उत्तर प्रदेश प्रदूषण नियंत्रण बोर्ड
UTTAR PRADESH POLLUTION CONTROL BOARD

संदर्भ सं० H-47196 /सी-2/ NGT Cell-35/2020 दिनाँक 04-02-2020
Ref. No ..... Date .....

To,

The Registrar,
Hon'ble National Green Tribunal,
Principal Bench,
Copernicus Marg, New Delhi.
E-mail - judicial-ngt@gov.in

Sub: Compliance of direction issued by Hon'ble National Green Tribunal in Original Application No. 208/2019, Sandeep Kumar Singh Versus State of UP & Ors. vide order dated 15.01.2020.

Sir,

In compliance of the order passed by Hon'ble National Green Tribunal on 15.01.2020 in Original Application No. 208/2019 in the matter of Sandeep Kumar Singh Versus State of UP & Ors. with respect to status report of Committee dated 04.02.2020 on the subject of illegality of sand mining in rivers Kane, Yamuna, Bangey etc. in Banda District, Uttar Pradesh. The Status report is being enclosed herewith alongwith annexures for your kind perusal.

Yours faithfully,

Encl: As above.

(P.K. Agarwal)
Chief Environmental Officer
(Circle-2)

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REPORT OF JOINT COMMITTEE IN COMPLIANCE TO HON'BLENGT ORDERDATED 15.01.2020 IN OA NO. 208/2019IN THE MATTER OF SANDEEP KUMAR SINGHVS STATE OF UP & ORS.

In pursuance of Hon'ble NGT directions in its order 15.01.2020 on Original Application No. 208/2019 in the matter of Sandeep Kumar Singh Vs State of UP &Ors., a Joint Committee having representation from State Environment Impact Assessment Authority (SEIAA) UP, Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB) UP is decided to seek factual information and Action Taken Reports regarding sand mining in rivers Kane, Yamuna, Bangey etc. in Banda District, Uttar Pradesh. The major issues of concerns highlighted by Hon'ble NGT are as under:

- *Report filed on 07.01.2020 on behalf of SEIAA, Uttar Pradesh does not mention any study of sustainability of the area for extent of mining which is being allowed or proposed which is necessary in view of 'Precautionary' as well as 'Sustainable Development' principles inherent in the process of granting EC/CTE/CTO.*
- *A part of such study is the replenishment potential which has also not been mentioned in the report.*

As instructed in order, the committee reviewed the previous visits, reports & documents filed and verified the status on the issues raised in Hon'ble NGT order dated 15.01.2020.

(1) It becomes necessary to mentioned here that the report filed by joint committee is retreated here that:

> *"At present, all lease areas having ECs belong to B1 category and EC has been granted as per the provision of EIA notification."*

Grant of Environment Clearance for B1 Category projects are of basically two-tierappraisal programme i.e. during the 1st phase the projects are granted with Terms of References (ToR's). Terms of Reference granted to the project has to conduct Environment Impact Assessment (EIA) studies, more specific on to the ToR's points grantedto conduct environmental studies accordingly w.r.t various parameters. Among all the ToR's points the subjective in the question of the some are below:

- The TOR shall be valid strictly for the annual production/yearly production as given in the approved Mining Plans of the respective proposal.
- All documents including approved mine plan, EIA and public hearing should be compatible with one another in terms of the mine lease area, production level, waste generation and its management and mining technology and should be in the name of the lessee. The mine plan should take into account the conditions of the mine lease, if any, in terms of distance to be left un-worked from the river flowing nearby.

04/2/2022

- Land use plan of mine lease area should be prepared to encompass pre-operational, operational and post-operational phases and submitted.
- Impact of mining on the hydrology of the area including water flow in the river adjoining the mine lease. It should also take into account the inundation of mined out area due to flow of water from the river.
- Details of first order stream, if any passing through lease area and modification diversion proposed, if any and the impact of the same on the hydrology should be brought out.
- Information on reduced levels site elevation, working depth, groundwater table etc. below natural surface level should be provided. A schematic diagram may also be provided for the same.
- Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia should include the impact due to change of land use, due to loss of agricultural land and grazing land, if any, occupational health impacts beside other impacts of the projects. It should also take into account the impacts due to stone crusher nearby and also provide for preventing the silt from going into the river.
- The Environment Policy must prescribe for standard operating process/ procedures to bring into focus any infringement /deviation /violation of the environment or forest norms/conditions and it may be detailed in EIA.
- All pages of technical documents/EIA/EMP etc. should be signed by the consultant and project proponent both.

(2) In the 2nd phase, with the grant of terms of condition, the project proponent makes an application for the grant of Environment Clearances along with the submission of Environment Impact Assessment report for the studies he has conducted for the very projects. In lieu of precautionary as well as sustainable development principles inherent in the process of granting Environmental Clearances SEAC examines and appraises the EIA report during its convened meetings into which the committee do examines the study of sustainability of the area for the extent of mining which is being allowed or proposed.

(3) Subsequently, based on the recommendations of State Level Expert Appraisal Committee for the very project, the State Level Environment Impact Assessment Authority decides to grant the Environment Clearance for the project in question subject to effective implementation of general & specific conditions. Some of them are given below

- No mining shall be carried out in the safety zone of any bridge and/or embankment.
- It shall be ensured that excavation of minor mineral does not disturb or change the underlying soil characteristics of the river bed /basin, where mining is carried out.
- It shall be ensured that mining operation of Sand/Moram will not in any way disturb the, velocity and flow pattern of the river water significantly.
- Hydro-geological study shall be carried out by a reputed organization/institute within six months and establish that mining in the said area will not adversely affect the ground water regime. The report shall be submitted to the RO, PCB and SEIAA within six months. In case adverse impact is observed /anticipated, mining shall not be carried out.

04/2/2020

- The project proponent shall submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions including results of monitored data (both in hard & soft copies) to the SEIAA, the District Officer and the respective Regional Office of the State Pollution Control Board by 1st June and 1st December every year.
- Special Measures shall be adopted to protect the nearby settlements from the impacts of mining activities. Maintenance of Village roads through which transportation of minor minerals is to be undertaken, shall be carried-out by the project proponent regularly at his own expenses.
- Measure for prevention & control of soil erosion and management of silt shall be undertaken. Protection of dumps against erosion, if any, shall be carried-out with geo textile matting or other suitable material.
- The project proponent shall undertake adequate safeguard measures during extraction of river bed material and ensure that due to this activity the hydro geological regime of the surrounding area shall not be affected.
- The green cover development/tree plantation is to be done in an area equivalent to 20% of the total leased area either on river bank or along road side (Avenue Plantation).
- Debris from the river bed will be collected and stored at secured place and may be utilized for strengthen the embankment.
- No mining activity should be carried out in-stream channel as per SSMMG, 2016.
- The project proponent shall in 2 years conduct detailed replenishment study duly authenticated by a QCI-NABET accredited consultant, and the District Mines Officer.
- Submit annual replenishment report certified by an authorized agency. In case the replenishment is lower than the approved rate of production, then the mining activity / production levels shall be decreased / stopped accordingly till the replenishment is completed.
- To avoid ponding effect and adverse environmental conditions for sand mining in area, progressive mining should be done as per sustainable sand mining management guidelines 2016.
- The project proponent shall in 2 years conduct detailed replenishment study duly authenticated by a QCI-NABET accredited consultant, and the District Mines Officer which shall form the basis for midterm review of conditions of Environmental Clearance.
- It shall be ensured that there shall be no mining of any type within 03 m or 10% of the width which-ever is less, shall be left on both the banks of precise area to control and avoid erosion of river bank. The mining is confined to extraction of sand/moram from the river bank only.
- The project proponent shall under take adequate safeguard measures during extraction of river bank material and ensure that due to this activity the hydro-geological regime of the surrounding area shall not be affected.
- The project proponent shall adhere to mining in conformity to plan submitted for the mine lease conditions and the Rules prescribed in this regard clearly showing the no work zone in the mine lease i.e. the distance from the bank of river to be left un-worked (Non mining area), distance from the bridges etc. It shall be ensured that no mining shall be carried out during the monsoon season.
- The extended mining scheme will be submitted by the proponent before expiry of present mining plan.

Vijay Kumar 04/12/2020

- Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.
- A width of not less than 50 meter or 10% width of river can be restricted for mining activities from river bank. A condition can be imposed that mining will be done from river activities from river bank.

(4) As for the aforesaid reasons a copy of EIA report is annexed as Annexure-I.

Thus it is evident that due to aforesaid reasons, entrusted points which has been already covered during the grant of Terms of References and to that of grant of Environment Clearances for the projects in question it was found to be just valid & sufficient by mentioning that "*At present, all lease areas having ECs belong to B1 category and EC has been granted as per the provision of EIA notification.*"

04/02/2020 (Ghanshyam) **Regional Officer, UPPCB, RO, Banda**	Vijay Kumar 04/02/2020 (Er. Sanjay Kumar) **Scientist 'C', CPCB, RD (N), Lucknow**	(MerajUddin) 04/02/2020 **Member, SEIAA, UP**

Annexure - I

ENVIRONMENT IMPACT ASSESSMENT REPORT

FOR

KEN RIVER SAND/MORRUM MINING PROJECT OF AREA-44.46 ACRE (18.0HA) ON KEN RIVER FOR SAND/MORRUM MINING PROJECT AT KHAND NO/ GATA NO-60 VILLAGE-SADIKHADAR TEHSIL- PAILANI, DISTRICT- BANDA (U.P)

Project Proponent:
S.G. Projects Limited
Smt. Neha Singh

EIA Consultant:

Ind Tech House Consult
(An ISO 9001:2008 Certified Organization)
G-8/6, Ground Floor, Sector 11, Rohini
Delhi – 110 085
Tel: +91 11 2757 1410, 6460 7252
Fax: +91 11 2757 2241
Email: ithconsult@hotmail.com

Sep, 2019

FINAL ENVIRONMENT IMPACT ASSESSMENT REPORT FOR KEN RIVER SAND/MORRUM MINING PROJECT OF AREA- AREA- 44.46ACRE (18.0HA) ON KEN RIVER FOR SAND/MORRUM MINING PROJECT AT KHAND NO/ GATA NO-60 VILLAGE- SADIKHADAR TEHSIL- PAILANI, DISTRICT- BANDA (U.P)

Project Proponent:

S.G. Projects Limited..
Smt.Neha Singh

For and on behalf of:	**Ind Tech House Consult**
Approved by:	Mr. Anand Kumar Dubey
Signed:	
Position:	EIA Coordinator
Date:	Sep-2019

This report has been prepared by Ind Tech House Consult with all reasonable skill, care and diligence within the terms of the contract with the client, incorporating our general terms and conditions of business and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

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DECLARATION BY EXPERTS

Declaration by Experts Contributing to the Final EIA Report of Ken River Sand/Morrum Mining Project of Area- 44.46Acre (18.0Ha) On Ken River For Sand/Morrum Mining Project at Khand No/ Gata No-60 Village- Sadikhadar Tehsil- Pailani, District- Banda (U.P)

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

EIA coordinator: Mr. Anand Kumar Dubey

Signature and Date

Functional Area Experts:

S. NO.	Functional areas	Name of the expert/s	Signature and date
1	WP	Mr. Suman Banerjee	
2	ISW	Mr. Soumya Dwivedi	
3	LU	Mr. Manish Shukla	
4	AP	Mr. Suman Banerjee	
5	NV	Dr. Manoj Kr. Mishra	
6	AQ	Dr. Manoj Kr. Mishra	
7	GEO	Mr. U.P.S Chauhan	
8	HW	Mr. Anand Kumar Dubey	
9	RH	Mr. Soumya Dwivedi	
10	EB	Dr. Bideh Shukla	
11	SE	Dr. Debashish Bhttacharya	
12	SC	Dr. Bideh Shukla	
13	HG	Mr. Manish Shukla	
Associate Staff			
1.	Mr. Indra Sharma		
2.	Mr. Saurabh Bharadwaj		
3.	Mr.Shobhit Arora		
4	Mr. Sumit Saxena		
5	Mr. Girish Chandra Mishra		
Monitoring Laboratory Involved			
Ind Research and Development House (NABL Approved Lab)			

Signature
For Ind Tech House Consult

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CHAPTER-1

INTRODUCTION

1.0INTRODUCTION

1.1PREAMBLE

Environment Impact Assessment (EIA) is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for proposed projects. It aims predicting environmental impacts at an early stage of project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision makers. By using EIA, both environmental and economic benefits can be achieved. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensures that these impacts are taken into account during the project design. By considering environmental effects and mitigation early in the project planning cycle, there are many benefits, such as protection of the environment, optimum utilization of resources and saving overall time and cost of the project. Properly conducted EIA also lessens conflicts by promoting community participation, informs decision-makers, and helps lay the base for environmentally sound projects.

The Ministry of Environment Forests& Climate Change, Govt. of India, made environmental clearance (EC) for certain development projects mandatory through its notification of 27/01/1994 under the Environment Protection Act, 1986. Keeping in view of the experience gained in environmental clearance process over a period of one decade, the MoEF&CC came out with Environment Impact Notification, SO 1533(E), and dt.14/09/2006. It has been made mandatory to obtain environmental clearance for different kinds of developmental projects (Schedule-1 of notification).

The notification has classified projects under two categories-A and B. Category-A Projects (including expansion and modernization of existing projects) require clearance from Central Government (Ministry of Environment, Forest & Climate Change, Govt. of India) while category-B projects should be considered by State Level Environmental Impact Assessment Authority (SEIAA), constituted with the approval of MoEF&CC.

1.2 BENEFITS OF SUSTAINABLE SAND/MORRUM MINING

The benefits of sustainable sand/morrum mining are given as follows:

- Prevents the river bed from becoming shallow due to the deposition of sediments.
- It maintains the water retention capacity and help to avoid flood like situations.
- It generates useful economic resource for construction and generates employment in local.

1.3 PURPOSE OF THIS REPORT

Environmental Impact Assessment (EIA) is a decision making tool, in the hands of the Environmental Appraisal Committee/Statutory bodies which brings forth the factual position about a project that enables them in arriving at an appropriate conclusion for the proposed projects, to retain them if environmentally sound, and reject if it has deleterious impact. EIA identifies the extent of the environmental,

social and economic impacts of a project prior to decision making. EIA systematically examines both beneficial and adverse impacts of the proposed project over and above the prevailing conditions of environmental parameters and ensure that these impacts are taken into account during the project designing stage itself and the values of the combined impacts are never allowed to exceed and remain within the statutory norms. This process has been envisioned and set in motion by the Ministry of Environment, Forests and Climate Change (MoEF&CC) for sustainable development.

The basic objective of this EIA study is to collect the baseline data within the impact zone to identify the associated impacts and propose suitable mitigation measures due to the construction and operation of the proposed development. The objectives of the EIA study can be summarized as follows:

- To identify and describe the elements of the community and environment likely to be affected by the proposed project;
- To establish the baseline environmental and social scenario of the project surroundings;
- To identify, predict and evaluate environmental and social impacts expected to arise during the construction and operation phase of the project in relation to the sensitive receptors;
- To develop EMP mitigation measures so as to minimize pollution, environmental disturbance and nuisance during construction and operation of the proposed project. and the effectiveness of the mitigation measures adopted.
- To design and specify the monitoring and auditing requirements necessary to ensure the implementation.

This Final Environmental Impact Assessment report is being prepared to comply with the Terms of Reference (TOR) received from SEIAA, UP under EIA notification of the MoEF& CC dated 14-9-2006, as amended on 1st Dec 2009 & 4th April 2011, 13th December, 2012, 13th March 2013, 9th September 2013, 15 Jan 2016 of MoEF & CC, Govt. of India, for seeking environmental clearance for mining of sand/morrum in the mining lease area measuring 44.46 Acres (18.00 Ha) falling under category “B” under Sub Category B1. As per Sustainable sand/morrum Mining Management Guideline,2016 and Notification dated 15 Jan 2016 of MoEF& CC, Govt. of India,Incase the mining leases are in cluster (if periphery of one lease is within 500 meters), fowling are the categorization of projects:-

- Category 'B2'Project: Cluster area of Mine leases > 5 ha and < 25 ha with no individual lease > 5 ha and to be dealt at DEIAA/DEAC level.
- Category 'B1'Project: Cluster of mine leases of area > 25 hectares with individual lease size < 50ha and to be dealt at SEIAA/SEAC level.
- The size of lease area for B1 Category has been amendment from 50.0 Ha to 100 Ha as per amendment notification dated 14 August 2018 of MoEF&CC.

- Category 'A' Project: Cluster of any size with any of the individual lease >100ha and to be dealt at MoEF&CC/EAC level.

1.4 IDENTIFICATION OF PROJECT

The Proposed sand/morrum mining project is situated on river bed of Kenriver.The Ken rising is district Damoh, touches Banda near village Bilaharka in Naraini tahsil for about two km and then turns towards Chhatarpur district appearing again in the same tahsil. Then entering Banda tahsil near Utarandi village it flows north-east boarding distt. Hamirpur and then turns eastward to meet Yamuna at Chill hat. On the whole it flows in a deep and well defined channel scoured out by the action of flood-waters which occasionally comes down in enormous volumes. The right bank is generally high and steep, scarred with innumerable ravines, but the left bank slopes somewhat more gently, and is subject to a certain amount of fluvial action. From Pailani to its junction eith Yamuna, the Ken is much affected by the stream of the larger river, which blocks occasionally its flow resulting in the swell of river water, submergence of even high-level villages and deposition of valuable silt in elevations which are normally above the flood plains.The collection and marketing of minor minerals (Sand/morrum) from the river bed has been undertaken in order to protect the forest land, agricultural land from flooding. The mining will be done manually /Semi-mechanised with shovel other hand tools and with light machinery.

The mine lease is spread over an area of 44.46 Acres (18.00 Ha) in as single Block. However, DEIAA has recommended extraction of RBM (sand/morrum) from 44.46 Acres (18.0 Ha) area in Approved District Survey Report. The extractable volume of RBM in this block taken is 3,60,000m^3 Per Annum or 6,48,000TPA (at tonnage factor of 1.8).

1.5 NAME AND CONTACTADDRESS OF PROJECT PROPONENT

The contact name and address of applicant is as given below:
FIRM NAME :S.G Projects Limited.
PROPRIETOR : Smt Neha Singh
ADDRESS: R/O- H R/o- 613 Jasmine Tower 31, Shakespeare Saraini Kolkata West Bangal..
CONTACT DETAILS :-
EMAIL.ID :projectssg95@gmail.com

1.6 LOCATION AND LAND DESCRIPTION

Proposed mininig project of an area of about Total 44.46 Ha(18.0 Ha) is granted in village-Sadi Khadar, Tehsil-Pailani, District-Banda, U.P. was granted to S.G. Projects Limited., Prop. Smt. Neha Singh Singh intends to extract River Sand/morrum from the River Bed Mineral of Ken River of as per vide letter No.1083/Khanij-30(E-tender2018 Banda dated 27 May 2018 issued by D.M Office, Banda, Uttar Pradesh attached as **Annexure No.01**

Table 1. 1BRIEF DESCRIPTION OF THE PROJECT

Particulars	
Pillar Coordinates	<table><tr><th>POINT</th><th>LATTITUDE</th><th>LONGITUDE</th></tr><tr><td>A</td><td>25°42.535'N</td><td>80°19'475"E</td></tr><tr><td>B</td><td>25°42'488"N</td><td>80°20'083"E</td></tr><tr><td>C</td><td>25°42.579'N</td><td>80°20'076"E</td></tr><tr><td>D</td><td>25°42.689'N</td><td>80°19'463"E</td></tr><tr><td>E</td><td>25°42.590'N</td><td>80°19'996"E</td></tr><tr><td>F</td><td>25°42.603'N</td><td>80°19'757"E</td></tr><tr><td>G</td><td>25°42.653'N</td><td>80°19'663"E</td></tr><tr><td>H</td><td>25°42.668'N</td><td>80°19'561"E</td></tr><tr><td>I</td><td>25°42.592'N</td><td>80°19'441"E</td></tr><tr><td>J</td><td>25°42.522'N</td><td>80°19'439"E</td></tr></table>
Toposheet No	63C/1, 63C/2, 63C/5, 63C/6
Area & Project Detail	Area- 44.46 Acre (18.0Ha) For Ken River Sand/Morrum Mining At Khand No./ Gata No-60 Village-Sadi Khadar Tehsil-Pailani District- Banda (U.P)
Sanctioned Period of Mine lease	5 Years
Total Geological Reserves	6,10,880m^3 /Annum
Total Mineable Reserve in LOI	3,60,000m^3 /Annum
Total Proposed Production	3,60,000m^3 /Annum
Landuse	River bed

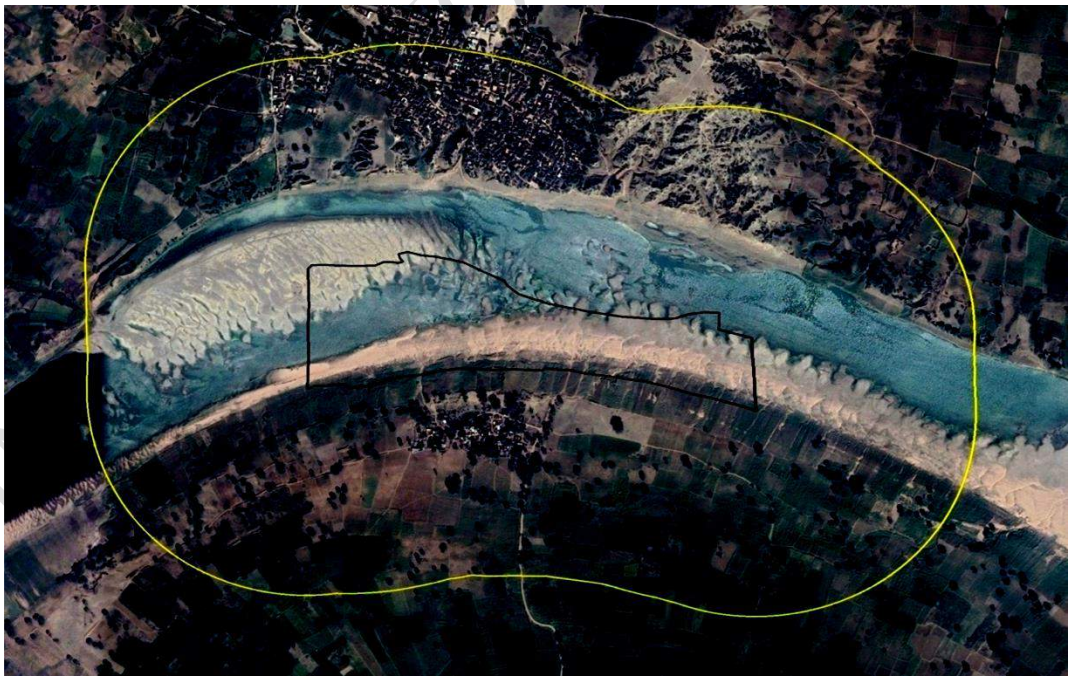


Figure 1. 1 500m Buffer Map of project Site on Google Image

1.7 PROJECT'S IMPORTANCE TO THE COUNTRY AND THE REGION

The sand/morrum are one of the most important construction materials. Ensuring their availability is vital for the development of the infrastructure in the country. There are different sources of sand/morrum the most important among them is the river. As the requirement of these construction materials is on rise, they also are very vital for the health, physical character of the river and the different important functions of the river. The extraction of sand/morrum from the river bodies has to be regulated and done with adoption of required environmental safeguards. For making available these resources, a mapping of these resources at the district level, identification of appropriate sites for extraction, appraisal of the extraction process, putting in place the required environmental safeguards, and rigorous monitoring of the volume of extracted material is required to ensure sustainability of the entire process. Mineral resources of the nation reflect in terms of potential economic growth of the country.

Sand/morrum have long been used as aggregate for construction of roads and building. Today, the demand for these materials continues to rise. In India, the main sources of sand/morrum are river flood plain, coastal regions, paleochannel and sand/morrum from agricultural fields. River sand/morrum mining is a common practice as habitation concentrates along the rivers and the mining locations are preferred near the markets or along the transportation route, for reducing the transportation cost. River sand/morrum mining can damage private and public properties as well as aquatic habitats. Excessive removal of sand/morrum may significantly distort the natural equilibrium of a stream channel. Removing sediment from the active channel bed in river interrupt the continuity of sediment transport through the river system, disruptingthe sediment mass balance in the river downstream and induces channel adjustments (usually incision) extending considerable distances (commonly one kilometer or more) beyond the extraction site. The magnitude of the impact basically depends on the magnitudes of the extraction relative to bed load sediment supply and transport through the reach. Implementation of the principles and processes will limit the negative externalities of sand/morrum mining.

This project operation will generate employment to the local people residing in vicinity for about 225 days annually and approximately 100 people will be benefited directly and indirectly by the project.

1.8 SCOPE OF THE STUDY

The Environmental Impact Assessment has been prepared to assess the current environmental scenario of the area, will identify and address the impacts, where these are adverse in nature, and there after design imitative measures to manage such impacts in a manner as to conserve environment and ecology of the area. The EMP has been prepared with a view to ultimately ensure that the adverse impacts are minimized if these cannot be prevented altogether.

The Environmental Impact Assessment report has been prepared as per TOR recommended and issued by the State Expert Appraisal Committee, U.P vide letter no 678/Parya/SEAC/4565/2018 on 7 Feb 2019 **(Annexure 1.2).**The base line monitoring study has been carried out during the Winter season (Oct 2018 to Dec 2018) for various environmental components so as to assess the anticipated impacts of the

proposed project on the environment The compliance of the ToR has been given in **Annexure 1.3.**Primary data collection coupled with secondary data collection so as to establish the baseline environmental status of the study area;

- Identify various existing pollution loads in and domestic activities in the study area.
- Predict incremental levels of pollutants in the study area due to the mining activity.
- Evaluate the predicted impacts on the various environmental attributes in the study area by using scientifically developed and widely accepted Environmental Impact.
- Identification of mitigation measures and preparation of an Environmental Management Plan (EMP) outlining the measures for improving environmental quality and scope for future projects for environmentally sustainable development.
- Identify critical environmental attributes required to be monitored regularly.

1.9 EIA METHODOLOGY

This EIA/EMP report is based on the observations made by the team during visits to the study area and collection of primary and secondary environmental data. Literatures have also been reviewed and relevant information has been collected for environmental and social baseline. Reconnaissance surveys have been conducted to identify the major environmental issues in the study area. The sampling locations were identified on the basis of:

- Existing topography;
- Location of water bodies;
- Location of villages/ towns/ sensitive areas;
- Accessibility, power availability, security of monitoring equipment; and
- Areas, which represent baseline conditions.

The EIA study for the proposed project has been carried out as per the Terms of Reference (ToR) and EIA guidelines of the Ministry of Environment, Forest & Climate Change (MoEF&CC). The EIA methodology for the proposed project has been described in **Figure 1.2**

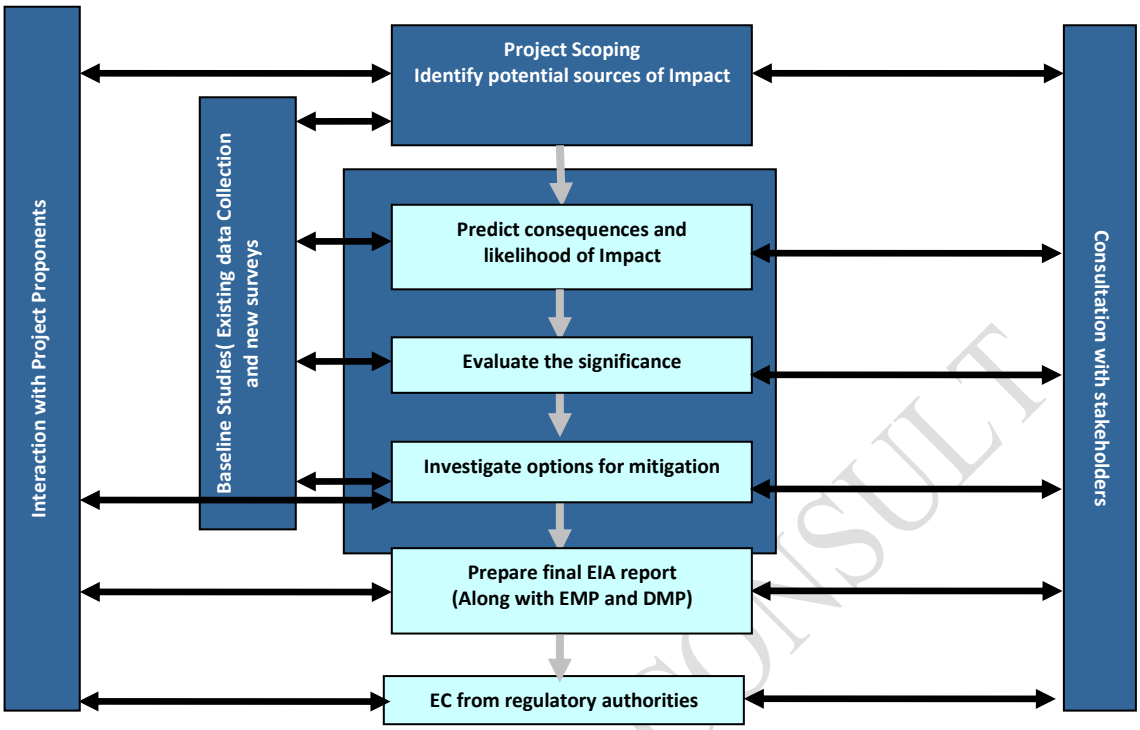


Figure 1. 2EIA methodology

1.10 SELECTION OF MINING METHOD

Factors in the choice of an actual mining method for a given deposit are deposit characteristics, percentage recovery, requirement of health and safety and environmental concerns, production, scheduling scope of mechanization and automation, workforce requirements wage rates, and land reclamation, 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 pit mining is used for large, near-surface deposits. Sand/morrum is excavated and loaded into trucks, and hauled to a facility to reach it with end user. Surface mining requires the removal and disposal of layers of top soil called the overburden. Mining must be planned so that the combine of mining processing and reclaiming the land is taken up concurrently.

1.11 OPEN CAST MINING

General geology and hydrogeology of the study area, and geologic sections of the deposit (transverse and longitudinal) in the project area are to be prepared. Natural and geologic factors, terrain topography, depth, geological disturbances climate, mineral / ore grade, mineable reserves within the property boundary, production rate, estimated life of mine are to studied before selection of the mine area. Depth of the deposit at the final it limit thickness and dip be given. Overburden thickness (maximum and minimum) is to be estimated. Maximum allowable stripping ratio, overall stripping ratio, mining plan (development and exploitation) are to be critically examined. Year wise development plan and year wise production plan for the next five years are to be worked out. Methods for handling of overburden waste for the next five years are to be outlined. Similar plans of five year duration subsequently

should be prepared and the approval of the concerned regulatory authority is to been taken.

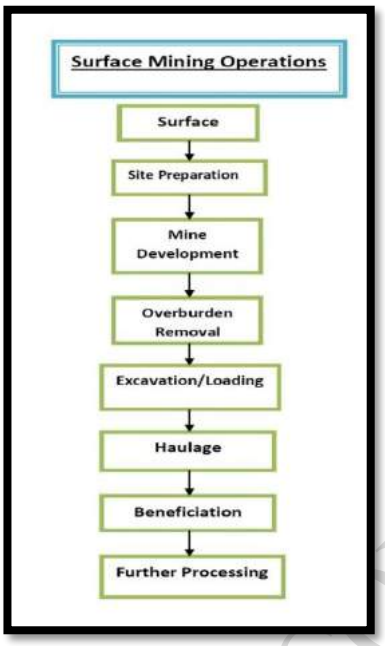


Figure 1. 3 Surface Operation Mining

1.12 ENVIRONMENTAL CLEARANCE

The projects are classified into Category A or Category B projects based on spatial extent of potential impacts on human health and natural and man-made resources. Category A projects require prior clearance by the MoEF, Govt. of India while the Category B projects have to get clearance from the state government. The environmental clearance process for new projects comprises of a maximum of four stages .As per the EIA notification of 14th September 2006 and its amended on 1st Dec 2009 & 4th April 2011, 13th December, 2012, 13th March 2013, 9th September 2013, 15 Jan 2016 & 14 Aug 2018 of MoEF & CC, Govt. of India, for seeking environmental clearance for mining of sand/morrum in the mining lease area measuring 44.46 Acres (18.0Ha) falling under category "B" under Sub Category B1. As per Sustainable Sand/morrum Mining Management Guideline, 2016 and Notification dated 15 Jan 2016& amendment 14 Aug 2018 of MoEF& CC, Govt. of India.

Stage (1) – Screening

In case of category 'B' projects or activities, this stage will entail the scrutiny of an application seeking prior environmental clearance made in Form 1* by the concerned SEAC for determining whether or not the project or activity requires further environmental studies for preparation of an Environmental Impact Assessment (EIA) for its appraisal prior to the grant of environmental clearance depending upon the nature and location specificity of the project. The projects requiring an Environmental Impact Assessment report shall be termed Category 'B1' and remaining projects shall be termed category 'B2' and will not require an Environmental Impact Assessment report.

Stage (2)- Scoping

'Scoping' refers to the process by which the EAC in the case of Category 'A' projects or activities, and SEAC in the case of Category 'B1' projects or activities, including applications for expansion and/or modernization and/or change in product mix of existing projects or activities, determine detailed and comprehensive TOR addressing all relevant environmental concerns for the preparation of an EIA report in respect of the project or activity for which prior environmental clearance is sought. The EAC or SEAC concerned shall determine the TOR on the basis of information furnished in the prescribed application Form 1 including TOR proposed by the applicant, a site visit by a sub-group of EAC or SEAC concerned only if considered necessary by the EAC or SEAC concerned and other information that may be available with the EAC or SEAC concerned.

Stage (3)- Public Consultation

"Public consultation" refers to the process by which the concerns of local affected persons and others who have plausible stake in the environmental impact of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. All Category 'A' and Category 'B1' projects or activities shall undertake Public consultation, except the following:

After completion of the public consultation, the applicant shall address all the material environmental concerns expressed during this process, and make appropriate changes in the final EIA and EMP.

