based sample survey, family-wise, should be undertaken to assess their requirements, and action programmers prepared and submitted accordingly, integrating the sectoral programmers 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.

21. One season (non-monsoon) primary baseline data on ambient air quality as perCPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM_{10}, particularly for free silica, should be given.

22. 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. Details of the model used and input parameters used for modeling should be provided for both mining and non-mining scenario. The air quality contours should be shown on a location map clearly indicating the location of the site, location of sensitive receptors, and the habitation. The wind roses showing pre-dominant wind direction also be indicated on the map.

23. 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.

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

25. Description of water conservation measures proposed to be adopted in the Project should be given.

26. 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.

27. 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.

28. 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.

29. 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.

30. 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 a forestation 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 begiven.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.

31. Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck / tractor and other vehicular 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.

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

33. 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.

34. 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.

35. 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.

36. 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.

37. 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.

38. 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.

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

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

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

42. 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.

43. 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.

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 the roads located within aerial distance of 10 km using suitable air model.
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 the quantity of sand extracted from overlapped area should also be furnished duly certified from the concerned District Mining Officer.

3. The satellite imageries (high resolution) of last three years in succession for summer, rainy and winter seasons of each proposed mining lease must 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).
4. Alternative route be explored if extraction path is passing through dense population/ human settlements.
5. A Cumulative traffic management plan for cluster sand mining proposal must be submitted.
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.
7. A report of the cumulative EIA/EMP study for the cluster sand mining blocks of the proposed mining site.

Sd/-
(Sudhir Kumar)
Member-Secretary
SEIAA, Bihar

Copy, through email, for information and necessary action to:-

1. Member Secretary, Bihar State Pollution Control Board, Patna (By Email).
2. Director, Deptt. of Mines and Geology Govt. of Bihar, Patna (By Email).
3. Additional Secretary, Deptt. Of Envit, Forest & CC GoB, Patna (By Email).
4. Guard file.

(Sudhir Kumar)
Member-Secretary
SEIAA, Bihar

ANNEXURE - II

LOI

समाहरणालय, पटना।
(खनन शाखा)

पत्रांक 2834 /खनन, पटना।	**फोन नं० :–** 0612–2219545(O),2219097(R)
दिनांकः 08/11/2022	**फैक्स नं०:–** 0612 - 2218900 (Fax)
	ई–मेल :– dm-patna.bih@nic.in

प्रेषित,

मे0 राणा इण्टरप्राइजेज,
प्रो0– राणा सौरभ, पिता–राणा उदय प्रताप सिंह,
पता– ग्रा0–करसा कोठी, पो0+थाना–बिक्रम, जिला–पटना, पिन–821104
ई–मेलः– ranasaurav7251@gmail.com,
मो0– 7677111151

विषयः– पटना जिलान्तर्गत सोन नदी के बालूघाट/बालूखण्ड संख्या–11 की आगामी पाँच वर्षों के लिए बन्दोबस्ती हेतु दिनांक–17.10.2022 को सम्पन्न ई–नीलामी में उच्चतम डाकवक्ता घोषित होने के फलस्वरूप सैद्धांतिक स्वीकृत्यादेश के संबंध में।

महाशय,

उपर्युक्त विषयक पटना जिलान्तर्गत सोन नदी के **बालूघाट/बालूखण्ड संख्या–11, रकवा–42.09 हेक्टेयर** की आगामी पाँच वर्षों के लिए बन्दोबस्ती हेतु दिनांक–17.10.2022 को सम्पन्न ई–नीलामी में आपके द्वारा रू0– 11,36,43,000/– (ग्यारह करोड़ छत्तीस लाख तेतालीस हजार रू0 मात्र) की सुरक्षित जमा राशि के विरूद्ध **उच्चतम डाक की राशि रू0– 60,23,07,900/– (साठ करोड़ तेईस लाख सात हजार नौ सौ 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– 12,21,66,225/– (बारह करोड़ इक्कीस लाख छियासठ हजार दो सौ पच्चीस रू0 मात्र)** के भुगतान का साक्ष्य **दिनांक–22.10.2022** को कार्यालय में प्रस्तुत किया गया है।

निविदा दस्तावेज की कंडिका 20(i) (ii) (iii) (iv) (v) के आलोक में जिलान्तर्गत सोन नदी के बालूघाट/बालूखण्ड संख्या–11 का सैद्धांतिक स्वीकृति के शर्त्त एवं बंधेज निम्नवत् हैः–

1. बालूघाट/बालूखण्ड संख्या–11 से संबंधित विवरणी निम्नवत् हैः–

क्र0 संख्या	नदी का नाम	कुल रकवा	बालूघाट का नाम	बालूघाट का रकवा	Geo Coordinates	
					Latitude	Longitude
1	सोन (Perennial)	42.09	Sone - 11	19.48	25.4108048	84.76375812
					25.41272392	84.76515328
					25.41392464	84.76510723
					25.4173491	84.76639802
					25.41942682	84.76840242
					25.42045689	84.76893111
					25.42411352	84.76938504
					25.425944	84.7701536
					25.42543953	84.77101562
					25.41763436	84.76852498
					25.4129551	84.7662398
					25.41146776	84.76505301
					25.41094096	84.76429313
			Sone - 12	4.01	25.43290394	84.77524573
					25.43304366	84.77496578
					25.43397955	84.77535911
					25.43470331	84.77588399
					25.43509721	84.77654562
					25.43714623	84.77798932
					25.43758269	84.77808495

					25.43747098	84.77871285
					25.43673083	84.77839512
					25.43479929	84.77716448
			Sone – 13	8.29	25.44728437	84.78069489
					25.44718873	84.78078351
					25.44650365	84.78141834
					25.44546538	84.78143779
					25.44402535	84.78121801
					25.44391148	84.78115536
					25.44283717	84.77976851
					25.44272432	84.77950054
					25.44240832	84.77957033
					25.44241844	84.77822087
					25.44265508	84.77799867
					25.44518656	84.77977885
			Sone – 14	10.31	25.46983285	84.76993348
					25.46996451	84.77014975
					25.46997958	84.7701745
					25.46908019	84.77101713
					25.46889769	84.77107393
					25.46872096	84.77171681
					25.46816599	84.77243387
					25.46714795	84.77306155
					25.46639639	84.77315627
					25.46552281	84.77386647
					25.46453347	84.77515274
					25.46360115	84.77689795
					25.46175602	84.77703658
					25.46158368	84.77631935
					25.46198175	84.77583543
					25.46869675	84.77081098
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				नहीं (रकबा 0.00 हे0)।	
5	पुरातात्विक स्थल से दूरी				लागू नहीं।	
6	खनन योग्य मात्रा				757620 घनमीटर	

2. **<u>भुगतान की शर्तेः–</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।
द्वितीय किस्त (25%)	पट्टा संविदा निष्पादन की तिथि से 06 महीना पूरा होने से पहले।

3. **<u>GST का भुगतानः–</u>** जी0एस0टी0 के रूप में प्रचलित दर के अनुसार राशि वाणिज्य कर विभाग को भुगतान करना होगा। जिला खनन कार्यालय, पटना में जी0एस0टी0 भुगतान का प्रमाण प्रत्येक किस्त के साथ देना होगा।
4. **<u>आयकर/अन्य करों का भुगतानः–</u>** 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, पटना 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, पटना 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. **बन्दोबस्ती विलेख/पटट्ा संविदा (डीड) निष्पादन करनाः–**

i. सफल डाकवक्ता द्वारा सभी वैधानिक अनापत्ति प्राप्त करने के उपरान्त 5 वर्षों 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. **सामान्य शर्त्तेः–**

(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 जिम्मेवारी 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, पटना 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, पटना 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,
पटना।

ANNEXURE - III

MINE PLAN

II

बिहार सरकार,
खान एवं भूतत्व विभाग।

पत्रांक– 5761 /एम0, पटना, दिनांक– 24/11/2022

प्रेषक,

नैय्यर इकबाल, भा0प्र0से0
निदेशक, खान

सेवा में,

Email

मे0 राणा इण्टरप्राइजेज,
प्रो0– राणा सौरभ, पिता–राणा उदय प्रताप सिंह,
पता– ग्रा0–करसा कोठी, पो0+थाना–बिक्रम,
जिला–पटना, पिन–821104
ई–मेलः– ranasaurav7251@gmail.com

विषयः– **पटना जिला के सोन नदी कलस्टर/ब्लॉक सं0– कलस्टर सं0– 11 (ब्लॉक सं0–11, 12, 13 एवं 14) 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 संशोधित 2021) के नियम–17 में वर्णित प्रावधानों के तहत् **पटना जिला के सोन नदी कलस्टर/ब्लॉक सं0– कलस्टर सं0– 11 (ब्लॉक सं0–11, 12, 13 एवं 14)** 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।

K

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। P.T.O.

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 ROP/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 ROP द्वारा प्रत्येक पृष्ठ पर हस्ताक्षरित होगी, निदेशक, खान एवं भूतत्व विभाग के कार्यालय के अतिरिक्त समाहर्त्ता, पटना के गोपनीय कोषांग, उपनिदेशक, पटना अंचल, पटना 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 **पटना सोन <u>नदी कलस्टर/ब्लॉक सं0– कलस्टर सं0– 11 (ब्लॉक सं0–11, 12, 13 एवं 14)</u>** से संबंधित समर्पित खनन योजना के अन्तर्गत ही बालू उत्खनन् कार्य सुनिश्चित कराया जायेगा।

विश्वासभाजन

(नैयर इकबाल)
निदेशक, खान
24/11/22

MINING PLAN

WITH

PROGRESSIVE MINE CLOSURE PLAN

Submitted under Rule (17) of Bihar Minerals (concession, prevention of illegal transportation & storage) Rules 2019

OF

PATNA SONE CLUSTER 11 (SONE – 11, SONE – 12, SONE – 13, SONE - 14) SAND GHAT ON RIVER - SONE

in Mauja – Kab, Lahladpur,Janpara I, Janpara II,

Anchal –Bikram & Dulhin Bazar, Dist – Patna (Bihar).

APPLIED AREA- 42.09 HECTARES

PLAN PERIOD: FOR FIVE YEARS

SETTLEE
M/s Rana Enterprises
Pro – Rana Saurav
S/O – Rana Uday Pratap Singh
Add : - Vill – Karsa Kothi, P.O + P.S – Bikram, Dist – Patna (Bihar) Pin – 821104
Mob : - 7677111151
e-mail : ranasaurav7251@gmail.com

Prepared By:
Er. Pravin Kr Sinha (Regd. No.: RQP/BIH/SR.NO.20)
Consultant :
P&M Solution
C-88, SECTOR-65 NOIDA
(Accredited by QCI- NABET)
Regional Off :-
9889024004 & 7542949027, Mangal Market, Raja Bazar, Patna (Bihar) Pin - 800014.
indusminingbihar@gmail.com

5761 24/11/2022

CONTENT

LIST OF ANNEXURES

ANNEXURE NO.	NAME OF ANNEXURE
1	COPY OF LETTER OF INTENT
2	COPY OF RQP CERTIFICATE

LIST OF PLATES

PLATE NO.	LIST OF PLATES
1	LOCATION MAP
2	GOOGLE & ROUTE MAP
3	KEY PLAN
4	LEASE MAP
5	SURFACE GEOLOGICAL PLAN
6	GEOLOGICAL SECTION
7A	DEVELOPMENT PLAN (PRE MONSOON)
7B	DEVELOPMENT PLAN (MONSOON)
7C	DEVELOPMENT PLAN (POST MONSOON)
8	CONCEPTUAL PLAN
9	PROGRESSIVE MINE CLOSURE PLAN

MINING PLAN

PART A

CHAPTER–1

1. INTRODUCTION

1.1	Applicant Name & Full address Phone. No. E-mail ID	M/s Rana Enterprises Pro – Rana Saurav S/O – Rana Uday Pratap Singh Add : - Vill – Karsa Kothi, P.O + P.S – Bikram, Dist – Patna (Bihar) Pin – 821104 7677111151 ranasaurav7251@gmail.com
1.2	Letter no. / date of lease execution & lease period	District Magistrate issue LOI on letter no. 2834/khanan dated. 08.11.2022 for a period of 05 years (Annexure No. -1)
1.3	Settlee post/social status	Private
1.4	Mineral or Minerals which the Settlee intends to mine	Sand
1.5	Applied area for mining lease	Patna Sone Cluster 11 (Sone – 11, Sone – 12, Sone – 13, Sone -14) Sand Ghat Lease has an applied area of 42.09 Hectare.
1.6	Name & address of RQP & Regd. No. Mobile No. E-mail ID	Er. Pravin Kr Sinha Reg. No. - RQP/BIH/SR.NO.20 Letter No. 3825 Dated 07/11/2019 **Consultant :** P & M Solution 201,Mangal Market Raja Bazar, Patna (Bihar) 9889024004 & 7542949027 indusminingbihar@gmail.com
1.7	RQP Certificate	RQP certificate copy attached as **Annexure 2**
1.8	Name of the Prospecting agency	The base data is collected from various geological reports of the Department of Mines & Geology and local authorities as well as detailed prospecting of the area is carried out by the RQP.
1.9	Status of Environmental clearance	After Mining Plan approval then Settlee shall submit application to state Environment Impact Assessment Authority (SEIAA) of Bihar for environment clearance.
1.10	Date of Survey	09.11.2022

RANA ENTERPRISES

PROPRIETOR

CHAPTER–2

2. PROJECT DESCRIPTION

2.1 JUSTIFICATION OF PROJECT

Sand is a ubiquitous material; available everywhere and is being used from the time immemorial for wide applications in our daily life; infrastructures, building construction, highways, roads, townships, multiplexes, foundations of buildings and industrial units etc. and is an integral part of development. Over the millennia, the weathering effect, the flow of water at high velocities in rivers and the pressure of water from the high mountainous reservoirs converted and pushed the hard ground underneath into sand, etc. which travelled as sediments with the flow. Huge amount of sand get deposited along the river course wherever conditions were favorable. As a result of continuous deposit of sand, the rivers may change their course, by widening itself and expanding, can result in flooding, inundation and breaking their banks, may cause devastation of property and loss of life. The rivers thus, needed channelization and therefore, extraction of sand through mining was expedient. The haphazard mining of sand being practiced now for long, through unregulated, uncontrolled and illegal way added almost an irreversible damage to the environment, which became a cause of serious concern to everyone. Though sand is a very important mineral source for development, its mining through scientific methods has also become equally imperative.

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

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

2.2 BACKGROUND OF THE PROJECT

The Department of Mines & Geology, Bihar required under Bihar Minerals (Concession, Prevention of Illegal Mining, Transportation & Storage) Rules, 2019. The general conditions of mining lease for minor minerals are mentioned here below:

- First the State Government shall identify the areas which are suitable for river bed mining based on quantity of the minor minerals available and suitable from ecological and environmental aspects as well.
- Under rule 17 (4) Approval and submission of Mining Plan - All Mineral Concession Holders or the Government/Corporation as the case may be shall submit a mining Plan duly prepared by an RQP and approved by the Director or any officer / person/academic institution/Govt. agency authorized by the Department in this regard within a period of three months from the date on which communication regarding grant of mineral concession is received or such other period as may be decided/ allowed by the department for the submission of the approved Mining Plan.
- While preparing the mining plan, proper attention has been paid to ensure that the relevant provisions under MMDR Act-1957, MMR-1961, Mines Act-1952 & Mines Rules-1955, Sustainable Sand Mining Guidelines – 2016 and Enforcement & Monitoring Guidelines for sand Mining - 2020 have been followed. All safety measures, provided in the statue, will be taken into consideration. On 17.09.2019 Bihar Government took its policy decision vides notification no. – 4/V.Mu-20-93 / 18-3174 /M . That all Mining Lessee / Settlee under rule 17 of the said Rules, the lessee shall submit the mining plan with Progressive Mine closure plan for approval to the competent officer, Department of Mines & Geology, Bihar.
- Mining operation to be in accordance with Environmental clearance.
- For baseline, data assistance has been taken from the data, available from local authorities.

2.3 Restricted areas for sand quarrying

i. The quarrying of sand shall be prohibited within up to a distance of 1 kilometre (1 km) from major bridges and highways on both sides, or five times (5x) of the span (x) of a bridge/public civil structure (including water intake points) on up-stream side and ten times (10x) the span of such bridge on down-stream side, subjected to a minimum of 250 meters on the upstream side and 500 meters on the downstream side.

ii. No quarrying shall be permitted within 50 (fifty) meters of any public place i.e. cremation ghat or any religious place etc.

iii. No quarrying shall be allowed to be extracted where erosion may occur, such as at the concave bank.

iv. The quarrying of sand shall be prohibited within 100 (one hundred) meters upstream and downstream from any dam/weir or any other structure erected for irrigation purpose.

v. Sand ghats should preferably be located on the river side embankment. For low embankment less than 6 meters height, quarrying should not be done within 25 meter from toe/heel of the embankment and depth of mining should not be more than 1.0 meter. In case of higher embankments, the distance should not be less than 50 meter and depth of mining should be maximum 1.50 meter and at a distance of 75 meter of more mining depth should be maximum 2.0 meter. In order to obviate the development of flow parallel to embankment, crossbars of width eight times the depth of mining pits spaced at 50 to 60 meters center to center should be left in the mining pits.

vi. The irrigation outlet shall be maintained at the same level as that of the river bed and in no case, the river bed level shall be permitted to be below the irrigation outlet level. No quarrying shall be permitted around the infiltration well/intake well up to a distance of 5 meters.

vii. No quarrying of sand shall be permitted in any private land owned by a person other than a settlee unless the settlee obtains the consent of the concerned land owner/raiyat.

viii. No quarrying of sand shall be permitted in any area which the State Government notifies as restricted area.

ix. Mining depth should be restricted to 3 meters and distance from the bank should be ¼th or river width and should not be less than 7.5 meters.

x. Demarcation of mining area with pillars and geo-referencing should be done prior to the start of mining.

xi. A buffer distance /un-mined block of 50 meters after every block of 1000 meters over which mining is undertaken or at such distance as may be the directed/prescribed by the regulatory authority shall be maintained.

xii. 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, as the case may be and decided by regulatory authority while granting environmental clearance in consultation with irrigation department. Regulating authority while regulating the zone of river bed mining shall ensure that the objective to minimize the effects of riverbank erosion and consequential channel migration are achieved to the extent possible. In general, the area for removal of minerals shall not exceed 60% of the mine lease area, and any deviation or relaxation in this regard shall be adequately supported by the scientific report.

RANA ENTERPRISES
PROPRIETOR

CHAPTER–3

3. LOCATION, GENERAL AND ACCESSIBILITY

3.1 LOCATION

(a) Details of the area

<table>
<tr><td>(i)</td><td>Lease-hold area</td><td>42.09 Hect.</td></tr>
<tr><td></td><td>Location</td><td>Patna Sone Cluster 11

Sone – 11 – Area – 19.48 Hect. (Mauja – Kab)
Sone – 12 – Area – 4.01 Hect. (Mauja – Lahladpur)
Sone – 13 – Area – 8.29 Hect. (Mauja – Janpara I)
Sone - 14 – Area – 10.31 Hect. (Mauja – Janpara II)
Anchal – Bikram & Dulhin Bazar, Dist – Patna (Bihar).

The location plan is enclosed (Plate No. 1)</td></tr>
<tr><td>(ii)</td><td>Mining Lease Map</td><td><table><tr><td>SAND GHAT</td><td>KHATA</td><td>KHESRA</td></tr><tr><td>Sone 11</td><td>1915</td><td>12092(P), 12094(P), 12096 (P)</td></tr><tr><td>Sone 12</td><td>46</td><td>1508(P)</td></tr><tr><td>Sone 13</td><td>259</td><td>2098(P)</td></tr><tr><td>Sone 14</td><td>259</td><td>2096(P)</td></tr></table>
Google Map of Patna Sone Cluster 11 Sand Ghat is attached as Annexure no. 3.</td></tr>
<tr><td>(iii)</td><td>District & State</td><td>Patna, Bihar</td></tr>
<tr><td>(iv)</td><td>Mining Plot</td><td><table><tr><th>Sand Ghat</th><th>River</th><th>Area (ha)</th></tr><tr><td>Patna Sone Ghat 11</td><td>Sone</td><td>42.09</td></tr><tr><td>Total</td><td></td><td>42.09</td></tr></table></td></tr>
<tr><td>(v)</td><td>Name of Ghat</td><td>Patna Sone Cluster 11 (Sone – 11, Sone – 12, Sone – 13, Sone - 14) Sand Ghat Area – 42.09 Hect.</td></tr>
<tr><td>(vi)</td><td>Ghat details</td><td>Sone – 11 – Area – 19.48 Hect.
Sone – 12 – Area – 4.01 Hect.
Sone – 13 – Area – 8.29 Hect.
Sone - 14 – Area – 10.31 Hect.</td></tr>
<tr><td>(vii)</td><td>Coordinates</td><td>The area & geographical coordinates of Patna Sone Cluster 11 Sand ghat is given in Table No.1

Toposheet Map No. – 72 C/10, 72 C/11, 72C/14, 72C/15</td></tr>
</table>

RANA ENTERPRISES
PROPRIETOR

PATNA SONE CLUSTER 11 SAND GHAT CO-ORDINATES

S. No	Sand Ghat	Area (in Ha)	Co-ordinates					Ghat/ Address	River
1	Patna Sone Cluster 11	42.09	SSONE 11	19.48	1	25.4108048	84.76375812	Mauja – Kab, Anchal – Dulhin Bazar, Dist – Patna (Bihar)	Sone
					2	25.41272392	84.76515328		
					3	25.41392464	84.76510723		
					4	25.4173491	84.76639802		
					5	25.41942682	84.76840242		
					6	25.42045689	84.76893111		
					7	25.42411352	84.76938504		
					8	25.425944	84.7701536		
					9	25.42543953	84.77101562		
					10	25.41763436	84.76852498		
					11	25.4129551	84.7662398		
					12	25.41146776	84.76505301		
					13	25.41094096	84.76429313		
			SONE 12	4.01	1	25.43290394	84.77524573	Mauja – Lahladpur, Anchal – Bikram, Dist – Patna (Bihar)	Sone
					2	25.43304366	84.77496578		
					3	25.43397955	84.77535911		
					4	25.43470331	84.77588399		
					5	25.43509721	84.77654562		
					6	25.43714623	84.77798932		
					7	25.43758269	84.77808495		
					8	25.43747098	84.77871285		
					9	25.43673083	84.77839512		
					10	25.43479929	84.77716448		
			SONE 13	8.29	1	25.44728437	84.78069489	Mauja – Janpara I, Anchal – Bikram Dist – Patna (Bihar)	Sone
					2	25.44718873	84.78078351		
					3	25.44650365	84.78141834		
					4	25.44546538	84.78143779		
					5	25.44402535	84.78121801		
					6	25.44391148	84.78115536		
					7	25.44283717	84.77976851		
					8	25.44272432	84.77950054		
					9	25.44240832	84.77957033		
					10	25.44241844	84.77822087		
					11	25.44265508	84.77799867		
					12	25.44518656	84.77977885		

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			SONE 14	10.31	1	25.46983285	84.76993348	Mauja – Janpara II, Anchal – Bikram Dist – Patna (Bihar)	Sone
					2	25.46996451	84.77014975		
					3	25.46997958	84.7701745		
					4	25.46908019	84.77101713		
					5	25.46889769	84.77107393		
					6	25.46872096	84.77171681		
					7	25.46816599	84.77243387		
					8	25.46714795	84.77306155		
					9	25.46639639	84.77315627		
					10	25.46552281	84.77386647		
					11	25.46453347	84.77515274		
					12	25.46360115	84.77689795		
					13	25.46175602	84.77703658		
					14	25.46158368	84.77631935		
					15	25.46198175	84.77583543		
					16	25.46869675	84.77081098		

(b) Key plan of area:-

Key plan of Patna Sone Cluster 11 (Sone – 11, Sone – 12, Sone – 13, Sone -14) Sand Ghat (Sone river) attached as **Plate-3.** Total mining area is completely outside of any restricted or protected area by any state or central government.

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Rana Sarwar
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3.2 GENERAL

(a) Mineral being worked	Sand
(b) Period of Mining Lease	The lease period has been granted for Five years.
(c) Category of Land used	The mining area is inactive channel of riverbed
(d) Relief of Plot	Patna Sone Cluster 11 Sand Ghat Patna – Sone 11 (63 ASML to 61 ASML) Patna – Sone 12 (61 ASML to 60 ASML) Patna – Sone 13 (60.5 ASML to 59.6 ASML) Patna – Sone 14 (60 ASML to 59 ASML)
(e) Existing pits	As the mining area is of river bed and it will be replenished every year no pits will be formed..
(f) Type of lease area:	Total area is almost hundred percent river bed flood plain land & it is free from forest land.
(g) Present land use pattern:	The existing land use is given below:

Sr. No.	Land use	River bed (Ha)	Forest Land (Ha)	Barren land (Ha)	Grazing Land (Ha)
1	Mining pits Quarry	-	-	-	-
2	Approach Road	-	-		-
3	Dumps	-	-	-	-
4	Office, Resht Shelter etc.	-	-	-	-
5	Balance undisturbed land	42.09	-	-	-
	Total	42.09	-	-	-

3.2ACCESSIBILITY

Patna district is situated in the South Bihar alluvial plains. The district is bounded in the north by river Ganga, in the south by Jahanabad and Nalanda districts, in the east by Lakhisarai district and in the west by Bhojpur district. The district is situated between North latitudes 25° 13' and 25° 45 'and East longitudes 84° 43' and 86° 44' falling in Survey of India toposheet nos. 72C/11, The total geographical area of the district is 3172 sq. km. The district falls in the Ganga Basin and is drained by the mighty Ganga in the north, by the Sone in the West, and by the Punpun, Phalgu and their tributaries in the central part of the terrain.

Project site falls under Mauja – Kab, Lahladpur,Janpara I, Janpara II,, Dist – Patna (Bihar). Nearest road is NH 139 at distance of 5.0 km in SE direction. Nearest Railway station is Bihta Railway station at distance of 15 km in NE. Nearest Airport is JPN International Airport at a distance of 35 km in NE direction.

RAMA ENTERPRISES
Rama Sahay
PROPRIETOR

CHAPTER-4

4.1 GEOLOGY & EXPLORATION

Topography and general geology and local / mine geology of the mineral deposit including drainage pattern

The sand deposits of Patna district of Bihar broadly form part and parcel of the flood plains of Ganga River as whole formed since geological ages.

The State of Bihar is transecting by a no. of rivers. The individual river basins and their catchment areas is shown in Fig. no. I below.

The various sand mining lease areas (also referred to as sand ghats) lie in the river bed of river Sone which is a major tributary of river Ganga. They are formed in the Quaternary period of central Bihar Plains- the OAG (Older Alluvium Group) forming the highest terrace, in the Sone-Ganga alluvial tract, and NAG (Newer Alluvium Group) forming younger terraces, as Older Flood Plains, are exposed all along the Alluvial Upland.

Figure 1

Ganga & Sone Valley Plains:

The river Sone originates at an elevation of 600 m above msl near Amarkantak plateau in Madhya Pradesh (MP), and debouches in the river Ganga near Patna, Bihar. The total length of the river is 784 km, out of which about 500 km lies in MP, 82 km in Uttar Pradesh and the remaining 202 km in Bihar. The important tributaries of river Ganga are Sone , Mahatwain, Dharda, Dhowa, Mohani, Punpun, Morhar The total catchment area of the river is spread over 71,259 sq km. The river has a

steep gradient with quick run-off and ephemeral regimes, becoming a roaring river with the rainwater in the catchment area, but turning quickly into a formidable stream. The river being wide and shallow leaves disconnected pools of water during summer (lean period).

4.1.2 Regional Geology

Regionally the area constitutes a part of the Ganga River Basin. The Sone originates near Amarkantak in Anuppur district of Madhya Pradesh, just east of the headwater of the Narmada River, and flows north-northwest through Shahdol district in Madhya Pradesh state before turning sharply eastward where it encounters the southwest-northeast-Kaimur Range. The Sone parallels the Kaimur hills, flowing east-northeast through Uttar Pradesh, Jharkhand and Bihar states to join the Ganges just west of Patna. Geologically, the lower valley of the Sone is an extension of the Narmada Valley, and the Kaimur Range an extension of the Vindhya range. Anuppur, Chopan, Deori, Rohtasgarh, Dehri, Sonebhadra and Bihta are the major cities situated on Sone River.

Showing the Geological Succession and their geographic distribution.