Stage (4)- Appraisal

Detailed scrutiny by the EAC or SEAC of the application and other document like the Final EIA report, outcome of the public consultations including public hearing proceedings, submitted by the applicant to the regulatory authority concerned for grant of EC.

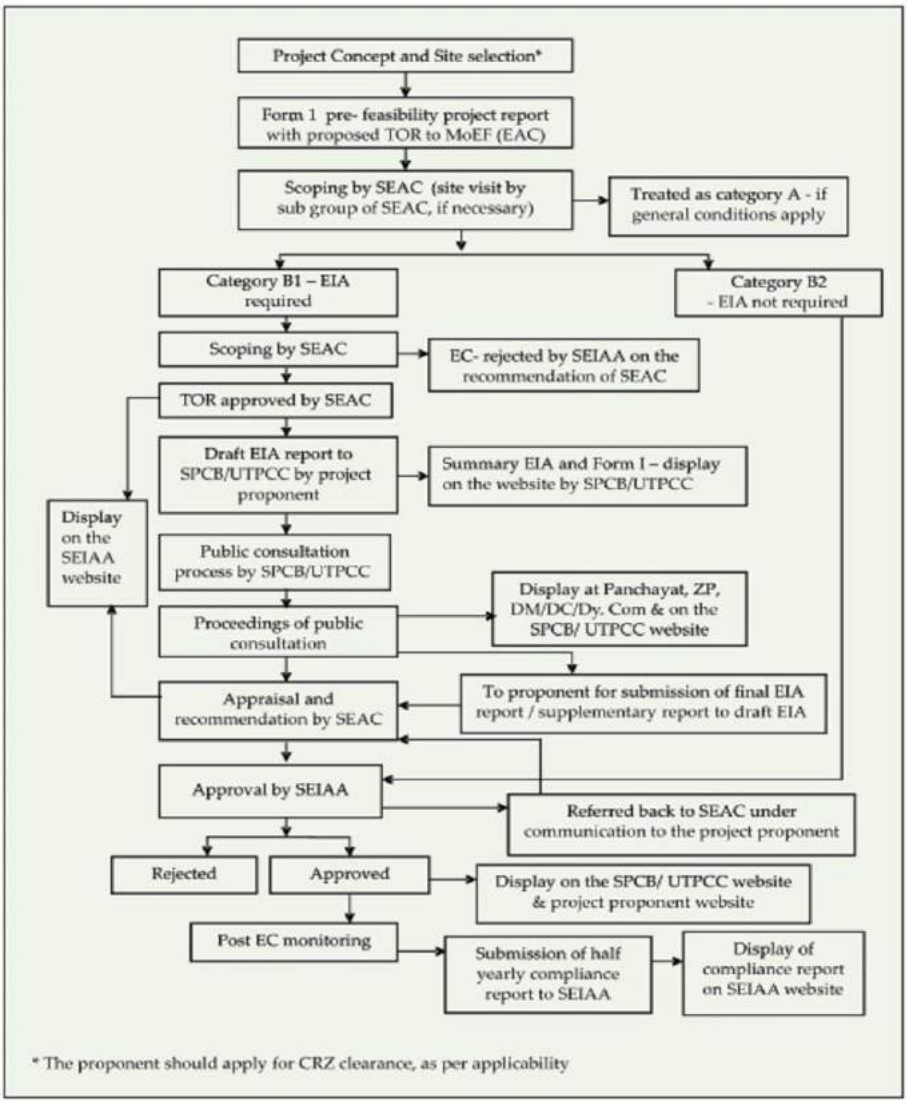


Figure 1. 4Prior Environmental clearance process for category B projects &

Flow-charts depicting these stages to obtain the prior environmental clearance for mining projects are presented in

1.13 REPORT LAYOUT

The overall contents of the EIA report follow the list of contents prescribed in the Gazette Notification on "Environmental Clearance" issued by Ministry of Environment and Forests, GOI vide No. SO 1533 dated 14th September 2006 and EIAGuideline Manual for Mining of Minerals prepared by MoEF, New Delhi. There port consists of eleven chapters and the content is briefly described in this section. The various components of the study are presented in respective chapters are described below:

Chapter 1 - Introduction: This chapter gives the basic information about the project and project site. It also discusses the justification of the project and the purpose of the EIA study including the scope of the study.

Chapter 2 - Description of the Project: This chapter deals with the details of the mine plan and various mining parameters like mineral reserves, exploration, year wise mining plan, excavation method etc. and also the facilities to monitor and treat the pollutants. The features of the proposed project are described in this chapter.

Chapter 3 – Baseline Environmental Status: The methodology for assessing various baseline Environmental components in the study area prior to the commencement of the project has been identified in this chapter. The various parameters of present environmental status are identified under different aspects, which include location and regional setting of the area, physical aspect which include land use, land cover and soil quality of the study area. Hydrology aspect consists of surface and ground water quality. Meteorological aspect contains all the climatic factors and ambient air quality of the study area .Ecological environment describes the flora and fauna of the region. Human aspect includes the demographical features, socioeconomic environment and infrastructure facilities of the study area.

Chapter 4 - Environment Impacts Assessment: This chapter provides the details of the Environmental Impact Assessment of the project during construction and operation stages. It ascertains the impacts of the proposed project on the various components of environment. The mathematical modelling exercises pertaining to ground level concentrations of air pollutants have been presented in this chapter with suitable mitigation measures.

Chapter 5- Analysis of Alternatives: This chapter gives details of various alternatives in respect of technologies to be deployed are considered in this project.

Chapter 6 - Environment Monitoring Plan: This chapter emphasizes the formation of an Environment Management Cell with trained staff equipped with all monitoring facilities for monitoring of all environmental parameters during construction project monitoring. Organization structure for environmental management and frequency of monitoring has also been provided.

Chapter 7 - Additional Studies: A summary of the additional studies/activities conducted as per the requirements of the TOR is given in this chapter. A brief description of the Public Hearing is described in this chapter. The additional studies conducted are Risk Assessment and Disaster Management Plan and Hydro-geology Study. Although separate reports will be submitted for the Hydro-geology Study, a brief account has been given in the chapter. The Risk Assessment section provides information regarding the activities associated with the project likely to pose a risk to man, environment or property. Such activities include displacement, transport of raw materials, storage. It also provides details regarding precautionary measure to be taken. On-site disaster management describing the on-site and off-site emergencies commands and controls have also described in this chapter.

Chapter 8 - Project Benefits: The benefits that will be accrued from the project in the locality in particular and society in general as well as development will be identified and described in this chapter.

Chapter 9 - Environmental Management Plan: In this chapter, an environmental strategy to mitigate the adverse effects likely to occur on environmental parameters during mining phase has been drawn up for the proposed mining project.

Chapter 10 –Summary &Conclusion- Over all justification for implementation of the project. Explanation of how, adverse effects have been mitigated.

Chapter 11 –Disclosure of the Consultant: The detailed profile of the environment consultant along with their professional capabilities and expertise as well as work experiences are highlighted in this chapter.

1.14 ENVIRONMENTAL LEGISLATIONS

The mining sector has separate set of legislations covering management, conservation, grant and operation of mining leases etc. There are also separate legislations for coal mines, nonferrous mines etc. In addition, there are environmental / forest regulations, applicable to all types of mining activities have been prescribed by Ministry of Environment and Forests and CPCB. The important legislations related to mining sector are given in Table 1.3.

Name	Scope and Objectives	Key Areas	Operational Agencies
The Mines Act, 1952	The Act prescribes the duties of the owner to manage mines and mining operation and the health and safety in mines. It also prescribes the number of working hours in mines, the minimum wage rates, and other related matters.	Regulation of labour and safety in mines	Ministry of Labour and Employment through the Directorate General of Mines Safety (DGMS)
The Mines and Mineral (Development and Regulation) Act, 1957	Providing a mineral concession regime in the context of the metal making public sector undertakings	Regulation of mines and development of minerals under the control of the Union	Directorate General of Mines Safety, Government of India
Directorate General of Mines Safety, Government of India	These rules outline the procedures and conditions for obtaining a Prospecting License or Mining Lease	The levy and collection of royalty	Ministry of Mines, Government Of India.
The Water (Prevention and Control of Pollution) Act, 1974	To provide for prevention & control of water pollution and enhancing water quality	Control of sewage and industrial effluent discharges	Central and State Pollution Control Boards
The Air (Prevention and Control of Pollution) Act,	To provide for the prevention and control of air pollution	Control emission of air pollutants	Central and State Pollution Control Boards

1981			
The Environment (Protection) Act, 1986	To provide for the protection and improvement of environment	An umbrella legislation; supplements pollution laws	MoEF, GoI
The Forest (Conservation) Act,1988	To halt rapid deforestation & resulting environment degradation	Restriction on dereservation & using forest for non-forest purpose	MoEF, GoI
The Wildlife (Protection) Act, 1972	To provide for protection of wild animals, birds and plants; and for matters connected therewith.	Wildlife protection in forest areas	MoEF, GoI
Noise Pollution (Prevention and Control) Rules 2000	To take measures for abatement of noise and ensure that level do not cross standard.	Noise in urban area and around industrial sites	Central Government, nodal agencies MoEF, State governments

The MoEF & CC is the nodal agency to set up policy and standards for the protection of environment, along with Central Pollution Control Board (CPCB). This includes air, noise, water and hazardous waste standards. The relevant standards, which are of significance to the proposed project, are given in **Annexure. No.04**

1.15 REGULATORY COMPLIANCES

Data for environmental parameters will be generated for Ambient Air, water, soil and noise quality for one month representing season. Data will be complied to make six monthly report, which will be submitted along with other conditions laid into the EC letter. Annual report will be submitted into the regional office of MoEF & CC and local State Pollution Control Board.

1.16 POST – ENVIRONMENTAL CLEARANCE MONITORING

The project proponent will submit half yearly compliance report in respect of stipulated prior Environmental Clearance terms and conditions on 1st June and 1st Dec. of each calendar year. The latest compliance report will be displayed on the website of the concerned regulatory authority. Annual report based on half yearly reports will be submitted at the office of State Pollution Control Board and Regional Office of MoEF & CC.

CHAPTER-2

PROJECT DESCRIPTION

2.0 TYPE OF PROJECT

Mineral resources of the nation reflect in terms of potential economic growth of the country .Our natural mineral wealth has been exploited considerably during the past 50 years. With increase in industrialization coupled with population growth, the demand for different minerals has increased and is likely to grow further in years to come. This has resulted in irreversible impacts on diminishing reserves with simultaneous generation of solid wastes and effluents causing environmental degradation. It is therefore important to tackle the problem for control of pollution and mining of minerals in a cost- effective method causing least damage to the ecosystem. In the past few decades, the demand for construction grade sand/morrum is increasing in many parts of the world due to rapid economic development and subsequent growth of building activities. This results in indiscriminate mining of sand/morrum from in stream and floodplain areas leading to severe damages to the river basin environment. Moreover, lack of adequate information on the environmental impact of river sand/morrum mining is a major lacuna challenging regulatory efforts in many developing countries. Therefore, a scientific assessment is a pre requisite in formulating management strategies in the sand/morrum mining areas. This project is proposed for the excavation of sand/morrum from the bed of river Ken. It is an opencast semi mechanized mining project of 18.0 Ha to excavate sand/morrum in its existing form for direct usage as a construction material.

2.1 NEED OF THE SAND/MORRUM MINING PROJECT

Budget 2018-19 echoes the need to foster the infrastructure ecosystem and outlines the policies and reforms which are expected to revive the growth of infrastructure. As a result, demand of sand/morrum has increased mainly in infrastructure activities like roads, highways, buildings & townships. With the rapid pace of development, the gap between demand & supply of Sand/morrum as Construction Material must be minimized to control the pricing mechanism and support the demand of local market. The price correction in the sand/morrum rates will definitely provide growth impetus to our citizens and as well as to our economy (both directly and indirectly), if it is available legally. Therefore, utilization of sand/morrum through scientific mining methodology is (sustainable mining) at the stretch of Ken basin at Gata no./ Khand no. 60 in Village- Sadi Khadar, Tehsil- Pailani, District-Banda, in the state of Uttar Pradesh will support growth in nearby areas and Uttar Pradesh State at large.

2.2 PROJECT LOCATION AND DESCRIPTION OF THE AREA

The proposed lease area of 44.46 Acres (18.0 Ha) is granted to S.G. Prjects Ltd, Prop. Smt. Neha Singh Singh for sand/morrum mining on the river Ken . The land is under the ownership of State Govt. This land is sanctioned to applicant for only five years as vide letter No.1083/Khani-30(E-tender2018) Banda dated 27 May 2018. The proposed site is well connected to road and rail network.Maudaha Railway Station is situated 19.72 Km away in West direction from the site.

The location map of the proposed site is given as follows: The proposed mining project is for extraction of sand/morrum from the river bed. The proponent has

granted mining lease of an area of 18.0 Ha of river bed which is recommended for extraction of sand/morrum from the Ken river bed by DEIAA. This area is also included in District Survey Report, recommended by DEIAA. .The proposed production of the mine is 3,60,000m^3/annum (6,48,000tons per year). The mine will operate during the non-monsoon season for nine months period.

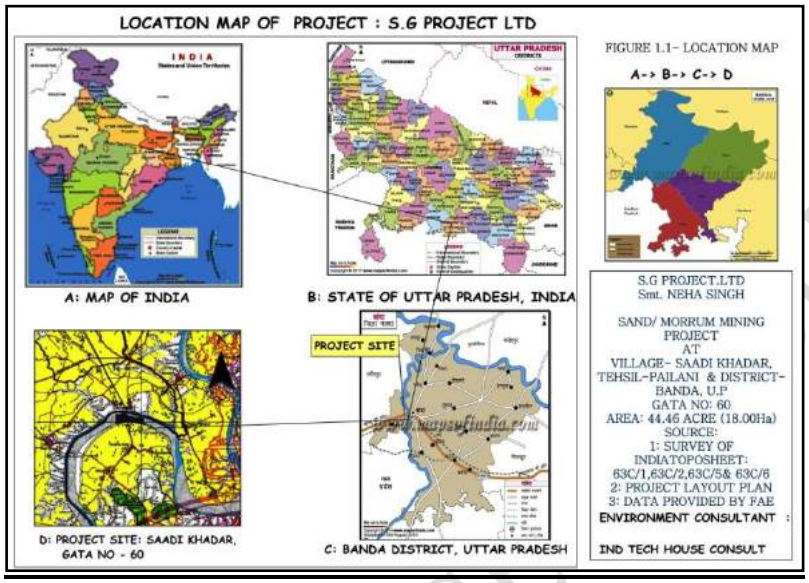


Figure 2. 1Location and General Map

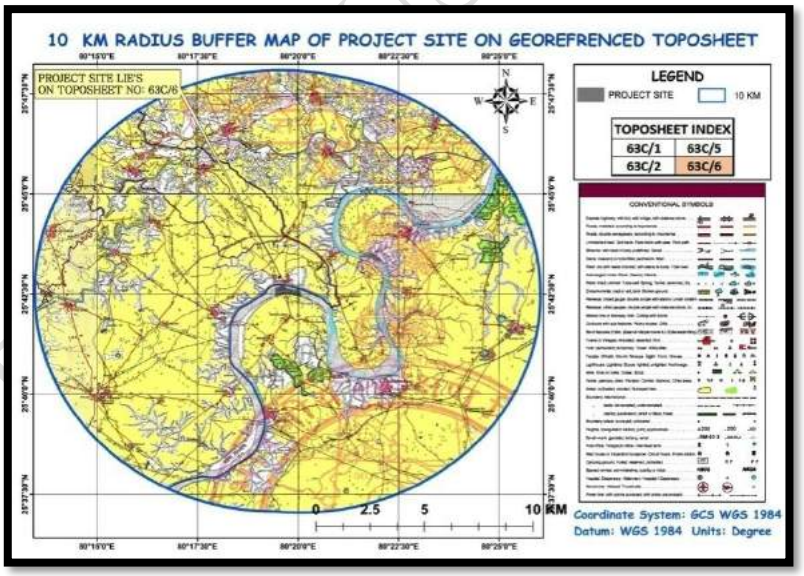


Figure 2. 2 Location MaponToposheet

Figure 2. 3 5KmBuffer ofProject Location on Google image

2.3 PROJECT SALIENT FEATURES

1 On-line proposal No.	SIA/UP/MIN/29795/2018
1. File No. allotted by SEIAA, UP	4565
2. Name of Proponent	S.G Projects Limited(Smt.Neha Singh)
3. Full correspondence address of proponent and mobile no.	R/o- 613 Jasmine Tower 31, Shakespeare Saraini Kolkata West Bangal.
4. Name of Project	Area- 44.46Acre (18.0Ha) On Ken River For Sand/Morrum Mining Project at Khand No/ Gata No-60 Village- Sadikhadar Tehsil- Pailani, District- Banda (U.P)
5. Project Location(Plot.Khsra/Gata No.)	Khand No/Gata No-60
6. Name of River	Ken River
7. Name of Village	Sadikhadar
8. Tehsil	Pailani
9. District	Banda
10. Name of Minor Mineral	Sand/Morrum
11. Sanctioned Lease Area (in Ha.)	18.0 Ha.
12. Max. & Min mRL within lease area	101.0 mRL & 91.0 mRL
13. Pillar Coordinates (Verified by DMO)	POINT / LATTITUDE / LONGITUDE A / 25°42.535'N / 80°19'475"E B / 25°42'488"N / 80°20'083"E C / 25°42.579'N / 80°20'076"E D / 25°42.689'N / 80°19'463"E
14. Total Geological Reserves	6,10,880 m^3 /Annum

15. Total Mineable Reserve in LOI	3,60,000 m^3 /Annum
16. Total Proposed Production	3,60,000 m^3 /Annum
17. Proposed Production /year	Year: Production 1St: 3,60,000 $m^{3/}$ Annum 2nd: 3,60,000 $m^{3/}$ Annum 3rd: 3,60,000 $m^{3/}$ Annum 4th: 3,60,000 $m^{3/}$ Annum 5th: 3,60,000 $m^{3/}$ Annum Total: 18,00,000 m^3
18. Sanctioned Period of Mine lease	5 Years
19. Production of mine/day	1600 m^3 /Day
20. Method of Mining	Open cast Manual / Semi Mechanized Mining Method /Bar Scalping or Skimming Method (as per IBM Rules & SSMMG, 2016 MoEF & CC ,GOI)
21. No. of working days	225 Days
22. Working hours/day	8 Hours
23. No. of worker	100 Worker
24. No. of vehicles movement/day	178 Trucks / Day
25. Type of Land	River Bed (Govt. Land)
26. Ultimate of Depth of Mining	3.0 m
27. Nearest metalled road from site	2.46 Km
28. Water Requirement	PURPOSE: REQUIREMENT (KLD) Drinking: 1.0 Suppression of dust: 12.0 Plantation: 1.90 Others (if any): Total: **14.90 KLD**
29. Name of QCI Accredited Consultant with QCI No and period of validity.	Ind Tech House Consult QCI No.87 Period of Validity- 31-01-2021
30. Any litigation pending against the project or land in any court	No
31. Details of 500 m Cluster Map & Certificate verified by Mining Officer	Letter No1638/Khanij-MMC-30Vividh/18-19 Date-26.06.18
32. Details of Lease Area in approved DSR	Page No65 Table No- 22 (Sr. No 75)
33. Proposed CER cost	2.75 Lac
34. Proposed EMP cost	19.52 Lac
35. Length and breadth of Haul Road	1000 mtr Length & 6m width haulage road
36. No. of Trees to be Planted	475 Trees

2.4 GEOLOGICAL AND MINEABLE RESERVES (AS PER APPROVED MINE PLAN).

2.4.1 GEOLOGICAL RESERVES

Particulars	Unit	
Total Lease area	1,80,000	Sqm
Total Average Thickness considered	4	m
Total volume of Mineral	6,10,880	Cum
Total Geological Reserves	6,10,880	Cum

2.4.2 MINEABLE RESERVES –

As per Letter of Intent the mineable reserves has been calculated and approved by the district authority's mineable reserves in the area and are given as follows.

Particulars	Unit	
Total Lease area	1,80,000	Sqm
Submerged Lease area under water	18,568	Sqm
Area Leaving from water boundary (10m)Towards Workable Area both side(4152+4560)	8,712	Sqm
Total Workable Lease Area (Block1-39,197+ Block2- 113,523)	1,52,720	Sqm
Peripheral Buffer Area 7.5 m (Block1-6,787 + Block2- 15,973)	22,760	Sqm
Total Mineable Area after Leaving 7.5m Buffer (Block1-32,411 + Block2-97,550)	1,29,961	Sqm
Total Mineable Reserves (considering 3.0 m Depth) (Block1-89,670 + Block2- 2,74,077)	3,63,747	Cum
Highest Point with in the Lease	101.0	mRL
Lowest Point with in the Lease	91 .0	mRL
Zero Level	88.0	mRL
Total Saleable or Sanctioned Reserves as per LOI (considering 3.0 m Depth) (Block1- 89,670+ Block2- 270,330)	**3,60,000**	Cum

2.4.3 PROJECT - ACTIVITIES IN OPERATIONAL PHASE

This project is proposed for the excavation of sand/morrum from the bed of river Ken . It is an opencast semi mechanized mining project to excavate sand/morrum in its existing form for direct usage as a construction material. Sand/ morrum excavation will be carried out up to a depth of 3.0 m or 1.0 m above the ground water table or whichever is less by using light weight excavators. Mining will be carried out with the Mining Plan and Year wise proposed production details as per approved Mining Plan are given below:-

Year	Production
1St	3,60,000m^3 /Annum
2nd	3,60,000m^3 /Annum
3rd	3,60,000m^3 /Annum
4th	3,60,000m^3 /Annum
5th	3,60,000m^3 /Annum
Total	18,00,000 m^3

2.5CONCEPTUAL MINING PLAN

The digging depth will be restricted to 3.0 m only or 1.0 m above the ground water table. This will be further get replenished during the rainy season. The reserves of proved River Bed Material estimated on surface geological plan are to the tune of 3,60,000m^3/Annum .The deposit in the river bed will never exhaust. The material will be regularly replenished during floods by the action of river water.

2.6 SURFACE DRAINAGE SYSTEM

The total geographical area of the district is 4460 km2 . The Yamuna, Ken and several tributaries of river Yamuna are flowing in the Banda district. Average rain in the district approximate 902.00 mm. General climate of the district is healthy and pleasant. The net irrigated area is 153804 Ha and the net area sown is 336000 Ha, which shows that 45.77% area is irrigated by ground water and the surface water while the rest depends on rainfall

DESCRIPTION OF RIVERS

Yamuna:

The Yamuna River is one of the important and sacred rivers of India. It is the largest tributary of the River Ganga. It originates from Yamunotri glacier in the Mussoorie range of the lower Himalayas, and after traversing 1,376 km joins the river Ganga at Allahabad. The drainage area of the Yamuna basin is 366,220 sq km, which comprises part of seven states, viz. Uttarakhand, Himachal Pradesh, Uttar Pradesh, Haryana, Delhi, Rajasthan and Madhya Pradesh. The Yamuna River has four main tributaries in the Himalayan region: Rishi Ganga, Hanuman Ganga, Tons, and Giri. In the plains, the main tributaries are the Hindon, Chambal, Sind, Betwa and Ken. The river water is generally used for irrigation, drinking and industries as well as for mass bathing, laundry, cattle bathing, and secretion of the cremation ash. The construction of diversion structures at regular intervals (Hathinikund, Wazirabad, Okhla, Gokul, etc.) for irrigation, domestic and industrial water supply, has largely modified the flow regime of the river. The inflow of wastewater either treated or partially treated in the river further aggravates the water quality problem of the river. Though the green revolution was important for food security, but lack of regulation in the groundwater abstraction has led to ground water table depletion causes damage in causal linkage between surface and ground water, resulting change in surface water dynamics during

the lean season of the river. This is the main reason of dry river segments observed between Hathinikund and Palla (Delhi).

Ken River:

The Ken River is one of the major rivers of the Bundelkhand region of central India, and flows through two states, Madhya Pradesh and Uttar Pradesh. It is a tributary of the Yamuna. The Ken River originates near village Ahirgawan on the north-west slopes of Barner Range in Jabalpur district and travels a distance of 427 km, before merging with the Yamuna at Chilla village, district Banda in Uttar Pradesh at 25°46′N 80°31′E. Ken has an overall drainage basin of 28,058 km2 , out of which 12,620 km2 belong to Sonar River its largest tributary, whose entire basin lies in Madhya Pradesh; and along its 427 kilometres (265 mi) course it receives water from its own tributaries such as Bawas, Dewar, Kaith and Baink on the left bank, and Kopra and Bearma of the right. Out of its total length of 427 kilometres (265 mi) it flows for 292 kilometres (181 mi) in Madhya Pradesh, 84 kilometres (52 mi) in Uttar Pradesh, and 51 kilometres (32 mi) forms the boundary between the two states.

Ranj River:

The river enters in Chandpura and passes through various including guda and gopara. At gurha kalan the river joins the Baghein river.

Other Rivers of Banda

Chan River- This stream rises in the upland below the Patha proper, on which the village of Rukma and Dadri are situated, sometimes called The Dadri-ka-Patha, lying to the south of karwai. It flows in shallow bed, stream with boulders, as far as the village of Semardaha.

Bardaha River- This stream flows from the highlands of Rewah in the south-east corner of tehsil Karwi, and after a short course in this district flows out eastward into district.

Garra River- the last stream of any importance is the Garara, One branch rises near the village of Jamrahi and the other in Adhrauri, Both in Tehsil Naraini. The united stream flows due north joining the Yamuna at the village of jalalpur in tehsil Baheru.

Beghain River- It is perennial rivers, it issues from a hilla near kohari in district and enters at the village of Masauni Bharatpur in tehsil Naraini. Flowing north- eastward through tehsil Naraini.

Paisuni River- This stream, one of the tributaries of the Yamuna, rises in the hills of Madhye Pradesh. Near its junction with the Yamuna it forms some remarkable curves amidst lowlying land, chefly in the village of Bhadedu, which it often floods. Its banks are usually steep and its characteristics are like those of the baghain.

Table 2. 1 Drainage system with description of main rivers

S.No'	Name of River	Area Covered (Sq.Km.)	% Area Covered
1.	**Yamuna**	51.88	1%
2.	**Ken**	138.68	2%
3.	**Baghain**	3.82	0.5
4.	**Ranj**	1.32	0.25%

Table 2. 2 Salient features of Important rivers and streams

S.No.	NameOf River/stream	Total length in the District (in Km)	Place Origin of	Altitude at Origin
1.	Yamuna	124.70	Yamunotri glacier Lower Himalaya in Uttarakhand	6387 m
2.	Ken	143.84	VillageAhargawan on the north west slopes of Barner range in Jabalpur district	550 m
3.	Baghain	32	Kohari in Panna District	416 m
4.	Ranj	15	Udesa, Panna	416 m

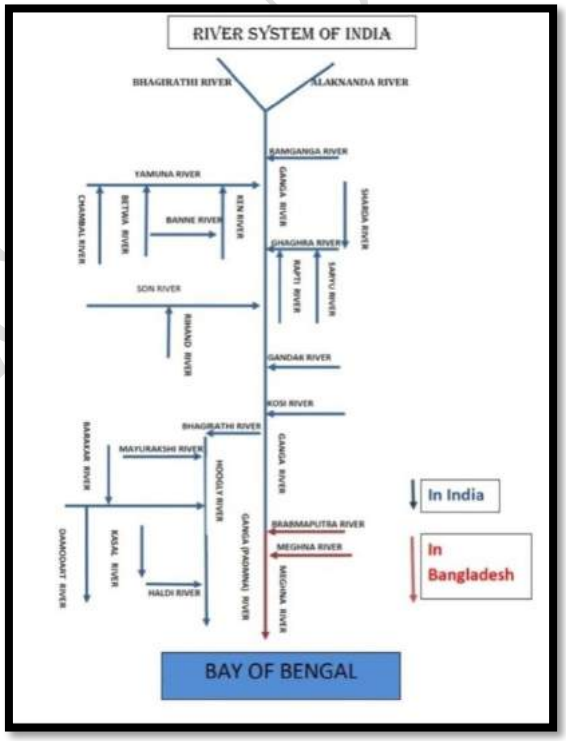


Figure 2.7 TECHNOLOGY AND PROCESS DESCRIPTION

The project does not involve any processes such as drilling, blasting and beneficiation. The mining process involves collection of material by simple hand tool such as shovel, pans and sieves. This is followed by sorting and manual/Semi

Mechanized picking, stacking and loading into trucks/tractor-trolley for transporting. The pits from where the material is picked are not deeper than 2.50 m as allowed in mining area and shall follow the normal channel direction of the river. These get replenished during monsoon. About 3,60,000Cum mineral will be exploited per year. From first year to fifth year total 18,00,000Cum mineral will be produced. The proposed area is within river bed and mined out area will be replenished gradually during succeeding rainy season. The lease area has gentle slope towards South. Highest point is at RL 101 m in the of the area where as lowest point RL 91.0m is in the corner of the area. The mineral extraction will be done for a period of 225 days in a year. The guidelines of the Ministry of Environment & Forests and Directorate of Geology and Mining will be followed; the most important is as under:

- Dry pit mining will be followed which means mining at all times will be above the flowing river water level. Mining activity will be immediately stopped when water comes in the mining pits.
- Stream will not be diverted to form inactive channel.
- Mining at the concave side of the river channel will be avoided to prevent bank erosion.
- Mining will be restricted minimum 3m away (inward) from river bank to minimize effect of river bank erosion and to avoid consequent channel migration. Plantation will be done on such area to isolate mining operation from the rest of the area.
- Mining will be restricted in monsoon season i.e 1st July to 30th September.
- Area of mining lease will be demarcated prior to mining for sustainable development and Pucca Pillars will be erected on ground.
- No mining operations shall be carried out in proximity of any bridge and or embankment.
- Mining will be done Manual /Semi -mechanized Method.
- No mining operations shall be carried out in proximity of any bridge and or embankment. Gate/Check Post with CCTV camera & R.F.I.D Scanner will be built-up and will be ensured all such facility in working condition by the owner.
- Further Rules & Regulations modified time to time by State Govt. Shall be adhered.

The MoEF&CC prescribes following procedures for sand/morrum mining;

- Parts of the river reach that experience deposition or aggradations shall be identified first. The Lease holder/ Environmental Clearance holder may be allowed to extract the Sand/morrum deposit in these locations to manage aggradations problem.

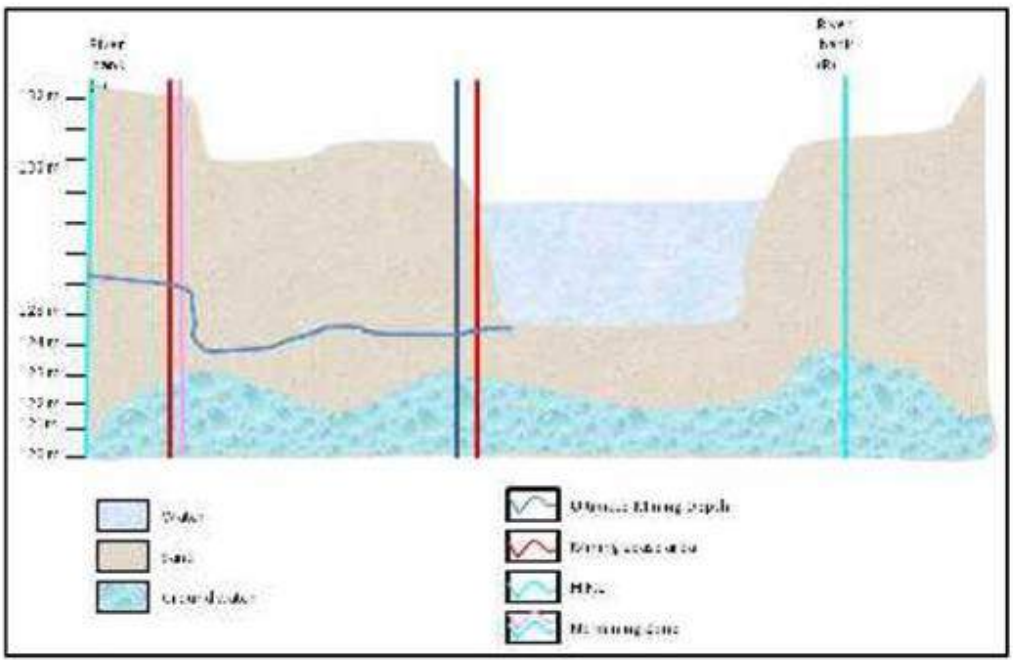
- The distance between sites for Sand/morrum mining shall depend on the replenishment rate of the river.
- Sand/morrum may be extracted across the entire active channel during the dry season.
- Bar scalping or skimming is extraction of sand/morrum from the surface of bars to avoid ponding effect.
- Proper Safe Zone or Buffer zone will leave from periphery of Lease Boundary to avoid River Capture through pits.
- Depth of scraping is typically kept 0.3 - 0.6 m (1-2 ft). Bar scalping is commonly repeated year after year.
- Abandoned stream channels on terrace and inactive floodplains be preferred rather than active channels and their deltas and flood plains. Stream should not be diverted to form inactive channel.
- Layers of Sand/morrum which could be removed from the river bed shall depend on the width of the river and replenishment rate of the river.
- Sand/morrum shall not be allowed to be extracted where erosion may occur, such as at the concave bank.
- Segments of braided river system should be used preferably falling within the lateral migration area of the river regime that enhances the feasibility of sediment replenishment.
- Sand/morrum shall not be extracted within 200 to 500 meter from any Crucial hydraulic structure such as pumping station, Bridges, water intakes.
- Sand/morrum could be extracted from the downstream of the sand/morrum bar at river bends. Retaining the upstream one to two thirds of the bar and riparian vegetation is accepted as a method to promote channel stability.
- Flood discharge capacity of the river could be maintained in areas where there are significant flood hazard to existing structures or infrastructure.
- Alternatively, off-channel or floodplain extraction is recommended to allow rivers to replenish the quantity taken out during mining.
- Mining depth should be restricted to 3 meter and distance from the bank should be 3 meter or 10 percent of the river width whichever less.
- Demarcation of mining area with pillars and geo-referencing should be done prior to start of mining.

- **GSI Guidelines-** Geological Survey of India (GSI) has collated/ formulated considered geo-scientific opinions to address issues pertaining to riverbed sand/morrum/ mining.
- Abandoned stream channels on terrace and inactive floodplains may be preferred rather than active channels and their deltas and flood plains. Replenishment of ground water has to be ensured if excessive pumping out of water is required during mining.
- Stream should not be diverted to form inactive channel.
- Mining below subterranean water level should be avoided as a safe guard against environmental contamination and over exploitation of resources.
- Large rivers and streams whose periodic sediment replenishment capacity are larger, may be preferred than smaller rivers.
- Segments of braided river system should be used preferably falling within the lateral migration area of the river regime that enhances the feasibility of sediment replenishment.
- Mining at the concave side of the river channel should be avoided to prevent bank erosion. Similarly meandering segment of a river should be selected for mining in such a way as to avoid natural eroding banks and to promote mining on naturally building (aggrading) meander components.
- Scraping of sediment bars above the water flow level in the lean period maybe preferred for sustainable mining.
- Mining of sand/morrum from the riverbed should be restricted to a maximum depth of 3m from the surface. For surface mining operations beyond this depth of 3m (10 feet), it is imperative to adopt quarrying in a systematic bench- like disposition, which is generally not feasible in riverbed mining. Hence, for safety and sustainability restriction of mining of riverbed material to maximum depth of 3m.is recommended.
- Mining of riverbed material should also take cognizance of the location of the active channel bank. It should be located sufficiently away, preferably more than 3m away (inwards), from such river banks to minimize effects on riverbank erosion and avoid consequent channel migration.

Identification of river stretches and their demarcation for mining must be completed prior to mining for sustainable development.

2.7.1 PROCESS OF DEPOSITION

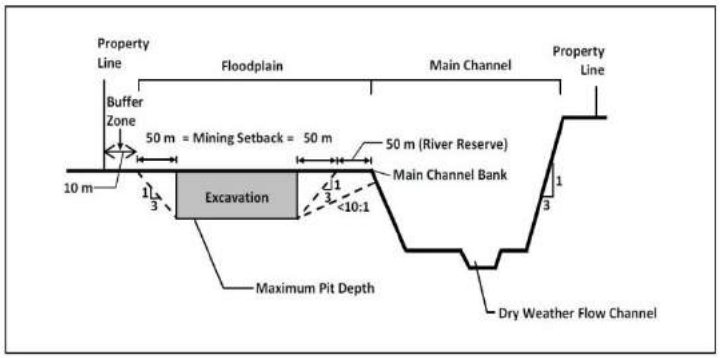
Sediment transport is critical to understanding how river work because it is the set of processes that mediated between the flowing water and the channel boundary .Erosion involves removal and transport of sediments (mainly from the boundary)and deposition involves the transport and placement of sediment on the boundary Erosion and deposition are what form the channel of any alluvial river as well as the floodplain through which it moves. The amount and size of sediment moving through a river channel are determined by three fundamental controls: competence, capacity and sediment supply. Competence refers to the largest size (diameter) of sediment particle or grain that the flow is capable of moving; it is a hydraulic limitation. If a river is sluggish and moving very slowly it simply may not have the power to mobilize and transport sediment of a given size even though such sediment is available to transport. So a river may be competent or incompetent with respect to a given grain size. If it is incompetent it will not transport sediment of the given size. If it is competent it may transport sediment of that size if such sediment is available (that is, the river is not supply-limited). Capacity refers to the maximum amount of sediment of a given size that a stream can transport in traction as bed load. Given a supply of sediment, capacity depends on channel gradient, discharge and the caliber of the load (the presence of fines may increase fluid density and increase capacity; the presence of large particles may obstruct the flow and reduce capacity). Capacity transport is the competence limited sediment transport (mass per unit time) predicted by all sediment-transport equations, examples of which we will examine below. Capacity transport only occurs when sediment supply is abundant (non-limiting). Sediment.



Standard Mining operation

supply refers to the amount and size of sediment available for sediment transport. Capacity transport for a given grain size is only achieved if the supply of that caliber of sediment is not limiting (that is, the maximum amount of sediment a stream is capable of transporting is actually available). Because of these two different potential

constraints (hydraulics and sediment supply) distinction is often made between supply-limited and capacity-limited transport.



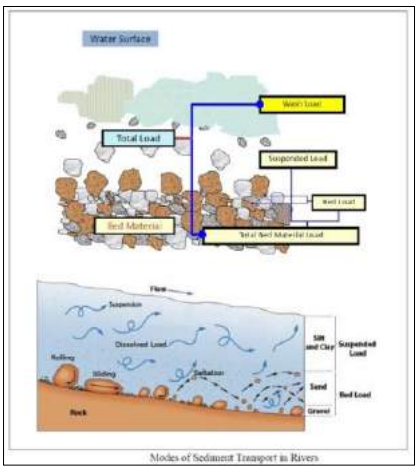
Floodplain Excavation Pit Geometry for Streamlined Floodplain Use Permit

Most rivers probably function in a sediment-supply limited condition although we often assume that this is not the case. Much of the material supplied to a stream is so fine (silt and clay) that provided it can be carried in suspension, almost any flow will transport it. Although there must be an upper limit to the capacity of the stream to transport such fines, it is probably never reached in natural channels and the amount moved is limited by supply. In contrast, transport of coarser material (say, coarser than fine sand/morrum) is largely capacity limited.

2.7.2 MODES OF SEDIMENT TRANSPORT

The sediment load of a river is transported in various ways although these distinctions are to some extent arbitrary and not always very practical in the sense that not all of the components can be separated in practice:

1. Dissolved load
2. Suspended load
3. Intermittent suspension (saltation) load
4. Wash load
5. Bed load



Modes of Sediment Transport in Rivers

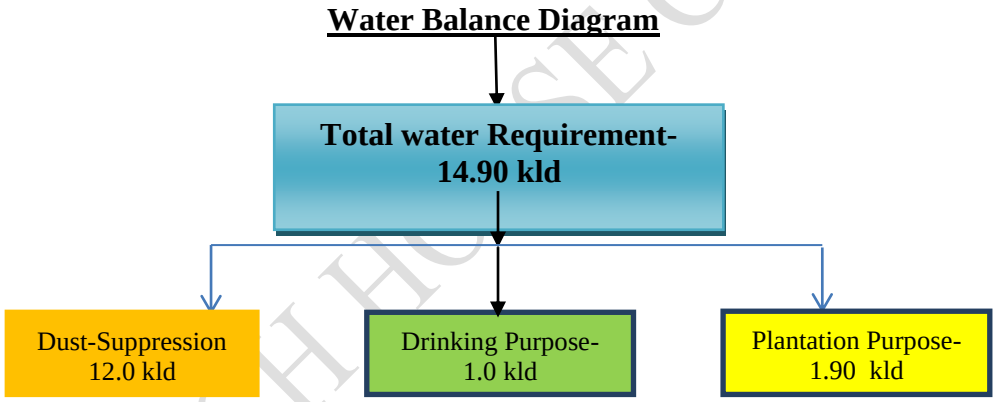
2.8 POWER, WATER SUPPLY AND OTHER INFRASTRUCTURE REQUIREMENTS

2.8.1 POWER SUPPLY

The lease area falls near village Sadi Khadar which is electrified by 220 volt supply; nearly 80% area fall 5 km periphery of the area is electrified The mining activity will take place during day time (sunlight) only and no other equipment's requiring power will be deployed for mining operations, therefore there will be no power requirement for the project.

2.8.2 WATER SUPPLY

The total water requirement for drinking purpose during mine operation stage has been estimated as 14.90 KLD /day. The water requirement for drinking purpose and ancillary activities will be met from water sources in nearby villages, water sprinkling on roads for suppression of dust generated due to transport activities which could be met through water from nearby villages in tankers. The water requirement for drinking purposes and dust suppression will be around 13.0 KLD



2.8.3 INFRASTRUCTURE

The following site services will be provided:

- Office
- Store
- First Aid Centre
- Drinking water shed
- Rest shelter

The site services like rest room shelter, first aid box and drinking water facilities will be provided to workers at the mine site.

2.8.4 MANPOWER REQUIREMENT

The workforce required for mining activity comprises of mining supervisors and workers. 100 people will be directly employed during the mining activities. The mine manager should be a graduate engineer holding at least second class manager's certificate. The category-wise employments are given in**Table 2.3**.

Table 2. 3Manpower Break-Up

Designation	Number
Manger/Geologist/Mine Engineer	1
Certified Mines Foreman	2
Mine Engineer	1
Supervisor	2
Skilled	4
Unskilled	90
Total	**100**

The services of following persons/agencies may be retained on part time basis.

- Environment consultancy agency
- Consultant Mining Engineer (Part-time) degree in Mining
- Mining Geologist/Mine Manger
- Mine Mate
- Mines Supervisor

2.8.5 PROJECT COST & IT'S BREAK-UP

The work on project would be resumed as soon as all the relevant permissions from the concerned authorities are obtained. The proposed riverbed mining project is likely to get operational by March, 2019. The estimated cost of mining is given in Table 2.4

Sr No.	Particular/Item	Units	Rate(Rs)	Total Cost Rs.	Total Cost Rs.
1.0	**Equipment's**			**Capital**	**Recurring**
a.	JCB /Loader (Light Earth Movers) with Prior Permission to Concerned Authorities	3	60,000/Month	-	16,20,000
b.	Oil & Lubricant	-		2,25,000	
c.	Manual Hand Equipment's	-	75,000	75,000	–
2.0	**Cost of Labour**				
a.	Unskilled workers	90	Rs- 250 for one labour 90X 250=22,500Rs/ Day	-	50,62,500
b.	Semi-skilled workers	6	Rs- 400 for one labour 6X 400= 2400Rs/ Day	-	8,76,000
c.	Skilled	4	Rs- 600 for one	-	8,76,000

			labour 4X 600=2400Rs/ Day		
3.0	**Site Services**				
a.	Site Office/Rest Shelter/PPE	-		-	1,00,000
b.	Drinking water for site workers	100 workers @ for 10 LPCD =1.0kld	1 tankers of 1.0 Kld @1000Rs/Tanker Per Day	-	2,25,000
c.	Mobile Toilets	5			1,00,000
d.	Separate Bins for waste Collection	5		10,000	–
4.0	**Dead rent**	(44.46 Acre)	(90,000/Acre)	40,01,400	–
5.0	**Site Development**				
a.	Iron Sheets/Checker Plates for Transportation with in the mine	10			1,00,000
b.	CCTV , Systems, Cabin , Pole Marking & other Infrastructure	-		-	3,00,000
c.	Maintenance for Haulage Road	-		-	2,00,000
	Total			**43,11,400**	**94,59,500**
	Grand Total		**1,37,70,900**		

Table 2. 4 PROJECT COST & IT'S BREAK-UP

CHAPTER- 3

BASELINE ENVIRONMENT STATUS

3.0 BASELINE ENVIRONMENT STATUS

3.1 INTRODUCTION

This chapter describes the existing environmental settings in the study area and is based upon the secondary information collected from the published sources, reconnaissance survey, primary socio-economic survey and environmental monitoring of air, noise, soil, ground and surface water in the study area. The major purposes of describing the environmental settings of the study area are:

- To assess the existing environmental quality, as well as the environmental impacts of the future developments being studied.
- To identify environmentally significant factors or geographical areas that could preclude any future development.
- Additional purposes of the baseline studies is to provide sufficient information so that decision makers alien with the general location can develop an understanding of the project need.

The environmental impacts are assessed for a project at a specific location to establish baseline status and monitor the environmental quality prevailing in the study area prior to implementation of the project. The environmental status within the study area could be used for identification of significant environmental issues to be addressed for assessment of project impacts (positive and negative) and suggest remedial measures thereof.

3.2 METHODOLOGY OF CONDUCTING BASELINE STUDY

The guiding factors of the present baseline study are the requirements laid down by the Central Pollution Control Board (CPCB) and guidelines as per the Environmental Impact Assessment Notification.

The baseline environmental monitoring has been carried for the period of Oct 2018 to Dec 2018.

For the purpose of the EIA study, the general impact zone for the proposed implementation shall confine within a radius of 10 km from the centre of the project site and specific impact within the project area.

This chapter presents the existing baseline environmental status of the project influenced/study area (within the 10 km radius) of the project site. Furthermore, the primary data also have been analysed from Environmental Monitoring Surveys viz. air quality, water quality, soil quality and noise level, conducted at selected locations within 10 km radius.

- The Met Data for this project has been collected from secondary source, It is collected from IMD Monitoring station Jhansi. Wind speed, wind direction,

temperature, relative humidity, rainfall and general weather conditions were collected from secondary source.

- In order to assess the Ambient Air Quality (AAQ), samples of ambient air were collected by installation of Respirable Dust Sampler and Fine Particulate Matter Sampler at different locations within the study area and analysed to find out the existing status of air quality.

- Ground water samples were collected from the existing tube wells, while samples for surface water were collected from rivers & small ponds. The samples were analysed for parameters necessary to determine water quality (based on IS: 10500 criteria) and those, which are relevant from environmental impact point of view of the proposed river bed mining project.

- The noise level measurements were also done at various locations in the study area at different intervals of time with the help of sound level meter to establish the baseline noise levels in the impact zone.

- The land use pattern of the study area was assessed through latest satellite imagery and topographical sheets of Survey of India, followed by ground truthing / verification by experts.

- Soil samples were collected and analysed for relevant physical and chemical characteristics in order to assess the impact of the proposed mining on soil.

- Socio-economic data was collected from primary sources through village-level surveys and household visits. Data was also taken from secondary sources like Primary Abstracts of Census of India 1991, 2001 and 2011.

- Inventory of flora and fauna species present in the area was made through field visits and surveys by ecologists and secondary data such as Forest Working Plan available with the Forest Department.

Since the project involves river bed mining from Gata no / Khand no.-60 village- Sadi Khadar therefore a Scientific method was adopted for collection of baseline data which covers 10 km Study area as well as core area of lease.

3.3 CRITERIA FOR BASELINE ENVIRONMENT STUDY

For the purposed of EIA study, the study area has been classified into general study area and core study area. The general study area extends upto 10 km radius from the site and has been studied for any likely general impacts. The core area for the proposed implementation shall confined within a radius of 500 m from the boundary of the project site, since the nature of the project is such that most of the potential impacts are likely to occur within this area.

The location of the baseline monitoring has been selected with respect to proposed land-use and environmental susceptibility of the critical areas. The sampling locations have been selected on the basis of the following factors:

- Predominant wind directions
- Existing topography
- Drainage pattern and location of existing surface water bodies like ponds, tals, nalas;
- Location of villages/towns/sensitive areas

3.4 COMPONENTS AND PARAMETERS FOR BASELINE ENVIRONMENT STUDY

The various components studied as a part of the baseline study are discussed in the following sections components:

- Physical Environment
- Air Environment
- Noise Environment
- Water Environment
- Land Environment
- Ecological Environment
- Socio-Economic Environment

Table- 3.1 gives various environmental attributes considered for formulating environmental baseline and **Table-3.2** gives frequency and monitoring methodologies for various environmental attributes.

S. No.	Attribute	Parameter	Source of Data
1	Land Use	Trend of land use change for different categories	Latest satellite Imagery and Toposheet From SOI
2	Water Quality	Physical, Chemical and Biological parameters	One ground water and two surface water samples were collected.
3	Ambient Air Quality	PM_{10}, $PM_{2.5}$, , SO_2, NOx,	Ambient air quality monitoring at 5 locations
4	Noise levels	Noise levels in dB(A)	Noise level monitoring at 3 locations.
5	Ecology	Existing terrestrial flora and fauna within the 10 km radius of project influence area	Secondary sources.
6	Geology	Geological history	Secondary sources.
7	Soil Quality	Physical and chemical parameters	Data collected from secondary sources and soil sampling at one location.
8	Socio-economic	Socio-economic characteristics	Based on field survey and data collected from

S. No.	Attribute	Parameter	Source of Data
	aspects	of the study area	secondary sources.

Table 3. 1 Various Environmental Attributes

Attributes	Sampling		Measurement Method	Technical Protocol
	Network	Frequency		
A. Air Environment				
Particulate Matter less than 2.5 µg/m^3($PM_{2.5}$)	Requisite locations in the project influenced area	24 hourly (One Season)	Gravimetric Method	IRDH/SOP/AAQM/01
Particulate Matter less than10 µg/m^3 (PM_{10})			Gravimetric Method	IS 5182 P- 23: (2006)
SO_2			Modified West and Gaeke	IS 5182 P-02: (2001)
NO_x			Jacob & Hochheiser Method	IS 5182 P-06: (2006)
B. Noise				
Day and Night equivalent noise levels Day (06:00 A.M to 09:00 PM) Night (09:00 PM to 06:00 AM)	Requisite locations in the project influenced area	One Season	Instrument : Noise level meter	IS: 4954-1981
C. Water				
Parameters for water quality: pH, temp, total suspended solids, total dissolved solids, total hardness, calcium hardness, magnesium hardness, total alkalinity, chloride, sulphate, nitrate, phosphate, fluoride, , total phosphorus, BOD, COD, Heavy	Set of grab samples at requisite locations for ground and surface water	One Season	Samples for water quality, collected and analysed as per IS : 10500 , methods for sampling and testing of Industrial effluents and • Standard methods for examination of water and wastewater	`

Attributes	Sampling		Measurement Method	Technical Protocol
	Network	Frequency		
metals (iron, arsenic, zinc) Total coliforms			analysis published by American Public Health Association (APHA).	
D. Land Environment				
Parameters for soil quality: pH, texture, electrical conductivity, organic matter, nitrogen, phosphate, sodium, calcium, potassium and magnesium.	Requisite soil samples be collected as per BIS specifications within project influenced area	One Season	Collected and analyzed as per soil analysis reference book, M.L.Jackson	

Table 3. 2 Environmental Attributes: Frequency and Monitoring Method

3.5 PHYSICAL ENVIRONMENT COLLECTION AND ANALYSIS OF BASELINE DATA

3.5.1 PHYSIOGRAPHY

The area comprises Precambrian Bundelkhand granites unconfirmably overlain by Vindhyan are quaternary alluvium. The main and major drainage of the district are Yamuna, Ken and Baghain which are part of Yamuna river system.

Physiographically the area can be divided into three physiographic units–
(1) Alluvial Plain
(2) Marginal Alluvial
(3) High Land (Hard rock) area.

Agriculture is the main source of economy of the district. Both surface and ground water are used for irrigation. The net irrigated area is 153804 Ha and the net area sown is 336000 Ha, which shows that 45.77% area is irrigated by ground waterand the surface water while the rest depends on rainfall. Length of canal network in the district is 1193 Km. and the number of government tubewells is 460.

Banda district is drained by Yamuna, Ken and Baghain rivers. River Yanuna bifurcates the district Banda from Fatehpur in north and flows from west to east in the entire district. River Ken meets Yamuna at Chilla. River Baghain also bifurcates Banda from Chitrakoot in southeast.

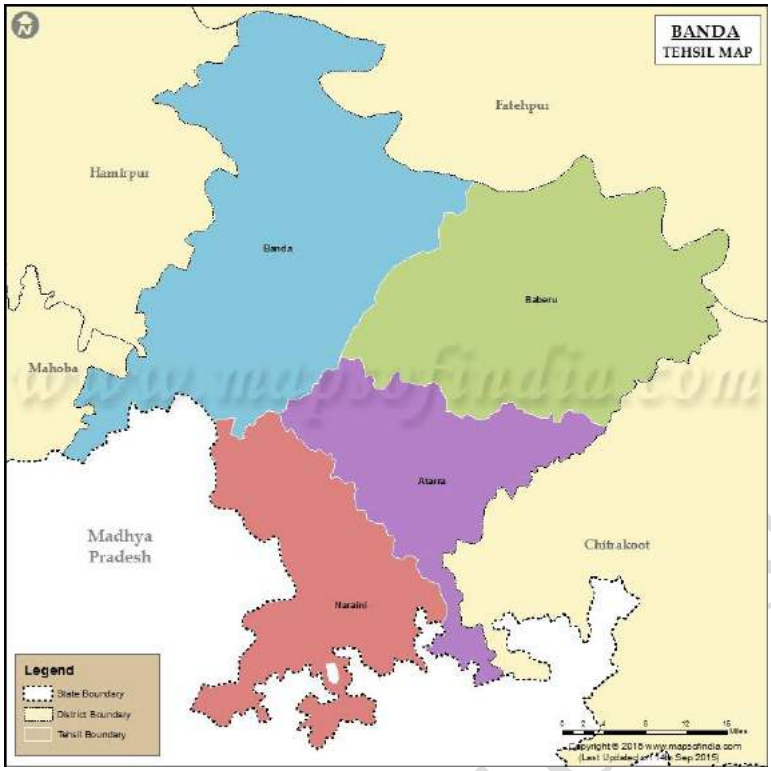


Figure 3. 1Tehsil Map of Banda District

3.5.2 GEO-MORPHOLOGY& TOPOGRAPHY

The district forms a part of marginal Ganga, alluvial plains. Geomorphology bears tremendous control on the ground water regime. The relief, slope, depth of weathering, type material, nature ofdeposits and thickness and overall assemblage of different land forms plays an important role in the ground water regime in hard rock as well as in the unconsolidated sediments. Various geomorphic units identified in the area are grouped into four major categories, these are (1) Pediment zone (2) Alluvial plain (3) Ravines land and (4) Flood plains.

3.5.3MAIN RESERVE FORESTS IN 10 KM STUDY AREA ARE GIVEN AS FOLLOWS:

To determine the forest area falls within 10km study area, Four no's of Topographical Topo sheets from Survey of India having no 63C/1,63C/2,63C/5, 63C/6, are studied to assess the information .but there are no'of forest area falling within the study area from the project site.

Sr. No.	Forest Name	Distance & Direction
1.	Khare Reserve Forest	3.62 Km S Direction
2.	Pailani West Reserve Forest	9.21 Km NE

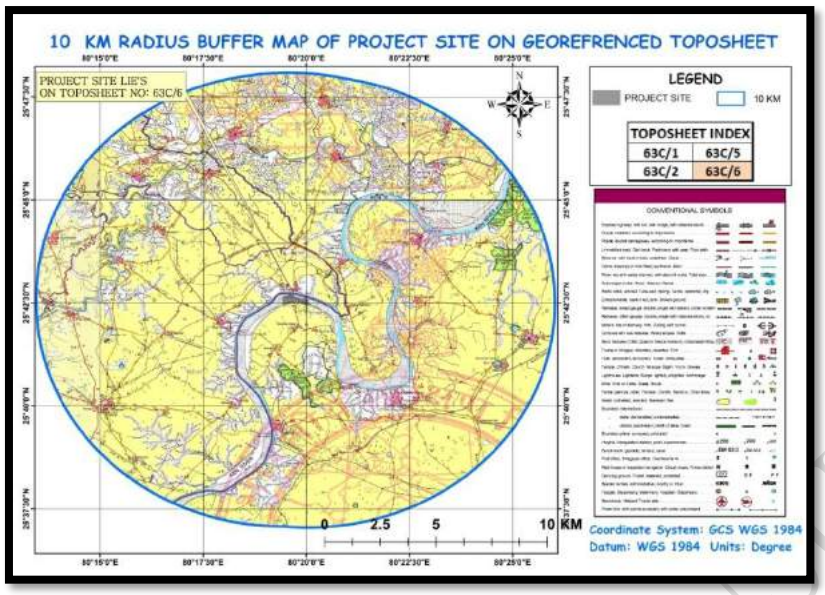


Figure 3. 2 Project Site on Toposheet Map

3.5.4LAND USE PATTERN

The objectives of land use studies are:-

- To determine the existing land use pattern in the study area and to assess its compatibility with the proposed development;
- To analyze the impacts on land use in the study area.

The study of land use in the area enables one to know about the present land use practices as well as to know the type of land that can be used for various development activities envisaged in post project scenario. The land use pattern indicates the manner in which different parts of land in the study area is being utilized. It is an important indicator of environmental health and human activity and a degree of inter-play between these two. The land-use map of the study area was prepared by utilizing three principal resources, v.i.z.

- Survey of India topo-sheet of 1:50,000 scale (63C/2, 63C/1, 63C/5, 63C/6);
- Satellites imagery data without any cloud cover and
- Ground validation for interpretation of the FCC imagery

3.5.5 LAND USE PATTERN WITHIN PROJECT SITE

A study of the land use pattern of the project site reveals that the proposed project site lies on River Bed of Ken River.The project site is limited to river bed. Mostly sand/morrum, besides streams of water body is Present within the core zone.The database for all environmental components is collected from primary site investigations as well as secondary investigations, there are no habitations, forests

and crops within the project site. Majority of the land in the 10 km radius of the study area is covered.

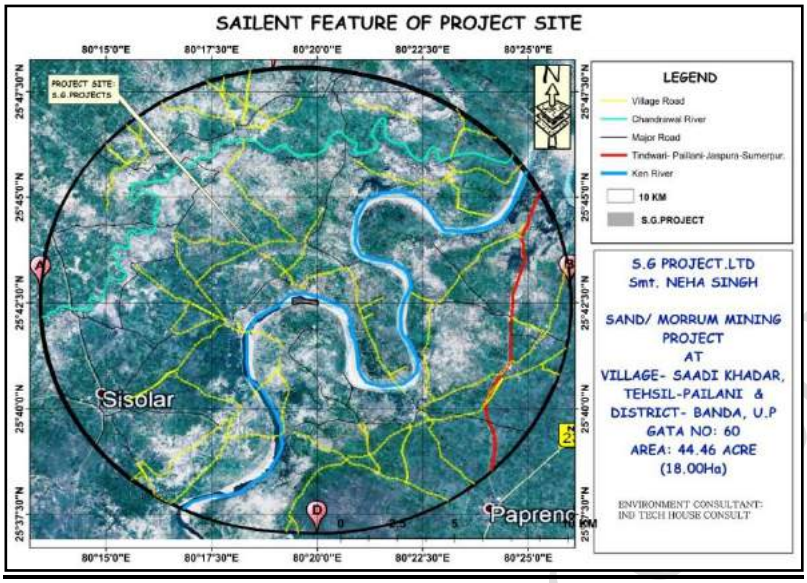


Figure 3. 3 Google Map 10 Km Radius

S. No.	Particulars	Details (in Crow fly Distance)
1.	Nearest National/State Highway	NH-232, 11.68 km in South East direction
2.	Nearest Railway Station	Maudaha Railway Station Km 19.72 W
3.	Nearest Airport	Chaudhary Charan Singh Airport 129 Km NE
4.	Nearest Town/ City	Nearest Town & City Banda, approx. 24.95 km S
5.	River Body	Ken River on project site
6.	Hills/ Valleys	Not within 10 km from the project site
7.	Site Topography	Plain
8.	Archaeologically Important Site	Nil
9.	National Parks/ Wildlife Sanctuaries	Not within 10 km.
10.	State Boundary	Not within 10 km.
11.	Seismicity	The study area falls under Seismic Zone2

Table 3. 3 Main surrounding Features

3.6 RAINFALL AND CLIMATE:

Rainfall: The climate is sub-humid and it is characterized by a hot dry summer and a bracing cold season. The average normal rainfall is 902.00 mm. About 80% of rainfall take place from June to September. During monsoon surplus water is available for deep percolation to ground water. There is a meteorological observatory at Banda, January is the coldest month with minimum temperature of the order of 5.8^{0}C. May and early June 7 from the hottest period of the year. The mean monthly maximum temperature is 47^{0}C and means monthly minimum temperature is 19.7^{0}C. During March to May the air is least humid with relative humidity high in the morning and less in the evening mean. Monthly morning relative

humidity is 85% and means monthly evening relative humidity is 57%. During monsoon season the winds blow predominantly from east or southeast.

(Source: Meteorological Department, Government of India, 2010.).

YEAR	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Annual Total
2012	32	10.4	1.9	6.2	0.1	13.2	338	218.1	165	0	0.4	0	785.3
2013	0	78.8	2.7	1.2	0	410.8	331.1	306.6	35.9	0	2.9	1.7	1171.7
2014	84.9	33.9	48.2	0.1	0.9	54.4	104.4	157.9	82.5	0	13.2	14.2	594.6
2015	39.8	24.5	100.8	18	0.6	82.8	207.2	117.6	69.3	1.6	1.9	6.2	670.3
2016	11.1	7.9	6.3	0	30.2	71.4	585.5	452.2	56.9	0	0	0	1219.5

Figure 3. 4 Rainfall data of Last Five Years

3.7 SITE TOPOGRAPHY & CONTOUR MAP

Contour Map is a topographic map on which the shape of the land surface is shown by Contour lines, the relative spacing of the lines indicating the relative slope of area. the surface Contour map reveals the topography or relative surface elevation of study area. This map is prepared with help of Digital elevation Model (ASTER DEM downloaded from https://earthexplorer.usgs.gov/) with using Hydrology tools of Arc GIS 10.3 Software.

This map is prepared with help of Digital elevation Model (ASTER DEM downloaded from https://earthexplorer.usgs.gov/) with using Hydrology tools of Arc GIS 10.3 Software.

Project site and its surrounding area is situated on Moderately Flat terrain. Contour elevation at project site is about 84m AMSL. Map is showing maximum elevated contour of 110m AMSL in north westpart of Map. While lowest contours are located within river bed in eastern part of Map showing 100 m AMSL along the river. Whitish portion of the map showing completely flat Terrain. Contour map comprising in 10 km buffer area from the project site is situated on Moderately Flat topography. Contour topography reveals that terrain is moderately flat and slopes towards Eastern direction. Map is not showing dense contours .while less dense contour occurs in whole Map. Contour map clearly demonstrate several Mature stage alluvial depositional Features like, Longitudinal Bars, Ox bow lake, Meandering ,Bar Deposits ,& Flood Plain Deposits.Figure-4.3

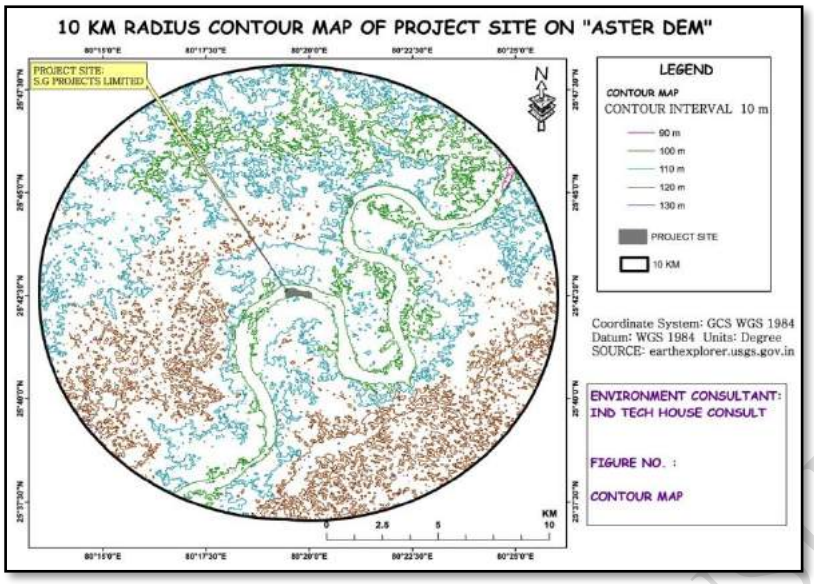


Figure 3. 5 Contour Map of the Project Study Area

3.8 DRAINAGE MAP

The Drainage Order or stream order or waterbody order is a positive whole number used in geomorphology and hydrology to indicate the level of branching in a river system The Strahler and Shreve methods are particularly valuable for the modelling and morphometric analysis of river systems, because they define each section of a river. That allows the network to be separated at each gauge or outflow into upstream and downstream regimes, and to classify these points. They are also used as a basis for modeling the water budget using storage models or time-related, precipitation-outflow models and the like.In Preparation of DrainageMap for this project Strahler Stream order Method is used in which rivers of the first order are the outermost tributaries. If two streams of the same order merge, the resulting stream is given a number that is one higher. If two rivers with different stream orders merge, the resulting stream is given the higher of the two numbers.Strahler order is designed for the morphology of a catchment and forms the basis of important hydrographical indicators of its structure, such as bifurcation ratio, drainage density and frequency. Its basis is the watershed line of the catchment. It is, however scale-dependent.

This map is prepared with help of Digital elevation Model (ASTER DEM downloaded from https://earthexplorer.usgs.gov/) with using Hydrology tools of Arc GIS 10.3 Software.

This drainage map is prepared in10 km radius area from the project site and which covers about 314 Sq Km. After interpretation map reveals 5 no's of Drainage Orders. The Lease area & Surrounding area sloping towards 5th order Drainage(Main Stream) first order drainage(Blue Color) having characteristic

situated at high elevation with smallest distance in comparison with other drainage in its drainage Basin. While Fifth order drainage (Red Colour) situated at lowest elevation and having greater length than other drainage in its drainage Basin.First ,Second, Third & Fourth order of drainage successively meet to fifth order drainage which is the main channel of whole Catchment area and flows towards S direction. Drainage map is showing dominantly Dendritic to sub dendritic drainage pattern. Contour map clearly demonstrates several Mature stage alluvial depositional Features like, Longitudinal Bars, Ox bow lake, Meandering, Bar Deposits, Natural Levees & Flood Plain Deposits. Ken River is Main Drainage in this map. It appears that drainage system (main stream) following its mature stage. Drainage map showing system is controlled by Alluvial Terrain.