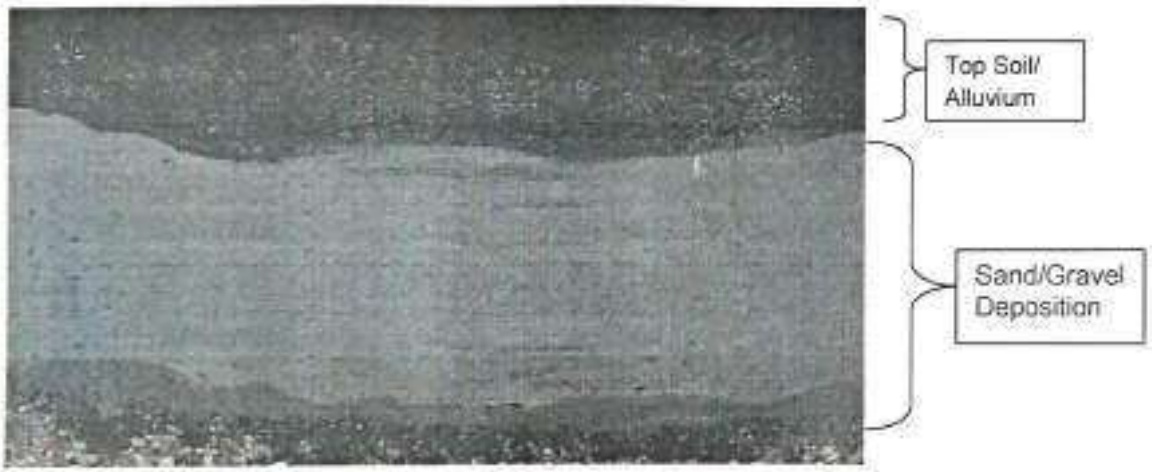
Age	Geology	Occurrences
Quaternary	Alluvial Deposits (Sand, Clay, Silt, Fragments)	North Bihar Plain & Central Bihar Plain
Tertiary	Sand Stones & Clay Stones	North Champaran Hills
Gondwana	Coal Measures, Forming a series of Small outlier basins	Banka District
Vindhyans	Sandstones, Shales, Limestones, etc.	Parts of Bahbhua and Rohtas dist
Satpura	Schist, Phyllite, Quartzite	Part of Aurangabad, Gaya, Nawada, Nalanda,Sheikhpura and Munger District
Proterozoic	Schist, amphibolites, quartzite, granite, dolerite and pegmatite	Nawada, Jamui and Banka
Archaean	Gneisses, Granites, Schists, Phyllites, quartzite, amphibolites & intrusive all metamorphosed sedimentary and igneous rocks	Part of Aurangabad, Gaya, Nawada, Jamui, Banka and Bhagalpur

4.1.3 Local Geology

The Sone parallels the Kaimur hills, flowing east-northeast through Uttar Pradesh, Jharkhand and Bihar states to join the Ganges just west of Patna. Geologically, the lower valley of the Sone is an extension of the Narmada Valley, and the Kaimur Range an extension of the Vindhya Range.

The sand exposed in the River bed of Sone and surrounding areas is the product of the deposition of the sediments brought and deposited in the flood plains of River Ganga. These sediments are of recent geological formation. The litho-units exposed within the river and surrounding areas have formed as water borne sediments brought by flood water during rainy season every year and deposited in riverbed.

The litho units encountered in the riverbed and surrounding areas belongs to the Shivalik super groups. The size of the sediments towards the source i.e. host rock is course and at the tale end of the river the grain size is reduced to smaller sizes resulted in the formation of clay beds. The following sequences have been observed in the area, i.e. Top soil/ Alluvium followed by sand deposition (as shown in the figure below).



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 0.60m m constitute the top horizons in the area suitable for agriculture. River Ganga meanders through the area exposing the alluvium and soil at the banks. Sand is found in the river bed upto a depth of more than 3.0 m. The major part of bed remains dry as water flows in a single stream during the non-monsoon season. Only during rainy season the entire flood plain has water, when there will be no mining done.

4.2 ORIGIN & CONTROL of MINERALIZATION (ANNUAL REPLENISHMENT OF MINERAL IN RIVER BED AREA/SEDIMENTATION)

Sedimentation, in the geological sciences, is a process of deposition of a solid material from a state of suspension or solution in a fluid (usually air or water). Broadly defined river sand is a product of natural weathering of rocks over a period of millions of years and these materials get collected under the impetus of gravity alone, as in talus deposits, or accumulations of rock debris at the base of cliffs. The term is commonly used as a synonym for sedimentary petrology and sedimentology.

Sedimentation is generally considered by geologists in terms of the textures, structures, and fossil content of the deposits lay down in different geographic and geomorphic environments.

The factors which affects the "Computation of Sediment":

Geomorphology & Drainage Pattern: The following geomorphic units plays important role:

- Structural Plain
- Structural Hill
- Structural Ridge
- Denudation Ridge & Valley
- Plain & Plateau of Gangetic plain
- Highly Dissected pediment
- Un-dissected pediment
- Distribution of Basin Area River wise
- Drainage System/Pattern of the area, Rainfall & Climate: Year wise Rainfall data for previous 10 years .
- As per Dandy & Bolton study "Sediment Yield" can be related to

i) Catchment Area and

ii) Mean Annual Run-off

Sand is an essential minor mineral used extensively across the country as a useful construction constituent and variety of other uses in sports, agriculture, glass making (a form of sand with high silica content) etc. It is common knowledge that minerals are non-renewable but this form of mineral naturally gets replenished from time to time in a given river system and is very much interrelated to the hydrological cycle in a river basin.

Sand mining has become a widely spread activity and does not require a huge set up or technology, the number of ventures has increased extensively and it has become a footloose industry in itself but the backward-forward linkages are becoming stronger as many are getting employed as well as the construction activity / industry requires this mineral at consistent rates. Riverine environmental systems are unique in themselves and provide environmental services, natural resources to meet variety of needs of urban and rural communities.

4.2.1 REPLENISHMENT STUDY OF MINED AREA OF SONE RIVER:-

Replenishment Rate is the rate at which Bajri is transported into the river channel, which is under examination or subjected to sand extraction. This volume is often considered as sustainable yield of that river. Estimation of Bajri discharge through stream bed and its residence period (temporary deposition) is one of the most difficult task in sediment budgeting.

The rate of gross or absolute silt production (erosion) in the watershed and the ability of the stream system to transport the eroded material in a river and then to a reservoir has the direct relation with the quantity of sediment delivered into a reservoir. It has been observed that the average rate of sediment production decreases as the size of drainage area increase and the larger watershed the lesser is the variation between the rates. The larger watershed presents more opportunity for deposition of silt during its traverse from the point of production.. The total amount of eroded material, which reaches a particular hydraulic control point, is termed as sediment yield. The sediment control of inflow is governed by Character of run-off; Susceptibility of soils; the extent and density of vegetative cover in the area; and the hydraulic efficiency of the drainage system.

This report quantifies the annual replenishment of bed material in the Sone River during periods of sediment transport at high flows within the mined area. It provides estimates of the amounts of sand & bajri which will be used in construction and for other uses.

4.2.2. METHODOLOGY FOR REPLENISHMENT STUDY:-

The methodology used for Replenishment study is based on the measurement of volumetric survey (RL) at selected points as monitoring stations within the lease area in Pre-monsoon season & Post Monsoon season respectively. For the said project replenishment study has been done during the post-monsoon season has done by field survey (volumetric survey) method. Firstly Volumetric Survey was done in the proposed mining block. By this method spot RL/level are marked & mapped and sections are drawn for several monitoring locations within the mine area. After that, for post-monsoon season again spot RL/level are marked & mapped on the same location and sections are drawn. The RL(m) observed during Pre-monsoon season of all locations.

Table 7. volumetric survey measurement

Sone 11

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	584400
Total		584400

Replenished quantity of sand = 584400 cum. Or 1005168 tonnes.

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Sone 12

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	120300
Total		120300

Replenished quantity of sand = 120300 cum. Or 206916 tonnes.

Sone 13

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	248700
Total		248700

Replenished quantity of sand = 248700 cum. Or 427764 tonnes

Sone 14

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	309300
Total		309300

Replenished quantity of sand = 309300 cum. Or 531996 tonnes.

4.3 EXPLORATION

Mining of sand is being done since long time therefore no specific method of exploration is required as the sand, deposited all along the bed and its pale channels, which is very well exposed on the surface. The minerals excavated from the river bed will be replenished gradually during the monsoon season every year. And the area pertaining to palaeochannels of the river will be leveled & restored back. Adequate quantity of Sand in reserves is available for meeting consumer demand.

4.4 MINERAL RESERVES

The Mineral reserves have been estimated as per the Indian Standard Procedures. The area of the mining lease is 42.09 Hectares and the average thickness of the river bed minerals estimated as 3.0 meter.

4.4.1 Parameters of Reserve Estimation:

The geological reserves have been estimated as per UNFC guidelines in all the three axis.

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Economic Axis (E-1): The Sand is exists with in the entire stretch & having no problem selling in the market. The road is near the Ghat & sand shall loaded into tipper with the deployment of an excavator & transport to various parties. The land is State Govt. land & State Govt. has given its consent for the exploitation of Sand on their expensive land. On the feasibility study, economic viability of deposit has been established sand in economic viable, therefore economic axis has been considered as E-1.

Feasibility Status (F-1): Feasibility study has been carried out & is considered to be feasibility status. A feasibility study provides a preliminary assessment with a level of confidence as compared to that of feasibility study. It has been revealed that exploitation of sand is feasible & economic viable & feasibility axis under UNFC code has been considered as F-1:

Geological Axis: The exposure of sand is seen in the entire stretch & thickness of sand varies 2.5m to 3.0m. Therefore geological axis has been considered as G-1.

Geological Reserves

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

i) **Proved Mineral Reserves (111):** All quantities of sand occurring upto depth of 3m from surface has been considered as proved reserves.

Sone 11

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	584400
Total		584400

Geological Reserve = 584400 cum. Or 1005168 tonnes.

Sone 12

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	120300
Total		120300

Geological Reserve = 120300 cum. Or 206916 tonnes.

Sone 13

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum

1)Proved Mineral Reserve	111	248700
Total		248700

Geological Reserve = 248700 cum. Or 427764 tonnes

Sone 14

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	309300
Total		309300

Geological Reserve = 309300 cum. Or 531996 tonnes.

Total Geological Reserve = 1262700 cum or 2171844 tonnes

4.4.2 Mineable Reserves:

Mineable reserves have been computed up to 3m depth from surface. Benches having height 1.5m & width 6.0m drawn from the ultimate pit limit. Area of each benches have been calculated multiplied by strike influence to get the volume. The volume multiplied by bulk density (**1.72 g/cm^3**) to get the tonnage.

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

Table-4.4:- Summary of minable reserves of Patna Sone Cluster 11 Sand Ghat as below:

PATNA SONE CLUSTER 11 SAND GHAT OF SONE RIVER

Sone 11

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
63-61.5	1757	95	1.5	250373	430642
61.5-60	1747	85	1.5	222743	383118
Total				473115	813758

Mineable Reserve = **473115 CUM or 813758 Tonnes**

Sone 12

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
61-59.5	586	51	1.5	44829	77106
59.5-58	876	41	1.5	53874	92664
Total				98703	169769

Mineable Reserve = **98703 CUM or 169769 Tonnes**

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Rana Sahrawat
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Sone 13

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
60-58.5	541	134	1.5	108741	187035
58.5-57	531	124	1.5	98766	169878
Total				207507	356912

Mineable Reserve = **207507 CUM or 356912 Tonnes**

Sone 13

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
60-58.5	1113	76	1.5	126882	218237
58.5-57	1103	66	1.5	109197	187819
Total				236079	406056

Mineable Reserve = **236079 CUM or 406056 Tonnes**

Total Mineable Reserve (Sone 11 + Sone 12 + Sone 13 + Son 14) = 1015404 CUM or 1746495 Tonnes

- Mineable reserve has been consider 60% approx. of geological reserve after applying the guideline of Enforcement & Monitoring Guidelines for Sand Mining 2020.
- The proposed production grant in LOI is **757620 cum** per year which is within the sustainable limit of mineable reserve.
- The BD for Sand has been adopted at 1.72(g/cm^3) [Rappid Test Lab Private Limited, Patna]

• CLASSIFICATION MINERAL RESERVES:

SAND GHAT	Area (Hect)	Geological Reserves (m3)	Mineable Reserves (m3)	Annual Permitted Reserve As per Lol (m3)
PATNA SONE CLUSTER 11	42.09	1262700	1015404	757620

The annual extractable RBM comes to 757620 CUM or 1303107 Tonnes. It will be replenished after rainy season every year.

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Rana Sanyal
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4.5 LIFE OF MINE

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

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CHAPTER – 5

5.0 MINING

- Mining will be done as per the guidelines of Bihar Mineral (Concession Prevention of illegal Mining Transportation & Storage) Rules, 2019, SSMG -2016, and EMGSM – 2020.
- This is an open-cast mining project. The operation will be semi-mechanized/OTFM with use of excavators/JCBs truck /tractors combination or Manually etc. The sand will be collected in its existing form.
- Sand Mining will be carried out only upto a depth of 3 m bgl or above ground water level (whichever is less), for river bed block.
- No drilling /blasting are required as the material is loose in nature.
- Proper benching of 1.5 m height and 6 m width will be maintained for mining blocks as per guideline M.M.R-12019, under rule 115(1).
- Mining will be done only during the day time and completely stopped during the monsoon season.

Restriction on mining:

i) Sand and gravel shall not be extracted up to a distance of 1 km from major bridges and highways on both sides, or five times (5x) of the span (x) of a bridge/public civil structure (including water intake points) on up-stream side and ten times (10x) the span of such bridge on down side, subjected to a minimum of 250 meters on the upstream side and 500 meters on the downstream side.

ii) No quarrying shall be permitted within 50 (fifty) metres of any public place i.e. cremation Ghat or any religious place etc.

iii) No quarrying shall be permitted within 5 (five) metres from both banks of the river.

iv) The quarrying of sand shall be prohibited within 100 (one hundred) metres upstream and downstream from any dam/weir or any other structure erected for irrigation purpose.

v) Sand Ghats should preferably be located on the river side embankment. For low embankment less than 6 metres height, quarrying should not be done within 25 metre from toe/heel of the embankment and depth of mining should not be more than 1.00 metre. In case of higher embankments, the distance should not be less than 50 metre and depth of mining should be maximum 1.50 metre and at a distance of 75 metre of more mining depth should be maximum 2.00 metre. In order to obviate the development of flow parallel to embankment, crossbars of width eight times the depth of mining pits spaced at 50 to 60 metres center to center should be left in the mining pits.

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vi) The irrigation outlet shall be maintained at the same level as that of the river bed and in no case the river bed level shall be permitted to be below the irrigation outlet level. No quarrying shall be permitted around the infiltration well/intake well up to a distance of 5 metres.

vii) The extraction of sand shall be permitted only after obtaining a No Objection Certificate from the Water Resources Department in the case of rivers where from irrigation channels are out flowing.

viii) No quarrying of sand shall be permitted in any private land owned by a perSone other than the settlee unless the settle obtains the consent of the concerned land owner/raiyat.

ix) No quarrying of sand shall be permitted in any area which the State Government notifies as a restricted area.

x) Sand and gravel shall not be allowed to be extracted where erosion may occur, such as at the concave bank.

xi) Mining depth should be restricted to 3 meters and distance from the bank should be ¼th or river width and should not be less than 7.5 meters.