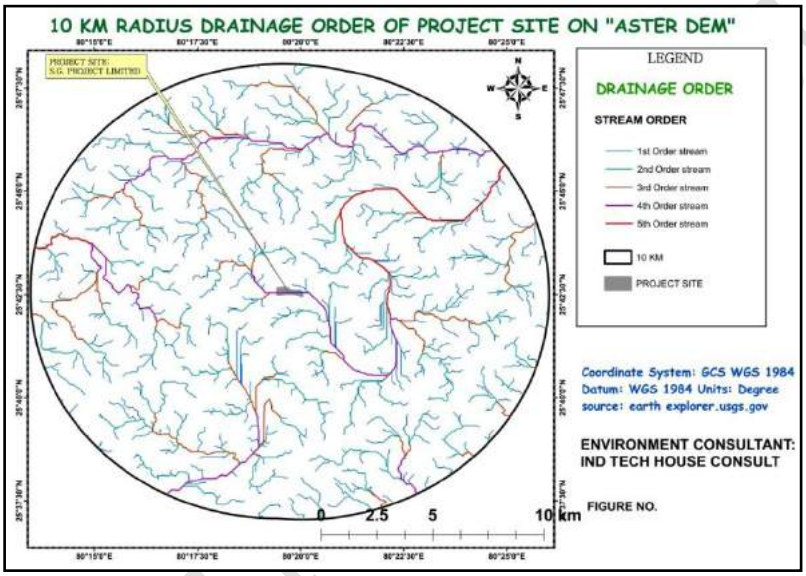


Figure 3. 6 Drainage Map of the project Study area

3.9 GEOLOGY

3.9.1 DETAILS OF REGIONAL GEOLOGY

Geologically, the area is underlain by Bundelkhand granite and complex (BGC) with a capping of quaternary deposits. The setup is as follows:

Younger Alluvium	Recent channel fill deposits and present-day flood plains of streams
Older Alluvium	Older flood plain deposits, which includes bad-lands/ shallow ravines.

The Bundelkhand granites (BGC) and the banded gneisses of Archaean age, display heterogeneity in texture and composition and are pegmatite in places. They are at certain localities traversed by quartz reef i.e. near Kabrai (80°00'15": $25^0$23'15") and basically intrusive of deloritic composition i.e. SW of Kharka ($80^0$05': $25^0$20'45"). A few typical basic dykes trending ENE-WSW originating from the south-western extremities of the area continue towards Mahoba (79°52'30": $25^0$17'30"). The major bulk of metamorphic rocks are exposed as isolated hills in the southern fringes of the area mapped. The older

alluvium on the other hand, comprises finer grained, well-compacted and more mature sediments occupying extensive stretches at relatively higher elevations. These sediments, related to some earlier fluvial episodes, have been at most places stabilized by vegetation and majority of the badlands are sculptured within it. These sediments characteristically display red and brown colour and are richer in ferruginous content. These older alluvium deposits range from a few metres in the south and increase progressively in thickness up to 70 m to 80 m or so in the northern part of the area under study. The older alluvium supports most of the vegetation in the terrain because of its higher moisture retaining capabilities. The younger alluvium, which is confined to the recent channel fill deposits and present dayflood plains or rivers/streams, occurs as narrow strips at lower levels. The sediments are light colored, coarse to very coarse and gravely, poorly sorted and not too well inundated. These immature sediments are relatively deficient in clay/silt fractions and also ferruginous matter. Geomorphologic ally the area can be sub-divided into four major units:

I.Recent Channel fill and presentday-plain: It is constituted from the deposits carried out by the Ken river and all its active network of stream and its periodically inundated contiguous low-lying tracts. It has been designated as younger alluvium.

II.The higher alluvial plain: Tracts bordering both the banks of Ken river with extensive lateral continuity have been designated as the older alluvium surface. The few definite river terraces and around Rihonda identified along the Ken river towards south appear related to older alluvium. This unit has a low northerly gradient, in conformity with the basement configuration.

III.Badlands or Ravines: These are noticed to be essentially confined along the courses of both the Ken river and its network of streams, the former accounting for better defined and well dissected ravines viz. 3 to 4 in in height. Hummocky ridges and rolling topography characterize badlands areas.

IV.Low residual hills of granitic composition are noticed between Girwan and Pithaurabad and at Chamarha varying in heights from 30 to 75 m. They tend to form domes and have steep slopes because of spheroidal weathering.

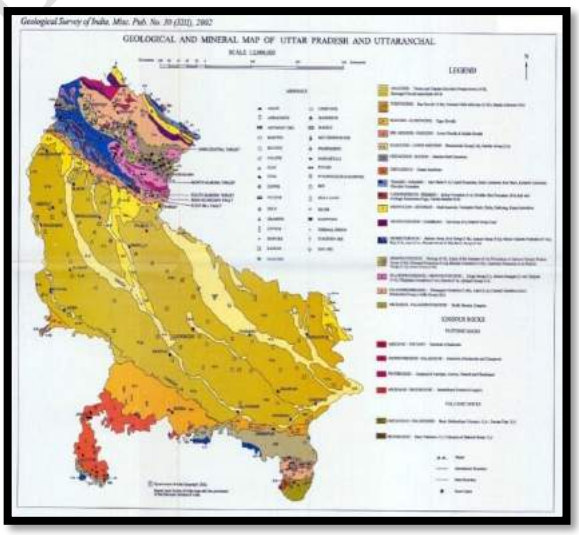


Figure 3. 7Geological Map of the State

3.9.2 LOCAL GEOLOGY

Mining area is situated in the bank of Ken River. No soil is present in the area. River Sand /Morrum is spread all over the area. The deposits in these region have been grouped as brown hill Alluvial deposits. Which form from the weathering process, alluvial deposits on the slope are shallow due to erosion and mass wasting processes and usually have moderate surface horizons.the Lease area falls in the Indo-Gangetic plain. This alluvium is a pile of unconsolidated sediments made up of sequence of clay, silt, kankar and different grades of sand. The sands are of varying grade from very coarse to fine occasionally becoming gravelly in nature. Sand mixed with gravel and kankar form the principal aquifers.. In the course of its journey it forms depositional landforms like flood plains, Natural Levees, Point Bars and Longitudinal Bars.

3.10 HYDROGEOLOGY

On the basis of hydro geological information ground water occurs inunconfined conditions in shallow depths and confined conditions in deeper depth inalluvium. The thickness of alluvium varies from 45.00 to 200.00 mbgl in the district. Granites (Bundelkhand) has also good potential and yield at economical discharge. Ground water occurs in fractures and joints in the hard rock. The potential fracturesare encountered from around 28.00 to 96.00 meters in some places. Depth To Water Level:As per the depth to water level data of 27 permanent ground water monitoring stations in the year 2009, pre monsoon water level ranges from 2.75 mbgl (Khurand)to 26.95 mbgl (Bhitar Kerdera). In the post monsoon period, depth to water levelvaries from 0.95 mbgl (Girwan) to 22.50 mbgl (Pailani). Water level fluctuationvaries from 0.0 in Rolyhdyajue to 8.02 m at Naraini. It is observed that the hilly and rocky area the fluctuation is higher than the plain. Fluctuation is more where lessorder streams are found.

(***Source: Groundwater Brochure of Banda District, Uttar Pradesh, 2012-2013 CGWB***)

3.11 SEISMICITY

Land form & Seismicity: - The district falls in seismic zone II, and lies in low to moderate hazard risk zone. No earthquake has been observed in the district during last 200 years. The district has, however experienced on a few occasions' earthquakes.

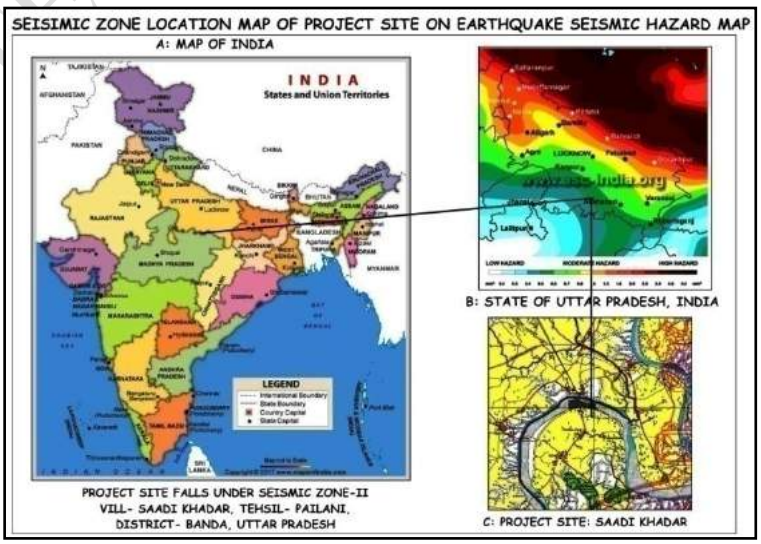


Figure 3. 8 Location of the Project Site on Seismic Zone map

3.12 SOIL QUALITY:

The district forms part of the vast Indo-Gangetic alluvial tract. The origin of the Indo-Gangatic tract as a whole is now attributed to sag in the earth's crust, formed in the upper Eocene times, between the Gondwana land and the raising Himalayan belt. The loamy, alluvial soils, locally known as Rakar, forms slightly elevated terraces, usually above the flood level. The newer alluvia, locally called khaddar, are contained to the lowland tracts.

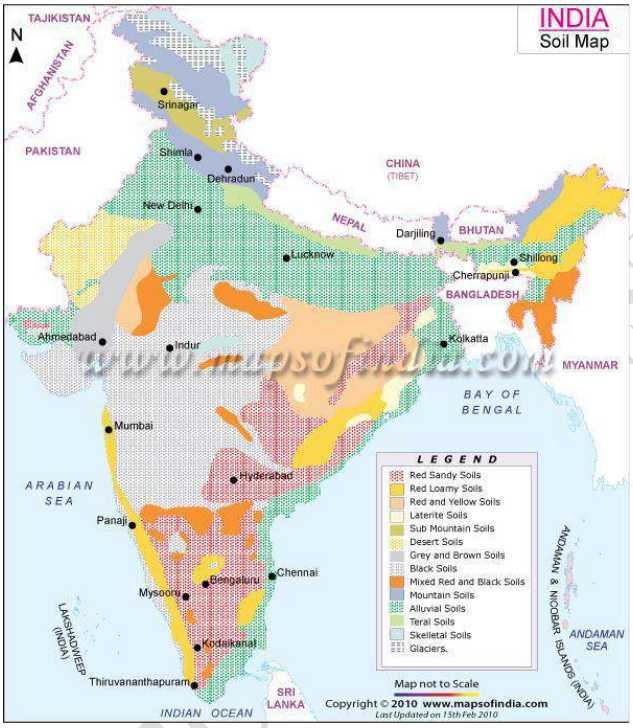


Figure 3. 9 Soil map of India

3.12.1 SOIL TYPES

In Banda district loose sediments as well as black cotton soil is found. Black cotton soil is prominent in the central part. Four major type of soil a) Rakar, b) Mar, c) Kabar and d) Padua are dominant in the district.

3.12.2 OBJECTIVE OF SOIL MONITORING

The objectives of the soil sampling are:-

- To determine the baseline soil characteristics of the study area.
- To determine the impact of existing as well as proposed activity on soil characteristics and
- To determine the impact on soil with view to agriculture.

3.12.3 SOIL MONITORING LOCATIONS

Soil monitoring was conducted at locations (3 in nos.) once in season representing core and buffer area of the project. The Distance and direction of the monitoring locations are given as follows:

Soil samples were collected from the various locations in the study area for the winter season given as follows:

Sr. No.	Monitoring Code	Village	Direction/ Distance	Lattitude	Longitude
1	SQ1	Garaha	0.76 Km N	25°41'44.46"N	80°19'44.67"E
2	SQ2	Bajemau	1.8 Km W	25°42'53.44"N	80°19'55.32"E
3	SQ3	Shivarampu	1.6 Km E	25°42'19.41"N	80°18'9.24"E

Table 3. 4 Soil Monitoring Locations

S.No.	Parameter	Test Method	SL1	SL2	SL3	Unit
1.	pH	IS 2720 P-26 (1987)	7.66	7.81	7.85	--
2.	Conductivity	IS 14767 (RA 2016)	358.0	364.0	374.0	µS/cm
3.	Moisture	IS 2720 P-25 (1972)	11.0	9.5	12.4	% by mass
4.	Water Holding Capacity	IRDH/SOP-SL/07	38.0	41.0	39.0	%
5.	Specific Gravity	IS 2720 P-3 (1980)	2.18	2.25	2.19	-
6.	Bulk density	IRDH/SOP-SL/06	1.41	1.38	1.41	gm/cc
7	Chloride	IRDH/SOP-SL/14	195.0	202.0	177.0	mg/kg
8	Calcium	IRDH/SOP-SL/17	1411.0	1402.0	1396.0	mg/kg
9	Sodium	IRDH/SOP-SL/11	113.0	118.0	124.0	mg/kg
10.	Potassium	IRDH/SOP-SL/12	51.0	58.0	67.0	mg/kg
11.	Magnesium	IRDH/SOP-SL/16	210.0	240.0	227.0	mg/kg
12.	Organic matter	IS 2720 P-22 (1972)	0.56	0.61	0.60	% by mass
13.	Cation Exchange Capacity(CEC)	IRDH/SOP-SL/09	13.9	14.2	14.0	meq/100gm
14.	Available nitrogen	IS 14684	51.0	48.0	50.0	mg/kg
15.	Available Phosphorous	IRDH/SOP-SL/10	6.2	7.7	8.0	mg/kg
16.	Texture	IRDH/SOP-SL/08				% by mass
	Sand		54.2	55.1	54.8	
	Clay		24.8	23.8	26.1	
	Silt		21.0	21.1	19.1	
17.	Sodium Absorption Ratio(SAR)	IRDH/SOP-SL/13	0.74	0.76	0.87	By calculation

Table 3. 5 Average Soil Analysis Result (Source-IRDH)

The soil sampling locations (3 in nos.) are superimposed on the topo-sheet map and shown below. Samples were collected from the site and buffer area representing site, human settlement, sensitive and commercial areas.

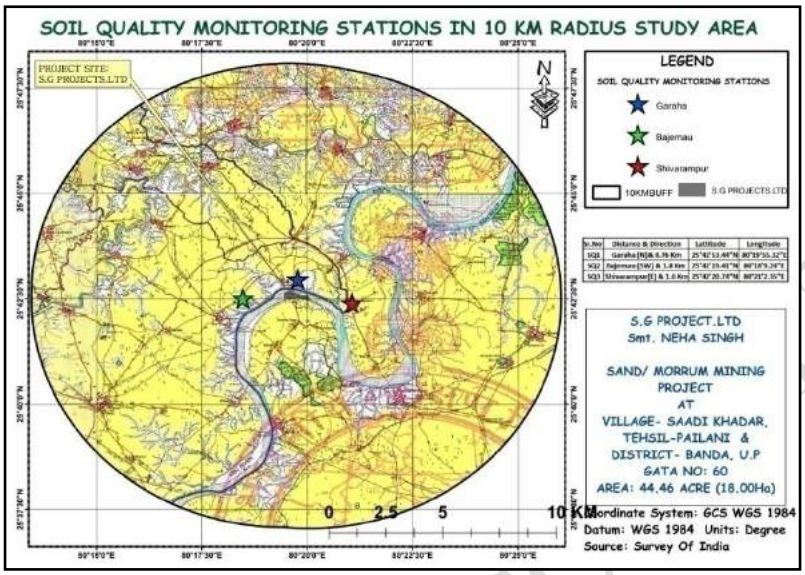


Figure 3. 10 Soil Monitoring Locations

3.12.4 OBSERVATIONS

The soil of study area is Sandy Clay in nature. The ph value of all the study sites range between 7.65 – 7.85 which shows that soil is alkaline in nature. The value of available phosphorus and available nitrogen range between 6.2 – 8.0 mg/kg and 48 – 52 mg/kg. While the value of potassium range between 50 – 70 mg/kg..

3.13 AIR ENVIRONMENT

Assessment of prevailing ambient air quality status in the vicinity of proposed project site is an important part of environmental impact assessment study. The tropical climatic conditions, especially monsoon winds prevailing in India mainly control the transport and dispersion of air pollutants during different seasons. According to the Indian climatology, for all practical purposes in air pollution studies, there are three seasons in a year, viz. winter, summer and post-monsoon. Significant changes are observed in predominant winds and weather conditions during these seasons (seasonal variation) apart from the local topographical influences, which ultimately control the air pollution impacts.

The baseline studies for air environment covers reconnaissance, identification of specific air pollutants expected to have impacts from the proposed project and assessing their prevailing levels in ambient air at representative locations within the core study area (500 m) around the project site.

During the EIA Study phase of the project, the following pollutant is anticipated to emitted:

- PM_{10}, $PM_{2.5}$ from all Operation activities like (Loading and Transportation)
- NO_2, PM_{10}, $PM_{2.5}$ and CO from vehicle exhaust within the project site and on the haulage road adjacent to the site.
- NO_2, PM_{10}, $PM_{2.5}$, CO and SO_2 from Light Earth Moving Machines.

3.13.1 METEOROLOGICAL DATA FROM SECONDARY SOURCES

Meteorological conditions prevailing at a geographical area play an important role in determining its existing air quality and environmental conditions. Climate, seasons and other meteorological parameters influence and alter site-specific activities and operations. The meteorological data collected from secondary sources for the area are presented in the subsequent sections.

3.13.2 TEMPERATURE

Climatologically data is used for devising baseline ambient air quality monitoring plans. **Table 3.6** presents the minimum and maximum temperature profile of the region for the period 1981 to 2010 from Indian Meteorological Department As per the data given in **Table 3.6**, the study area experienced averaged extreme lowest temperature -0.8o C in the month of Dec, 1987 and extreme highest 48.9^{o} C in the month of June, 1995 respectively.

3.13.3 PRECIPITATION

Table 3.6 shows averaged monthly rainfall during last Thirty years in (Year 1981 to Year 2010) .The maximum mean monthly rainfall for year 1980 is 1039.8 mm and occurs during Aug while the mean minimum monthly rainfall of 0.0 mm took place in several months such as Dec 2001, Dec 1975, 76 and May of 1978 etc.

3.13.4CLOUD COVER

The historical data of cloud cover have been obtained from the Secondary Source. As per the data given in **Table 3.6** the study area experienced averaged extreme lowest 0.6 **okt** in the month of Nov and extreme highest 4.4 okta in the month of Aug, **Table 3.6** provides the details of cloud cover data of morning hours and evening hours of this region, Uttar Pradesh.

RELATIVE HUMIDITY

The Historical data of humidity has been obtained from the IMD as per the data given in **Table No-3.7** the stands area experienced month averaged mean relative Highest humidity in 84%in month of August and 28% Lowest humidity in month of April in morning hour and evening hour data IMD.

3.13.5 WINDROSE

Wind speed and wind direction data recorded during the study period (Oct 2018 to Dec 2018) is useful in identifying the influence of meteorology on the air quality of the area. Based on the Secondary meteorological data, relative percentage frequencies of different wind directions are calculated and plotted as wind roses of eight directions viz., N, NE, E, SE, S, SW, W and NW for eight hourly and twenty four hour duration respectively. Maximum and minimum temperatures including

percentage relative humidity were recorded simultaneously. A windrose has been plotted for average of 24 hours for 3 successive months that shows the predominant wind direction and has been presented in **Figure-3.15**

3.13.6 MICRO-METEOROLOGICAL DATA

Meteorology is the key to understand the air quality. The essential relationship between meteorological condition and atmospheric dispersion involves the wind speed and direction in the broad sense. Other factors such as variation in temperature, Precipitation and cloud Cover etc. also plays a direct role in dispersion and dilution of pollutants. Wind fluctuations over a wide range of time, accomplish dispersion and strongly influence other processes associated with them. This section makes a comparative analysis of the meteorological data of the study area collected by the project team in 2018. Secondary data has been selected to record various meteorological parameters on hourly basis to understand the, temperature variation, rainfall and cloud cover. The monthly mean meteorological data recorded are given as follows. Wind rose is the diagrammatic representation of wind speed and frequency in a specified direction with its arms representing sixteen directions. Each arm gives a clear frequency distribution of wind speed in a particular direction for a given period of time. The prominent wind direction during this period was from West to East. This is followed by South East to north westdirection of wind. The average wind speed recorded during the study period was 5.7 m/s. Calm conditions prevailed for 6.5 %

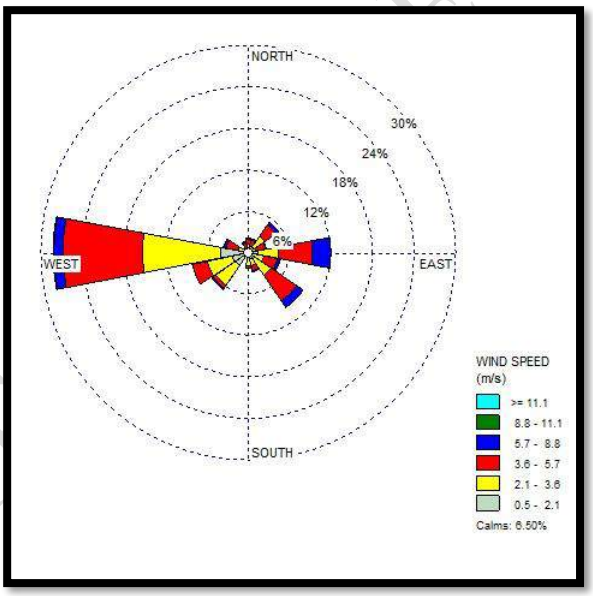


Figure 3. 11Windrows of the project site

Wind direction is West – East Wind speed was in the range of 3.6-5.7 m s^{-1}

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CLIMATOLOGICAL TABLE

स्टेशन : बांदा STATION : Banda   अक्षांश LAT. 25° 28'   देशांतर LONG. 80° 22'   समुद्री तल से ऊंचाई HEIGHT ABOVE M.S.L. 121 मीटर METRES   प्रक्षणों पर आधारित BASED ON OBSERVATIONS 1981-2010

MONTH		STATION LEVEL PRESSURE hPa	AIR TEMPERATURE MEAN: DRY BULB °C	WET BULB °C	DAILY MAX °C	DAILY MIN °C	HIGHEST IN THE MONTH °C	LOWEST IN THE MONTH °C	EXTREMES: HIGHEST °C	DATE AND YEAR	LOWEST °C	DATE AND YEAR	HUMIDITY: RELATIVE HUMIDITY %	VAPOUR PRESSURE hPa	CLOUD AMOUNTS (Oktas of sky): ALL CLOUDS	LOW CLOUDS	RAINFALL: MONTHLY TOTAL mm	NO. OF RAINY DAYS	TOTAL IN WETTEST MONTH WITH YEAR mm	TOTAL IN DRIEST MONTH WITH YEAR mm	HEAVIEST FALL IN 24 HOURS mm	DATE AND YEAR	MEAN WIND SPEED Kmph
JAN	I	1004.5	13.4	11.3	22.8	9.1	28.4	5.1	32.8	27	0.6	19	77	11.9	1.9	0.9	15.1	1.3	71.8	0	65.6	26	
	II	1001.1	20	15.6						1990		1962	62	14.3	1.2	0.4			1962			1962	
FEB	I	1002.1	17.5	13.9	28	12	32.8	7.8	38.2	27	3.2	11	66	13.4	1.3	0.6	15.7	1.3	90	0	52	11	
	II	996.6	24.4	17.8						1989		1996	50	15.2	1.3	0.4			2007			2007	
MAR	I	998.6	24.2	17.7	34.3	17.3	40	12.3	43	30	7.3	10	51	15.4	1.2	0.2	5.8	0.6	84.2	0	64.8	25	
	II	994.8	31.1	20.8						1973		1979	37	16.6	1.2	0.2			1967			1967	
APR	I	994.3	30.8	20.9	40.6	22.8	44.3	17.8	46.7	29	11.7	4	38	17	1	0.2	5	0.6	39	0	32	23	
	II	990.1	37.2	23.2						1979		1991	28	17.1	1.3	0.2			1976			1976	
MAY	I	990.1	33.8	23.9	43.1	26.9	46.6	22.1	48.8	31	17.2	13	43	22	1.2	0.3	15.1	1.4	82.4	0	62	13	
	II	986	39.8	25.3						1994		1964	30	20.8	1.3	0.2			1964			1964	
JUN	I	986.3	33.1	26	40.7	28.2	45.9	23.3	48.9	3	18.8	20	57	28.1	2.7	1	89.6	4.6	340.4	0	112.6	19	
	II	982.7	37.3	26.7						1995		2008	45	28.5	3.2	1.1			2008			1997	
JUL	I	986.3	30	26.9	34.9	26.3	40.2	23.4	45.6	1	16.9	12	78	32.9	4.4	2.5	231.4	11.5	863.6	0	230.4	28	
	II	983.4	31.8	27.4						1992		1967	71	32.8	4.7	2.6			1990			1981	
AUG	I	988	28.9	26.7	33.5	25.4	36.8	23	42.6	2	15.7	30	84	33.4	4.4	2.7	268.8	11.8	1039.8	0	230.2	1	
	II	985.1	30.6	27.3						1972		1987	77	33.5	4.4	2.5			1980			1990	
SEP	I	992.2	28.6	25.9	33.8	24.8	37.3	21.6	41.6	2	14.7	13	80	31.5	3.1	1.8	199.5	8	600.6	0	221	7	
	II	988.9	30.5	26.5						1979		1987	73	31.3	3.3	1.7			1999			1987	
OCT	I	998.1	26.3	21.9	34.4	20	37	15.7	40.6	5	8.8	22	67	23.2	1	0.4	35.3	1.7	272.6	0	109.6	3	
	II	994.5	29.9	23.6						1986		1987	57	24.1	1.1	0.4			1960			1960	
NOV	I	1002.4	20.1	16.2	30.8	14.2	34.2	10.1	39.5	15	2.7	30	65	15.6	0.6	0.2	4.4	0.4	55.8	0	50.8	28	
	II	998.9	25.7	19.6						2007		1987	54	18	0.7	0.2			1979			1979	
DEC	I	1004.8	14.9	12.5	25.2	10.2	29.8	6.2	32.2	5	-0.8	6	74	12.7	1	0.4	9.9	0.7	94.8	0	59.4	9	
	II	1001.2	21.1	16.7						2006		1987	62	15.6	1	0.4			1997			1997	
ANNUAL TOTAL OR MEAN	I	995.7	25.1	20.3	33.5	19.7	46	4.6	48.9	3	-0.8	6	65	21.4	1.9	0.9	895.6	44	1724.9	48.6	230.4	28	
	II	992.1	29.9	22.5					6	1995	12	1987	54	22.1	2	0.8			1980	1996	7	1981	
NUMBER OF YEARS		30	30	30	28	29	29	29	61		61		30	30	30	30	29	29	54	54	55		

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CLIMATOLOGICAL TABLE

स्टेशन : बांदा STAION : Banda

MONTH		WEATHER PHENOMENA (No. OF DAYS WITH): PPT 0.3 mm Or more	HAIL	THUNDER	FOG	DUST STORM	SQUALL	WIND: No. OF DAYS WITH WIND SPEED (Km. p. h.) 62 Or more	20-61	1-19	0	PERCENTAGE No. OF DAYS WIND FROM: N	NE	E	SE	S	SW	W	NW	CALM	CLOUD: No. OF DAYS WITH CLOUD AMOUNT (ALL CLOUDS) OKTAS: 0	1-2	3-5	6-7	8	No. OF DAYS WITH LOW CLOUD AMOUNT OKTAS: 0	1-2	3-5	6-7	8	FOG 8	VISIBILITY (No. OF DAYS WITH VISIBILITY): UP TO 1 Km.	1-4 Kms.	4-10 Kms.	10-20 Kms.	OVER 20 Kms.
JAN	I	1.8	0.1	0.1	2.6	0.1	0	0	0	25	6	2	9	5	11	1	14	5	34	19	21	1	4	2	3	27	0	1	1	2	0	2.6	2.6	13.2	1.6	11
	II							0	0	15	16	1	10	1	3	0	5	1	30	49	22	2	4	2	1	28	0	2	1	0	0	0.1	1	18.1	5.6	6.2
FEB	I	2	0	0.2	0.6	0	0	0	0	23	5	1	9	4	13	2	18	7	29	17	19	2	4	2	1	24	1	1	1	1	0	0.3	1	12.3	1.4	12.9
	II							0	0	19	9	1	11	1	7	0	5	1	38	32	19	2	4	2	1	25	1	2	0	0	0	0	0.3	13.6	3.1	11
MAR	I	1.3	0.1	0.3	0	0	0	0	0	28	3	1	9	3	14	1	22	10	29	11	22	3	3	2	1	30	0	1	0	0	0	0	0.1	16.1	1.1	13.7
	II							0	0	26	5	1	10	1	6	0	10	2	52	18	21	3	5	2	0	30	0	1	0	0	0	0	0	14	2.2	14.8
APR	I	1.1	0	0.1	0	0.2	0	0	0	27	3	2	7	5	15	2	21	9	28	11	22	2	4	1	1	29	0	1	0	0	0	0	0.2	14.8	1	14
	II							0	0	25	5	1	7	0	4	0	10	4	58	16	19	3	5	2	1	28	1	1	0	0	0	0	0.1	13	1.5	15.4
MAY	I	2.2	0	0.2	0	0.8	0	0	0	27	4	1	11	5	16	2	14	8	30	13	21	2	4	2	2	29	0	1	0	1	0	0	0.4	15.6	0.8	14.2
	II							0	0	27	4	1	17	1	9	0	8	4	46	14	21	2	5	2	1	29	1	1	0	0	0	0	0.1	14.9	1.8	14.1
JUN	I	5.9	0	0.2	0	0.4	0	0	0	26	4	1	10	3	15	1	13	12	32	13	14	3	7	3	3	26	0	2	1	1	0	0	1	15.6	3.3	10.1
	II							0	0	26	4	1	18	0	11	0	14	2	40	14	9	3	10	6	2	23	1	4	1	1	0	0	0.9	14.6	4.2	10.2
JUL	I	13.9	0	0.3	0	0	0	0	0	25	6	1	9	3	16	2	20	10	21	18	4	3	13	6	5	17	2	5	4	3	0	0	2.6	17.3	4.3	6.9
	II							0	0	24	7	0	13	1	15	1	22	2	23	23	3	2	14	8	4	16	2	8	3	2	0	0	1.2	19.6	5.3	4.9
AUG	I	15.1	0	0.4	0	0	0	0	0	25	6	0	12	4	19	0	16	7	22	20	3	4	12	7	5	17	2	5	4	3	0	0	2	16.1	6	6.9
	II							0	0	21	10	0	13	1	14	0	15	2	22	33	4	4	11	7	5	16	2	7	4	2	0	0	1.2	17.9	6.4	5.4
SEP	I	10	0	0	0	0	0	0	0	24	6	1	12	4	16	1	11	9	24	22	12	4	7	4	3	22	1	3	2	2	0	0	1.8	15.1	3.1	10
	II							0	0	18	12	1	14	1	11	0	8	1	24	40	11	3	8	5	3	20	1	5	3	1	0	0	1.1	16.9	4.9	7.2
OCT	I	2	0	0	0	0.1	0	0	0	22	9	1	8	2	15	2	12	6	25	29	24	2	3	1	1	28	0	1	1	1	0	0	0.2	16.4	1.4	13
	II							0	0	13	18	1	8	1	12	0	7	1	18	52	22	3	4	1	1	28	1	2	0	0	0	0	0.3	17.8	5.8	7.2
NOV	I	0.7	0	0	0.1	0	0	0	0	20	10	1	5	2	10	2	9	8	29	34	26	1	2	1	0	29	0	1	0	0	0	0	0.1	15.1	1.4	13.3
	II							0	0	10	20	1	6	1	3	0	2	1	18	68	24	2	3	1	0	29	0	1	0	0	0	0	0.2	17.1	6.7	5.9
DEC	I	0.9	0	0.1	1.9	0	0	0	0	24	7	1	8	2	9	1	13	9	31	26	24	2	3	1	1	28	0	1	1	1	0	0.8	2	15.5	1.8	10.8
	II							0	0	10	21	0	7	0	3	0	3	0	20	67	23	2	3	2	1	29	0	1	1	0	0	0	0.7	18.9	6.6	4.7
ANNUAL TOTAL OR MEAN	I	56.7	0.2	1.9	5.2	1.5	0	0	0	296	69	1	9	4	14	1	15	8	28	20	215	29	62	32	27	303	8	23	16	15	0	3.8	14	163.3	27.2	136.8
	II							0	0	239	126	1	11	1	8	0	9	2	33	35	204	31	74	38	18	300	10	35	13	7	0	0.1	7.1	197.5	54.3	105.9
NUMBER OF YEARS		30						28				28									30					30						30				

80

Table 3. 6 Indian Meteorological Departments (IMD (Banda)

3.13.7AMBIENT AIR QUALITY

The prime objective of collecting baseline air quality data is to assess the ambient air quality of the project influenced area. Ambient air quality monitoring locations were selected based on the representation of population, material and ecosystem exposure monitoring for the pollutants emitted from the project and the compliance monitoring for compliance of National Ambient Air Quality Monitoring Standards. The baseline study of air quality within the project-influenced area of 10 km has been carried out by selecting the monitoring locations based on the following criteria:

- Meteorological condition on a synoptic scale
- Topography of the project influenced area
- Representation of the regional background levels
- Representation of the site
- Influence of the existing sources
- Major human settlement in the project influenced area

3.13.8SAMPLING & ANALYTICAL TECHNIQUES

The equipment used in the air monitoring was equipped with timers, which automatically records the total duration of monitoring for which equipment was in operation. Based on this, total volume of gas sampled was calculated to arrive at concentrations of pollutants monitored. If by any reason, the monitoring could not be carried out for the duration of minimum sixteen hours as per CPCB guidelines, the monitoring was repeated next day to have a more representative sample. The concentrations of PM10, PM2.5, SO2, NOx and CO were computed for the total duration of monitoring and for the total gas volume sampled excluding the time lapses due to power failures.

Parameter	Analytical technique	Technical Protocol
Particulate Matter 10	Respirable Dust Sampler (Gravimetric method)	IS-5182 (Part 23)
Particulate Matter 2.5	Fine Particulate Sampler (Cyclonic method)	Guidelines for the Measurement of Ambient AirPollutants, Volume-I(IRDH/SOP/AAQM/01)
Sulphur Dioxide	West and Gaeke	IS-5182 (Part 2)
Oxides of Nitrogen	Jacob and Hochheiser	IS-5182 (Part 6)

Table 3. 7 Ambient Air Quality Monitoring Techniques

Ambient air quality monitoring (24 hrs –average result for monitoring period) has been carried out during one season i.e. Oct 2018 to Dec 2018 at 6 locations, i.e. at Project Site, Dhanduhan Dera ,Urauli, Pachkauri, Piproda and Harbanspur.The parameters for air quality were selected as per the stipulated National Ambient Air Quality standards, MoEF and these were Particulate Matter less than 2.5 µg/m^3 ($PM_{2.5}$), Particulate Matter less than 10 µg/m^3 (PM_{10}), Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO2) and Carbon Monoxide (CO) etc. were monitored and average results are as tabulated in **Table-3.9**. Map showing the ambient air quality monitoring locations is shown in **Figure-3.16**.

3.13.9 AMBIENT AIR QUALITY MONITORING STATIONS

Ambient air quality monitoring (AAQM) stations (6 in nos.) were selected on the basis of topography and meteorology of the area which are as follows:-

Sr.No.	Monitoring code	Distance & Direction	Lattitude	Longitude
1	AQ1	On Site	25°42'29.91"N	80°19'45.99"E
2	AQ2	Garaha(N) & 0.7 Km	25°42'57.48"N	80°19'46.04"E
3	AQ3	Sandi (S)&1.12Km	25°41'51.71"N	80°19'47.92"E
4	AQ4	Shivarampur(E) & 1.7 Km	25°42'24.90"N	80°21'4.92"E
5	AQ5	Bajemau (W) &0.8 Km	25°42'29.86"N	80°18'32.38"E
6	AQ6	Amna Dera(S)& 0.3 Km	25°42'24.94"N	80°19'34.21"E

Table 3. 8 Air Quality Monitoring Location

The ambient air monitoring has been carried out with a frequency of two days in a week at Five locations covering one complete season

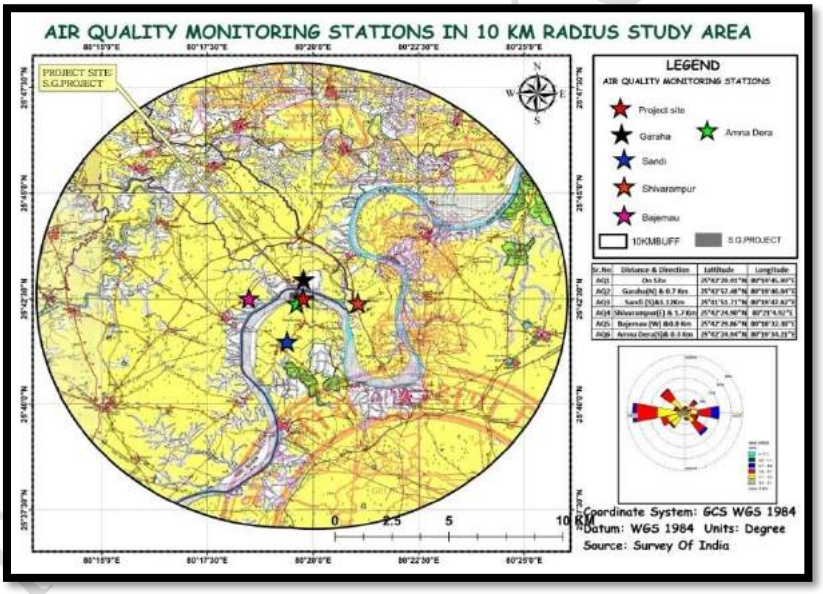


Figure 3. 12Ambient Air monitoring location

3.13.10 ENVIRONMENTAL PARAMETERS AND FREQUENCY

Parameters	Sampling Frequency
PM10	24 hourly sample twice a week
PM2.5	24 hourly sample twice a week
SO2	24 hourly sample twice a week
NOx	24 hourly sample twice a week

Table 3. 9 Sample Parametres and Frequency

3.13.11 AMBIENT AIR QUALITY MONITORING RESULTS

Ambient Air monitoring were conducted at six locations for PM2.5, PM10, SO2 NO2 and CO during winter season as per method specified by CPCB. The results of analysis for the environmental parameters are shown below. The results of Silica freely available are analysed at the five AAQM stations. It was observed that the presence of silica is in range of 2.5 (µg/m3) is observed at Core zone in the core area. Results of monitoring are given in Table below.

Ambient Air Quality was monitored at Six locations for PM2.5, PM10, SO2 , NO2 and CO during winter season as per method specified by CPCB. The Avgvalue of these parameters was 80.31 to 85.31, 135.08 to 128.96 , 11.81 to 15.52, 21.23 to 25.65 and 0.81 to 0.83 (µg/m3) respectively. Results are discussed in the Table below:

Statistical Summary of Concentration Levels of Criteria Pollutants

S. No.	Criteria Pollutant	Locations & Station Names		Max	Min	Avg	98th Percentile	CPCB Standard
1	PM2.5	AQ1	Project site	113	55	85.31	110.5	60
		AQ2	Garaha	115	55	80.31	112.0	
		AQ3	Sandi	114	56	82.42	111.5	
		AQ4	Shivarampur	113	56	81.65	111.0	
		AQ5	Bajemau	115	57	82.81	112.5	
		AQ6	Amna Dera	111	58	81.88	109.5	
2	PM10	AQ1	Project site	159	92	135.08	157.0	100
		AQ2	Garaha	156	95	127.42	153.5	
		AQ3	Sandi	158	95	129.38	156.0	
		AQ4	Shivarampur	158	96	128.15	156.0	
		AQ5	Bajemau	157	96	129.73	156.0	
		AQ6	Amna Dera	155	95	128.96	153.5	
3	SO2	AQ1	Project site	18	10	14.46	18	80
		AQ2	Garaha	19	09	15.52	19	
		AQ3	Sandi	18	09	13.04	17	
		AQ4	Shivarampur	18	10	14.23	18.0	
		AQ5	Bajemau	19	09	11.81	18	
		AQ6	Amna Dera	19	09	12.46	18.5	
4	NO2	AQ1	Project site	28	20	24.23	28	80
		AQ2	Garaha	29	19	25.65	29	
		AQ3	Sandi	29	18	24.04	28	
		AQ4	Shivarampur	29	21	25.08	29	
		AQ5	Bajemau	28	18	21.23	26.5	
		AQ6	Amna Dera	29	17	21.96	28	
5	CO	AQ1	Project site	0.93	0.71	0.81	0.92	04
		AQ2	Garaha	0.93	0.72	0.83	0.91	
		AQ3	Sandi	0.93	0.72	0.82	0.92	
		AQ4	Shivarampur	0.93	0.74	0.83	0.92	
		AQ5	Bajemau	0.93	0.71	0.81	0.92	
		AQ6	Amna Dera	0.93	0.71	0.81	0.93	

Table 3. 10 Average Ambient Air Analysis Result (Source-IRDH)

3.13.12 OBSERVATIONS AND DISCUSSION OF RESULTS

The Ambient Air Quality Monitoring reveals that of Six monitoring stations the minimum concentrations of PM10 were 84µg/m3 at AQ 2, and maximum 189µg/m3 at AQ1. The result sof PM2.5reveals that the minimum concentration of 53µg/m3 was recorded at AQ5, while maximum concentration of 117µg/m3 was found at AQ1.

As far as gaseous pollutants SO2 and NOx are concerned, the prescribed CPCB limit of 80 µg/m3 for residential and rural areas had never surpassed at any selected station. The minimum & maximum concentrations of SO2were found to be 9µg/m3& 19µg/m3 respectively. The minimum & maximum concentrations of NOx were found to be 18µg/m3& 29µg/m3 respectively.

3.13.13 MONITORING STATIONS OF FREE SILICA IN PM10

Sr. No	Monitoring code	Village	Distance & Direction	Latitude	Longitude
1	AQ1	On Site	0 km at Project Site(Cross wind Direction)	25°42'29.91"N	80°19'45.99"E

Table 3. 11 Free Silica Monitoring Location

3.13.14 FREE SILICA TEST AT PROJECT SITE

S .No	Parameter	Method	Results	Unit
01.	Free Silica	SOP/IRDH/AAQ-SiO2 /01	2.2	µg/m³

Table 3. 12 Free Silica Analysis Result (Source-IRDH)

The free silica content in PM10 was found to be 2.5µg/m3 at project site.

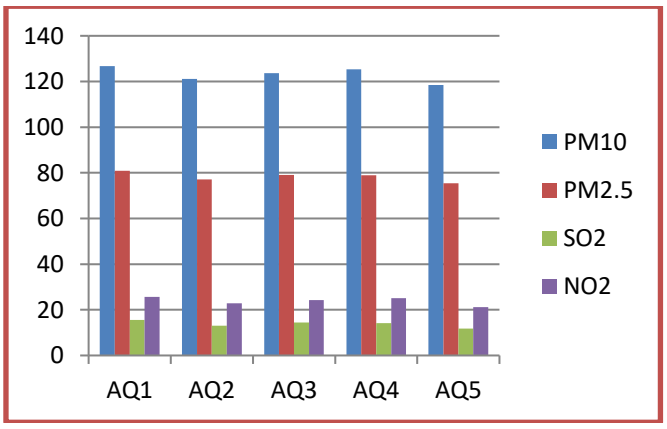


Figure 3. 13Ambient Air Quality Results in Chart

3.14 WATER ENVIRONMENT

Water environment consists of water resources such as ground water, ponds, streams, rivers etc. 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. During the survey samples of water within the periphery of 10 km radius were analyzed.

Water samples were collected once during the study period and analyzed for following selected physico- chemical and biological parameters.

- **Physical Parameters** - pH, odour, temperature, and conductivity, TDS and turbidity, Na, & K
- **Chemical Parameters** - Alkalinity, hardness, NO3, Cl, SO4, Ca, Mg, Phenolic compounds, DO, BOD and COD.
- **Heavy metals** -, Aluminum, Arsenic, Cadmium, Chromium, Iron, Copper, Lead, Manganese, Zinc and Mercury.

3.14.1 WATER QUALITY

Source of water for the proposed project is River Ken.Banda district is drained by Yamuna, Ken and Baghain rivers. River Yanunabifurcates the district Banda from Fatehpur in north and flows from west to east in theentire district. River Ken meets Yamuna at Chilla. River Baghain also bifurcatesBanda from Chitrakoot in southeast. The ground water properties vary with locations.

In order to assess the existing water quality, ground and surface water samples were collected from project site and analysed as per standard methods for examination of water and wastewater published by American Public Health Association/ American Water Works Association and the Bureau of Indian Standards (APHA/ AWWA & BIS) and compared with permitted desirable standards set by BIS (IS 10500: 1991).

3.14.2 OBJECTIVE OF WATER MONITORING

Water samples were collected from Ground water (3 in nos.) and Surface water (3 in nos.) to study the water quality of the study area in February month of winter season. The purpose of the study is to assess the water quality characteristics. The objective of analysis of water quality is given as follows:

3.14.3 GROUND WATER QUALITY

Objective of Ground water is discussed as follows:

- To evaluate the impacts on people, agriculture productivity, habitat conditions, recreational resources and aesthetics of the vicinity) and environment.
- To evaluate the physical, chemical and biological properties of water quality in the study area

3.14.4 SURFACE WATER QUALITY

- This is sand/morrum mining project on river bed. The project itself is a part of surface water body. The applied lease falls in Ken River. Objective of surface water analysis is discussed as follows:
- To analyze physical, chemical and biological properties and to assess impact of project on surface water quality (if any).
- Assess the water quality characteristics for critical parameters;
- Evaluate the impacts on agriculture productivity, habitat conditions, recreational resources and aesthetics of the vicinity;
- Predict the likely impacts on water quality due to the mining and other related activities.

3.14.5 WATER MONITORING LOCATIONS

Water monitoring was conducted at six locations (3in nos. for Ground water and 3 nos. for Surface water) in winter season representing core and buffer area of the project. The Distance and direction of the monitoring locations are given as follows:

3.14.6 GROUND WATER

Sr.No.	Monitoring code	Distance & Direction	Lattitude	Longitude
1	GW1	Garaha (N)& 0.8 Km	25°42'56.58"N	80°19'41.21"E
2	GW2	Bajemau (SW) & 1.8 Km	25°42'9.58"N	80°17'52.81"E
3	GW3	Amna Dera(S) & 1.2 Km	25°41'49.69"N	80°19'42.63"E

Table 3. 13 Ground Water Monitoring Location

The Ground Water monitoring locations are superimposed on the topo-sheet map and shown below. Samples were collected from the site and buffer area representing site, human settlement, sensitive area and commercial area of the Ground water and analyzed for physical, chemical and biological parameters. The locations of Ground water sampling locations are shown on map superimposed on the topo-sheet for the February month of winter season. Sampling locations of Ground water are shown on the map given below:

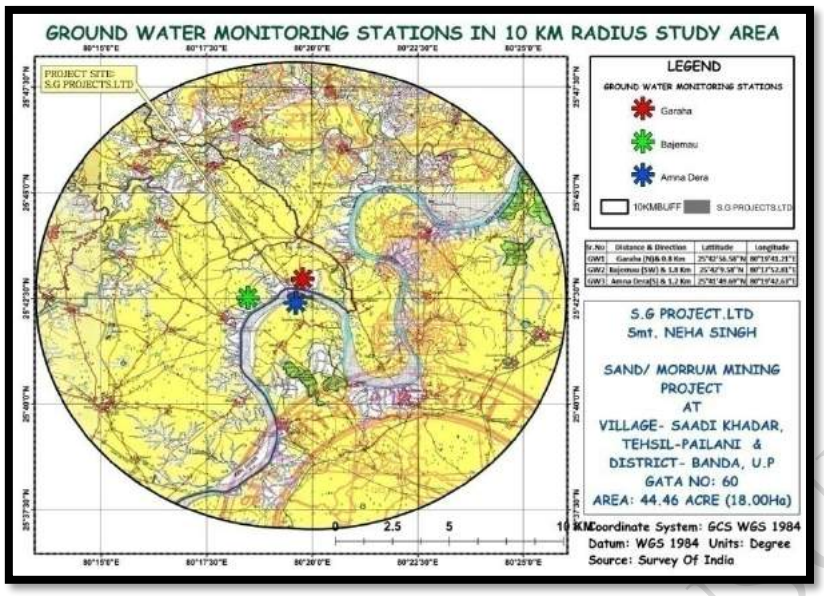


Table 3. 14 Ground Water Monitoring Stationson Toposheets

S No.	Parameter	Test Method	RESULTS			Unit	Requirements as per IS 10500- 2012	
			GW Q_1	GW Q_2	GW Q_3		Acceptable Limit (Max)	Permissible limits(Max))
1.	pH	IS 3025 P-11 1983	7.9	8.2	8.3	--	6.5-8.5	No Relaxation
2.	Turbidity	IS 3025 P-10 (1984)	<0.5	<0.5	<0.5	NTU	1	5
3.	Total Hardness	IS 3025 P-21 (2009)	261.0	270.0	279.0	mg/l	200	600
4.	Total Dissolved Solids (TDS)	IS 3025 P-16(1984)	428.0	420.4	440.0	mg/l	500	2000
5.	Calcium as Ca	IS 3025 P-40 (1991)	56.0	57..6	57.6	mg/l	75	200
6.	Magnesium as Mg	IS 3025 P-46 (1994)	29.4	30.6	32.80	mg/l	30	100
7.	Total Alkalinity as $CaCO_3$	IS 3025 P-23 (1986)	310.0	330.0	330.0	mg/l	200	600
8.	Chloride as Cl	IS 3025 P-32 (1988)	22.69	22.69	24.49	mg/l	250	1000
9.	Barium as Ba	Annex F of IS:13428	<0.05	<0.05	<0.05	mg/l	0.7	No Relaxation
10.	Ammonia as N	IS 3025 P-34 (1988)	<0.1	<0.1	<0.1	mg/l	0.5	No Relaxation
11.	Sulphate as SO_4	IS 3025 P-24 (1986)	7.0	6.0	8.2	mg/l	200	400
12.	Nitrate as NO_3	IS 3025 P-34 (1988)	2.0	2.0	2.4	mg/l	45	No Relaxation
13.	Fluoride as F	APHA,22nd Edition	0.17	0.28	0.13	mg/l	1	1.5
14.	Iron as Fe	IS 3025 P-53 (2003)	0.11	0.16	0.12	mg/l	0.3	No Relaxation
15.	Aluminium as Al	IS 3025 P-55(2003)	<0.01	<0.01	<0.01	mg/l	0.03	0.2
16.	Anionic Detergent	Annex K of IS:13428	<0.05	<0.05	<0.05	mg/l	0.2	1
17.	Phenolic Compounds	IS 3025 P-43 (1992)	<0.001	<0.001	<0.001	mg/l	0.001	0.002

18.	Boron as B	IS 3025 P-57 (2005)	<0.1	<0.1	<0.1	mg/l	0.5	1
19.	Chromium as Cr	IS 3025 P-52(2003)	<0.01	<0.01	<0.01	mg/l	0.05	No Relaxation
20.	Lead as Pb	IS 3025 P47 (1994)	<0.01	<0.01	<0.01	mg/l	0.01	No Relaxation
21.	Copper as Cu	IS 3025 P42 (1992)	<0.01	<0.01	<0.01	mg/l	0.05	1.5
22.	Mercury as Hg	IS 3025 P-48 (1994)	<0.001	<0.001	<0.001	mg/l	0.001	No Relaxation
23.	Manganese as Mn	IS 3025 P-59 (2006)	<0.01	<0.01	<0.01	mg/l	0.1	0.3
24.	Zinc as Zn	IS 3025 P-49 (1994)	<0.01	<0.01	<0.01	mg/l	5	15
25.	Arsenic as As	IS 3025 P-37 (1988)	<0.01	<0.01	<0.01	mg/l	0.01	No Relaxation
26.	Nickel as Ni	IS 3025 P-54 (2003)	<0.01	<0.01	<0.01	mg/l	0.02	No Relaxation
27.	Cadmium as Cd	IS 3025 P-41 (1992)	<0.001	<0.001	<0.001	mg/l	0.003	No Relaxation

Source: IR&DH

Table 3. 15 Ground Water Quality Monitoring Results

3.14.7 OBSERVATIONS AND RESULTS OF GROUND WATER SAMPLES

Water samples were taken from three (3 nos.) locations for the ground water representing the core and buffer area for physical, chemical and biological properties. The results indicate that pH of water at all locations are in range of 7.66 to 7.75 and hardness as CaCO3 varies 408 to 418 mg/l. All other parameters are within the acceptable and permissible limit. The analysis result is shown in the Table below.

3.14.8 SURFACE WATER

Sr.No.	Monitoring code	Distance & Direction	Lattitude	Longitude
1	SW1	On Site	25°42'33.51"N	80°19'31.73"E
2	SW2	Sandi (S)&0.98 Km	25°41'58.14"N	80°19'58.25"E
3	SW3	Bajemau (SW) & 2.3 Km	25°41'53.00"N	80°18'10.83"E

Table 3. 16 Surface Water Monitoring Location

The Surface Water monitoring locations are superimposed on the topo-sheet map and shown below. Samples were collected from the site and buffer area representing site, human settlement, sensitive area and commercial area of the Surface water and analyzed for physical, chemical and biological parameters. Sampling locations of Surface water are shown on the map given below:

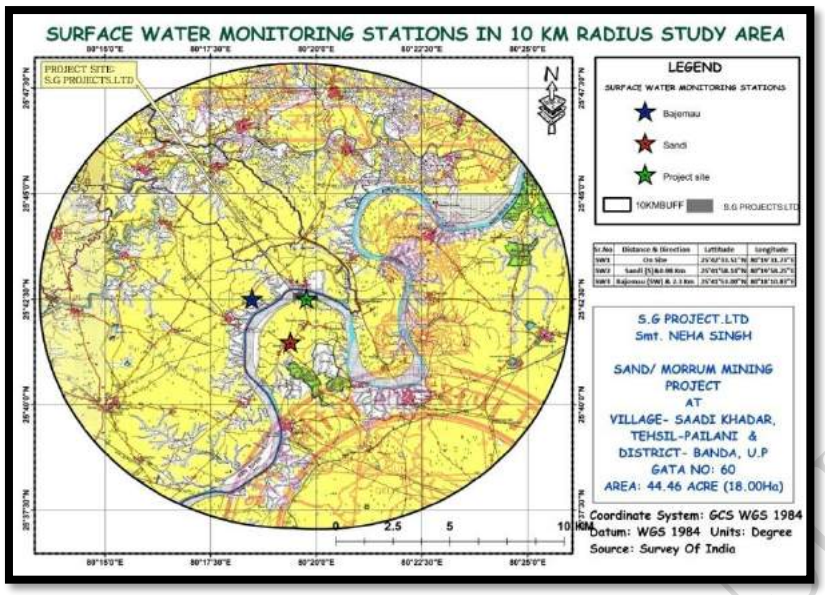


Figure 3. 14 Surface Water Monitoring Stations on Toposheets

3.14.9 OBSERVATIONS AND RESULTS OF SURFACE WATER SAMPLES

The analysis results indicate that pH of the Surface water to be in range of 6.52 – 6.78. The TDS were found to be in the range of 298 – 310 mg/l. Total Hardness was in range of 189 – 1198 mg/l. Other parameters like chlorides and sulphate were observed to be well within the prescribed limits but calcium and Magnesium was found high but within limit in the surrounding areas.

S No.	Parameter	Test Method	RESULTS			Unit	Requirements as per IS 10500- 2012	
			SW_1	SW_2	SW_3		Acceptable Limit (Max)	Permissible Limit (Max)
1.	pH	IS 3025 P-11 1983	6.52	6.78	6.60	-	6.5-8.5	No Relaxation
2.	Conductivity	IS 3025 P-14 1984	480.0	468.8	478.2	µs/cm	-	-
3.	Turbidity	IS 3025 P-10 (1984)	14.6	14.0	14.2	NTU	1	5
4.	Free Residual Chlorine	IS 3025 P-26 (1986)	<0.1	<0.1	<0.1	mg/l	0.2	1
5.	Total Hardness	IS 3025 P-21 (2009)	189.0	180.0	198.0	mg/l	200	600
6.	Total Dissolved Solids (TDS)	IS 3025 P-16(1984)	298.0	310.0	318.2	mg/l	500	2000
7.	Calcium as Ca	IS 3025 P-40 (1991)	29.0	28.8	36.0	mg/l	75	200
8.	Magnesium as Mg	IS 3025 P-46 (1994)	28.43	26.24	26.24	mg/l	30	100
9.	Total Alkalinity as $CaCO_3$	IS 3025 P-23 (1986)	320.0	310.0	350.0	mg/l	200	600
10.	Chloride as Cl	IS 3025 P-32 (1988)	24.26	29.9	29.9	mg/l	250	1000
11.	Barium as Ba	Annex F ofIS:13428	<0.05	<0.05	<0.05	mg/l	0.7	No Relaxation
12.	Ammonia as N	IS 3025 P-34 (1988)	<0.1	<0.1	<0.1	mg/l	0.5	No Relaxation

13.	Sulphate as SO_4	IS 3025 P-24 (1986)	2.0	2.5	4.0	mg/l	200	400
14.	Nitrate as NO_3	IS 3025 P-34 (1988)	2.0	1.8	1.8	mg/l	45	No Relaxation
15.	Fluoride as F	APHA 4500F^-(D)	0.12	0.13	0.10	mg/l	1	1.5
16.	Iron as Fe	IS 3025 P-53 (2003)	0.26	0.2	0.20	mg/l	0.3	No Relaxation
17.	Chemical Oxygen Demand(COD)	IS 3025 P-58 2006	20.0	20.0	40.0	mg/l	-	-
18.	Biochemical Oxygen Demand(BOD)at 27° C	IS 3025 P-44 1993	4.0	4.0	6.0	mg/l	-	-
19.	Dissolve Oxygen	IS 3025 P-38 1989	5.2	5.2	5.4	mg/l	-	-
20.	Aluminium as Al	IS 3025 P-55(2003)	<0.01	<0.01	<0.01	mg/l	0.03	0.2
21.	Anionic Detergent	Annex K oIS:13428	<0.05	<0.05	<0.05	mg/l	0.2	1
22.	Phenolic Compounds	IS 3025 P-43 (1992)	<0.001	<0.001	<0.001	mg/l	0.001	0.002
23.	Boron as B	IS 3025 P-57 (2005)	<0.1	<0.1	<0.1	mg/l	0.5	1
24.	Chromium as Cr	IS 3025 P-52 (2003)	<0.01	<0.01	<0.01	mg/l	0.05	No Relaxation
25.	Lead as Pb	IS 3025 P47 (1994)	<0.01	<0.01	<0.01	mg/l	0.01	No Relaxation
26.	Copper as Cu	IS 3025 P42 (1992)	<0.01	<0.01	<0.01	mg/l	0.05	1.5
27.	Mercury as Hg	IS 3025 P-48 (1994)	<0.001	<0.001	<0.001	mg/l	0.001	No Relaxation
28.	Manganese as Mn	IS 3025 P-59 (2006)	<0.01	<0.01	<0.01	mg/l	0.1	0.3
29.	Zinc as Zn	IS 3025 P-49 (1994)	<0.01	<0.01	<0.01	mg/l	5	15
30.	Arsenic as As	IS 3025 P-37 (1988)	<0.01	<0.01	<0.01	mg/l	0.01	No Relaxation
31.	Nickel as Ni	IS 3025 P-54 (2003)	<0.01	<0.01	<0.01	mg/l	0.02	No Relaxation
32.	Cadmium as Cd	IS 3025 P-41 (1992)	<0.001	<0.001	<0.001	mg/l	0.003	No Relaxation

Source: IR&DH

Table 3. 17 Average Surface Water Quality Monitoring Results

3.15 NOISE ENVIRONMENT

The noise level prevailing at a particular location in the outdoor environment is contributed by all kinds of sources at various distances around that location. Continuous, temporal and spatial variations occur in ambient noise levels depending on the type of surrounding activities. The impact of noise on the health of individual depends on physical dose of noise viz. noise level, frequency, intermittency etc. and human factors viz. sex, age, health status, type of activity, occupational exposure etc. The intensity also depends on psychological and physiological state of individuals.

The impact due to noise does undergo seasonal variations except some directional changes depending upon the predominant wind direction. Noise levels have been measured for Three locations. The baseline study of noise levels in the study area of 10 km has been carried out by selecting the noise monitoring locations based on the following criteria:

- Source of noise
- Proximity of the noise generating source to the human settlements
- Exposure time
- Time-scaled dose response ratio of individual receptor

Pollutant	Source	Primary Effects
Noise	▪ Mining activities ▪ Transport ▪ Human activities	▪ Annoyance ▪ Interference with communication ▪ NIHL ▪ Interference with sleep ▪ Aural pain, nausea & reduced muscular control ▪ Performance effects ▪ Effects on social behavior

Figure 3. 15 Primary Effects of Noise Pollution from Transportation & Operation Activities of the Site

3.15.1NOISE QUALITY

Unwanted noise and unpleasant sounds are generally classified as noise pollution. Normally a person begins to identify sounds when a level of 10 to 15 dB is reached. The other end of the scale is known as the threshold of pain (140 dB), or the point at which the average person experiences pain. Noise is generally measured in frequency-weighted scales and noise quality measurements are generally represent in the 'A' level and reported as dB (A).

3.15.2 METHODOLOGY OF BACKGROUND NOISE QUALITY MONITORING

- A site–specific background noise quality monitoring program was conducted for the existing project site.
- The basic considerations for designing noise quality surveillance programme include:
- Vehicle Movement Within the Impact Zone
- Activities in surrounding villages / settlements/nearby areas
- Ecologically Sensitive Locations

Based on the above mentioned criteria, noise monitoring was conducted at 3 locations within the impact zone. Sound Pressure Level (SPL) measurements were automatically recorded to give the noise level for every hour, continuously for 24 hours in a day. Accordingly one full day (i.e. 24 hourly values) of data was collected at each of the locations.

The standards of equivalent noise levels *viz*. L_{eq}-day and L_{eq}-night, have been prescribed by the CPCB as given. Below

Area Code	Category of Area/	Limits in dB(A) Leq*

		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Table 3. 18 Ambient Noise Standards as per CPCB

1. Day time shall mean from 6.00 a.m. to 10.00 p.m.
2. Night-time shall mean from 10.00 p.m. to 6.00 a.m.
3. Silence zone is defined as an area comprising not less than 100 m around hospitals, educational institutions and courts. The silence zones are zones, which are declared as such by the competent authority.

Noise levels were calculated using the following equation:

Where L_i = levels observed at n equally spaced times during interval T. $$L_{eq,T} = 10\log\left(1/n\sum_{i=1}^{n}10^{\frac{L_i}{10}}\right)$$

3.15.3 SOURCES OF NOISE EMISSIONS SURROUNDING THE SITE

The major source of noise in the site surrounding area is the vehicular movement along Southern peripheral road transportation and operation activities in the vicinity of the site. The impacts from these sources are expected to be captured in the levels of noise measured in the site-specific background noise monitoring study.

3.15.4 NOISE LEVEL IN THE PROJECT INFLUENCE AREA

The hourly noise levels were recorded for one season i.e. Oct 2018 at three locations for 24 hours considering two days in each month. The monitoring average results have been summarized in the **Table 3.25**Ambient Noise Monitoring was conducted at three locations (3 in nos.) in core and buffer areas. The locations were representative of proposed site, human settlements, commercial, industrial and sensitive areas monitored at one hour interval for 24-hours in Winter season. The Ambient Noise Stations superimposed on the topo-sheet locations and shown in Noise Level Monitoring Locations Map. Noise monitoring location (No.3) represents noise level of the study area. . Map showing the noise quality monitoring locations is shown in Figure-3.20

Sr.No.	Monitoring code	Distance & Direction	Lattitude	Longitude
1	NQ1	On Site	25°42'28.54"N	80°19'58.66"E
2	NQ2	Bajemau (SW) & 1.9 Km	25°42'14.15"N	80°18'7.21"E
3	NQ3	Amna Dera(S) & 1.3 Km	25°41'44.46"N	80°19'44.67"E

Table 3. 19 Noise Quality Monitoring Location

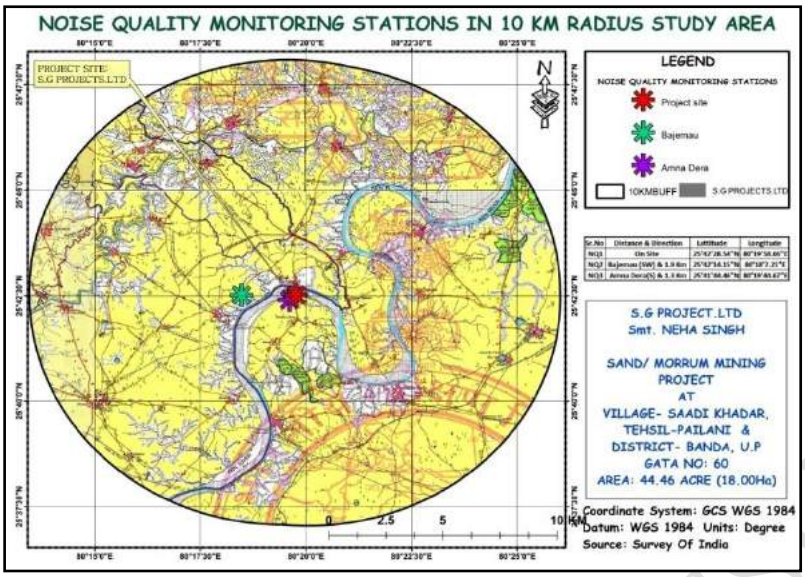


Figure 3. 16 Noise Quality Monitoring Stations on Toposheets

Location	Day Time		Night Time	
	Leq dB(A)	Limit dB(A)	Leq dB(A)	Limit dB(A)
ANQ-1	51.86	55	41.40	45
ANQ-2	51.18	55	40.55	45
ANQ-3	50.79	55	40.70	45

Source:IR&DH

Table 3. 20 Noise Monitoring Results

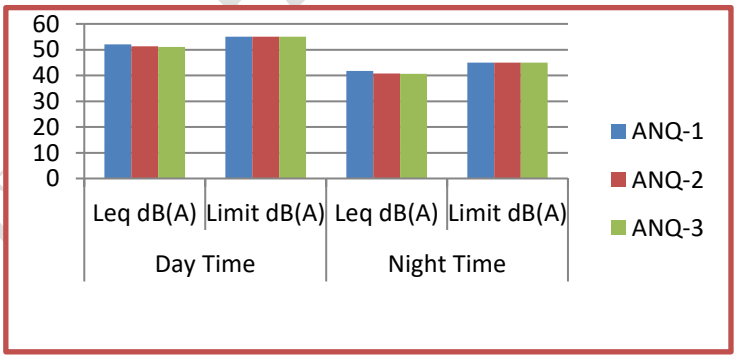


Figure 3. 17 Noise Level of the Study Area

3.15.5 OBSERVATIONS AND RESULTS OF NOISE QUALITY SAMPLES

The noise level at the project site is within the permissible limits during day and night times at all locations as specified by CPCB.

3.15.6 THE TRAFFIC STUDY

The roads connect from the mine site to NH-232 via(Chilla Ghat Village Road). These roads are wide enough to facilitate easy and smooth movement of heavy duty trucks. During mine operation, the truck movement will be as follows:

- Proposed Capacity of mine/annum : 3,60,000m^3 Per Annum
- No. of working days : 225 days
- Proposed Capacity of mine/day : 1600m^3
- Truck Capacity : 9 m^3
- No. of trucks deployed/day :178 Trucks
- No. of trucks deployed/hour : 22 Trucks(working time)

At present the traffic load at highway is less than 50PCUper hour, in particular. Due to the proposed project there will be an addition of 30trucks/hr in the existing trucks having thecapacity of 9 Cum, hence the changes will be at small level and will not affect the existing environment.