5.2.1 Proposed method of mining:

Mining activity will be carried out by open cast manual/Mechanically method.

- No OB/ waste material will be produced in river bed. The sand shall be exploited upto depth of 3.0m only through the formation of bench height 1.5m & width 6.0m. An approach road having width 6.0m & gradient 1:12 shall be provided for the movement of loading machineries & transportation of sand. The sand shall be exploited with the deployment of an excavator & filled into Tractors/Trucks & transported to various buyers.
- No drilling/ blasting are required as the material is loose in nature.
- Proper benching of 1.5 m height will be maintained.
- Roads will be properly made and sprayed by water for suppression of dust.
- Roads in the applied area for the movement of loaded tractors/ trucks will not have slopes more than 1 in 16.
- The mined out area shall be replenished each year during monsoon period and maintained in maximum original topography.
- Approach roads from the various blocks as already described earlier will be merging with permanent tar roads on both sides of the river for transportation of the mineral to final destinations.
- The Sand transportation shall be insured after the covering the vehicle Tarpaulin.

5.3 Year wise Production Schedule:

YEAR	Over burden (cum)	ROM Sand (cum)	Saleable Sand (cum)
1ST	-	757620	757620
2ND	-	757620	757620
3RD	-	757620	757620
4TH	-	757620	757620
5TH	-	757620	757620

The annual extractable RBM comes to 757620 CUM or 1303107 Tonnes. It will be replenished after rainy season every year.

5.4 Conceptual Mining Plan

Mine Applied Area will be worked for Patna Sone Cluster 11 Sand Ghat. However, as the digging depth will be restricted to 3.0 m only. This will be further replenished during rainy season. Sand Ghat will be worked systematically as the width is limited while length is much more. As the lease period is only 5 (Five) years, some of the area will be left un-worked at the end of lease period.

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

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

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

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

5.5 Extent of Mechanization:

The operation will be done by semi mechanized method / OTFM.

Following table gives the list of equipment to be used:

Table-5.2:- List of Equipment's to be used

S. No.	Name of machinery	Capacity	Fuel Consumption	No. of Machinery
1	JCB	1.00 m^3	10 Ltr/hr	2
2	Excavator	2.0 m^3	16 Ltr/hr	14
3	Trucks	12 tonnes	4 Ltr/hr	391
4	Tractors	04 Tonnes	2 Ltr/hr	130
5	Water Tanker	4000 liter	4 Ltr/hr	2
6	Light vehicles	As per requirement	4 Ltr/hr	1

5.6 QUANTITY OF HSD/ FUEL CONSUMPTION PER DAY

Table-5.3:- Quantity of HSD/Fuel to be used

S. No	Machine	Details of fuel (Diesel) requirements	Consumption of Diesel (in lits/ day.)
1.	Excavator & JCB	Number of Excavator & JCB = 14&2 Diesel consumption by 2 jcb & 14 Excavators m/c in one shift working.(i.e-10/15litre/hr) =2*8*10= 160 liters & 14*8*16= 1792 liters	1952 liters
2	Tippers/Tractors	Number of Tractors & Trucks = 130 &	14592 liters

		391 Diesel consumption by 391 trucks & 130 Tractors in one shift working (i.e-4ltr/hr.) & (i.e-2 ltr/hr.) =130*2*8 = 2080 =391*4*8= 12512	
3	Water Sprinkler	Number of Sprinkler=02 Diesel consumption by Sprinkler in one shift working.(i.e-4ltr/hr). =2*10*4=80 liters.	80 liters
3	Extra	Transport vehicle, super vision vehicle, maintenance vehicle	50 liters
			Total=18450

5.7 MINERAL PRODUCTION

The mining will be confined to excavation of sand to an extent depending upon availability and market demand. Production is taken tentatively upto a maximum of **1303107 TPA** as per marked demand.

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PROPRIETOR

CHAPTER –6

6.0 DRILLING AND BLASTING

No drilling and blasting shall be required to for the exploitation of river sand.

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Rana Sagar
PROPRIETOR

CHAPTER–7

7.0 MINE DRAINAGE:

a) Likely depth of water table based on observations from nearby wells and water bodies:

As per the proposed mining, the working shall be confined up to 3.0 m or above the ground water table whichever comes first. Hence no water is likely to be encountered. So there is no need of any such arrangements.

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CHAPTER–8

8.0 DISPOSAL OF WASTE MATERIAL

No waste as such will be generated at the site as all materials are saleable. If, at all silt clay will be generated along with the minerals will be used to dispose off in the low lying areas as spread, where plantation will be done after spreading top soil on it.

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CHAPTER-9

9.0 USE OF MINERALS

Sand has become a very important mineral for expansion of our society due to its many uses. It can be used for making concrete, filling roads, building sites, brick-making, making glass, sandpapers, reclamations, and etc.

CHAPTER – 10

10.0 OTHERS

10.1 HAULAGE AND SURFACE TRANSPORT

Mode of transportation of material is by trucks/ Tractors of size of 12 tonnes / 4 tonnes capacity have been planned.

Mining area is connected with an unmetalled (approach) road upto the nearest village and thereafter it is metalled road connected to State/National highway. The mine road is adequate to permit easy maneuverability of trucks allowing cross overs and changing points. Water is sprayed two times in a day by tractor mounted water sprinklers until dust remains airborne.

10.2 SITE SERVICES:

A temporary rest shelter will be provided for the workers near to the site for rest.

Provisions will also be made for following in the rest shelter:

- First aid box along with anti-venoms to counteract poiSone produced by certain species of small insects, if any.
- Sanitation facility i.e. septic tank or community toilet facility will be provided for the workers.
- Canteen will be made available near the sites.

10.3 WATER REQUIREMENT

Total water requirement for the project is 7.0 KLD, its breakup is as under:-

Table: 10.1- Water Requirement of the proposed project

S.No.	Purpose	Water Requirement (KLD)
1.	Dust Suppression	3.5
2.	Domestic	1
3.	Green Belt	2.5
Total		7.0

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10.4 EMPLOYMENT:

The manpower requirement for the proposed project is tabulated below. This manpower is the permanent resource which excludes personnel's coming along with trucks / Tractors.

Table 10.2:- Man power distribution of the proposed project

S. No.	Category	Numbers
1.	Administration	1
2.	Supervisor	4
3.	Skilled	16
4.	Un-skilled	46
TOTAL		67

The maximum annual production envisaged is **1303107** TPA which will be achieved every year that implies about 5213 tonnes per day 250-working days in a year. That implies 67 workers will meet the required production.

SAFETY PROVISION:

All provisions in safety rules & regulation will be maintained by providing required materials to the employees. The lessee will provide safety shoes, safety helmets to all the employees. There will be no violation of safety provisions.

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CHAPTER–11

11.0 MINERAL BENEFICIATION

Mineral Sand doesn't require processing or beneficiation. The excavated mineral will be directly loaded into the trucks.

RANA ENTERPRISES
Rana Sanyal
PROPRIETOR

CHAPTER –12

12.0 ENVIRONMENT MANAGEMENT PLAN

12.1 SOLID WASTE MANAGEMENT

In this if top soil will be generated, will be used for purposed of applied for green belt development. Small amount of domestic waste will be generated by the workers at the site, which will be disposed off through proper municipal way. No other waste generation is expected.

12.2 PLANTATION

The area of the proposed project lies in the river bed and devoid of any forest land.

Mining activities in River Bed blocks will not cause any harm to riparian or aquatic vegetation as mining will be only in the dry river bed portions of the river leaving safety distance from the bank. Hence it proposed to plant trees along the banks (wherever possible), along the haul road sides or near the civic amenities in consultation with village authority/local bodies.

In river bed mining cases plantation will be done at the river banks. It is proposed to have plantation along the haul road sides on both sides to provide cover against dust emission and also to act as noise absorber. Plantation will also be carried out as social forestry programme in villages, school/ and the areas allocated by the village authority/local bodies. Every year 86 trees of will be planted with various types of species. List of species is recommended for plantation.

Native plants like Mango, Neem, Kadamb, Kathal, Peepal, Gulmohar, and other local species will selected in suitable combination, so that can grow fast and also have good leaf cover. It is proposed to plant.

12.3 ENVIRONMENT MANAGEMENT PLAN

1.	Top soil storage, preservation and utilization	Present mining area is river bed, therefore no generally no top soil is present, if found then quantities of top soil to be generated will be stacked separately, preserved and used for purposed of plantation therefore no proposal has been envisage for storage, preservation & utilization.
2.	Waste dump management	No waste will be generated during mining whatever material is collected is transported in its original shape. Hence no waste management is required. Small amount of domestic waste is expected, which will be disposed off in a proper way. No waste will be thrown into the streams or left on

		the banks.
3.	Plantation programme	Plantation will be done along both sides of roads and civic amenities in consultation with the local authorities. social forestry programme will also be conducted in the nearby villages
4.	Quality of air	24 hourly samples twice a week for one month in each season except monsoon will be collected at the mine site and nearby villages and analyzed.
5.	Noise	Excavators used for mining & transportation vehicles used for dispatch of minerals are source of noise pollution at mine site. Hence periodical noise monitoring will be done. Ear muffs/protective equipments will also be provided for safety of the workers.
6.	Quality and make of water including surface and ground water	Mining will not have any impact on surface and ground water, however monitoring of parameters will be done once in each season.
7.	Soil	No major impact on soil due to mining operations is expected. Soil parameters will be monitored once in two years.
8.	Topography & drainage	Mined out area will be replenished every year during monsoon period in each stretches in each block in case of river bed blocks. Hence as such no topographical impact will be seen. A buffer zone will be left on either side of banks as safety measure. There is no stream crossing through the applied area which would show impact on drainage pattern.
9.	Local transport infrastructure	Trucks/dumpers are main vehicles running on the road for mineral transportation. The present road network is adequate to handle the load of this project. Water sprinkling on the haul roads/link roads will be done two times in a day to keep the dust suppressed. Also proper parking and traffic management will be followed.

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PROPRIETOR

CHAPTER–13

CONCLUSION:

The proposed project involves collection of sand from inactive channel of river bed of Sone river. Safety distance will be left intact to avoid bank erosion. Mining activity will be done except monsoon season. All necessary measures will be taken care to save environment and for safety purposes. Besides this extraction of sand every year will reduce the chance of flood level by removing the deposited mineral. This is very essential in order to prevent widening of the riverbeds and to prevent flooding off and damage to the adjoining areas. The sand extracted is in high demand in the local market which is used in making bridges, road & Building Material, etc.

This project operation will provide livelihood to the poorest section of the society. It provides employment to the people residing in vicinity directly or indirectly by the project. After all the proposed project will increase developmental activities and employment opportunities.

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PROPRIETOR

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PROGRASIVE MINE CLOSURE PLAN

PROGRESSIVE MINE CLOSURE PLAN

1.0. Introduction:

1.1	Applicant Name & Full address Phone. No. E-mail ID	M/s Rana Enterprises Pro – Rana Saurav S/O – Rana Uday Pratap Singh Add : - Vill – Karsa Kothi, P.O + P.S – Bikram, Dist – Patna (Bihar) Pin – 821104 7677111151 ranasaurav7251@gmail.com
1.2	Letter no. / date of lease execution & lease period	District Magistrate issue LOI on letter no. 2834/khanan dated. 08.11.2022 for a period of 05 years (Annexure No. -1)
1.3	Settlee post/social status	Private
1.4	Mineral or Minerals which the Settlee intends to mine	Sand
1.5	Applied area for mining lease	Patna Sone Cluster 11 (Sone – 11, Sone – 12, Sone – 13, Sone -14) Sand Ghat Lease has an applied area of 42.09 Hectare.
1.6	Name & address of RQP & Regd. No. Mobile No. E-mail ID	Er. Pravin Kr Sinha Reg. No. - RQP/BIH/SR.NO.20 Letter No. 3825 Dated 07/11/2019 **Consultant :** P & M Solution 201,Mangal Market Raja Bazar, Patna (Bihar) 9889024004 & 7542949027 indusminingbihar@gmail.com
1.7	RQP Certificate	RQP certificate copy attached as **Annexure 2**
1.8	Name of the Prospecting agency	The base data is collected from various geological reports of the Department of Mines & Geology and local authorities as well as detailed prospecting of the area is carried out by the RQP.
1.9	Status of Environmental clearance	After Mining Plan approval then Settlee shall submit application to state Environment Impact Assessment Authority (SEIAA) of Bihar for environment clearance.
1.10	Date of Survey	09.11.2022

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a). Location: Patna Sone Cluster 11 Balu ghat fall in Mauja – Kab, Lahladpur, Janpara I, Janpara II, Anchal –Bikram & Dulhin Bazar, Dist – Patna (Bihar). The location plan is enclosed **(Plate No. 1)**

b). Extent of Lease area: **42.09 Hectares**

c). Type of lease area: Total area is waste land & it is free from forest land

d). Present land use pattern: The existing land use is given below:

Sr. No.	Land use	River Bed (Ha)	Forest Land (Ha)	Barren land (Ha)	Grazing Land (Ha)
1	Mining pits Quarry	-	-	-	-
2	Approach Road	-	-		-
3	Dumps	-	-	-	-
4	Office, Resht Shelter etc.	-	-	-	-
5	Balance undisturbed land	42.09	-	-	-
	Total	**42.09**	-	-	-

e). Method of mining and mineral processing:

- Mining will be done as per the guidelines of Bihar Mineral (Concession Prevention of illegal Mining Transportation & Storage) Rules, 2019, SSMG -2018 and EMGSM – 2020.
- This is an open-cast mining project. The operation will be semi-mechanized/OTFM with use of excavators/JCBs truck tractors combination etc. The sand will be collected in its existing form.
- Sand Mining will be carried out only upto a depth of 3 m bgl or above ground water level (whichever is less), for river bed block.
- No drilling /blasting are required as the material is loose in nature.
- Proper benching of 1.5 m height and 6m width will be maintained for mining blocks as per guideline M.M.R-2019, under rule 115(1).
- Mining will be done only during the day time and completely stopped during the monsoon season.

1.1. Reasons for Closure:

The "closure plan is a plan by which reinstate condition can be created, so that justification to the mother earth can be done" said by **James E. Hansen**. In the case of

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Prepared by: Er. Pravin Kr. Sinha, Regd. No. RQP/MDNR.NO.

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river bed mining, the excavated sand gets replenished during every monsoon and the area pertaining to palaeochannels of the river will be levelled & restored back to its original topography. More or less, the river bed maintains its previous form, such that the main stream of river remains unchanged.

According to experience and rough estimation of the State Government whatever quantity of minor minerals is extracted from the said area during the year will be replenished every year by the River itself on account of its flow and velocity.

At present there is no foreseeable reason regarding closure of mine. The progressive mine closure plan is being submitted.

1.3. Closure plan preparation:

a). Name and address of the Lessee:

Damas Civil Constructions India Pvt. Ltd.
Pro – Dinanath Tiwari
S/O – Sudama Tiwari
Ward No. – 18, At + Post – Bhabhua,
Kaimur – 821101
Mob -7004513684

b). Name, address & Registration No. of R. Q. P.

Er. Pravin Kr Sinha
Reg. No. - RQP/BIH/SR.NO.20 Letter No. 3825 Dated 07/11/2019
Consultant :
P & M Solution
201,Mangal Market
Raja Bazar, Patna (Bihar)
Mobile : 9889024004 & 7542949027
E-mail : indusminingbihar@gmail.com.

Name of the executing agency:

The Proponent shall execute himself the provision of mine closure plan.

2.0 Mine Description:

i) Topography and general geology and local / mine geology of the mineral deposit including drainage pattern

The sand deposits of Patna district of Bihar broadly form part and parcel of the flood plains of Ganga River as whole formed since geological ages.

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The State of Bihar is transecting by a no. of rivers. The individual river basins and their catchment areas is shown in Fig. no. 1 below.

The various sand mining lease areas (also referred to as sand ghats) lie in the river bed of river Sone which is a major tributary of river Ganga. They are formed in the Quaternary period of central Bihar Plains- the OAG (Older Alluvium Group) forming the highest terrace, in the Son-Ganga alluvial tract, and NAG (Newer Alluvium Group) forming younger terraces, as Older Flood Plains, are exposed all along the Alluvial Upland.

ii) Regional Geology :-

Regionally the area constitutes a part of the Ganga River Basin. The Sone originates near Amarkantak in Anuppur district of Madhya Pradesh, just east of the headwater of the Narmada River, and flows north-northwest through Shahdol district in Madhya Pradesh state before turning sharply eastward where it encounters the southwest-northeast-Kaimur Range.

The Sone parallels the Kaimur hills, flowing east-northeast through Uttar Pradesh, Jharkhand and Bihar states to join the Ganges just west of Patna. Geologically, the lower valley of the Sone is an extension of the Narmada Valley, and the Kaimur Range an extension of the Vindhya range. Anuppur, Chopan, Deori, Rohtasgarh, Dehri, Sonbhadra and Bihta are the major cities situated on Sone River.

Showing the Geological Succession and their geographic distribution

Age	Geology	Occurrences
Quaternary	Alluvial Deposits (Sand, Clay, Silt, Fragments)	North Bihar Plain & Central Bihar Plain
Tertiary	Sand Stones & Clay Stones	North Champaran Hills
Gondwana	Coal Measures, Forming a series of Small outlier basins	Banka District
Vindhyans	Sandstones, Shales, Limestones, etc.	Parts of Bahbhua and Rohtas dist
Satpura	Schist, Phyllite, Quartzite	Part of Aurangabad, Gaya, Nawada, Nalanda,Sheikhpura and Munger District
Proterozoic	Schist, amphibolites, quartzite, granite, dolerite and pegmatite	Nawada, Jamui and Banka
Archaean	Gneisses, Granites, Schists, Phyllites, quartzite, amphibolites & intrusive all metamorphosed sedimentary and igneous rocks	Part of Aurangabad, Gaya, Nawada, Jamui, Banka and Bhagalpur

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GEOLOGY OF THE AREA:

The sand exposed in the River bed of Sone and surrounding areas is the product of the deposition of the sediments brought and deposited in the flood plains of River Ganga. These sediments are of recent geological formation. The litho-units exposed within the river and surrounding areas have formed as water borne sediments brought by flood water during rainy season every year and deposited in riverbed.

DETAILS OF EXPLORATION:

a) **Already carried out in the area:**

No exploration has been carried out as sand lies all over the area & average thickness of sand is 3.0 m & area replenish every during the monsoon period. Therefore is no exploration has been carried out.

b) **Proposed to be carried out:**

Sand average thickness of 3.0 m lies all over the area & area replenish every during the monsoon period. Therefore no proposal of exploration has been given.

2.2 **Reserves:**

PATNA SONE CLUSTER 11 SAND GHAT

Geological Reserves : -

Sone 11

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	584400
Total		584400

Geological Reserve = 584400 cum. Or 1005168 tonnes.

Sone 12

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	120300
Total		120300

Geological Reserve = 120300 cum. Or 206916 tonnes.

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Sone 13

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	248700
Total		248700

Geological Reserve = 248700 cum. Or 427764 tonnes

Sone 14

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	309300
Total		309300

Geological Reserve = 309300 cum. Or 531996 tonnes.

Total Geological Reserve = 1262700 cum or 2171844 tonnes

Mineable Reserves: -

Sone 11

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
63-61.5	1757	95	1.5	250373	430642
61.5-60	1747	85	1.5	222743	383118
Total				473115	813758

Mineable Reserve = **473115 CUM or 813758 Tonnes**

Sone 12

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
61-59.5	586	51	1.5	44829	77106
59.5-58	876	41	1.5	53874	92664
Total				98703	169769

Mineable Reserve = **98703 CUM or 169769 Tonnes**

Sone 13

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
60-58.5	541	134	1.5	108741	187035
58.5-57	531	124	1.5	98766	169878
Total				207507	356912

Mineable Reserve = **207507 CUM or 356912 Tonnes**

Sone 13

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
60-58.5	1113	76	1.5	126882	218237
58.5-57	1103	66	1.5	109197	187819
Total				236079	406056

Mineable Reserve = **236079 CUM or 406056 Tonnes**

Total Mineable Reserve (Sone 11 + Sone 12 + Sone 13 + Son 14) = 1015404 CUM or 1746495 Tonnes

- Mineable reserve has been consider 60% approx. of geological reserve after applying the guideline of Enforcement & Monitoring Guidelines for Sand Mining 2020.
- The proposed production grant in LOI is **757620 cum** per year which is within the sustainable limit of mineable reserve.
- The BD for Sand has been adopted at 1.72(g/cm^3) [Rappid Test Lab Private Limited, Patna]

• CLASSIFICATION MINERAL RESERVES:

SAND GHAT	Area (Hect)	Geological Reserves (m3)	Mineable Reserves (m3)	Annual Permitted Reserve As per LoI (m3)
PATNA SONE CLUSTER 11	42.09	1262700	1015404	757620

The annual extractable RBM comes to 757620 CUM or 1303107 Tonnes. It will be replenished after rainy season every year.

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2.3 **Mining Method:**

Existing Method of mining:

It is fresh grant case of mining lease & at present no mining is being carried with the applied area.

b) **Proposed method of mining:**

Mining activity will be carried out by open cast semi mechanized/OTFM method.

- No OB/ waste material will be produced in river bed. The sand shall be exploited upto depth of 3.0m only through the formation of bench height 1.5m & width 6.0m. An approach road having width 6.0m & gradient 1:12 shall be provided for the movement of loading machineries & transportation of sand. The sand shall be exploited with the deployment of an excavator & filled into Tractors/Trucks & transported to various buyers.
- No drilling/ blasting are required as the material is loose in nature.
- Proper benching of 1.5 m height will be maintained.
- Roads will be properly made and sprayed by water for suppression of dust.
- Roads in the applied area for the movement of loaded tractors/ trucks will not have slopes more than 1 in 16.
- The mined out area shall be replenished each year during monsoon period and maintained in maximum original topography.
- Approach roads from the various plots as already described earlier will be merging with permanent tar roads on both sides of the river for transportation of the mineral to final destinations.

2.4 **Mineral beneficiation:**

No mineral beneficiation will be under taken for next five years. The sand shall be exploited semi mechanised with shovel tractor trolley/tippers combination & transport to parties.

3.0 **Review of implementation of mining plan / scheme of mining including five years progressive closure plan up to the final closure of mine:**

At is fresh grant case of mining lease it is therefore premature to make any comments about review of implementation.

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4.0 Closure Plan:

4.1 Mined out land:

Mining is proposed in one block. The mining shall be carried out during post monsoon season & depth of mining shall restricted 3.0m. Mining operation shall be suspended during monsoon period. The mined out pit shall be replenished during the monsoon period by sand and silt & levelled it. After over the monsoon period the replenish material shall be exploited manually as well as by means of an excavators & this process will continue.

The area already degrades due to mining & likely to be used during next five years is given below:

Activities	Area already used (ha)	Area likely to be used in mining (ha)
Pits & quarries	-	42.09
Approach road	-	-
Top soil Stack	-	-
Interburden dump	-	-
Backfilled pit	-	-
Total	-	**42.09**

(A) Mining:

Sl. No.	Activities	Area(Ha)
1.	Area already broken up	-
2.	Area already backfilled /reclaimed	-
Sl. No.	**Activities**	**Area(Ha)**
1.	Additional area proposed to be broken during next five years	-
2.	Additional area proposed to be replenished with flood water	-

(B) Dump:

Sl.No.	Activities	Area(Ha)
1.	Area already covered by dump	Nil
2.	Additional area to be covered by soil stack	-
3.	Additional area to be covered by interburden dump.	Nil
4.	Dump area to be covered by protective measures	

(C) Plantation:

Sr. No.	Activities	Area(ha)
1.	Area already covered under plantation	-
2.	Area proposed to be covered under plantation in next five years (with in area)	-
	Total	-

4.2 Water Quality Management:

No ground water bodies exist with in the area & no seasonal Nalla exists with in the area the mined out shall be filled back with available top soil. The rain water accumulates in the pit & water percolates in to ground water.

Further no significant impact on water quality is anticipated as material exposed will be Sand & its shall very feebly react with water that too when water becomes acidic. Even of reaction takes place it gives arise to increased temporary hardness of water. Water is being supplied from the Tubewell.

4.3. Air Quality Management:

The mining shall be carried out manually with conventional hand tools with put adoption of drilling & blasting mining shall be carried out in shadow depth.

No doubt the mining in this remote area will deteriorate the air quality. The base line values are too low due to remoteness of the area with our past experience. In this kind of terrain, the SPM, SO2 and NOX will always below 100, 10 & 10 microgram per meter cube respectively. Air quality monitoring shall be conducted once in a year as per CCOM'S circular No 3/92.

4.4. Waste management:

No waste shall be generated due to mining activities. All quantities of sand to be generated shall be bold in the local market. Therefore no proposal of waste management has been envisaged.

4.5 Top Soil Management:

No soil shall be generated during plan period & no proposal has been envisaged for its separate stacking & this management.

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4.6. Tailing Dam Management:

No tailing dam is proposed in the soapstone mine.

4.7. Infrastructure:

No infrastructure facilities like aerial ropeway, conveyor belts, building & structure, water treatment plant, transport & water supply sources are present within the lease area. Therefore no utilization & their physical stability & maintenance will be required. Also no infrastructure facilities like telephone line, water pipe line, sewer line, gas pipe line, electrical cables, culvert, bridges are not existing within the lease area. So question does not arise for their restoration. The approach road passed within the lease area & lessee shall maintain it during PMCP period.

4.8. Disposal of Mining Machinery:

It will be opencast semi mechanised mine. No disposal of mining machineries shall be envisaged during plan period.

4.9. Safety and Security:

1. Each worker shall be provided with helmets & safety shoes.
2. Safety belt shall be provided to workers a working the top benches.
3. Hanging of loose materials shall be removed from mine faces.
4. The mining area shall be properly fenced to avoid any inadvertent entry in to mining pit.
5. Working hours shall be displaced at conspicuous places.
6. Mining shall be carried out thought the formation of benches maintaining overall pit slope 60deg.

4.10 Disaster Management and risk assessment:

The mining is proposed in a gentler agricultural field. The mining will go up to the economical depth of 3m therefore, no disaster management and risk assessment shall be observed. However during monsoon period the area shall be properly fenced with barbed wire to avoid any inadvertent entry of any live stock.

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5.0. Economic repercussions of closure of mine and manpower retrenchments:

All the workers being employed are contractor labours. An any industry will provide direct and indirect employment. The local residents will earn tremendous amount of money due to mining activities. It will change their life style. Due to closure of mine, it will create very negative impact on the economy of the workers for their survival. Those earning good money will get some occupation for survival of their families. The literate workers will move here and there for the search of job. In the overall view the closure of mine will give very bad impact on the society and surrounding areas.

5.1 Local residents of nearby villages will be employed in the mine. The family occupation is most by farming. Few of them occupation carpentry & masonry.

5.2 The lessee pay each year about 5,000 to 10,000 as a compensation for the sustenance of the few workers family.

5.3 About 30% of the workers employed in mine are independent but they are controlled depended by their family members.

5.4 The local residents will be employed in the mining operations, and allied activities related to mining operations.

5.5 During mining operations the land owners & society of the area shall earn lucrative amount of money from direct & indirect activities. Individual land owners shall also earn good amount of money in terms of royalty. Most of them will spend money to establish other business also. After mining, the total land shall be backfilled & agricultural activities shall be recommended. No repercussion should be observed during the closure of mine.

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6.0 Time Scheduling for abandonment:

It is proposed in the mining plan that mining will open from lower levels and subsequently advance towards higher elevations so that concurrent reclamation will be under taken to restore the topography of area. The mined area will be replenished during the monsoon period.