3.16ECOLOGICAL&BIOLOGICAL ENVIRONMENT

The biodiversity we see today is the fruit of billions of years of evolution, shaped by natural processes. The vast array of interactions among the various components of biodiversity makes the planet habitable for all Species, including humans. There is a growing recognition that, biological diversity is a global asset of tremendous value to present and future generations. At the same time, the threat to species and ecosystems has never been as great as it is today. Species extinction caused by human activities continues at an alarming rate. Protecting biodiversity is in our self-interest.

The biological study was under taken by Ecology & Biodiversity Expert, as a part of the EIA study report to understand the present status of ecosystem prevailing in the study area, to compare it with past condition with the help of available data, to predict changes in the biological environment as a result of present activities and to suggested measures for maintaining its health.

A survey was conducted to study the flora around 10 km radius. Some of the information was gathered from the local habitants. All the collected data were classified to interpret the impact of pollution on the flora and fauna of that region. Survey of the mild plants as well as cultivated crop plants was made and all the available information was recorded. The primary data collected was compared with the Secondary data collected from Forest Department.

3.16.1 OBJECTIVES AND PURPOSE OF STUDY:

The main objectives of the study are as follows:

1. To conduct the detailed study of plant and animal species around the nearby area and within the project site.
2. To identify location and features of ecological interest.
3. To assess and identify the rare, endangered, endemic and vulnerable species present in area if any.
4. To collect baseline data for study area.

5. To identify the impact of proposed project on the biological environment

3.16.2 SURVEY METHODOLOGY

Detailed survey was conducted to evaluate floral and faunal composition of the study area. Primary data on floral and faunal composition was recorded during site visit and secondary data was collected from the Forest department and published relevant literature.

Field study period: The ecological survey has been conducted for one season. The details are given below:

Core zone: At the project site.

Buffer zone: Around the project site in 10 km radius.

Inventory of flora and fauna has been prepared on the basis of collected data. The mode of data and parameters considered during field investigations is given below:

3.16.3 METHODOLOGY FOR TERRESTRIAL ECOLOGY

The primary objective of survey was to describe the floral and faunal communities within the study area. The sampling plots for floral inventory were selected randomly in the suitable habitats (Anderson, 1867; Jain and Rao, 1983). The methodology adopted for faunal survey involverandom survey, opportunistic observations, diurnal bird observation, active search for reptiles, faunal habitatassessment, active search for scats and foot prints, animal call, and review of previous studies. The aim wasto set baselines in order to monitor and identify trends after the commissioning of the mining activity. Emphasis has been placed on presence of endemic species, threatened species if any present in the study area.

3.16.4 METHODOLOGY FOR IN-LAND WATER SAMPLING

The samples for qualitative and quantitative analysis of planktons were collected from the sub surface layer at knee depth. Water samples were filtered through plankton net of 20µ mesh size (APHA, 1971). The filtered samples were concentrated by using the centrifuge. By using Lackey‟s drops method and light microscope (Lackey, 1938), the quantitative analysis was carried out for phytoplankton and zooplankton. The standard flora and other literature were followed for the qualitative evaluation of Plankton (Welch, 1948; Vollenweider,1969; Edmondson, 1974).

Aspect	Data	Mode Of Data Collection	Parameters Monitored
Terrestrial Ecology	Primary data collection	By field survey	Floral and Faunal diversity
	Secondary data collection	From authentic sources like Forests/Wild Life department of Jammu Kashmir , available published literatures like – Biodiversity and Environment Management and available publishes	Floral and Faunal diversity and study of vegetation, forest type, importance etc.

		papers of scholars	
Aquatic Ecology	Primary data collection	By field survey	Floral and Faunal diversity
	Secondary data collection	From authentic sources like Forests/Wild Life department, available published literatures like – Biodiversity and Environment Management and available publishes Papers of scholars.	Floral and Faunal diversity and study of vegetation, forest type, importance etc.

Table 3. 21 Mode of data collection & parameters considered during the Biological survey

3.16.5 FLORAL DIVERSITY OF THE STUDY AREA

The climatic, edaphic and biotic variations with their complex interrelationship and composition of species, which are adapted to these variations, have resulted in different vegetation cover, characteristic of each region (Ohasi,1975). The tree species, herbs, shrubs, climbers and major crops, were documented during this baseline study

Trees: The dominant trees in and around the study area are Listed below in the table:

S.No.	Botanical Name	Common Name	Family
1	*Acacia Catechu*	*Khair*	*Fabaceae*
2	*Delbergia Sisso*	*Sheesam*	*Fabaceae*
3	*Acacia Karoo*	*Kikar*	*Fabaceae*
4	*Diospyros Melanoxylon*	*Tendu*	*Ebinaceae*
5	*Salmalia Malberica*	*Semal*	*Bombacaceae*
6	*Azadirachta Indica*	*Neem*	*Meliaceae*
7	*Acacia Nilotica*	*Babool*	*Fabaceae*
8	*Delbergia Sisso*	*Sisum*	*Fabaceae*
9	*Alstonia Scholaris*	*Scholar Tree*	*Apocyanaceae*
10	*Albizzia Lebbeck*	*Siris*	*Fabaceae*
11	*Cassia Fistula*	*Amaltas*	*Caesalpiniaceae*
12	*Anthocephalus Cadamba*	*Cadamb*	*Rubiaceae*
13	*Ziziphus Mauritiana*	*Ber*	*Rhamnaceae*
14	*Polyalthia Longifolia*	*Asoka*	*Annonaceae*
15	*Bauhinia Purpurea*	*Kachnar*	*Fabaceae*
16	*Ficus Religiosa*	*Pipal*	*Moraceae*
17	*Aegle Marmelos*	*Bel*	*Rutaceae*
18	*Syzygium Cumini*	*Jamun*	*Myretaceae*
19	*Magnifera Indica*	*Aam*	*Anacardiaceae*
20	*Terminalia Arjuna*	*Arjun*	*Combretaceae*

21	*Tamarindus Indicus*	*Imli*	*Fabaceae*
22	*Bauhinia Purpurea*	*Kachnar*	*Fabacae*
23	*Pithecolobium Dulce*	*Jungle Jalebi*	*Fabaceae*
24	*Tectona Grandis*	*Teak*	*Verbenaceae*
25	*Emblica Officinalis*	*Amla*	*Euphorbiaceae*
26	*Butea Monosperma*	*Palash*	*Fabaceae*

Table 3. 22 Trees in the study area

Herbs Shrubs& Grasses: The species observed in the study area are listed below in the in the table.

S.No.	Botanical Name	Common Name	Family
HERBS			
1	*Argemone Maxicana*	*Poppy, Satyanashi*	*Papaveracea*
2	*Calatropis Procera*	*Madar*	*Asclepiadaceae*
3	*Ocimum Sanctum*	*Tulsi*	*Lamiaceae*
4	*Dhatura Inoxia*	*Dhatura*	*Solanaceae*
5	*AloeVera*	*Ghrit Kumari*	*Liliaceae*
6	*Tribulus Terrestris*	*Gokaharu*	*Zygophyllaceae*
7	*Solanum Nigrum*	*Makoi*	*Solanaceae*
8	*Achyranthus*	*Chirchita*	*Amaranthaceae*
9	*Euphorbia Hirta*	*Dudhi*	*Euphorbiaceae*
SHRUBS			
10	*Lantana Camara*	*Lantana*	*Verbenaceae*
11	*Nyctanthes Arbortristis*	*Harsingar*	*Oleaceae*
12	*Riccinus Communis*	*Arandi*	*Euphorbiaceae*
13	*Sacchrum Munja*	*Moonj*	*Gramineae*
14	*Mimosa Pudica*	*Chui Mui*	*Fabaceae*
15	*Nyctanthus Arbortritis*	*Harshingar*	*Oleaceae*
16	*Bougenvellia Glabra*	*Bougenvellia*	*Nyctaginaceae*
17	*Ipomea*	*Besharam*	*Convolvulaceae*
18	*Tridax Procumbens*	*Baramasi*	*Asteraceae*
19	*Cestrum Nocturnum*	*Raat Rani*	*Solanaceae*
20	*Vinca Rosea*	*Sadabahar*	*Apocyanaceae*
21	*Hibiscus Rosasinensis*	*Gurhal*	*Malvaceae*
GRASSES			
22	*Cyanodon Dactylon*	*Dub*	*Poaceae*
23	*Sacchrum Munja*	*Moonj*	*Poaceae*
24	*Parthenium*	*Congress/Gajar Grass*	*Asteraceae*
25	*Cymbopogan Martini*	*Lemon Grass*	*Poaceae*

Sources: Survey Team in consultation with Local People and Concerned State Forest Official

Table 3. 23Herbs Shrubs & Grassesin the study area

3.16.6 MEDICINAL PLANTS IN THE STUDY AREA

S.No.	Botanical Name	Common Name	Family	Medicinal Use
1	*Azadirachta Indica*	*Neem*	*Meliaceae*	*Fever, Skin Disease*
2	*Cassia Fistula*	*Amaltas*	*Fabaceae*	*Purgative,Astringent, Antipyretic*
3	*Butea Monosperma*	*Palash*	*Fabaceae*	*Liver Disorder*

4	*Acacia Nilotica*	*Babool*	*Fabaceae*	*Demulcent*
5	*Aloe Vera*	*Ghritkumari*	*Liliaceae*	*Purgative, Anti-inflammatory, Antimicrobial*
6	*Calatropis*	*Madar*	*Asclepiadeceae*	*BronchialAsthma,Indigestion,Flatulance, Constipation*
7	*Madhuca Indica*	*Mahua*	*Sapotaceae*	*Stimulant,Demulcent, Laxative*
8	*Emblica Officinalis*	*Amla*	*Euphorbiaceae*	*Antianaemic,Astringent,Antidiarrhoeal*
9	*Syzygium Cumini*	*Jamun*	*Myrtaceae*	*Acute Diarrhoea*
10	*Terminalia Arjuna*	*Arjun*	*Combertaceae*	*Cardioprotective and Cardiotonic*
11	*Nyctanthus Arbor-tristis*	*Harshingar*	*Oleaceae*	*Antipyretic,Antiinflammatory,Antispasmodic,Used for fever,Rheumatism and Sciatica*

Table 3. 24 Medicinal Plants in the study area

Sources: *Survey Team in consultation with Local People and Concerned State Forest Official*

3.16.7 FAUNAL BIODIVERSITY OF STUDY AREA

S.No.	ZOOLOGICAL NAME	COMMON NAME	FAMILY	STATUS IN WPA 1972	STATUS IN IUCN CATEGORY
MAMMALS					
1.	*Felis Chaus*	*Jungli Billi*	*Felidae*	Schedule II	Least Concern
2.	*Funambulus Pennanti*	*Gilhari*	*Sciuridae*	Schedule IV	Least Concern
3.	*Herpetes Edwardsii*	*Nevala*	*Herpestidae*	Schedule II	Least Concern
4.	*Lepus Nigricollis*	*Khargosh*	*Leporideae*	Schedule IV	Least Concern
5.	*Rattus Rattus*	*Chuha*	*Murideae*	Schedule V	Least Concern
6.	*Semnopithecus Entellus*	*Langur*	*Cercopethicideae*	Not Enlisted	Least Concern
7.	*Cow*	*Bos Taurus*	*Bovidae*	-	-
8.	*Bubalus Bubalis*	*Buffalo*	*Bovidae*	-	-
9.	*Canis Lupus*	*Dog*	*Canideae*	-	-
10.	*Capra aegagrus hircus*	*Goat*	*Bovidae*	-	-
11.	*Sus Scrofa*	*Pig*	*Suidae*	Schedule III	Least Concern
12.	*Neelgai*	*Baselophus Tragocamalus*			
13.	*Jackal*	*Cains Aureus*			
REPTILES					
14.	*Hemidactylus Brooki Gray*	*Chipkali*	*Gekkonideae*	*Not Enlisted*	*Not Evaluated*
15	*Chamaleo Chamaleons*	*Chameleon*	*Gekkonideae*	*Not Enlisted*	*Not Evaluated*

16	*Hemidactylus Maculates*	*Rock Gaeko*	*Gekkonideae*	*Not Enlisted*	*Not Evaluated*
AMPHIBIANS					
17	*Rana Tigrina*	*Common Frog*	*Ranideae*	Schedule IV	Least Concern
18	*Bufo Bufo*	*Toad*	*Bufonideae*	*Not Enlisted*	*Not Evaluated*

Table 3. 25 Faunal biodiversity in the study area

Sources: *Survey Team in consultation with Local People and Concerned State Forest Official*

3.16.8 BIRDS:

The List of Avifauna present in and around the study area are listed below in the table:

S.No.	ZOOLOGICAL NAME	COMMON NAME	FAMILY	STATUS IN WPA 1972	STATUS IN IUCN CATEGORY
1	*Achridotherus Tristris*	*Common Myna*	*Sturnideae*	Schedule IV	Least Concern
2.	*Columba libia*	*Pigeon*	*Columbideae*	Not Enlisted	Least Concern
3.	*Corvus Splendens*	*Crow*	*Corvideae*	Schedule IV	Least Concern
4.	*Eudynamys Scolopaceous*	*Koel*	*Cuculideae*	Schedule IV	Least Concern
5.	*Passer Domesticus*	*Sparrow*	*Passerideae*	Not Enlisted	Least Concern
6.	*Pavo Cristatus*	*Common Peacock*	*Phasianedeae*	Schedule I	Least Concern
7.	*Psittacula Krameri*	*Parrot*	*Psittaculadeae*	Schedule IV	Least Concern
8.	*Pycnonotus Cafer*	*Bulbul*	*Pycnonotideae*	Schedule IV	Least Concern
9.	*Saxicoloides Fulicata*	*Robin*	*Muscicapideae*	Schedule IV	Least Concern
10.	*Ploceus philippinus*	*Baya Weaver*	*Plocideae*	Schedule IV	Least Concern
11.	*Spilornis Cheela*	*Eagle*	*Accipitridae*	Not Enlisted	Least Concern
12.	*Coturnix Coturnix*	*Bater*	*Phasianideae*	Schedule IV	Least Concern
13	*Picideae*	*WoodPecker*	*Picideae*	Schedule IV	Least Concern
14	*Phasianideae*	*Quail*	*Phasianideae*	Schedule IV	Least Concern

15	*Lanius Schach*	*Shrikes*	*Laniidae*	Not enlisted	Least Concern

Sources: Survey Team in consultation with Local People and Concerned State Forest Official

Table 3. 26 Birds in the study area

3.16.9 AQUATIC ECOLOGY STUDY:

MethodologySample Collection, Preservation & Analysis:

The samples were collected from 10 cm depth below the water surface in polyethylene bottles presoaked in 10% nitric acid solution for 24 hours and thoroughly rinsed with distilled water before use.

Preservation of sample is done by adding 5 ml of 4% Formalin. The preserved samples were kept undisturbed for 24 hrs to allow the sedimentation of plankton suspended in water.After 24 Hrs the supernatant was discarded carefully without disturbing the sediment and final volume of concentrated sample was maintained 50 ml.

Analysis of Phytoplankton is done by Lackey Drop Method (Lackey, 1938) . A drop of sample is placed on the strip of slide and covered with cover slip. Now the no. of individual of each microorganism is counted under microscope and the no. is expressed per ml of sample.

Analysis of Zooplankton is done by using Sedgwick rafter cell and the no. of Zooplankton is expressed in per m^3 of sample.

Baseline Study of Aquatic Ecology:

The Phytoplankton community in the study area comprises of mainly Chlorophyceae, Bacillariophyceae, Cyanophyceae and Euglinophyceae.Chlorophyceae and Cyanophyceae were the most dominant group observed in the study area. Dominant Species observed are Microcystis, Nostoc, Anabeena, Scendesmus and chlorella etc.

Among the Zooplankton Protozoans,Rotifera and Cladocera are dominant group observed in study area

List of Phyto Planktons			
Chlorophyceae	**Bacillariophyceae**	**Cyanophyceae**	**Euglenophyceae**
Scendesmus sp.	Nitzschia sp.	Microsystis sp.	Euglena sp.
Ulothorix sp.	Navicula sp.	Nostoc sp.	
Chlorella sp.	Cymbella sp.	Anabaena sp.	
Volvox sp.	Cyclotella sp.	Oscillatoria sp.	
Oedogonium sp.			
Closterium sp.			
List of Zoo Planktons			
Protozoan	**Rotifera**	**Copepods**	**Cladocerons**
Arcellia sp.	Brachionus sp.	Cyclops sp.	Daphnia sp.
Actinophrys sp.	Monostyla sp.	Mesocyclops sp.	Moina sp.
	Mytillina sp		

Table 3. 27 List of Phyto Planktons

3.17SOCIO ECONOMIC DEVELOPMENT & ITS IMPACTS

Socio economic impact assessment provides necessary help to get an idea of change in social, economic and cultural status of study area. Baseline data for Occupation Status and Health amenities existing in the study area has been collected by personal interaction/ secondary sources such as census/ statistics data etc. with the villagers in the study area and are given in the following subsections.

3.17.1 HIGHLIGHTS OF DISTRICT PROFILE

- District Banda ranks 53rd in terms of population in the state.
- The percentage share of urban population in the district is 15.3 percent as against 22.3percent of the population in urban areas of the state.
- Banda district has population density of 408 persons per sq. km., which is less than the state average 829 persons per sq. km.
- Banda district ranks 67th in terms of sex ratio (863) which is lower than the state average (912) females for thousand males.
- Banda district ranks 46th in literacy with 66.7 percent which is lower than the state average 67.7 percent.
- There are only 37 uninhabited villages out of total 694 villages in the district.
- Decadal growth rate of the district 19.8 is lower to the state average of 20.2 percent.
- Banda tahsil has the highest number of inhabited villages 198 while Atarra tahsil has the lowest number (102) of inhabited villages.
- The district has 8 towns. Neither any statutory town has been added, merged nor declassified after 2001 census.
- There are 319,963 households in the district accounting for 1.0 percent of the total households in the state. The average size of households in the district is 5.6 persons.

3.17.2 DEMOGRAPHIC PROFILE OF DISTRICT

Total population of the area is 15,23,655 as per 2011 Census of India. Percentage of literate population in the area is 64%. Details of Socio Economic census Data are presented in Table 3.29

Total Number of HouseHold : 270245

Population	Persons	Males	Females
Total	15,23,655	8,19,243	7,04,412
In the age group 0-6 years	2,59,407	1,36,351	1,23,056
Scheduled Castes (SC)	3,44,057	1,84,929	1,59,128
Scheduled Tribes (ST)	61	27	34
Literates	8,11,134	5,19,162	2,91,972
Illiterate	7,12,521	3,00,081	4,12,440
Total Worker	6,15,905	4,14,809	2,01,096

Main Worker	4,14,188	3,24,923	89,265
Main Worker - Cultivator	1,95,143	1,62,282	32,861
Main Worker - Agricultural Labourers	1,48,518	1,05,249	43,269
Main Worker - Household Industries	7,762	5,788	1,974
Main Worker - Other	62,765	51,604	11,161
Marginal Worker	2,01,717	89,886	1,11,831
Marginal Worker - Cultivator	48,387	15,341	33,046
Marginal Worker - Agriculture Labourers	1,14,400	49,383	65,017
Marginal Worker - Household Industries	6,790	2,964	3,826
Marginal Workers - Other	32,140	22,198	9,942
Marginal Worker (3-6 Months)	1,68,054	76,166	91,888
Marginal Worker - Cultivator (3-6 Months)	39,471	11,986	27,485
Marginal Worker - Agriculture Labourers (3-6 Months)	96,171	42,499	53,672
Marginal Worker - Household Industries (3-6 Months)	4,947	2,442	2,505
Marginal Worker - Other (3-6 Months)	27,465	19,239	8,226
Marginal Worker (0-3 Months)	33,663	13,720	19,943
Marginal Worker - Cultivator (0-3 Months)	8,916	3,355	5,561
Marginal Worker - Agriculture Labourers (0-3 Months)	18,229	6,884	11,345
Marginal Worker - Household Industries (0-3 Months)	1,843	522	1,321
Marginal Worker - Other Workers (0-3 Months)	4,675	2,959	1,716
Non Worker	9,07,750	4,04,434	5,03,316

Source:http://censusindia.gov.in/

Table 3. 28 Demographic Profile of District

CHAPTER-4

ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

Human activity affects environment. Environmental parameters (such as Ambient Air Quality, Water quality , Soil, Noise level, Flora and Fauna and Socio-economic status) get affected. It has direct relation with health and hygiene of people. Impact on environment may be adverse or beneficial depends on activities it brings on environment changes in physical, chemical and biological status of air, water, land including biota and in socio-cultural life styles. Regular monitoring is required to know current status of environmental parameters. Mitigation measures are required and suggested once values are exceeding the stipulated limit. The potential impacts are identified in the activities and impact on environmental parameters is noted and mitigation measures are explored and implemented.
On the basis of the impact analysis, the mitigating action and future monitoring requirement are focused in the Environmental Management Plan for counting or minimizing adverse impacts.

It is pertinent that river bed sand mining project has environmental impact of major, medium and minor nature. Impacts on various environmental components due to this project, are identified in this section, quantifying the impacts as far as possible, and assessing the impacts a major, medium and minor impacts. Major impacts are those impacts, which are irreversible in nature. Medium impacts are those impacts which are reversible in nature, but in a long or medium duration. Minor impacts are reversible and short term impacts. Impacts identified for this project have been identified within the project site as well as along the transportation route of the mined out mineral.

Vis. a vis to the impacts identified, suitable mitigation measures have also been suggested in this section of the report, which is expected to result in:

a) Avoiding major environmental damage;
b) Minimize major impact;
c) Minimize medium impact; and
d) Restoration of damages, if at all occurring

Impact has been assessed under worst case, considering the mining operation is under full capacity, where quantity of mining, number of labors, number of vehicles used to be maximum as per the approved mining plan.
Prior to identification of impact, a brief summary of: a) project site, b) mode of operation of the project, c) resource requirement for the project and d) transportation route of mined out mineral is to be delineated.

A) Project site: The site having an area of 1,80,000sqm (18.0 Ha), on the River Ken. The river bed within the lease area is not a bend. Nearest distance of the Meandering about 4.30 km from the project site.
B) Mode of Operation: The project will operate under Manual/Semi-mechanized mining. Semi-mechanized method will involve light machineries which will be used for Bar Scalping or Skimming only (i.e. for extraction of sand/ morrum from the surface of bars to avoid ponding effect) while accumulating mounds of sand within the project site. The depth of scraping is maintained for a depth between 0.3 - 0.6 m (1-2 ft). The sand is then manually/semi-mechanized loaded on the trucks and then transported to its designated destination.

C) Resource requirement: The project will require about 100 employees (which includes 1 certified mines Manager/mine engineers/geologist, 2supervisors, 4Guards and 90unskilled/semi-skilled workers). Light machineries included in the project will include light dozer or rubber tired Back Hoe Loaders, Excavators. The manual equipment requirement for the project is hand operated tools like spade, tasla, etc. For transportation of sand, about 178 trucks, dumpers, tippers etc. per day is expected be used if the mine is operated in full strength (as per approved mining plan dated 31/10/2018). The project will require 14.90 kld of water for drinking, sprinkling and Green Belt Development purpose.

D) Transportation route: The loaded vehicles will start from the project site till it meets the National Highway (NH-232) travelling a distance of about 12.79 kms (via Tindwari -Pailani road). Certain stretches, which have been noted for having expected considerable impacts are given below:

a. River bed Approach Road exit: 1.2 km kachcha road (unpaved road)

b. Vehicles crossing three habitation villages- village,Amna Dera, village-Sadi Khadar, and village Khaatiha Kalan.

Impact Assessment and Mitigation Measures

A] SUSTAINABILITY OF MINING

Impact Assessed: The sand/Morrum mining is proposed to be done within the approved lease area which is entirely within the river bed. Unregulated mining on river bed will have significant impact on the river bed, which will lead to have impact on various component like water flow, ground water, topography of the river bed, impact on surrounding etc.

Intensity of impact without Measures: Major/Long term/Irreversible

Mitigation Measures Suggested:

In order to avoid the negative impacts, following measures are followed as per "Sustainable Sand Mining Management Guidelines (SSMMG) 2016" by the Ministry of Environment, Forests and Climate Change, Govt. of India.

- The project lease area is identified as areas of aggradations or deposition where mining can be done as per the District Survey Report (DSR) Banda.
- The ultimate depth of the mining for this project is proposed as per the approved mining plan is 3.0 m from the surface of river bed;
- No mining will be done during rainy season;
- In river flood plain mining, a buffer of 7.5 m is proposed to be left from the boundary of the river bank.
- Mining is proposed to be done by bar scalping and skimming method, in layers of 1 m depth to avoid ponding effect;
- No diversion of stream is to be done;
- The method of mining is proposed to be manual/ semi-mechanized)Bar Scalping or Skimming only) as per SSMMG, 2016

Intensity of impact with Measures: Moderate/Short term/Reversible

On the basis of the impact analysis, the mitigating action and future monitoring requirement are focused in the Environmental Management Plan for counting or minimizing adverse impacts.The following parameters are of significance in the Environmental Impact Assessment study for the proposed project and are being discussed in this section.

- Land environment
- Water environment
- Air environment
- Noise levels
- Ecology & Biodiversity
- Socio-economic environment
- Health

4.1 LAND ENVIRONMENT

On the River bed, the river mining does not carry any overburden/ waste. Waste generated from the one block will be used to refill the previous. There is no waste left to manage at the end of mining activity. Further, there is un-mined area left between the two blocks to avoid runoff and soil erosion of main land into the block, which is strengthen by development of plantation / green area between the two blocks. It is assumed that land will be reclaimed its original land-use after replenishment in monsoon season.

A] TOPOGRAPHY

Impact Assessed:

- The project will be operated within the mining lease area. The mining activity will be carried out leaving a buffer of 7.5 m along the boundary of the lease area. Therefore any change in topography outside the lease area is not anticipated.
- The topography of the river bed will temporarily change due to excavation of sand/morrum from the river bed, leading to depression within the lease area.

Intensity of impact without Measures: Minor/Short term/Reversible

Mitigation Measures Suggested:

- Since the entire operation will be restricted within the mining lease area which is recommended in DSR. Mining operation will be done by leaving safe zone from river channel or river side, therefore the topography of the surrounding of the lease area will not have any impact, no mitigation measures suggested..
- The change in topography within the lease area due to excavation of sand/morrum will replenish during the next monsoon season naturally with flow of water. Hence no mitigation measure suggested.

Intensity of impact with Measures: Minor/Short term/Reversible

B] SOIL EROSION & STABILITY OF RIVER BANK STRUCTURE.

Impact Assessed:

- Erosion of river banks due to haulage road and indiscriminate/unsystematic mining operation
- Natural Slope instability due to indiscriminate/unsystematic mining Operations.

Intensity of impact without Measures: Major/long term/Irreversible

Mitigation Measures Suggested:

- Safety zone or buffer area will be created from the river banks to minimize the instability & erosion and to increase the stability of structures. These safety zones will not be mined out. Apply erosion controls relative to possible soil erosion from vehicular traffic. Mining activities will be confined along the river bed maintaining the specified safety zone.

- Avoid creating excessive slopes during excavation. Slope will be maintained between 45^0 to 30^0 in benches within the mine. In addition, the slope of the haulage road towards the mine to be maintained with a ratio of 1:20. In order to reduce the flood impacts, surrounding vegetation, especially larger trees and shrubs will be preserved.

Intensity of impact with Measures: Minor/Short term/Reversible

C] DRAINAGE

Impact Assessed:

- The project will not attract to any diversion of natural drainage/stream.
- No ponding effect is expected within the lease area due to bar skimming and scalping

Intensity of impact without Measures: Minor/Short term/Reversible

Mitigation Measures Suggested:

- Since no diversion of natural drainage/stream is expected, no measures suggested.
- To avoid ponding effect within the project site, bar skimming and scalping will strictly be followed.
- No mining to be done during rainy season.

Intensity of impact with Measures: Minor/Short term/Reversible

D] LANDUSE

Impact Assessed:

- The entire operation of the project will be done within the river bed (lease area). The land use of the lease area will remain same.

Intensity of impact without Measures: Minor/Short term/Reversible

Mitigation Measures Suggested:

- Mining operation shall strictly be within the lease area. No measures suggested.

Intensity of impact with Measures: Minor/Short term/Reversible

E] GEOLOGY

Impact Assessed:

- The entire operation of the project will be done within the river bed (lease area), which is an alluvial plain and situated on longitudinal sand bar/natural levee. The Geology of the lease area will remain same.

Intensity of impact without Measures: Minor/Short term/Reversible

Mitigation Measures Suggested:

- Mining operation shall strictly be within the lease area. No measures suggested.

Intensity of impact with Measures: Minor/Short term/Reversible

F] HYDROLOGY

Impact Assessed:

- The mining operation of the project affects the hydrology or aquifer system of the area.
- Impact on ground water recharge potential as the thickness of the natural filter materials (sediments) is reduce causing less infiltration .
- Due to Mining activities depth will be increased, which may result in increase of flow velocity of river water cause to leading the bank erosion.

Intensity of impact without Measures: Minor/Short term/Reversible

Mitigation Measures Suggested:

No diversion is proposed. There will not be any adverse impact on flow pattern, surface hydrology and ground water regime

- The entire operation of the project will be done within the river bed (lease area), which is an alluvial plain and shallow aquifer system of alluvial sand , the thickness of shallow aquifer system of alluvial sand varies from surface to 25m along the topography. This formation is overlain on rocky terrain. Shallow water table varies between 10 to 15mbgl in this area. The ultimate mining depth will be maximum 3.0 m or 1.0m above the ground water table, whichever less. Therefore, the mining will not intersect the ground water table.
- Mining will be done as per approved Mine Plan, Mining Methodology (Bar Scalping and Skimming) and applicable Rules & Regulation, so that there is no damage on ground water recharge potential due to sand/morrum mining.
- Mining activities will be restricted to 3.0 m depth, which will not cause much change in flow pattern of the river. Proper safety zone will be left from channel side of river and 7.5m Buffer zone from the lease boundary, which will minimize the chances of bank failure.

Intensity of impact with Measures: Minor/Short term/Reversible

G] IMPACT ON LAND

Impact Assessed:

- Land contamination (by diesel, oil etc.) due to movement of site vehicles.

Intensity of impact without Measures: Minor/short term/Reversible

Mitigation Measures Suggested:

- Equipment's will be regularly serviced and inspected to make sure that there are no leakage of oil, diesel, fuel, detergents or hydraulic fluids.
- Servicing and maintenance of vehicles as far as possible will occur outside of the boundaries of mining lease area/River Bed. If maintenance does occur on site due to breakdown, all steps will be undertaken to avoid hydrocarbon spills/leakages.
- If sudden breakdown occurs to any vehicle inside the mine, to manage this condition a toe vehicle is provided at mine site. if any oil and lubricant leak out from the any vehicle, the it will be collected in separate containers /bins provided at the site and given to the approved vendors by CPCB or UPPCB.
- Under no circumstances will oil or diesel to be stored and disposed off at the site
- To avoid the spillage No night parking of vehicles in the mining lease area.

Intensity of impact with Measures: Minor /Short term/Reversible

H] CLIMATOLOGY

Impact Assessed:

- No macro/micro climatic change is expected due to this project and its activities.

Intensity of impact without Measures: Minor/Short term/Reversible

Mitigation Measures Suggested:

- No measures suggested.

Intensity of impact with Measures: Minor/Short term/Reversible

I] SEISMICITY

Impact Assessed:

- The propose project falls under the seismic zone –III. Since this project will not have physical infrastructure to be constructed, no impact of seismicity is envisaged in this project. Further, this project will not change/alter the seismic behavior of the area.

Intensity of impact without Measures: Minor/Short term/Reversible

Mitigation Measures Suggested:

- No measures suggested.

intensity of impact with measures: Minor/Short Term/Reversible

4.2 AIR ENVIRONMENT (AMBIENT AIR QUALITY)

Anticipated Impacts and Evaluation: Information on air quality was studied and various modelling techniques predicted that the mining activity is not likely to affect the air quality in a significant manner. However, loading of sand/morrum ,its transportation and unloading operations may cause some deterioration in air quality due to handling dry materials. In the present case, only wet materials will be handled, thus eliminating problems of fugitive dust. Also, the collection and lifting of minerals will be done manually without any blasting. Therefore the dust generated is likely to be insignificant as compared to mining processes involving drilling, blasting, mechanized loading etc.

Air Modelling: In case of river bed sand/morrum mining, as there is no blasting and drilling activities, wet sand/morrum handling will limit the impacts only to fugitive dust by transportation on unpaved road and vehicular emission. The distance of unpaved road for each project is limited upto the connectivity of nearest major road. The major road will not produce fugitive dust. Therefore, in case of pucca road modelling was carried out for emission likely due to vehicular transportation. The impact due to vehicular transportation was assessed by modelling practice.

Mining activities at the proposed site will have adverse impact on Ambient Air Quality. Movement of trucks &dumpers and mining machines, piling, loading and unloading of materials, are the potential parameters responsible for Air Pollution. Base line value represents Air Quality of the area when there are no project activities. Impact of project activities on Ambient Air Quality are predicted with emission factor of particulate matter and meteorology as input of the model through the Air Quality Dispersion Model discussed below:

Vehicular Load Emission using Caline 4: The Caline 4 Model has been deployed to assess the emission load likely due to transportation of minerals in trucks. Modeling for the project has been done for taking comprehensive approach including the entire vehicular load expected from other mines on the same side.

Emission Rate: The details of emission rate considered for the project are as follows

VEHICLE EMISSION STATEMENT

Mine	Category of Vehicles	Expected No. of Vehicles/hr	Emission Rate (g/kmS)		
			PM	NOx*	CO*
Sadi Khadar	Truck	15	0.002	0.036	0.015

Source -CPCB

Model Assumption: The emission load has been evaluated by Caline 4 for Vehicular Movement. The average meteorological data of Summerseason (Oct 2018 to Dec 2018) was considered as meteorological input for model study. CALINE 4 dispersion model software was run by using data on link geometry, traffic volume and environmental receptors given in the table above. The output results at various distances from the road are presented in Table below.