The year wise schedule of completion of quantities is given below:

Activities	YEAR				
	I	II	III	IV	V
Toe wall along Soil stack	-	-	-	-	-
Backfilling (Cum)	-	-	-	-	-
Plantation (No. of sampling, out side the area)	86	86	86	86	86

The tentative cost of implementation of activities during next five years is given below:

Sl. No.	Activities	Year					Total amount on Rs.
		I	II	III	IV	V	
1.	Toe wall (soil stack Rs. 40/m)	-	-	-	-	-	-
2.	Retaining at the edge of backfilled wall pit (Rs. 50/m)	-	-	-	-	-	-
3.	Plantation (Rs. 55/- sapling with in the area)	86	86	86	86	86	430000
	Total						**430000**

The tentative cost (In Rs) of implementation of activities during next five years is given below:

Tree guard @ 800 per unit	800
Per plant species cost	100
Average Water demand cost per species Per Year	100
Total	1000

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RANA ENTERPRISES
Rana Sarwar
PROPRIETOR

7.0 Abandonment Cost:

The tentative cost for implementation of protective and rehabilitation measures, the proposal given in the mining plan for next five years period is as under:

Activity	Year						Rate In Rs.	Amount In Rs.
	I	II	III	IV	V	Total		
i) Toe wall at the base and side of soil stack (mtr)	-	-	-	-	-	-	40/m	-
iii) Retaining wall at the edge of backfilled pit (m)	-	-	-	-	-	-	-	-
iv) Plantation (no. of sapling with in the area.)	86	86	86	86	86	430	1000/-	430000
v) Reclamation(Cum.)	-	-	-	-	-	-	40cum	-
Total								430000

RANA ENTERPRISES
PROPRIETOR

Prepared by: Er. Pravin Kr. Sinha, Regd. No. RQP/BR/[illegible]

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8.0 Any other information:

Community Development: The expensed increased towards the socio-economic development is given below:

Proposed Action Plan Towards socio economic development	First Year to Fifth Year	
	Expenditure proposed (in Rs.)	**Expenditure in occurred (in Rs.)**
General Development of the area	-	-
i) Housing	50,000	-
ii) Water Supply	35,000	-
iii) Sanitation	22,000	-
iv) Health, Safety & Medical Facilities	32,000	-
Education & Training	30,000	-
Employment to local inhabitants; Land owner compensation; Supervisor & Headers etc.	1,00,000	-
Public Transportation & Communication	25,000	-
Recreation & other sports activities	20,000	-
Expenditure for environment management	2,00,000	-
Others (Compensation to land owners)	80,000	-

RANA ENTERPRISES
PROPRIETOR

Prepared by: Er. Pravin Kr. Sinha, Regd. No-RQP/BIH/SR.NO.20

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9.0 Financial Assurance:

The financial assurance has been calculated on the basis of following parameters:

SL No.	Head	Area put on use at start of plan (In Ha)	Additional requirement during plan period. (In Ha)	Total (in Ha)	Area considered as fully reclaimed & rehabilitated (In Ha)	Net area considered for calculation (In Ha)
1.	Area under mining	-	42.09	42.09	42.09	0
2.	Storage for top soil	-	-	-	-	0
3.	interburden/ dump	-	-	-	-	0
4.	Mineral storage	-	-	-	-	0
5.	Infrastructure (Workshop, administrative building etc.)	-	-	-	-	0
6.	Approach Road		-	-	-	-
7.	Railways	-	-	-	-	0
8.	Green Belt	-	-	-	-	-
9.	Tailing pond	-	-	-	-	0
10.	Effluent Treatment Plant	-	-	-	-	0
11.	Mineral Separation Plant	-	-	-	-	0
12.	Township area	-	-	-	-	0
13.	Others to specify (retaining wall + toe walls	-	-	-	-	-
	Grand Total		42.09	42.09	42.09	-

The total mined out area shall be replenished each year during monsoon period & no broken area will be remained in the applied area. Therefore, it is not possible to calculate financial assurance at this stage.

Date:

Place: Patna

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RANA ENTERPRISES
Pawan Gaurav
PROPRIETOR

ANNEXURE

RANA ENTERPRISES
JAI PRAKASH NAGAR BISHUNPUR NALA
DHANBAD,JHARKHAND ,826001

Email id:-ranasaurav7251@gmail.com
GSTIN:-20EMAPS1147C1Z0
Contact No:- 7677111151

Ref No.

AUTHORISATION LETTER BY THE APPLICANT/ LESSEE

Date: .....

I, Rana Saurav hereby authorise ***Er. Pravinkumar Sinha***, Reg. No. - RQP/BIH/SR.NO.20 Letter No. 3825 Dated 07/11/2019 to prepare the Mining plan Submitted under Rule (17) of Bihar Minerals (concession, prevention of illegal transportation & storage) Rules 2019 in respect of M/s Rana Enterprises at over an area of 42.09 Hectare for mineral(s) for Patna Sone Cluster 11 Sand Ghat in Mauja – Kab, Lahladpur, Janpara I, Janpara II, Anchal –Bikram & Dulhin Bazar, Dist – Patna (Bihar).

I request The Director, Department of Mines & Geology Patna, Bihar to make further correspondence regarding modification and to collect the approved copies of the aforesaid mining plan with the said recognized person on his following address:

Name of RQP : Er. Pravin Kr. Sinha
Reg. No. - RQP/BIH/SR.NO.20
Letter No. 3825 Dated 07/11/2019

Address of RQP

: 201,Mangal Market
Raja Bazar, Patna (Bihar)
9889024004 & 7542949027
indusminingbihar@gmail.com

Proponent

RANA ENTERPRISES

Place : Patna

Date :

PROPRIETOR
Rana Saurav
M/s Rana Enterprises
S/O – Rana Uday Pratap Singh
Add : - Vill – Karsa Kothi,
P.O + P.S – Bikram,
Dist – Patna (Bihar) Pin – 821104

Certificate

1. Certified that the provisions of mines Act, Submitted under Rule (17) of Bihar Minerals (concession, prevention of illegal transportation & storage) Rules 2019 made there under have been observed in Patna Sone cluster 11 (Sone – 11, Sone – 12, Sone – 13, Sone -14) Sand Ghat and wherever specific permissions are required, the lessee will approach concerned authorities for granting permission.

2. The information furnished in Patna Sone Cluster 11 (Sone – 11, Sone – 12, Sone – 13, Sone -14) Sand Ghat is true and correct to the best of my knowledge.

(*Pravin Kumar Sinha*)

Reg. No. - RQP/BIH/SR.NO.20
Letter No. 3825 Dated 07/11/2019

Place: - Patna

Date:-

(Approved RQP under Bihar Government)

EXECUTIVE SUMMARY

FOR

SAND MINING PROJECT (CLUSTER) AT SON RIVER PATNA CLUSTER SON-11

(SONE-11, 12, 13 & 14) SAND) GHAT

At

Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara II,
Tehsil-Bikram & Dulhin Bazar, District Patna, State – Bihar

AREA	**Sone 11 - 19.48 Ha.** **Sone 12 - 4.01 Ha.** **Sone 13 - 8.29 Ha.** **Sone 14 - 10.31 Ha.** **Total Cluster Area - 42.09 Ha.**
PRODUCTION Patna Cluster Son-11 (Sone-11, 12, 13 & 14)	**757620 CUM or 1303107 TPA**

PROJECT PROPONENT

M/s Rana Enterprises
Pro – Rana Saurav
S/O – Rana Uday Pratap Singh
Add : - Vill – Karsa Kothi, P.O + P.S – Bikram,
Dist – Patna (Bihar) Pin – 821104

Environment Consultant

P and M Solution
(Accredited by QCI/NABET)
Accreditation No. : NABET/EIA/1992/IA0053
C-88, Sector 65 Noida
www.pmsolution.in

EXECUTIVE SUMMARY

INTRODUCTION

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

Patna Cluster Son-11(Sone-11, 12, 13 & 14)

The project has been proposed by M/s Rana Enterprises, Pro – Rana Saurav. The Proposed Sand Mining Project is located on Son River at Patna Cluster Son-11(Sone-11, 12, 13 & 14) at Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara II, Tehsil-Bikram & Dulhin Bazar, District Patna, (Bihar). LOI issued to lessee via letter no 2834 /M, Patna dated 08-11-2022.The Draft EIA report has been prepared according to EIA notification 2006 and its subsequent amendment thereof. TOR of the proposed project has been issued by SEIAA Bihar dated 12-01-2023.

Cluster Situation: As per District Survey Report Patna the Proposed sand Ghats of (Patna Sone-11, 12, 13 & 14) Sand Ghat are comes in cluster situation whose combined cluster area is 42.09 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

The Details of cluster is given below:

Sand Block Name	Area (Ha)	Production in TPA
Sone 11	19.48	946728
Sone 12	4.01	194886
Sone 13	8.29	402894
Sone 14	10.31	501066
Total	**42.09**	**2045574**

It has been proposed to mine around **1303107** Tonnes per annum for applied lease. The estimated project cost for the proposed project is **Rs 60,87,21,400 /-** (including auction cost)

PROJECT DESCRIPTION

LOCATION

1. Patna Son-11

The proposed mining lease area falls in Survey of India Toposheet Topo sheet No- 72 C/10, 72 C/11, 72C/14, 72C/15. The lease area is located in Mauza- Kab, District Patna, (Bihar). The mine lease co-ordinates are listed below:

Pillar Co-ordinates (Sone 11)

Pillar No.	Latitude /Longitude	
1	25.4108048	84.76375812
2	25.41272392	84.76515328
3	25.41392464	84.76510723
4	25.4173491	84.76639802
5	25.41942682	84.76840242
6	25.42045689	84.76893111
7	25.42411352	84.76938504
8	25.425944	84.7701536
9	25.42543953	84.77101562
10	25.41763436	84.76852498
11	25.4129551	84.7662398
12	25.41146776	84.76505301
13	25.41094096	84.76429313

LOCATION

2. Patna Son-12

The proposed mining lease area falls in Survey of India Toposheet Topo sheet No- 72 C/10, 72 C/11, 72C/14, 72C/15. The lease area is located in Mauza- Lahladpur, District Patna, (Bihar). The mine lease co-ordinates are listed below:

Table: Mine lease Pillar Co-ordinates (Sone 12)

Pillar No.	Latitude /Longitude	
1	25.43290394	84.77524573
2	25.43304366	84.77496578
3	25.43397955	84.77535911
4	25.43470331	84.77588399
5	25.43509721	84.77654562
6	25.43714623	84.77798932
7	25.43758269	84.77808495
8	25.43747098	84.77871285
9	25.43673083	84.77839512
10	25.43479929	84.77716448

LOCATION

3. Patna Son-13

The proposed mining lease area falls in Survey of India Toposheet Topo sheet No- 72 C/10, 72 C/11, 72C/14, 72C/15. The lease area is located in Mauza- Janpara I, District Patna, (Bihar). The mine lease co-ordinates are listed below:

Table: Mine lease Pillar Co-ordinates (Sone 13)

Pillar No.	Latitude /Longitude	
1	25.44728437	84.78069489
2	25.44718873	84.78078351
3	25.44650365	84.78141834
4	25.44546538	84.78143779
5	25.44402535	84.78121801
6	25.44391148	84.78115536
7	25.44283717	84.77976851
8	25.44272432	84.77950054
9	25.44240832	84.77957033
10	25.44241844	84.77822087
11	25.44265508	84.77799867
12	25.44518656	84.77977885

LOCATION

4. Patna Son-14

The proposed mining lease area falls in Survey of India Toposheet Topo sheet No- 72 C/10, 72 C/11, 72C/14, 72C/15. The lease area is located in Mauza- Janpara II, District Patna, (Bihar). The mine lease co-ordinates are listed below:

Table: Mine lease Pillar Co-ordinates (Sone 14)

Pillar No.	Latitude /Longitude	
1	25.46983285	84.76993348
2	25.46996451	84.77014975
3	25.46997958	84.7701745
4	25.46908019	84.77101713
5	25.46889769	84.77107393
6	25.46872096	84.77171681
7	25.46816599	84.77243387
8	25.46714795	84.77306155
9	25.46639639	84.77315627
10	25.46552281	84.77386647
11	25.46453347	84.77515274
12	25.46360115	84.77689795
13	25.46175602	84.77703658

14	25.46158368	84.77631935
15	25.46198175	84.77583543
16	25.46869675	84.77081098

Area & production: The total ML area is 42.09 Ha. Proposed rate of production will be 1303107 TPA.

Connectivity:

1. Patna Son-11

Patna Son-11 Sand Ghat is well connected to the nearest metalled road 1.23 Km distance from the lease. approx, 2.80 km towards E direction, Koelwar Railway station at distance of approx. 16.80 km towards N direction.

2. Patna Son-12

Patna Son-12 Sand Ghat is well connected to the nearest metalled road 1.35 Km distance from the lease. NH-139 approx 3.0 km towards E direction, Koelwar Railway station at distance of approx. 14.80 km towards N direction.

3. Patna Son-13

Patna Son-13 Sand Ghat is well connected to the nearest metalled road 1.50 Km distance from the lease. NH-139 approx 3.50 km towards ESE direction, Koelwar Railway station at distance of approx. 13.75 km towards N direction.

4. Patna Son-14

Patna Son-14 Sand Ghat is well connected to the nearest metalled road 0.53 Km distance from the lease. NH-139 approx 5.0 km towards SE direction, Koelwar Railway station at distance of approx. 11.60 km towards N direction.

Salient Features of Project

Patna Cluster Son-11(Sone-11, 12, 13 & 14)

Name of the applicant	M/s Rana Enterprises Pro – Rana Saurav
Address of Lessee	M/s Rana Enterprises Pro – Rana Saurav S/O – Rana Uday Pratap Singh Add : - Vill – Karsa Kothi, P.O + P.S – Bikram, Dist – Patna (Bihar) Pin – 821104

Name of Mine	Sand Mining Project on Son River at Patna Cluster Son-11(Sone-11, 12, 13 & 14) Sand Ghat at Mauza +Vill-Kab, Lahladpur, Janpara I, Janpara II, Tehsil-Bikram & Dulhin Bazar, District Patna, (Bihar)
Village	Sone 11 - (Mauza -Kab) Sone 12 - (Mauza - Lahladpur) Sone 13 - (Mauza - Janpara I) Sone 14 - (Mauza - Janpara II)
District & State	Patna, Bihar
Mineral	Sand
Area (ha)	Sone 11 - 19.48 Ha. Sone 12 - 4.01 Ha. Sone 13 - 8.29 Ha. Sone 14 - 10.31 Ha. Total Cluster Area - 42.09 Ha

MINING

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

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

Mining will be done in layers.

The deposit will be worked from the surface of the bed up to 3 m bgl or above ground water level, whichever comes first. Hence, at no point of time mining will intersect with ground water table. Mining will be done only during the day time and completely stopped during the monsoon season.

RESERVE AND PRODUCTION

Mineable reserves have been computed up to 3m depth from surface. The volume multiplied by bulk density (1.72 g/cm^3) to get the tonnage.

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

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

Sone 11

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
63-61.5	1757	95	1.5	250373	430642
61.5-60	1747	85	1.5	222743	383118
Total				473115	813758

Mineable Reserve = **473115 CUM or 813758 Tonnes**

Sone 12

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
61-59.5	586	51	1.5	44829	77106
59.5-58	876	41	1.5	53874	92664
Total				98703	169769

Mineable Reserve = **98703 CUM or 169769 Tonnes**

Sone 13

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
60-58.5	541	134	1.5	108741	187035
58.5-57	531	124	1.5	98766	169878
Total				207507	356912

Mineable Reserve = **207507 CUM or 356912 Tonnes**

Sone 14

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
60-58.5	1113	76	1.5	126882	218237
58.5-57	1103	66	1.5	109197	187819
Total				236079	406056

Mineable Reserve = **236079 CUM or 406056 Tonnes**

Total Mineable Reserve (Sone 11 + Sone 12 + Sone 13 + Son 14) = 1015404 CUM or 1746495 Tonnes

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

SITE FACILITIES AND UTILITIES

Water Supply

Water will be provided to workers for drinking & domestic purpose. Water will also be required for dust suppression. A total cluster water of 30.50 KLD will be required for the proposed project. Fresh water will be only used for drinking purpose. The water will be supplied from available sources from nearby village.