INCREMENTAL POLLUTION DUE TO VEHICULAR TRANSPORTATION

Distance from the Road (m)	Incremental GLCs (µg/m³)		
	SPM	NOx	CO

20	**0.6**	**85.0**	**38.0**
50	**0.4**	**57.0**	**25.0**
100	**0.1**	**14.0**	**6.0**

It is evident from the above table the impact due to vehicular movement shall get almost normalized at a distance of approximately 100m on either side of transporting road.

Impact Assessed:

- Dust generation is expected from site preparation which will cause increase in the level of PM2.5 and PM10 in the atmosphere leading to air pollution and will have health impact tothe workers on site. Nearest residents will not get much affected as the nearest habitation is village is Sadi Khadar which is located at a distance of about 1.10 Km in S of the lease area. Further, as well as for nearby habitants.
- Dust generation due to bar scalping and skimming by light loaders which will cause increase in the level of PM 2.5 and PM 10 in the atmosphere leading to air pollution and will have health impact to the workers on site as well as for nearby habitants;
- Dust generation due to loading of sand in transport vehicles which will cause increase in the level of particulate matter in the atmosphere leading to air pollution and will have health impact to the workers on site as well as for nearby habitants;
- Dust generation due to the loose dry sand during transportation which will cause increase in the level of PM 2.5 and PM 10 in the atmosphere leading to air pollution and will have health impact to the workers on site as well as for nearby habitants of village, Sadi Khdar village Garaha and Bajemau village;
- Dust generation from movement of transport vehicles during transportation on unpaved road from the river bank to Village exit point which is about 1.2 km stretch. This will cause increase in the level of PM 2.5 and PM 10 in the atmosphere leading to air pollution and will have health impact to the Sadi Khadar Village habitants;
- Fugitive emission from combustion of fuel during operation of light machineries used for bar scalping and skimming operation which will emit SOx, NOx, CO2, CO, HC etc. leading to air pollution and will have health impact to the workers;
- Fugitive emission from combustion of transport vehicles which will emit SOx, NOx, CO2, CO, HC etc. leading to air pollution which will have health impact on the Sadi Khdar village Garaha and Bajemau village habitants:

Intensity of impact without Measures: Major/Medium term/Reversible

Mitigation Measures Suggested:

- Sprinkling of water will be done along the entire lease area prior to site preparation. This will lead to reduction in dust generation during site preparation;
- The area to be scalped or skimmed will have water sprinkling done prior to scalping/ skimming. This will lead to reduction in dust generation during scalping and skimming process;
- During the loading activity, dust mask will be provided to be labours working at the project site. This will lead to minimize direct inhaling of dust in the form of PM2.5 by the workers;

- The mined out sand/morrum will be properly covered in the transport vehicle by tarpaulin sheet. It will be ensured that the tarpaulin sheets are not torn and the cover does not have any leakage to cause spilling along the transport. This will lead to reduction in dust generation due to spillage of sand/morrum during transportation;
- The unpaved road having stretch of 1200m will be redeveloped by the project proponent. The unpaved road will be widened minimum of 6 m and the road will be paved by the project proponent at its own cost. This will lead to reduction of dust generation during transportation;
- Proper maintained and PUC certified light machineries will be deployed for bar scalping/ skimming mining excavation of sand/morrum. This will lead to emission of fugitive gases within permissible limit;All transport vehicles will be properly maintained and PUC certified. In addition, overloading of sand/murrum beyond the permissible capacity will strictly be prohibited. This will lead to emission of fugitive gases within permissible limit;

Intensity of impact with Measures: Medium/Short term/Reversible

4.3 WATER ENVIORNMENT

Impact Assessed:
Impact for this project is assessed for Surface and Ground water.

- Spillage and leakage of oil and grease from light machineries and transport vehicles operating on river bed will cause contamination of the river water leading to water pollution.
- Dumping of waste including food waste, plastic waste and other wastes by labors will cause contamination of river water leading to water pollution. Assuming 50 gm of solid waste generation per head, the total quantity of waste generated is expected to be 6.25 kg per day.
- Open defecation by labors will cause contamination of river water leading to water pollution
- Washing of vehicles on river bed will contaminate river water leading to water pollution.
- During transport, the transport vehicles are to travel on 1000 m kachha road and 5.0 km mettaled road at Major Village Road .In case of overturning of vehicles due to rough driving or in case of accident, the entire sand/murrum will be dumped into the road to physical and environmental damage.
- During transport, the transport vehicles are to travel near village Kewat Purwa village, , crossing one irrigation canal at about 2.0km from Project Site on transport route toward NH-232. In case of overturning of vehicles due to rough driving or in case of accident, the entire sand/morrum will be dumped into the canal, leading to physical and environmental damage to the pond/canal.
- Leakage of oil and grease from light machineries and transport vehicles on land will ground water contamination leading to ground water pollution. Since most of the

water supply in the region is from ground water as source, the leaching of oil and grease in ground water may lead to health impact to the users.

Intensity of impact without Measures: Major/Long term/Reversible

Mitigation Measures Suggested:

- No vehicles/ light machineries will be allowed to enter the river bed if found leakage of oil and grease. In addition iron sheets/checker plates will be used for movement of vehicles will also enable identification/detection and any kind of spillage and leakage of oil and grease from the transport vehicle on river bed, while prohibiting leaching to the river bed.
- Two bin system will be used while placing a number of bins (Blue and Green) at various locations of the work place. The blue bins will be used for storing organic waste while green bins will be used to store other wastes like plastic/wrappers etc. Smoking and consumption of alcohol and tobacco will strictly be prohibited. The labours will be made aware of the system prior to engagement and start of work. The stored waste will be collected everyday and disposed off at not less than 1 km away from the river bank or 500 m from any other water body. Very small amount of waste water will be generated due to washing of hands during lunch time .this waste water will be collected separately in a container and it will be used in sprinkling & spraying of haulage road.
- Mobile toilets will be provided by the project proponent at the project site, but not on the river bed. All labours will be made mandatory to use these toilets. Cleanliness of the mobile toilet will be checked at every four hourly basis so that the users are encouraged to use the toilets. Open defecation will strictly be prohibited.
- Washing and cleaning of vehicles on river bed and using river water will strictly be prohibited.
- All the drivers of transport vehicles will be instructed to drive vehicles at a speed not more than 20 km/hr along the Haulage Road. In case of any overturning of vehicles in the Canal, irrigation department will be intimated soon and remediation of sand from the canal will be initiated in presence of the officers of irrigation department.
- No vehicles/ light machineries will be allowed to operate if found leakage of oil and grease.
- Oil and lubricants will not be stored on mining site. It will be ensured that the scraper, hydraulic excavator and front-end loader are properly maintained. Equipments will be regularly serviced and inspected to make sure there are no leaks of oil, diesel, fuel, detergents or hydraulic fluids. Servicing and maintenance of vehicles as far as possible will occur outside of the boundaries of mining lease area. If maintenance does occur on site due to breakdown, all steps will be undertaken to avoid hydrocarbon spills/ leakages. Under no circumstances will oil or diesel to be disposed off at the site.
- The mining will be carried out up to a depth of 3.0 m or water level, whichever is less. Therefore there will be no interfacing of the activity to the ground water.

- No pumps/ bore well will be constructed at the project site. Water demand will be met through tanker water supply by private vendors from nearby villages.
- As Per SSMMG, 2016 MoEFCC ,GOI. one Dug well will be installed near the project site. and monitoring of water level carried out monthly.
- Twice in a Year monitoring of water samples will be done as precautionary measures.

INTENSITY OF IMPACT WITH MEASURES: Minor /Short term/Reversible

4.4 NOISE ENVIORNMENT

- The major sources of noise pollution are vehicles transporting the mined out minerals. The trucks proposed to be used for transportation of minerals are anticipated to produce noise levels in the range of 80 – 85 dB(A). The material transportation road passes through populated areas at villages and several sensitive receptors such as forests are located along the road, people in these places will be exposed to the increased noise levels. It may have negative environmental impacts on the sensitive receptors close to the project road.

NOISE LEVEL VARIATIONS WITH VEHICLE SPEED

Speed (kmph)	Noise Level due to Truck in dB(A)
40	76.0
50	80.0
60	81.0
70	81.5
80	82.0
90	83.0
100	83.5

Source: FHWA Traffic Noise Model User Guide, version 2.5

Impact Assessed:

- Noise pollution caused by loud music and blowing horns increases stress, causes distraction & discomfort and deprives peace of mind.
- Noise generation due to use of light machinery

Intensity of impact without Measures: Minor/short term/Reversible

Mitigation Measures Suggested:

- The village Sadi Khadar is situated 1.10 km away from mine lease area in S direction. Therefore impact is negligible due to human noise generated within the project site. Drivers of the transportation vehicles will be instructed for not blowing horns unnecessarily.
-
- Regular maintenance and proper management of deployed machinery will be ascertained and entire mining operation will be carried out in day time only.
-

Intensity of impact with Measures: Minor /Short term/Reversible

4.5 SOCIAL IMPACT ON SOCIO-ECONOMIC ASPECT

- The area is considered as industrially backward. The population in general does not have opportunities of earning from employment. The only employment to depend on is agriculture, which is seasonal.

- In the absence of any high employment potential activities, the people are economically backward. The Mining operations will provide employment opportunities to the persons of nearby areas.

- The various indirect employment opportunities will also be generated. Several persons of the Neighboring villages will be benefited with contract works, employment through contractors, running of jeeps, trucks, tractors water tankers and bullock carts on hire, and transport related business avenues.

  There will be some people who are engaged in trading of sand/morrum. Therefore due to mining of sand/morrum .There is possibility of the per capita income improving.

V = Volume in PCU per day	C = Capacity of PCU per day for Intermediate lane roads	Existing V/C ratio	LOS as per IRC
3564	15000	0.27	B

4.6 HEALTH

Impact Assessed:

- Extraction from riverbanks and beds and the resultant generation of workers of sand mining sector are suffering from occupational hazards like skin allergies, eye and respiratory problems etc.
- Further, the deep pits created in the channel also can contribute to an increase in accidents in the working environment. This creates serious threat to residents in the area who depend on river water for their domestic purposes.
  The major source of socio-health impacts of transportation will stem from truck fumes, dust generation and movement. Increase in accidents as a result of rash driving of dumpers carrying sand through the roads may be a possibility.

Intensity of impact without Measures: Minor/short term/Reversible

MITIGATION MEASURES SUGGESTED:

- In each of the areas of impact, measures have to be taken to reduce potentially significant adverse impacts and where these are beneficial in nature, such impacts are to be enhanced /augmented so that the overall adverse impacts are reduced to as low level as possible.
- It has to be ensured that all the workers are recruited locally so as to generate employment in the area.
- Welfare activities should be initiated in the area so as to improve the quality of life of the local people.

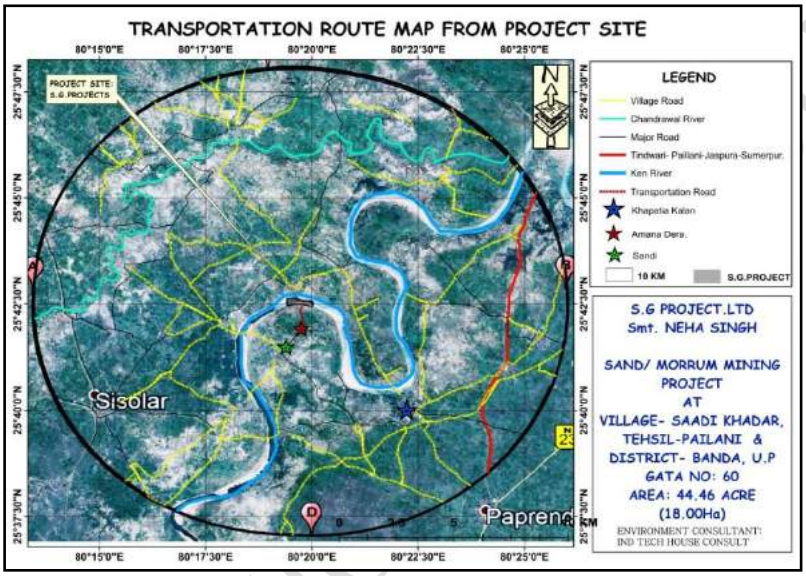
Existing Traffic Scenario on Tindwari-Pailani Road (Towards-NH-232)

Intensity of impact with Measures: Minor /Short term/Reversible

4.7 TRAFFIC STUDY

The information on traffic volume is an important input required for planning, analysis, design and operation of roadway systems. Table 4.4 shows the existing Level of Service (LOS) of the roads that will be used for transportation of the mined minerals.

Evacuation Route: The roads connect from the mine site to Towards-NH-232 via Tindwari Pailani Major Road. These roads are wide enough to facilitate easy and smooth movement of heavy duty trucks. During mine operation, the truck movement will be as follows:



Transportation route of the proposed project

Level of service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by drivers/passengers. 6 LOS are recognized commonly, designated from A to F. **Table 4.5** show the relation between V/C ratio and LOS

RELATION BETWEEN V/C RATIO AND LOS

V/C ratio	LOS	Performance
0.0-0.2	A	Represents a condition of free flow (Excellent)
0.2-0.4	B	Represents a zone of stable flow (Very Good)
0.4-0.6	C	The general level of comfort and convenience declines noticeably at this leve (Good / Average / Fair)
0.6-0.8	D	Represents the limit of stable flow (Poor)
0.8-1.0	E	Represents operating conditions when traffic volumes are at or close to the capacity level (Very Poor)

Source: IRC Guidelines 64-1990

During Mine operation
Proposed Capacity of mine/annum: 3,60,000m3 Per Annum

No. of working days : 225 days
Proposed Capacity of mine/day: 1600m3
Truck Capacity: $9m^3$
No. of trucks deployed/day: 178
No. of trucks deployed/hour : 22
Considering both loaded & empty trucks
Increase in PCU/day will be 474 PCUs

TRAFFIC SCENARIO IN PRESENCE OF MINING OPERATION

V = Volume in PCU per day		Combined Volume of PCU per day	C = Capacity of PCU per day for intermediate New V/C ratio lane roads	New V/C ratio	LOS as per IRC
Existing IRC (2018)	Incremental (on project initiation)				
3564	474	4038	15000	0.27	B

Source: IRC Guidelines 64-1990

Results

From Table 4.5 and 4.6, it can be concluded that the incremental load on the carrying capacity of the concerned roads is not likely to change the LOS of the roads and unlikely to have any significant impact. From the traffic study it is observed that due to the additional traffic load on the existing road sand/morrum highways the LOS of the village road as well as the highway will remain "B" i.e."Very Good". Moreover, to avoid the adverse effect on the concerned roads due to additional load, traffic management has been proposed as given below.

Traffic Management:
1. Roads will be repaired regularly and maintained in good conditions
2. A supervisor will be appointed to regulate the traffic movement near the site.
3. Speed breakers will be constructed accident prone areas to calm the traffic and its speed.
4. Signage will be erected at the sensitive & precarious places to caution or provide information to road users.

4.8 ECOLOGY & BIODIVERSITY

IMPACT ON FLORA

- As it is a mining project of sand from river bed, activities will be confined to core zone only. Thus no direct impact is foreseen on the flora of the forested area because of mining, whereas activities related to mining as transportation of minerals and passage of workers to and fro from mining area will have an adverse impact on the road side flora.

- Significant reduction in total chlorophyll content at road side plant species affects the plant species by affecting the plant metabolism. The reduction in chlorophyll concentration corresponds directly to the reduction in plant growth.
- The new linear surface creates a new microclimate and a change in other physical conditions which may extend to varying distances from the road edge. Plant mortality and biological community may extend this along the edge and such mortalities may extend from the road edge for varying distances.
- The newly created edge provides habitat for edge species.
- The run-off from the roads may affect the aquatic communities.
- Emissions, litter, noise and other physical disturbances may extend into road side vegetation for varying distances and result in changes in species composition

MITIGATION MEASURES

- Plantation will be carried out on approach roads and nearby vicinity at river banks areas.
- Native plant species which are stress and pollution tolerant and comparatively well acclimatized should be grown along roadsides. For selection of plant species it is necessary to consider certain factors as agro climatic suitability, height and canopy architecture, growth rate and habit and aesthetic effect (foliage, conspicuous and attractive flower color). The plants selected should be hardy so as to withstand severe climatic conditions and should not use much of irrigation.
- Annual bio-monitoring of roadside plants exposed to vehicular pollution will be done to check the dust load and Air Pollution Tolerance Index (APTI).

IMPACT ON FAUNA

The mining, specifically, will have no adverse impact on fauna whereas the operational activities such as human activity, transportation and noise generation may have an adverse impact on fauna.

- As it is a forest area, chances of vehicle collisions with wildlife attempting to cross roads are possible.
- Loud sounds generated by human activities and transportation may have an adverse impact on terrestrial fauna and avifauna.
- The use of roadside habitats by animals that communicate using acoustic signals, such as birds, presents an interesting tradeoff between the presence of suitable habitat and the potentially detrimental effects of traffic noise and passing vehicles on survival rates, and breeding success.
- Some fauna will move from the area of the road side as a result of habitat loss and physical
disturbance.
- Indiscriminate sand mining from active channels of rivers causes many adverse effects on the benthic fauna, which inhabits the bottom sandy substratum. Excessive sand extraction from rivers affects the eco-biology of many terrestrial insects whose initial life history begins in aquatic environments.
- In the fisheries point of view, loss of food in the form of benthic invertebrates is a major negative impact which will ultimately end up in the decline of inland fishery resource of the area.

MITIGATION MEASURES

- To the extent practicable, the right-of-way (ROW) to avoid residential areas and important wildlife habitat areas (e.g., rookeries, raptor nesting areas, calving areas).
- All equipment should have sound-control devices no less effective than those provided on the original equipment. Motorized equipment used should be adequately muffled and maintained.
- Use exhaust silencers and optimized acoustical pipe lagging (acoustical wrapping) to minimize compressor noise.
- A strict monitoring of the mining activity is utmost essential for reviving the health of the river ecosystem and in turn aquatic biology will be benefited.
- No mining will be carried out during the rainy season to minimize impact on aquatic life.
- As the mining site has no vegetation, thus clearance of vegetation is not required. Thus there will be no loss for wildlife.
- Sand extraction in vegetated riparian areas will be avoided.
- Undercut and incised vegetated banks will not be altered.
  Large woody debris in the riparian zone will be left undisturbed or replaced when moved and not be burnt.
- Sand stockpiles and/or vegetative debris will not be stored within the riparian zone.
- It is essential the spillage generated is evenly redistributed over mined voids as soon as possible after the operation has been completed.
- Operation and storage of heavy equipment within riparian habitat will be restricted.
- Access roads will not encroach into the riparian zones.
  The removal or disturbance of in stream roughness elements during sand extraction activities will be avoided and those that are disturbed will be replaced or restored.

4.8.1 PLANTATION

The lease area is in the river bed and devoid of any vegetation. Mining activities will not cause any harm to riparian vegetation cover as the working will not extend beyond the offset left against the banks. Plantation willbe carried out as social forestry programme in villages, school and the areas allocated by the Panchayat / State authorities.

Plantation has been proposed on both sides of the roads as greenbelt to provide cover against dust dissemination. A massive plantation will be done nearby the mine area to mitigate the ill-effects of mining and to improve environment of its surrounding area.

A suitable combination of trees that can grow fast and also have good leaf cover shall be adopted to develop the greenbelt. It is proposed to plant native species along with some fruit bearing and herbal trees during the plan period 26 Plants/Ha plantation

Year	Saplings to be planted	Survival (@ 80%)	Species	Place of Plantation
I	475	380	Khair, babul, Deodar,Shisham, Buri, Simbal, Gulmohar , apples, almonds,	Along the roads, in Schools and public Building and
II	475	380		
III	475	380		
IV	475	380		
V	475	380		

TOTAL	2375	1900	melons, and Laukats etc	other Social forestry Programme with consultation of the panchayat / state authorities

Native plants like Khair, babul, Deodar, Shisham, Buri, Simbal, Gulmohar , apples, almonds, melons, Laukats and other local species will be planted. The management will give emphasis on plantation and will also motivate local persons for plantation during rainy season. This will also increase the consciousness in workers and near-by villagers for greenery. Fruit trees can contribute towards their financial gains.

CHAPTER-5

ANALYSIS OF ALTERNATIVES

5.0 ANALYSIS OF ALTERNATIVES

5.1 INTRODUCTION

Mining of minerals is site specific in nature and the location of the proposed project is restricted to the geology and mineral deposition of the area. Safety, economical and technical constraints determine the mining methods to be employed. Unlike other industries, the project cannot be shifted to other sites.Therefore, utilization of sand/morrum through scientific mining methodologies (sustainable mining) at the stretch of Ken basin at the village Sadi Khdar, Tehsil Pailani and District Banda in the state of Uttar Pradesh will support growth in nearby areas and Uttar Pradesh State at large.

SITE: The propose site for mining activities was allotted in favour of S.G Projects Limited, Prop. Smt Neha Singh intends to extract River Sand/morrum from the River Bed Mineral of Ken River of as per vide letter No. 1083/Khanij-30(E-tender 2018 Banda dated 27 May 2018for a period of five years, by the Dept. of mines and Geology, Govt. of Uttar Pradesh at Khand No/,Gata No-60 Village- Sadi Khadar, Tehsil- Pailani , District- Banda, for sand/morrum mine of Area (18.0 Ha) in the District Uttar Pradesh . **Alternate site is not possible as proposed site was allotted by the Dept. of Mines & Geology, Govt. of Uttar Pradesh to the said allot tee on the basis of highest royalty for Minor Mineral Mine (18.00Ha) as Royalty to State Govt.** The site details is discussed in Chapter 3 of EIA report.

5.2TECHNOLOGY

The proposed technology was approved by the Dept. of Mines & Geology, Govt. of Uttar Pradesh. Technology will not change during mining activities. This project is proposed for the excavation of sand/Morrum from the bed of river Yamuna. It is an opencast semi mechanized mining project to excavate sand in its existing form for direct usage as a construction material. Sand excavation will be carried out up to a depth of 3.0 m or 1.0 mabove the ground water table or whichever is less by using light weight excavators. Mining will be carried out in 1 Block with the Approved Mining Plan and Year wise proposed production details as per approved Mining Plan are given below:

Year	Production
1St	3,60,000m3 /Annum
2nd	3,60,000m3 /Annum
3rd	3,60,000m3 /Annum
4th	3,60,000m3 /Annum
5th	3,60,000m3 /Annum
Total	18,00,000 m3

5.3 MINING METHODOLOGY

As per Uttar Pradesh Minor Mineral Concession Rules, 1963 and "Sustainable Sand Mining Management Guidelines (SSMMG) 2016" *by the Ministry of Environment, Forests and*

*Climate Change, Govt. of India.*extraction of sand/Morrum in bench mode will be limited to 3.0 m depth, the depth and width of working bench will be 1m and 10m respectively and bench will advance parallel to the bank of the river. Extraction activities will start in the block from the upstream to downstream side. This will not obstruct the movement of water, if any, during monsoon period in the river course. Roads in the lease area for the movement of loaded tippers/ trucks will not have slopes more than 1: 20. Roads will be properly maintained and water sprinkling will be used for dust suppression. Lease area will have its own approach road, which already exist and is well connected to main highways. Light weight excavators will be used for loading of mineral in tippers/trucks.

5.4 CONCEPTUAL MINING PLAN

The digging depth will be restricted to 3.0 m only or 1.0 m above the ground water table. This will be further get replenished during the rainy season. The reserves of proved River Bed Material estimated on surface geological plan are to the tune of 3,60,000 $m^{3/}$ Annum The deposit in the river bed will never exhaust. The material will be regularly replenished during floods by the action of river water.

5.5 CONCLUSION

Analysis of alternate site /technology is not possible as proposed site was allotted by the Dept. of Mines &Geology, Govt. of Uttar Pradesh to in favour of S.G Projects .Ltd., Prop. Smt.Neha Singh based on the highest royalty to the State Govt. for the mining lease among the other bidders. This is site specific project and technology is approved in the mining plan. Mining plan is approved by the competent authority which finalizes the method of mining, cost and schedule for the proposed project, involvement of man power and materials. Change in site and technology are not applicable for the proposed project.

CHAPTER-6
ENVIRONMENTAL MONITORING PROGRAMMES

6.0 ENVIRONMENTAL MONITORING PROGRAMME

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.

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 socioeconomic 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.

6.1 MONITORING METHODOLOGIES AND PARAMETERS

Air Quality Monitoring

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

Parameter	Analytical technique	Technical Protocol
Particulate Matter 10	Respirable Dust Sampler (Gravimetric method)	IS-5182 (Part 23)
Particulate Matter 2.5	Fine Particulate Sampler (Cyclonic method)	Guidelines for the Measurement of Ambient Air Pollutants, Volume-I(IRDH/SOP/AAQM/01)
Sulphur Dioxide	West and Gaeke	IS-5182 (Part 2)
Oxides of Nitrogen	Jacob and Hochheiser	IS-5182 (Part 6)

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-105

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

6.2 MONITORING SCHEDULE

S.No.	Description of Parameters	Schedule of Monitoring
1	Air Quality	24 hourly samples twice a year each except monsoon season
2	Water Quality (Surface & Groundwater)	Twice 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	Plantation monitoring	Once in a season

6.3 MONITORING SCHEDULE – IMPLEMENTATION

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

The major attributes of environment are not confined to the mining site alone. Implementation of proposed control measures and monitoring programme has an implication on the surrounding area as well as for the region. Therefore, mine management should strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented within the mining area relating to the following specific areas:

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, stationary and mobile sources, 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.

6.4 BUDGET ALLOCATION FOR MONITORING

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

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:

Sr.No	**Description**	**Cost to be incurred (in lakhs/annum)**
1	Air Quality	1.50
2	Water Quality (Surface & Groundwater)	0.80
3	Soil Quality	0.60
4	Noise Level	0.60
5	Haulage Road Maintenance	2.0
	Total	**5.50**

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.

CHAPTER-7

ADDITIONAL STUDIES

7.0 ADDITIONAL STUDIES

7.1 INTRODUCTION

All types of industries face certain types of hazards which can disrupt normal activities normal activities abruptly and due to disaster like fires, inundation, failure of machinery to name a few. Similarly Riverbed mines also have risks which need to be addressed for which a disaster management plan has been formulated with an aim of taking precautionary steps to avert disasters and also take such action after Disaster which limits the damage to minimum. The following natural/industrial problems may be encountered during the mining operation.

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

7.2 PUBLIC CONSULTATION

The public consultation for this project was held on 25.07.2019 The Public hearing Notice is shown below which was published on 23.6.2019 in the regional news papers, The Times of India.

The records of the proceedings are attached at (Annexure IX A) and the action plan Along with budget allocation is attached as (Annexure IX B).

7.3 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:
i. Elimination of hazards
ii. Substitute something safer
iii. Use engineering/design controls
iv. Use administrative controls such as safe work procedures
v. 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 work place 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.

7.4 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 Sub divides 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

Risk Likelihood Table for Guidance

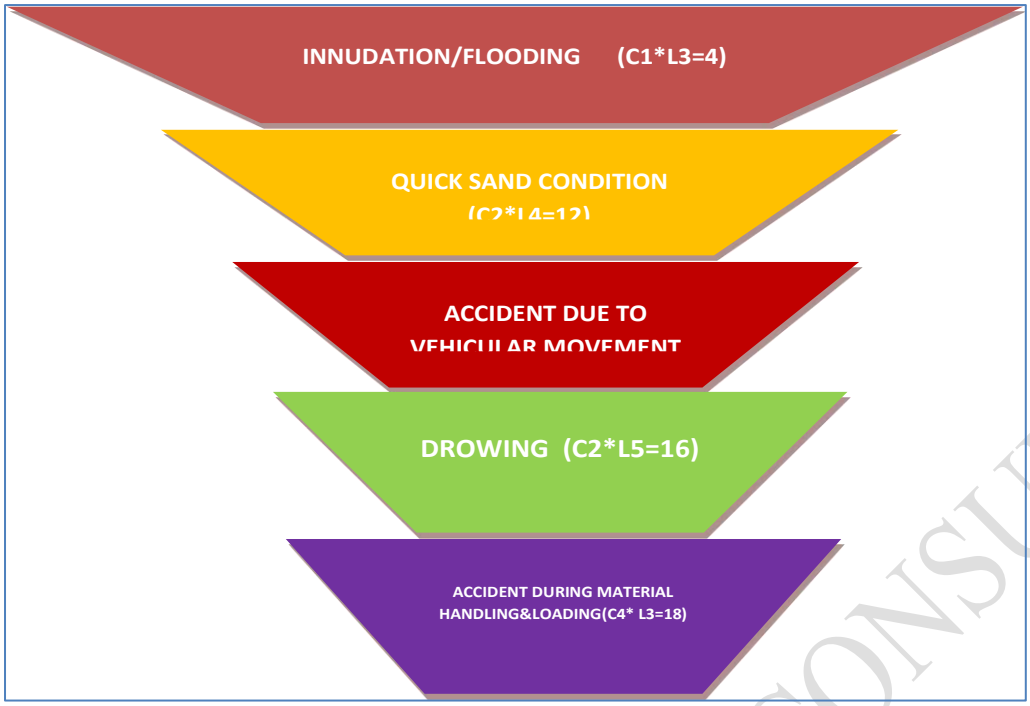
Step 1: Assess the Likelihood				Step 2: Assess the Consequences		
L1	Happens every time we operate	Almost Certain	Common or repeating occurrence	C1	Fatality	Catastrophic
L2	Happens regularly (often	Likely	Known to have occurred "has happened"	C2	Permanent disability	Major
L3	Has happened (occasionally)	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.

Risk Rank Likelihoods 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)



There are various factors, which can create unsafe working conditions/hazards in mining of Minor minerals from river bed.
The key risk (hazard x probability) event rating associated with sand bed mining and to assess its consequences of such events occurring and the likelihood based on above Table-2 are as:-The Risk rating of such hazards is as follows:

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 be 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

7.5 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 bed 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.

7.6 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.

7.7 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

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 river bank collapse, over thrown Boulders/pebbles, injuries due to carelessness use of hand tools, etc.

Measures to Prevent Accidents during material handling & loading

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.

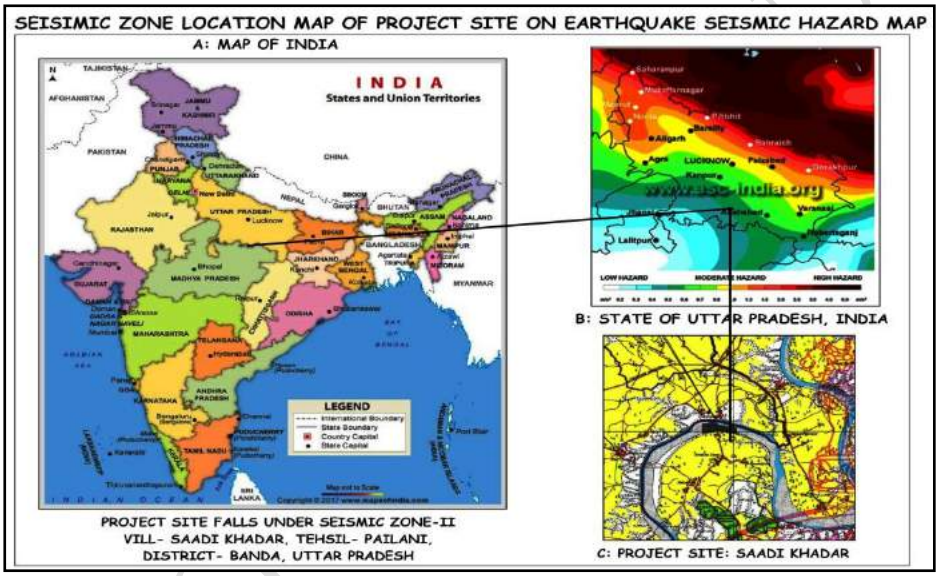
All the activities will be done under strict supervision/control to avoid anticipated accidents so that the risk is reduced to a level considered As Low As Reasonably Practicable (ALARP) Conditions which are adequately safe and healthy.

7.8 DISASTERS& ITS MANAGEMENT

Anticipated Disasters & its Mitigation Measures

1.**Floods:** The area is prone to floods. However bank protection has been taken care by the govt. by constructing of flood embankments/retaining walls/check dams, etc. Precautionary measures will be taken to avoid the effects on the workers at the site if the disaster occurs.

2. **Earth Quake:** The lease area falls in seismic zone 2 which is moderate intensity zone. However there will be no impact as there is no built-in structure at the site.



7.9 SOCIO-ECONOMIC IMPACT OF THE PROJECT & SAFETY MEASURES

INTRODUCTION

Socio-Economic Impact Assessment (SEIA) refers to systematic analysis of various social andeconomic 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 kilometres 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, Socioeconomic 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.

7.10 OBJECTIVES OF SEIA

The prime objective of the current study is to assess the impact of the proposed sand/morrum mining project on socio-economic characteristics of people living in the neighbourhoods. 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 population composition
The impact of the proposed mining project on population composition will be marginal as only few skilled and managerial staff will be recruited from outside and the rest will be recruited locally. The impact will be significant if a large number of people from outside get employed in the proposed project. In that case not only the population of the study area will go up but also the skewed sex ratio may make permanent social effects like rise in exploitation of women, higher crime rate, increase in sexual diseases and depression among youth.

Impact on employment generation
The proposed sand mining project is expected to provide employment opportunities to workers. It is understood that all the persons to be deployed for various mining activities will be recruited locally and there is very little scope for migration of people from outside the study area. The employment potentiality of the project is expected to ameliorate the economic condition of the families of those persons who will get employed in the proposed mining project. However, the mining project will provide seasonal employment. Further, the project will provide direct employment to about 100 people who will be involved in segregation of extracted mining materials, petty business and service oriented industries.

Impact on Health
Extraction of sand/morrum from the river bed poses serious health risks due to dust, quarrying of sand/morrum. The effects will vary depending upon the nature of the dust particles, silica content in it and the size of the particles. Pneumoconiosis is an occupational lung disease often caused to miners, due to the inhalation of dust. Silica content in the sand may also lead to Silicosis, which is again an occupational lung disease. Miners may also suffer with occupational respiratory ailments, skin allergies etc, but the same are preventable

if exposure is minimized. Further, regular health check-up of the miners is required to prevent any negative impact on their health. In the present mining project, no adverse impact on health is expected if minimum precautions are taken by the miners.

IMPACT ON INCOME

In India poverty is widespread. Uttar Pradesh is one of the worst poverty ridden states in India, with per capita income of Rs. 26,051. The proposed mining project at Sadi Khadar is expected to provide casual employment to workers. According to Department of labour, Government of Uttar Pradesh each unskilled worker is eligible to get a minimum basic wage of Rs. 191.66 per day. In addition they will get V.D.A amounting to Rs. 62.11 per day. Thus the total amount an unskilled worker is expected to get is Rs 253.77 per day. Further, a semi-skilled worker will get a basic wage of Rs 210.83 and V.D.A amounting to Rs. 68.32 making the total amount of Rs. 279.15 per day. Lastly, a skilled worker can expect to get a minimum wage of Rs. 236.54 and V.D.A amounting to Rs. 76.53 making the total amount of Rs. 313.07 per day. The impact of the proposed mining activity on household income in the study area is thus positive since it will provide employment to local people, which will result to an increase in household income of those workers who will be recruited for mining operation. However, this impact will be effective for a limited period of 225 days in a year.

Impact on consumption pattern

The field survey has revealed that people in the study are poverty ridden. Increased household income may slightly change the consumption pattern of few but majority of the people will continue to be burdened with poverty.

Impact on road development

Movement of trucks and other vehicles to and fro the quarry is expected to increase substantially, when mining will start. The existing roads connecting the quarry with the national and state highways are mostly narrow mud roads. There will be mud slide and traffic bottle neck if these roads are not widened and their conditions are not improved by making them paved roads. Hence, there is ample scope for road development in and around the mining areas.

Impact on law & Order As local people will be employed to run the quarry, 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 is over. 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 project area.

7.11 CONCLUSION

The commissioning of sand/morrum mining project in Village- Sadi Khadar, Tehsil- Pailani , District- Banda, Uttar Pradesh will provide employment to local people who are in search of the same. The granting of Environment Clearance to the project will make mining of Sand/Morrum legally valid and it will generate revenue for the state. With the implementation of the project there will be increase in the employment opportunities for the local villagers. 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 activities. Also, Proposed CER activity will improve the socio-economic status of the villagers of the study area.

CHAPTER-8

PROJECT BENEFITS

8.0 PROJECT BENEFITS

8.1 GENERAL

The execution of the project, bring overall improvement in the locality, neighborhood and the State by bringing industry, roads, employment and hence improving living standard and economic growth.

8.2 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 mineral 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.

d.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

8.3 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 allot tees, mining operation in the state will get legalized and it will fetch income to the state exchequer.

c) Health facilities for nearest villagers.

Sr. No	Activities recommended for communities level services	Tentative cost (Lakh Rs)
1	Assistance to set up a temporary health center during the lease tenure	1.0
2	Provide free health checkups & medicines to the nearby villagers of the project site.	2.0
3	Awareness campaigns regarding health issues in the nearby villages	0.50
	Total	**3.50**

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.

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.

ENVIRONMENTAL BENEFITS

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

PLANTATION

The lease area is in the river bed and devoid of any vegetation. Mining activities will not cause any harm to riparian vegetation cover as the working will not extend beyond the offset left against the banks. Plantation willbe carried out as social forestry programme in villages, school and the areas allocated by the Panchayat / State authorities.

Plantation has been proposed on both sides of the roads as greenbelt to provide cover against dust dissemination. A massive plantation will be done nearby the mine area to mitigate the ill-effects of mining and to improve environment of its surrounding area.

A suitable combination of trees that can grow fast and also have good leaf cover shall be adopted to develop the greenbelt. It is proposed to plant native species along with some fruit bearing and herbal trees during the plan period for 26Plants/Ha plantation

Year	Saplings to be planted	Survival (@ 80%)	Species	Place of Plantation
I	475	380	Khair, babul, Deodar,Shisham, Buri, Simbal, Gulmohar , apples, almonds, melons, and Laukats etc	Along the roads, in Schools and public Building and other Social forestry Programme with consultation of the panchayat / state authorities
II	475	380		
III	475	380		
IV	475	380		
V	475	380		
TOTAL	2375	1900		

Native plants like Neem, Babool, Sisum, Imli, Siris, Amaltas, Ber ,Asoka ,Teak, Pipal, Bel, Jamun, Aam, Arjun, Khair, and other local species will be planted. The management will give emphasis on plantation and will also motivate local persons for plantation during rainy season. This will also increase the consciousness in workers and near-by villagers for greenery. Fruit trees can contribute towards their financial gains.

8.4 CORPORATE ENVIRONMENT RESPONSIBILITY

Some percentage of the project cost will be allotted for the Corporate Social Responsibility. The following has been proposed for CER activity.

Education	Social Cause	Health care & Family welfare	Environment
Distribution of school bags, books and uniform to the children in nearby villages	Common vocational training centre shall be set up.	Free medical camps for the villagers	Awareness programs for the workers to sensitize them about the importance of biological environment
Free computer education to the students	Distribution of blankets to the needy people	Awareness programs will be arranged for healthcare	Distribution of free saplings to encourage villagers for plantation

However the activity may change considering the needs & demand of the people:

PROPOSED ACTIVITIES UNDER CORPORATE ENVIRONMENTAL RESPONSIBILITY

Total cost of the project	**(Approx)1.37 Crore**	
2% amount allocated for CER amounting to Rs.	Approx 2.75Lac	
2 No's of Toilet Facilities will be provided in which 1Toilets for Female and 1 Toilets for Male. Cost of Toilet Construction	30,000*2=	60,000 Rs.
05 no's of Solar Lights –	10,000*05=	50,000 Rs.
Child Education Provide School Bags, Shoes and Stationary)		65,000 Rs
1no's installation of Hand pumps	50,000*1=	50,000 Rs.
Skill Development		
Distribution of 1 no's Computer in nearby Govt. School	25,000*1=	25,000 Rs.
Distribution of 5 no's Sewing Machine of School Girls	5000*5=	25,000 Rs.
Total (Approx 2.75 Lac)		**2,75,000**

All work will be carried out with consultation of nearby Gram Pradhan, Panchayat & Villagers.

CHAPTER-9

ENVIRONMENT MANAGEMENT PLAN

9.0 ENVIRONMENT MANAGEMENT PLAN

9.1 INTRODUCTION

The environmental impact assessment presented in previous chapter is based on the control measures. It is concluded that the mining activities having substantial, but reversible impact on environment and the suggestive measures should be taken so as to minimize the impacts.

Environmental management plan details the environmental quality control measures which are proposed for this project to achieve the production of 3,60,000m3 /Annum of sand/morrum (Minor Minerals).

The mitigation measures which reduce the impact have already been identified earlier in this report. To minimize the adverse impact, certain additional EMP is enumerated below for implementation. Environment Management Plan, which is to be implemented in the project has detailed under the following heads:

- Land use pattern and river course environment
- Air Environment
- Water Environment
- Noise Environment
- Solid waste Management
- Biological Environment including Plantation Development
- Implementation of EMP and monitoring Programme

9.2 ENVIRONMENT MANAGEMENT PLAN IMPLEMENTATION

Environmental Management Plan serves no purpose if it is not implemented with true spirit. Some loopholes in the EMP can also be detected afterwards when it is implemented and monitored. Thus, it is important to have a well devised environment monitoring plan.

The major attributes of environment are not confined to the mining site alone. Implementation of proposed control measures and monitoring programme has an implication on the surrounding area as well as for the region. Therefore, mine management should strengthen the existing control measures as elaborate earlier in this report and monitor the efficiency of the control measures implemented within the mining area relating to the following specific areas for eco-friendly mining plan:

- Collection of air and water samples at strategic locations with frequency suggested and by analysing thereof. If the parameters exceed the permissible tolerance limits, corrective measure will be taken.
- Collection of soil samples at strategic locations once in every year and analysis thereof with regard to harmful constituents, if any.
- The effectiveness of drainage system depends upon proper cleaning of all drains provided in the surrounding of mine area. Any blockage due to siltation or loose material will be checked at least once in a month.
- Measurement of water level fluctuations in the nearby ponds, dug wells and bore wells will be done.

- Regular visual examination will be carried out to look for erosion of river banks. Any abnormal condition, if observed will be taken care of.
- Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done in every quarter of the year.

Plantation/afforestation should be done as per program. Regular watering of plant and fencing to protect them from cattle/goats has to be provided. 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.

Mine management will be in regular touch with local surrounding villages to update the various developmental schemes made by them. They will also consider any immediate requirement, which could be taken care of in near future.

9.3 LAND-USE PATTERN AND RIVER COURSE ENVIRONMENT

Deviation from planned mining procedure can lead to bank erosion/cutting and thereby river channel shifting and degradation of land, causing loss of properties. Thus for environment friendly river bed mining the following control/abatement measures will be followed:

- Mineral will be mined out in central position of stream leaving 10% width of the river on either side of the river. So that the river flow / course will not get disturbed.
- Mining of minerals will be started from dip side towards rise at the centre and also laterally in 1 meter slice so that the river course will not get affected. Unwanted material including mineral or spillage (if any) will not be stacked by the side of the excavation area. If need be done then it should be dozed afterwards in excavation voids created. This is to be done so, because it will otherwise hinder the flow of water in monsoon season.
- Mining is to be done leaving safety barrier on both sides and maximum barrier should be on concave side of river. Preferably the flow channel (excavation void created) should be kept straight so as to help avoid erosion as side cutting.
- The proposed river bed mining is unlikely to change any characteristic of the river bed as the permitted mining volume is based upon annual replenishment as has been calculated by DEIAA in DSR.

9.4 AIR ENVIRONMENT

In order to minimize impacts of mining on air quality and to maintain it within the prescribed limits of CPCB/SPCB, an Environment Management Plan (EMP) has been prepared. This will help in mitigating the impacts likely to happen to air environment due to mining in the area. During the course of mining no toxic substances will be released into the atmosphere and as such there seems to be no potential threat to health of human beings.
In river bed mining activities, the only source of gaseous emission is the fugitive dust generation during mining and from the engines of vehicles transporting the mined materials. The following mitigation measures are suggested to control the fugitive dust generation during mining and transportation:

- Proper mitigation measures like water sprinkling on haul roads will be adopted to control fugitive dust emission.
- Plantation will be carried out on approach roads and nearby vicinity of river bank.
- To control the emissions regular preventive maintenances of vehicles will be done and all transportation vehicles will carry a valid PUC certificate.

9.5 NOISE ENVIRONMENT

- Proper maintenance of all vehicles will be carried out which will help in reducing generation of noise during operations.
- No other equipment's accept the transportation vehicles will be allowed as the mining will be Completely manual.
- Periodical monitoring of noise will be done and corrective actions will be adopted.
- Plantation will be taken up along the approach roads which will minimize propagation of noise.

9.6 WATER MANAGEMENT

SURFACE WATER &GROUNDWATER MANAGEMENT

- Mining in the area will be done well above the water table as well as river bed water level. Therefore impact on water regime is not anticipated. River bed mining will be done up to depth of 3m from the surface as per approved mining plan.

- Mining will not intersect the river bed water level or ground water table of the area. So not at all disturbing water environment.

9.7 SOLID WASTE MANAGEMENT

- Solid waste (clay & silt) that will be generated during mining activities as spillage will be utilized for filling of the mine voids. Apart from this, no other solid wastes will be generated from the said mining operations.
- There is no toxic element present in the mineral which may contaminate the soil.

9.8 BIOLOGICAL ENVIRONMENT

The mining activity will have insignificant effect on the existing flora and fauna. Secondary data have been considered from various Government Departments such as forests, agriculture, fisheries, animal husbandry and various offices to establish the pre-project biological environmental conditions. The project area is surrounded by reserved forests on the banks are also lined with agricultural land. The purpose of the project itself is to save the flora around the project area from river widening, excessive erosion and floods. It was found that the sand mining activity will not have any significant impact on the biological environment of the region.

There is a requirement to establish a stable ecosystem with both ecological and economic returns.Minimization of soil erosion and dust pollution enhances the beauty of the core and the buffer zone. To achieve this it planned to increase plantation activities. The basic objectives of plantations are as follows:-

- Improvement of Soil quality

- Quick vegetative cover to check soil erosion
- Improvement in river bank stability
- Conservation of biological diversity

9.9 GREENBELTDEVELOPMENT AND BIO-DIVERSITY PRESERVATION

- Compensatory afforestation on degraded forest land, forest protection / conservation and river training measures will be carried out every year from the fund collected from disposal / sale of RBM.
- This activity will promote the emergence of the primary succession species; hence it will be asilvicultural operation, extremely important for maintaining ecology and environment of the area.
- Plantation will be carried along the river banks or along the road sides or near the civicamenities in consultation with local authority. The species selected for greenbelt development are given below:

S. No.	Scientific Name	Common Name
1	*Azadirachta Indica*	Neem
2	*Acacia Nilotica*	*Babool*
3	*Delbergia Sisso*	*Sisum*
4	*Tamarindus Indicus*	*Imli*
5	*Albizzia Lebbeck*	*Siris*
6	*Cassia Fistula*	*Amaltas*
7	*Ziziphus Mauritiana*	*Ber*
8	*Polyalthia Longifolia*	*Asoka*
9	*Tectona Gandis*	*Teak*
10	Ficus Religiosa	Pipal
11	Aegle Marmelos	Bel
12	Syzygium Cumini	Jamun
13	Magnifera Indica	Aam
14	Terminalia Arjuna	Arjun
15	*Acacia Catechu*	Khair

9.10 MANAGEMENT OF FAUNA

Plantation/afforestation as should be done as per program i.e along the road sides and near civic amenities, which will be allotted by Government bodies as it is not feasible to plant trees near the mine lease area. Post plantation, the area will be regularly monitored in every two years for evaluation of success rate. For selection of plant species local people should also be involved. Mine management will be in regular touch with local surrounding villages to update the various developmental schemes made by them. They will also consider any immediate requirement.

The following management measures are suggested to reduce the impact upon fauna:

- Sand extraction from vegetated riparian areas will be avoided.
- Undercut and incised vegetated banks will not be altered.
- Large woody debris in the riparian zone will be left undisturbed or replaced when moved and not be burnt.
- Sand stockpiles and vegetative debris will not be stored within the riparian zone.
- It is essential that the spillage generated is evenly redistributed in mine voids.
- Operation and storage of heavy equipment within riparian habitat will be restricted.
- Access roads will not encroach into the riparian zones.

- The removal or disturbance of in stream roughness elements during sand extraction activities will be avoided and those that are disturbed will be restored or replaced.

9.11SOCIAL ENVIRONMENT

The environmental management plan has been developed with a view to bring down the levels of impacts within limits. In each of the areas of impact, measures have to be taken to reduce potentially significant adverse impacts and where these are beneficial in nature, such impacts are to be enhanced/augmented s that the overall adverse impacts are reduced to as low level as possible. For improving the socio-economic environment, proper CER activities will be taken up in vicinity to uplift the condition of people.

Sr No.	Particular/Item	Units	Rate(Rs)	Total Cost Rs.	Total Cost Rs.
1.0	**Equipment's**			**Capital**	**Recurring**
a.	JCB /Loader (Light Earth Movers) with Prior Permission to Concerned Authorities	3	60,000/Month	-	16,20,000
b.	Oil & Lubricant	-		2,25,000	
c.	Manual Hand Equipment's	-	75,000	75,000	–
2.0	**Cost of Labour**				
a.	Unskilled workers	90	Rs- 250 for one labour 90X 250=22,500Rs/ Day	-	50,62,500
b.	Semi-skilled workers	6	Rs- 400 for one labour 6X 400= 2400Rs/ Day	-	8,76,000
c.	Skilled	4	Rs- 600 for one labour 4X 600=2400Rs/ Day	-	8,76,000
3.0	**Site Services**				
a.	Site Office/Rest Shelter/PPE	-		-	1,00,000
b.	Drinking water for site workers	100 workers @ for 10 LPCD =1.0kld	1 tankers of 1.0 Kld @1000Rs/Tanker Per Day	-	2,25,000
c.	Mobile Toilets	5			1,00,000
d.	Separate Bins for waste Collection	5		10,000	–
4.0	**Dead rent**	(44.46 Acre)	(90,000/Acre)	40,01,400	–
5.0	**Site Development**				
a.	Iron Sheets/Checker Plates for Transportation with in the mine	10			1,00,000
b.	CCTV , Systems, Cabin , Pole Marking & other Infrastructure	-		-	3,00,000
c.	Maintenance for Haulage Road	-		-	2,00,000
	Total			**43,11,400**	**94,59,500**
		Grand Total	**1,37,70,900**		

CHAPTER-10

SUMMARY &CONCLUSION

10.0 SUMMARY & CONCLUSION

With increase in industrialization coupled with population growth, the demand for different minerals has increased and is likely to grow further in years to come. This has resulted in irreversible impacts on diminishing reserve, with simultaneous generation of solid wastes and effluents causing environmental degradation. In order to mitigate the impact of sand/morrum mining on the environment, a scientific assessment is a pre-requisite for framing sustainable development strategies. It is therefore important to tackle the problem for control of pollution and mining of minerals in a cost- effective method causing least damage to the ecosystem. Project has to go through scoping under Cat B sub-category B1 project to obtain Environmental Clearances from the State Environment Impact Assessment Authority, Uttar Pradesh (SEIAA), Govt. of Uttar Pradesh as it is under general conditions. S.G Projects Ltd, Prop. Smt. Neha Singh for sand/morrum mining on the river Ken . The land is under the ownership of State Govt. This land is sanctioned to applicant for only five years as vide letter No.1083/Khani-30(E-tender 2018) Banda dated 27 May 2018.issued by D.M Office, Banda, Uttar Pradesh For A Period of Five Years, Khand No/,Gata No-60 in village- Sadi Khadar, Tehsil- Pailani District- Banda by the Dept. of mines and Geology, Govt. of Uttar Pradesh for the mining of minor on the river Yamuna as per EIA Notification 2006 of MoEF & CC and subsequent amendment.

SALIENT FEATURES OF PROJECT

The silent features of the river bed mining project in brief are given as follows:

PROJECT - ACTIVITIES IN OPERATIONAL PHASE

This project is proposed for the excavation of sand from the bed of river Ken. It is an opencast semi mechanized mining project to excavate sand/Morrum in its existing form for direct usage as a construction material. Sand/morrum excavation will be carried out up to a depth of 3.0 m or 1.0 m above the ground water table or whichever is less by using light weight excavators. Mining will be carried out in 1 Block as per Mining Plan and Year wise proposed production details as per approved Mining Plan are given below:-

Block Name	Area(Ha)
River bed Block	18.0.00
Total Area of Block	**18.0.00**

Year	Production
1St	3,60,000m3 /Annum
2nd	3,60,000m3 /Annum
3rd	3,60,000m3 /Annum
4th	3,60,000m3 /Annum
5th	3,60,000m3 /Annum
Total	18,00,000 m^3

Five Years Proposed Production Details (T/A) (Source: Mine Plan)

10.1 MINING METHODOLOGY

As per Uttar Pradesh Minor Mineral Concession Rules, 1963 extraction of sand/morrum in bench mode will be limited to 3.0 m depth, Height and width of working bench will be 1m and 10 m respectively and bench will advance parallel to the bank of the river. Extraction activities will start in the block from the upstream to downstream side. This will not obstruct the movement of water, if any, during monsoon period in the river course. Roads in the lease area for the movement of loaded tippers/ trucks will not have slopes more than 1 : 20. Roads will be properly maintained and water sprinkling will be used for dust suppression. Lease area will have its own approach road, which already exist and is well connected to main highways. Light weight excavators will be used for loading of mineral in tippers/trucks.

BASE LINE DATA & IMPCT DUE TO PROPOSED PROJECT

Ambient Air

Base line data were monitored twice in a week in pre-monsoon season in March, April and May for eight (5 in nos.) Locations as per wind rose pattern of the area. The methodology in selection of monitoring locations is discussed in Chapter 3 of EIA report. Predicted values of GLC obtained from modeling is superimposed on the baseline to obtain total GLC. The total GLC value is obtained is compared with Standards applicable for the environmental parameter and given in the Table below

INCREMENTAL POLLUTION DUE TO VEHICULAR TRANSPORTATION

Distance from the Road (m)	Incremental GLCs (µg/m3)		
	SPM	NOx	CO
20	**0.6**	**85.0**	**38.0**
50	**0.4**	**57.0**	**25.0**
100	**0.1**	**14.0**	**6.0**

It is evident from the above table the impact due to vehicular movement shall get almost normalized at a distance of approximately 100m on either side of transporting road.

GROUND WATER QUALITY

Water samples were taken from 3 locations for the ground water representing the core and buffer areas and two locations for the surface water. Water was analyzed for physical, chemical and biological properties in pre-monsoon season. The results indicate that pH of water at all locations are in range of 7.78 to 7.88 and Alkalinity as CaCO3 varies 380 to 390 mg/l. All other parameters are within the acceptable and permissible limit. The ground water is potable and good quality. Presence of TDS is in between 596 mg/l to 618 mg/l, which is in the desirable limit. Detailed discussed in Chapter 3 of EIA report. The proposed project has no impact on Ground & Surface water quality of the area as all the mining activities will be conducted upto 3 m depth of from ground level.

SOIL QUALITY

Soil samples were taken at three (3 nos.) locations and analyzed for physical and chemical properties. It was found that electrical conductivity (EC) is in the range of 360 to 380 mS/cm.

ENVIRONMENT MANAGEMENT PLAN & CER

Separate fund of approx 19.52 Lakh was allocated for EMP. Separate fund of 2.75 Flakh was allocated under CER activities which are discussed in detail in the EIA report.

CONCLUSION

Results of baseline environmental parameters and impact of proposed project on them, it was found that impact of proposed project on environment is not significant. Proposed project will improve infrastructure development as sand is core constituent in construction of structures, bridges, highways etc. It will provide direct employment to the people in the area and business development opportunities to others. Scientific river bed mining will protect river bed and stops floods. In total project has positive and significant impact in development of socio-economic environment.

CHAPTER-11

DISCLOSURE OF CONSULTANT

I	**Name**	**:**	**Mr. Suman Banerjee**
1	Status in the Organization	:	EIA Coordinator
2	Educational Qualification	:	B.E. Environmental Engineering
3	Work Experience	:	15 Years
4	Work Experience related to EIA	:	12 Years More than 50 successful EIA projects
5	Previous Organizations Served	:	Common - Hazardous Waste Management Facility at Taloja, Mumbai; Common - Biomedical Waste Management Facility at Taloja, Mumbai; Consultant for JBIC for Environment and Social Guideline Frame Work for Steel and Thermal Power Projects in India; Consultant for JICA for Dedicated Freight Corridor for DFCCL - Ministry of Railways, projects; EIA Consultant and Environmental Trainer for JBIC funded Kerala water supply project for Thiruvananthapuram, Meenad, Cherthala, Kozhikode& Pattuvam.
6	Specialization	:	Air Pollution, Water Pollution, Noise and Vibration, Green Building, Municipal Solid Waste, Hazardous Waste and Biomedical Waste; Environmental Impact Assessment for Building and Construction Projects, Highway Projects, Area Development Projects, Industrial Estate/ Park/ Leather Park Projects, SEZ, Oil and Natural Gas Exploration Projects, Mineral Beneficiation Projects, Highway and Solid and Hazardous Waste Management Projects; Noise and Vibration assessment and analysis expert
7	Additional Qualification	:	GRIHA – Green Rating for Integrated Habitat Assessment ECBC – Energy Conservation Building Code EIA Trainer for CPWD Officials at CPWD Training Institute, Ghaziabad
II	**Name**	**:**	**Mr. Anand Kumar Dubey**
1	Status in the Organization	:	EIA Coordinator
2	Educational Qualification	:	M. Sc. Environment and Ecology
3	Work Experience	:	11 years
4	Work Experience related to EIA	:	11 years More than 50 successful EIA projects
5	Previous Organizations Served	:	- -
6	Specialization	:	Environmental Impact Assessment for Mining (Opencast & Underground), Building Construction, Industrial Estates &Parks, Solid Waste Management, Township & Area Development Projects, Oil and Natural Gas Exploration, Highway Projects, Air Quality, Water Quality, Solid Waste and Ecology and Biodiversity Expert
III	**Name**	**:**	**Mr. Arvind Narayan Devikar**
1	Status in the Organization	:	Vice President & EIA Coordinator
2	Educational Qualification	:	Bachelor of Architecture (Visvesvaraya Regional College of

			Engineering – Nagpur (1973)
3	Work Experience	:	44 Years
4	Work Experience related to EIA	:	12 years More than 100 successful EIA projects in Building Construction Sector
5	Previous Organizations Served	:	Senior Architect, CPWD, Directorate General, CPWD Nirman Bhawan (1976 – 2007)
6	Specialization	:	Planning and Designing, Energy Efficient Buildings, Climate Responsive Architectural Design, Passive Energy in Buildings, Energy Conservation, Landscape and Environmental Impact Assessment
7	Additional Qualification	:	Evaluator and Trainer for GRIHA - Green Rating for Integrated Habitat Assessment; Panel member for National Building Code 2005 in Landscaping, CED 46:p18; Architecture, Energy and Environment – Lund University Sweden Planning and Design of Energy Efficient Building – CPWD Ghaziabad; Post Graduate Diploma in Public Administration (IIPA)
IV	**Name**	**:**	**Dr. Chandrasekhar Anantrao Moghe**
1	Status in the Organization	:	EIA Coordinator; Water Pollution, Soil Conservation Expert
2	Educational Qualification	:	M.Sc. Environmental Science (Nagpur University) Ph.D.
3	Work Experience	:	42 years
4	Work Experience related to EIA	:	20 years
5	Previous Organizations Served	:	"Principal Scientist" at NEERI - Nagpur Visiting Faculty - National Power Training Institute, Nagpur Visiting Faculty - Institute of Science, Nagpur
6	Specialization	:	Environmental Impact Assessment
	Specialized Study	:	"The MSM Executive Programme in Management," Specialization: Environmental Management in Asia Program by Asian Productivity Organization (APO), Japan and Maastricht School of Management (MSM), Netherland at Singapore; Initial Environmental Legislation and Internal Audit for EMS (ISO 14001); SIDA Financed Advanced International Training Program on EIA/SEA by Ramboll Natura AB under the auspices and sponsorship of SIDA in Sweden (Stockholm and Malmo) ; Training on "Certified Measurement Uncertainty Analyst" Chemical Parameters - Centre for Electronics Test Engineering, Bangalore
V	**Name**	**:**	**Mr. Soumya Dwivedi**
1	Status in the Organization	:	EIA Coordinator, FAE – Solid Hazardous Waste & Risk and Hazard Expert
2	Educational Qualification	:	B.E. Chemical
3	Work Experience	:	08 years

4	Work Experience related to EIA	:	08 years
5	Previous Organizations Served	:	Mantec Consultants Pvt. Ltd.
6	Specialization	:	Risk and Hazard Study for Oil & Gas Pipeline and Depots, Ports, Harbors & Jetties and Building Construction Projects
VI	**Name**	**:**	**Mr. Umesh Pratap Singh Chauhan**
1	Status in the Organization	:	EIA Coordinator and General Manager -Projects
2	Educational Qualification	:	M.Sc. Geology
3	Work Experience	:	32 years
4	Work Experience related to EIA	:	10 years
5	Previous Organizations Served	:	Uttar Pradesh State Mineral Development Corporation Ltd.; Directorate of Geology and Mining
6	Specialization	:	Senior Geologist; Mining Plan; R&D project for Mining and Quality Control; Exploration, Surveying and Mapping.
VII	**Name**	:	**Mr. Arvind Purohit**
1	Status in the Organization	:	EIA Coordinator
2	Educational Qualification	:	M.Sc. Chemistry Ph.D.
3	Work Experience	:	41 years
4	Work Experience related to EIA	:	11 Years
5	Previous Organizations Served	:	Gujarat Mineral Development Corporation Ltd.
6	Specialization	:	Environmental Impact Assessment and Pollution Control
7	Specialized Study	:	Meteorology and Air Quality Modelling (CEPT - Ahmedabad) Diploma in Pollution Control & Environment Management (NILEM-Chennai) Environmental Management Capacity Building sponsored by MoEF, GOI (New South Wales University, Australia Environmental Management and Capacity Building sponsored by MoEF, GOI (Indian School of Mines, Dhanbad)
VIII	**Name**	:	**Mr. Sameer Vilasrao Deshpande**
1	Status in the Organization	:	Ecology and Biodiversity Expert
2	Educational Qualification	:	M.Sc. Botany
3	Work Experience	:	11 years
4	Work Experience related to EIA	:	11 years
5	Previous Organizations Served	:	National Environmental Engineering Research Institute - NEERI Nagpur
6	Specialization	:	Biological Monitoring, preparation of Biodiversity report, conservation plan for scheduled plant and animals, green belt development plan

IX	**Name**	:	**Dr. Manoj Kumar Mishra**
1	Status in the Organization	:	Air Pollution, Meterology, Modeling and Noise and Vibration Expert
2	Educational Qualification	:	M.Tech. Atmospheric Sciences – University of Pune Ph.D. Atmospheric Sciences (Air Quality Modeling and Micrometeorology – IIT Delhi)
3	Work Experience	:	19 years
4	Work Experience related to EIA	:	19 years
5	Previous Organizations Served	:	IIT Delhi – Research Associate SENES Consultants India Pvt. Ltd.
6	Specialization	:	Air and Noise Impact Assessment Studies; Air Quality and Noise Modeling by ISCST3, AERMOD, CALPUFF, OCD, CALINE, INM, DHAWANI, TNM, etc.; Air and Noise Modeling for Coal and Gas fired industries, landfill, helipads, airports, wind farms, highways & SEZ Projects;
7	Specialized Study	:	Coastal Atmospheric Boundary Layer (CABL) field experiment at Kalpakkam in collaboration with Indira Gandhi Centre for Atomic Research (IGCAR) Kalpakkam, Bhabha Atomic Research Centre (BARC) Mumbai and Institute of Meteorology and Physics, University of Agriculture, Forestry and Renewable Resources – Vienna, Austria
X	**Name**	:	**Dr. Debasish Bhattacharya**
1	Status in the Organization	:	Social Expert
2	Educational Qualification	:	Ph.D. – IIT Kharagpur (Tribal Development/ Social Science) MRP Regional Planning – IIT Kharagpur
3	Work Experience	:	28 years
4	Work Experience related to EIA	:	23 years More than 70 successful EIA projects
5	Previous Organizations Served	:	IIT Kharagpur – Senior Project Manager; LEA Associates; SMEC India Pvt. Ltd.; Feedback Ventures Pvt. Ltd.; Nippon Koei; External Funding Agency Projects for World Bank, ADB, JICA.
6	Specialization	:	Tribal Development, Socio economic Development, Social Study in Forest Management, Preparation of RAP, SIA, SE Framework Development, Rehabilitation and Resettlement (R&R)
XI	**Name**	**:**	**Dr. Bideh Shukla**
1	Status in the Organization	:	Project In charge, FAE - Ecology and Biodiversity Expert & Soil Conservation
2	Educational Qualification	:	Ph.D. Botany
3	Work Experience	:	15 years
4	Work Experience related to EIA	:	5 years
5	Previous Organizations Served	:	B.H.U., I-Service India (Pvt. Ltd.), Dimension India Network (Pvt.) Ltd.
6	Specialization	:	GIS, Water Pollution, Ecology, Soil Conservation and Remediation

XII	**Name**	**:**	**Mr. Manish Shukla**
1	Status in the Organization	:	FAE – Geology, Hydrogeology & Land Use Expert
2	Educational Qualification	:	M. Sc. - Applied Geology PG Diploma - Geo Informatics for Earth Sciences(GSI)
3	Work Experience	:	05 Years
4	Work Experience related to EIA	:	03 Years
5	Previous Organizations Served	:	Sahaj Sahyog Consultant Pvt. Ltd. Hydrologist at (NDWSPP) MoDWS (Govt. of. India)
6	Specialization	:	• Technology alliances and acquisitions for developing future technology plan in the area of Land use and Land cover Mapping; • Drainage Mapping Contour Development and its mapping; • Geology and Stratigraphy of the area; • Hydrogeology, Rainwater harvesting and recharge Structures related to Building and construction Projects; • Preparation of Mining plan for Mining Projects;
XIII	**Name**	**:**	**Indra Kumar Sharma**
1	Status in the Organization	:	Project Executive
2	Educational Qualification	:	M. Sc. - Environmental Science
3	Work Experience	:	02 Years
4	Work Experience related to EIA	:	02 Years
5	Previous Organizations Served	:	None
6	Specialization	:	EIA Report Preparation; Mapping; Assisting in Air Modeling, Risk Assessment, Water & Waste Water, Consent Management & Compliance.
XIV	**Name**	**:**	**Saurabh Bhardwaj**
1	Status in the Organization	:	Project Executive
2	Educational Qualification	:	Bachelor in Computer Application
3	Work Experience	:	5 Years
4	Work Experience related to EIA	:	2 Years
5	Previous Organizations Served	:	Haryana State Pollution Control Board
6	Specialization	:	EIA Report Preparation; Mapping; Assisting in Air Modeling, Risk Assessment, Water & Waste Water, Consent Management & Compliance.
XV	**Name**	**:**	**Mr. B. Kulaala Anandan**
1	Status in the Organization	:	General Manager - Corporate Relations

2	Educational Qualification	:	Bachelor of Engineering - Mechanical Engineering
3	Work Experience	:	15 Years
4	Work Experience related to EIA	:	- -
5	Previous Organizations Served	:	Ramky Enviro Engineers Ltd. Garware Wall Ropes Ltd.
6	Specialization	:	Customer Relations
7	Specialized Sources	:	NEBOSH - International General Certification in Occupational Health & Safety; IOSH - Institution of Occupational Safety & Health