Temporary Rest Shelter

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

BASELINE ENVIRONMENTAL STATUS

Environmental data has been collected in relation to proposed mining for Air, Noise, Water, Soil, Flora & Fauna. The baseline environment study was carried out over an area with radial distance of 10 km around the mining lease area during winter season from Dec 2022 to Jan-Feb 2023

Meteorology

The Summarized Meteorological Data for the Monitoring Period Dec 2022 to Jan-Feb 2023) is given below:

Month	Temperature °C		Wind Speed (Km/Hr)	
	Min	Max	Min	Max
DEC 2022	10	20	1	24
JANUARY 2023	05	19	1	26
FEBRUARY 2023	12	22	2	32

Table Baseline Environmental Status

Attribute	Baseline status
Ambient Air Quality	Ambient Air Quality Monitoring reveals that the minimum & maximum concentrations of PM2.5 amongst all the 14 AQ monitoring stations were found to be 27.2 µg/m3 to 50.1µg/m3 respectively; PM10 was in the range of 52.03 µg/m3to 92.5µg/m 3 As far as the gaseous pollutants SO2 and NO2 are concerned, the

	prescribed CPCB limit of 80 μg/m3 for residential and rural areas has never been surpassed at any station.
Noise Levels	The results of the monitoring program indicated that both the daytime and night time levels of noise were well within the prescribed limits of NAAQS, at all the 10 locations monitored.
Water Quality	The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by IS: 10500. Surface water analysis from River Son results it is evident that most of the parameters of the samples comply with 'Category B' standards of CPCB, indicating their suitability for outdoor bathing.
Soil Quality	Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 5.65 to 8.55, which shows that the soil is slightly alkaline in nature.
Ecology and Biodiversity	There is no Ecological Sensitive Areas are found within 10 km of the study area.

ANTICIPATED ENVIRONMENTALIMPACTS

Impact on Air Environment

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

Impact on Water Environment

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

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

- Alteration of flow patterns resulting from modification of the *river*

- An excess of suspended sediment during monsoon season.

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

Impact on Land Environment

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

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

Impact on Noise Environment

The proposed mining activity is semi-mechanized in nature. No drilling & blasting is envisaged for the mining activity. Hence, the only impact is anticipated is due to movement of vehicles deployed for transportation of minerals. The vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.

Impact on Biological Environment

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

Impact on Socio Economic Environment

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

POST PROJECT ENVIRONMENTAL MONITORING

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

ADDITIONAL STUDIES

Public Hearing

Public hearing is yet to be conducted.

Risk Assessment

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

Disaster Management Plan

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

PROJECT BENEFITS

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

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

Environmental Benefits:

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

CORPORATE SOCIAL RESPONSIBILITY

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

CER cost for **Patna Cluster Son-11(Sone-11, 12, 13 & 14)** will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is Rs. 60,87,21,400 x 2% = Rs. 1,21,74,428/-.

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

❖ PLANTATION:

- The project will not lead to any tree cutting. However, asocial responsibility, greenery will be developed along the both sides of road and the bank of river. Community services will be deployed in raising these plantations. Trees of economic importance and native origin such as fruit trees shall be planted.
- Approx. 421 trees will be planted around haul road during the plan period.
- The trees proposed for plantation are:
- As per Sustainable Sand Management & Mining Guidelines 2016,minimum 5 plant per hectare will be proposed for development of greenbelt but in this cluster of projects 10 plants per hectare will be proposed for better condition of environment.
- Peepal, Arjun, Jamun, Banyan, Neem, Mango etc trees will be planted.

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

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

BUDGET ALLOCATION FOR EMP IMPLEMENTATION

Table, Budget of EMP (Patna Cluster Son-11(Sone-11, 12, 13 & 14))

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	**Nil**	**1.5**
2	Pollution Monitoring i) Air pollution ii) Water pollution iii) Soil pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	4.21	0.5
4	Haul road Maintenance Cost	11.525	1.5
TOTAL		**15.735**	**5.5**

Note: *421 plants * 1000 Rs (for each plants including hedges and fences) =Rs 421000/-

- Salary of Labour for haul road maintenance 2 labor*300=600 per day
- 600* 250= 1,50,000/-
- * 2.5 lakh per kilometer (2,50,000 *4.61km haul road) = 11,52,500/-

CONCLUSION

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

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कार्यकारी सारांश

रेत खनन परियोजना पटना क्लस्टर सोन-11 (सोन-11,12,13 और 14) रेत घाट, के लिए

मौजा+गांव- कब, लहलादपुर, जनपारा I, जनपारा II, तहसील-बिक्रम और दुल्हिन बाजार,जिला- पटना, बिहार

क्षेत्रफल	सोन 11 - 19.48 हे. सोन 12 - 4.01 हे. सोन 13 - 8.29 हे. सोन 14 - 10.31 हे. **कुल क्लस्टर क्षेत्र - 42.09 हेक्टेयर**
उत्पादन क्लस्टर सोन 11 (सोन-11,12,13 और 14)	757620 घनमीटर or 1303107 टन प्रति वर्ष

आवदेन कर्ता

मेसर्स राणा इंटरप्राइजेज

प्रो. राणा सौरभ

पुत्र – राणा उदय प्रताप सिंह

पता: - ग्राम - करसा कोठी, पी.ओ + पी.एस - बिक्रम, जिला - पटना (बिहार) पिन - 821104

एनवायरनमेंट कन्सल्टेंट

पी & एम सल्यूशन

(क्वालिटी कौंसिल ऑफ़ इंडिया द्वारा मान्यता प्राप्त)

सी-88 सेक्टर 65 नॉएडा उत्तर-प्रदेश

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Accreditation No. : NABET/EIA/1992/IA0053

कार्यकारी सारांश

❖ परिचय

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

पटना क्लस्टर सोन-11(सोन-11,12,13 & 14)

परियोजना के प्रस्ताव मैसर्स राणा इंटरप्राइजेज , प्रो.- राणा सौरव ने दिया है। प्रस्तावित रेत खनन परियोजना मौजा+गांव- कब, लहलादपुर, जनपारा-I, जनपारा-II, तहसील- बिक्रम और दुल्हिन बाजार, जिला पटना, (बिहार) में पटना क्लस्टर सोन-11(सोन-11 ,12,13 & 14) रेत घाट पर सोन नदी पर स्थित है। पत्र संख्या 2834 दिनांक 08.11.2022 के माध्यम से पट्टेदार को एलओआई जारी किया गया।

ईआईए अधिसूचना 2006 और इसके बाद के संशोधन के अनुसार ड्राफ्ट ईआईए रिपोर्ट तैयार की गई है। प्रस्तावित परियोजना का टीओआर SEIAA बिहार दिनांक 12-01-2023 द्वारा जारी किया गया है।

आवेदित पट्टे के लिए प्रति वर्ष लगभग 1303107 टन खनन प्रस्तावित किया गया है, प्रस्तावित परियोजना के लिए अनुमानित परियोजना लागत 60,87,21,400/- रुपये (नीलामी लागत सहित) है।

- **क्लस्टर स्थिति:** जिला सर्वेक्षण प्रतिवेदन पटना के अनुसार प्रस्तावित रेत घाट (पटना सोन-11, 12, 13 एवं 14) रेत घाट संकुल स्थिति में आते हैं जिनका संयुक्त संकुल क्षेत्र 42.09 हेक्टेयर है। खनिजों का समस्त पट्टा क्षेत्र एक दूसरे से 500 मीटर के दायरे में आ रहा है जो एक समूह स्थिति की पुष्टि करता है।

क्लस्टर का विवरण नीचे दिया गया है:

ब्लॉक का नाम	क्षेत्र)	उत्पादन (टीपीए)
सोन 11	19.48	946728
सोन 12	4.01	194886
सोन 13	8.29	402894

सोन 14	10.31	501066
कुल	42.09	2045574

❖ परियोजना विवरण

❖ स्थान

1. पटना सोन-11

प्रस्तावित खनन पट्टा क्षेत्र सर्वे ऑफ इंडिया टोपोशीट टोपो शीट संख्या- 72C/10,72C/11, 72C/14,72C/15 के अंतर्गत आता है। पट्टा क्षेत्र मौजा + गांव- कब, जिला पटना, राज्य- बिहार में स्थित है। खान पट्टा समन्वय नीचे सूचीबद्ध हैं:

स्तंभ	**अक्षांश (एन)/ देशांतर (ई)**	
1	25.4108048	84.76375812
2	25.41272392	84.76515328
3	25.41392464	84.76510723
4	25.4173491	84.76639802
5	25.41942682	84.76840242
6	25.42045689	84.76893111
7	25.42411352	84.76938504
8	25.425944	84.7701536
9	25.42543953	84.77101562
10	25.41763436	84.76852498
11	25.4129551	84.7662398
12	25.41146776	84.76505301
13	25.41094096	84.76429313

2. पटना सोन-12

प्रस्तावित खनन पट्टा क्षेत्र सर्वे ऑफ इंडिया टोपोशीट संख्या- 72C/10,72C/11, 72C/14,72C/15 के अंतर्गत आता है। पट्टा क्षेत्र मौजा + गांव- लहलादपुर, जिला पटना, राज्य- बिहार में स्थित है। खान पट्टा समन्वय नीचे सूचीबद्ध हैं:

स्तंभ	अक्षांश (एन)/ देशांतर (ई)	
1	25.43290394	84.77524573
2	25.43304366	84.77496578
3	25.43397955	84.77535911
4	25.43470331	84.77588399
5	25.43509721	84.77654562
6	25.43714623	84.77798932
7	25.43758269	84.77808495
8	25.43747098	84.77871285
9	25.43673083	84.77839512
10	25.43479929	84.77716448

3. पटना सोन-13

प्रस्तावित खनन पट्टा क्षेत्र सर्वे ऑफ इंडिया टोपोशीट टोपो शीट संख्या- 72C/10,72C/11, 72C/14,72C/15 के अंतर्गत आता है। पट्टा क्षेत्र मौजा + गांव- जनपारा-I, जिला पटना, राज्य- बिहार में स्थित है। खान पट्टा समन्वय नीचे सूचीबद्ध हैं:

स्तंभ	अक्षांश (एन)/ देशांतर (ई)	
1	25.44728437	84.78069489
2	25.44718873	84.78078351
3	25.44650365	84.78141834
4	25.44546538	84.78143779
5	25.44402535	84.78121801
6	25.44391148	84.78115536
7	25.44283717	84.77976851
8	25.44272432	84.77950054
9	25.44240832	84.77957033
10	25.44241844	84.77822087
11	25.44265508	84.77799867
12	25.44518656	84.77977885

3. पटना सोन-14

प्रस्तावित खनन पट्टा क्षेत्र सर्वे ऑफ इंडिया टोपोशीट टोपो शीट संख्या- 72C/10,72C/11, 72C/14,72C/15 के अंतर्गत आता है। पट्टा क्षेत्र मौजा + गांव- जनपारा-II, जिला पटना, राज्य- बिहार में स्थित है। खान पट्टा समन्वय नीचे सूचीबद्ध हैं:

स्तंभ	अक्षांश (एन)/ देशांतर (ई)	
1	25.46983285	84.76993348
2	25.46996451	84.77014975
3	25.46997958	84.7701745
4	25.46908019	84.77101713
5	25.46889769	84.77107393
6	25.46872096	84.77171681
7	25.46816599	84.77243387
8	25.46714795	84.77306155
9	25.46639639	84.77315627
10	25.46552281	84.77386647
11	25.46453347	84.77515274
12	25.46360115	84.77689795
13	25.46175602	84.77703658
14	25.46158368	84.77631935
15	25.46198175	84.77583543
16	25.46869675	84.77081098

क्षेत्र और उत्पादन: कुल एमएल क्षेत्र 42.09 हेक्टेयर है। उत्पादन की प्रस्तावित दर 1303107 टीपीए होगी।

❖ **संयोजकता**

1. पटना सोन-11

पटना सोन-11 रेत घाट पट्टे से 1.23 कि.मी. की दूरी पर निकटतम पक्की सड़क से अच्छी तरह से जुड़ा हुआ है। NH-139 लगभग 2.0 कि.मी. पूर्व दिशा में है। कोइलवर रेलवे स्टेशन उत्तर दिशा में 14.0 कि.मी लगभग की दूरी पर है।

2. पटना सोन-12'

पटना सोन-12 रेत घाट पट्टे से 1.35 कि.मी. की दूरी पर निकटतम पक्की सड़क से अच्छी तरह से जुड़ा हुआ है। NH-139 लगभग 3.0 कि.मी. पूर्व दिशा में है। कोइलवर रेलवे स्टेशन उत्तर दिशा में 14.80 कि.मी लगभग की दूरी पर है।

3. पटना सोन-13

पटना सोन-13 रेत घाट पट्टे से 1.50 कि.मी. की दूरी पर निकटतम पक्की सड़क से अच्छी तरह से जुड़ा हुआ है। NH-139 लगभग 3.50 कि.मी. पूर्व दक्षिण पूर्व दिशा में है। कोइलवर रेलवे स्टेशन उत्तर दिशा में 13.75 कि.मी लगभग की दूरी पर है।

3. पटना सोन-14

पटना सोन-14 रेत घाट पट्टे से 0.53 कि.मी. की दूरी पर निकटतम पक्की सड़क से अच्छी तरह से जुड़ा हुआ है। NH-139 लगभग 5.0 कि.मी. दक्षिण पूर्व दिशा में है। कोइलवर रेलवे स्टेशन उत्तर दिशा में 11.60 कि.मी लगभग की दूरी पर है।

❖ **परियोजना की मुख्य विशेषताएं**

<u>पटना क्लस्टर सोन-11(सोन-11,12,13 & 14)</u>

आवेदक का नाम	मेसर्स राणा इंटरप्राइजेज प्रो राणा सौरभ
पट्टेदार का पता	मेसर्स राणा इंटरप्राइजेज प्रो राणा सौरभ पुत्र - राणा उदय प्रताप सिंह पता: - ग्राम - करसा कोठी, पी.ओ + पी.एस - बिक्रम, जिला - पटना (बिहार) पिन - 821104
नाम	रेत खनन परियोजना पटना क्लस्टर सोन- 11(सोन-11, 12, 13 और 14) रेत घाट , मौजा+गांव- कब, लहलादपुर, जनपारा I, जनपारा II, तहसील-बिक्रम और दुल्हिन बाजार , जिला पटना (बिहार)

गाँव	सोन 11 - (मौजा - कब) सोन 12 - (मौजा - लहलादपुर) सोन 13 - (मौजा - जनपारा I) सोन 14 - (मौजा - जनपारा II)
जिला और राज्य	पटना, बिहार
खनिज	रेत
क्षेत्र (हेक्टेयर)	सोन 11 - 19.48 हे. सोन 12 - 4.01 हे. सोन 13 - 8.29 हे. सोन 14 - 10.31 हे. **कुल क्लस्टर क्षेत्र - 42.09 हेक्टेयर**

- **ड्रिलिंग**

ड्रिलिंग और ब्लास्टिंग की आवश्यकता नहीं है।

- **खनिज का उपयोग**

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

- **खनन**

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

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

निक्षेप को संस्तर की सतह से 3 एमबीजीएल या भूजल स्तर से ऊपर, जो भी पहले आए, तक कार्य किया जाएगा। इसलिए, किसी भी समय खनन भूजल स्तर को नहीं काटेगा। खनन केवल दिन के समय किया जाएगा और मानसून के मौसम में पूरी तरह बंद कर दिया जाएगा।

❖ **रिजर्व और उत्पादन**

खनन योग्य भंडार की गणना सतह से 3 मीटर की गहराई तक की गई है। टनभार प्राप्त करने के लिए वॉल्यूम को बल्क डेंसिटी (1.72 g/cm3) से गुणा किया जाता है।

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

बेंचवार रेत का वार्षिक दोहन नीचे दिया गया है:

ब्लॉक नं: सोन 11

बेंच स्तर (mRL)	**लंबाई (M)**	**चौड़ाई (M)**	**गहराई (M)**	**मात्रा (घन मीटर)**	**टन**
63-61.5	1757	95	1.5	250373	430642
61.5-60	1747	85	1.5	222743	383118
कुल				**473115**	**813758**

कुल खनन योग्य रिजर्व = **473115** घन मीटर या **813758** टन

ब्लॉक नं: सोन 12

बेंच स्तर (mRL)	**लंबाई (M)**	**चौड़ाई (M)**	**गहराई (M)**	**मात्रा (घन मीटर)**	**टन**
61-59.5	586	51	1.5	44829	77106
59.5-58	876	41	1.5	53874	92664
कुल				**98703**	**169769**

कुल खनन योग्य रिजर्व **= 98703** घन मीटर या **169769** टन

ब्लॉक नं: सोन 13

बेंच स्तर (mRL)	**लंबाई (M)**	**चौड़ाई (M)**	**गहराई (M)**	**मात्रा (घन मीटर)**	**टन**
60-58.5	541	134	1.5	108741	187035
58.5-57	531	124	1.5	98766	169878
कुल				**207507**	**356912**

कुल खनन योग्य रिजर्व = **207507** घन मीटर या **356912** टन

ब्लॉक नं: सोन 14

बेंच स्तर (mRL)	लंबाई (M)	चौड़ाई (M)	गहराई (M)	मात्रा (घन मीटर)	टन
60-58.5	1113	76	1.5	126882	218237
58.5-57	1103	66	1.5	109197	187819
कुल				**236079**	**236079**

कुल खनन योग्य रिजर्व = **236079** घन मीटर या **236079** टन

कुल खनन योग्य भंडार (सोन 11 + सोन 12 + सोन 13 + सोन 14) = 1015404 घन मीटर या 1746495 टन

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

❖ **साइट सुविधाएं और उपयोगिताएँ**

- **जलापूर्ति**

श्रमिकों को पीने व घरेलू उपयोग के लिए पानी उपलब्ध कराया जाएगा। धूल के दमन के लिए भी पानी की आवश्यकता होगी। प्रस्तावित परियोजना के लिए 30.50 केएलडी के जल की आवश्यकता होगी। ताजे पानी का उपयोग केवल पीने के उद्देश्य के लिए किया जाएगा। आसपास के गांव के उपलब्ध स्रोतों से पानी की आपूर्ति की जाएगी।

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

- **आधारभूत पर्यावरणीय स्थिति**

वायु, ध्वनि, जल, मिट्टी, वनस्पति एवं जीव-जन्तुओं के लिए प्रस्तावित खनन के संबंध में पर्यावरणीय डाटा एकत्र किया गया है। बेसलाइन पर्यावरण अध्ययन दिसंबर 2022 से जनवरी-फरवरी 2023 तक सर्दियों के मौसम के दौरान खनन पट्टा क्षेत्र के आसपास 10 किमी की रेडियल दूरी वाले क्षेत्र में किया गया था।

- **मौसम विज्ञान**

निगरानी अवधि दिसंबर 2022 से जनवरी-फरवरी 2023 के लिए संक्षिप्त मौसम संबंधी डेटा नीचे दिया गया है:

महीना	**तापमान °C**		**हवा की गति (किमी/घंटा)**	
	न्यूनतम	**अधिकतम**	**न्यूनतम**	**अधिकतम**
दिसम्बर 2022	10	20	1	24
जनवरी 2023	05	19	1	26
फरवरी 2023	12	22	2	32

आधारभूत पर्यावरणीय स्थिति

गुण	**आधारभूत स्थिति**
एम्बिएंट(परिवेशी) वायु गुणवत्ता	एम्बिएंट (परिवेशी) वायु गुणवत्ता निगरानी से पता चलता है कि सभी 14 AQ निगरानी स्टेशनों में PM2.5 की न्यूनतम और अधिकतम सांद्रता क्रमशः 27.2 µg/m3 से 50.1 µg/m3 पाई गई; PM10 52.03 µg/m3to 92.5 µg/m3 की सीमा में था जहां तक गैसीय प्रदूषकों SO2 और NO2 का संबंध है, आवासीय और ग्रामीण क्षेत्रों के लिए 80 µg/m3 की निर्धारित CPCB सीमा किसी भी स्टेशन पर पार नहीं की गई है।
शोर का स्तर	निगरानी कार्यक्रम के परिणामों ने संकेत दिया कि निगरानी किए गए सभी 10 स्थानों पर शोर के दिन और रात दोनों समय एनएएक्यूएस की निर्धारित

	सीमा के भीतर थे।
पानी की गुणवत्ता	सभी स्रोतों से भूजल पीने के उद्देश्यों के लिए उपयुक्त रहता है क्योंकि सभी घटक IS: 10500 द्वारा प्रख्यापित पेयजल मानकों द्वारा निर्धारित सीमा के भीतर हैं। सोन नदी के सतही जल विश्लेषण के परिणामों से यह स्पष्ट होता है कि नमूनों के अधिकांश पैरामीटर सीपीसीबी के 'श्रेणी बी' मानकों का अनुपालन करते हैं, जो इंगित करता है यह जल स्नान के लिए उपयुक्त हैं।
मिट्टी की गुणवत्ता	चिन्निहित किए गए स्थानों से एकत्र किए गए नमूने इंगित करते हैं कि मिट्टी रेतीली प्रकार की है और पीएच मान 5.65 से 8.55 के बीच है, जो दर्शाता है कि मिट्टी प्रकृति में थोड़ी क्षारीय है।
पारिस्थितिकी और जैव विविधता	अध्ययन क्षेत्र में कोई पर्यावरण-संवेदनशील क्षेत्र नहीं है।
सामाजिक आर्थिक	नदी तल पर रेत खनन परियोजना के कार्यान्वयन से स्थानीय लोगों को प्रत्यक्ष और अप्रत्यक्ष दोनों तरह के रोजगार के अवसर मिलेंगे। अध्ययन क्षेत्र में शिक्षा, स्वास्थ्य, आवास, पानी, बिजली आदि को और बेहतर किया जा सकता है। उम्मीद है कि प्रस्तावित खनन परियोजना और संबद्ध औद्योगिक और व्यावसायिक गतिविधियों के कारण इसमें काफी हद तक और सुधार होगा।

❖ अनुमानित पर्यावरणीय प्रभाव

- **वायु पर्यावरण पर प्रभाव**

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

- **जल पर्यावरण पर प्रभाव**

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

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

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

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

- **भूमि पर्यावरण पर प्रभाव**

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

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

❖ शोर पर्यावरण पर प्रभाव

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

❖ जैविक पर्यावरण पर प्रभाव

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

❖ सामाजिक आर्थिक पर्यावरण पर प्रभाव

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

पोस्ट प्रोजेक्ट पर्यावरण निगरानी

क्रम संख्या	पैरामीटर्स का विवरण	निगरानी की अनुसूची
1	हवा की गुणवत्ता	मानसून को छोड़कर प्रत्येक मौसम में सप्ताह में दो बार/तीन बार 24 घंटे के नमूने
2	जल गुणवत्ता (सतह और भूजल)	साल में 4 सीजन के लिए एक बार
3	मिट्टी की गुणवत्ता	परियोजना क्षेत्र में वर्ष में एक बार
4	शोर स्तर	साल में दो बार पहले दो साल और फिर साल में एक बार
5	सामाजिक-आर्थिक स्थिति	3 साल में एक बार
6	वृक्षारोपण निगरानी	एक बार एक मौसम में

❖ अतिरिक्त अध्ययन

- **सार्वजनिक सुनवाई**

जन सुनवाई अभी बाकी है।

❖ जोखिम आकलन

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

❖ आपदा प्रबंधन योजना

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

❖ परियोजना लाभ

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

❖ पर्यावरणीय लाभ:

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

❖ **कॉर्पोरेट की सामाजिक जिम्मेदारी**

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

पटना क्लस्टर सोन-11(सोन-11 ,12,13 & 14) के लिए सीईआर (CER) लागत कुल परियोजना लागत का 2% होगी। इस राशि का उपयोग समाज कल्याण के लिए किया जाएगा। सीएसआर (CSR) लागत 60,87,21,400/-x 2% = रु. 1,21,74,428/-

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

❖ वृक्षारोपण:

- परियोजना से कोई पेड़ नहीं कटेगा। तथापि, असामाजिक उत्तरदायित्व, सड़क के दोनों ओर और नदी के किनारे हरियाली विकसित की जाएगी। इन वृक्षारोपण को बढ़ाने के लिए सामुदायिक सेवाओं को तैनात किया जाएगा। आर्थिक महत्व के पेड़ और देशी मूल के पेड़ जैसे फलों के पेड़ लगाए जाएंगे।
- योजना अवधि में हॉल रोड के आसपास लगभग 421 पौधे रोपे जाएंगे।
- वृक्षारोपण के लिए प्रस्तावित पेड़ हैं:
- सस्टेनेबल सैंड मैनेजमेंट एंड माइनिंग गाइडलाइंस 2016 के अनुसार ग्रीनबेल्ट के विकास के लिए प्रति हेक्टेयर न्यूनतम 5 पौधे प्रस्तावित किए जाएंगे लेकिन पर्यावरण की बेहतर स्थिति के लिए परियोजनाओं के इस समूह में 10 पौधे प्रति हेक्टेयर प्रस्तावित किए जाएंगे।
- पीपल, अर्जुन, जामुन, बरगद, नीम, आम आदि के पेड़ लगाए जाएंगे।

पर्यावरण प्रबंधन योजना (ईएमपी)

- रिवर बैंक से सुरक्षा क्षेत्र छोड़कर नदी तल से निकासी की जाएगी।
- अधिकतम काम करने की गहराई क्षेत्र के भूजल तालिका के ऊपर रहेगी।
- स्वास्थ्य प्रभावों को कम करने के लिए प्रभाव क्षेत्र में श्रमिकों और आसपास के लोगों को स्वास्थ्य सुविधाएं प्रदान किया जायेगा ।

- वन्यजीव संरक्षण सुनिश्चित करना और उसी के लिए जागरूकता अभियान की व्यवस्था किया जायेगा।
- नदी में महीन तलछट छोड़ने वाली गतिविधियों को किया जायेगा।
- खनिजों के परिवहन और प्रबंधन के दौरान गड़बड़ी को कम करने के लिए प्रभावी शमन उपाय अपनाए जाएंगे
- स्थानीय/देशी और तेजी से बढ़ने वाली प्रजातियों के वृक्षारोपण के साथ सुधार कार्यक्रम की स्थापना किया जायेगा
- मानसून के मौसम की शुरुआत में खान के बंद होने के दौरान बहाली योजना की स्थापना किया जायेगा
- आसन्न आपदाओं के प्रभाव से बचने के लिए समय पर एहतियाती उपाय करने के लिए प्रभावी आपदा प्रबंधन योजना की स्थापना।
- पर्यावरण प्रबंधन प्रकोष्ठ द्वारा प्रभावी निगरानी कार्यक्रम की स्थापना किया जायेगा।

❖ **ईएमपी कार्यान्वयन के लिए बजट आवंटन**

टेबल, ईएमपी का बजट (पटना क्लस्टर सोन-11(सोन-11,12,13 & 14)

क्रम संख्या	**विवरण**	**पूंजी लागत (लाख)**	**आवर्ती लागत (लाख)**
1	प्रदूषण नियंत्रण और धूल दमन	**Nil**	**1.5**
2	प्रदूषण निगरानी i) वायु प्रदूषण ii) मृदा प्रदूषण iii) जल प्रदूषण iv) ध्वनि प्रदूषण	--	2.0
3	वृक्षारोपण और वेतन एक माली के लिए (अंशकालिक आधार पर)	4.21	0.5
4	परिवहन सड़क रखरखाव लागत	11.525	1.5
TOTAL		**15.735**	**5.5**

नोट: *421 पौधे * 1000 रुपये (हेज और बाड़ सहित प्रत्येक पौधे के लिए) = 421000/- रुपये

· खनन परिवहन सड़क रखरखाव के लिए श्रम का वेतन 2 श्रमिक*300=600 प्रति दिन

· 600* 250= 1,50,000/-

· *2.5 लाख प्रति किलोमीटर (2,50,000*4.61 किमी लंबी सड़क) = 1152500/-

निष्कर्ष

ईआईए अध्ययन के आधार पर यह देखा गया है कि धूल प्रदूषण में वृद्धि होगी, जिसे पानी के छिड़काव और वृक्षारोपण द्वारा नियंत्रित किया जाएगा। खनन गतिविधियों के कारण (एम्बिएंट) परिवेशी पर्यावरण और पारिस्थितिकी पर नगण्य प्रभाव पड़ेगा, इसके अलावा खनन संचालन से क्षेत्र में प्रत्यक्ष और अप्रत्यक्ष रोजगार सृजन होगा। क्षेत्र के चारों ओर हरित पट्टी का विकास एक प्रभावी प्रदूषण न्यूनीकरण तकनीक के साथ-साथ खान परिसर से निकलने वाले प्रदूषकों को नियंत्रित करने के लिए भी किया जाएगा। खनन कार्य जारी रहने तक निगरानी कार्यक्रम का पालन किया जाएगा। इसलिए, यह संक्षेप में कहा जा सकता है कि खान के विकास से क्षेत्र के सामाजिक-आर्थिक वातावरण पर सकारात्मक प्रभाव पड़ेगा और क्षेत्र के सतत विकास को बढ़ावा मिलेगा।

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