DEIA REPORT

For

Ukrauli& Meravarana Sand Boulder & Bajri Mining Project"

Located at

Khasra no. 38, 40, 41, 55/1,
Village- Ukrauli & Meravarana,
Tehsil- Sitarganj, District-Udham Singh Nagar,
State- Uttarakhand
(Area- 12.59 Ha)
Production-498564 TPA

Applicant

Guru Nanak Enterprises,
R/O-Sood Colony, Bhoona Islam Nagar,
Tehsil- Bajpur, Distt- Udhamsingh Nagar (U.K)

PREPARED AND SUBMITTED BY:

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Chapter-1

Introduction

CHAPTER-1

INTRODUCTION

1.1 PURPOSE OF THERE PORT

Environmental Impact Assessment (EIA) is a decision making tool, in the hands of the Authorities 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 found having deleterious overall 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 and Forests for sustainable development and the final decision is arrived at only, when those to whom it matters are made known of the salient features of the project being envisaged close to them and their opinion has been sought in a widely advertised Public Hearing Event under the chairmanship of the district authorities so that public could also express their opinion free, without favour and fear. Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from SEIAA, Uttrakhand, under EIA Notification of the MoEF dated 14-09-2006, and its subsequent amendments and EIA Guidance Manual for Mining of Minerals of MoEF, Govt. of India, for seeking environmental clearance for Ukrauli& Meravarana Sand Boulder & Bajri Mining Project in the applied mining lease area measuring 12.59 ha. The proposed project falls under Category “B1” as per EIA Notification2006 its amendment 2009, 2011, 2012& 2018 of the Ministry of Environment and Forests, New Delhi and NGT order dated 13.09.2018 & OM dated 12th December 2018 by MOEF & CC.

1.2 IDENTIFICATION OF PROJECT & PROJECTPROPONENT

The proposed project of Guru Nanak Enterprises for Ukrauli & Meravarana Sand, Boulder & Bajri Mining Project which covers an area of 12.59Ha Located at Khasra No-38, 40, 41, 55/1, Village- Ukrauli & Meravarana ,Tehsil- Sitarganj, District- Udham singh Nagar, State-

Uttarakhand. LOI has been granted in favour of Guru Nanak Enterprises, being the highest bidder was issued letter of intent (LOI) by state government vide letter no. 40/VII-1/19/02(3)/2019 dated 05.02.2019 and after fresh demarcation revised letter of intent issued vide letter no.1450/VII-A-1/2021/2(3)/19 dated 25th August 2021.

The RBM will be used for making buildings, bridges, infrastructure etc. The RBM of lease area is soft, medium to coarse grained yellowish in color. RBM is an essential minor mineral used extensively across the country for construction purposes.

Minor Minerals are mainly consumed by infrastructure & housing industries & development. Virtually there is no construction or infrastructure building work is possible without these minor minerals, hence the same can be assumed as backbone of the infrastructural growth of India.

Lease Area: 12.59ha

Production -498564 TPA

S.No.	Year	Production (Tonnes)
1.	1st Year	498564
2.	2nd Year	498564
3.	3rd Year	498564
4.	4th Year	498564
5.	5th Year	498564
Total Proposed Production in 5 Year : 2492820 tonnes		

The proposed mining project has been categorized as Category B1 project.

Proponent & Address

M/s Guru Nanak Enterprises

R/o-Sood Colony, Bhoona Islam Nagar, Tehsil- Bajpur,

Distt- Udhamsingh Nagar, State- Uttarakhand.

1.3 Brief description of nature, size and location of the project:

Brief details of the project are described in the Table No. 1.1 given below:

Table No.1.1:- Details of the Project

S.No.	Information	Details
1.	Project name	Ukrauli & Meravarana Sand, Boulder & Bajri Mining Project
2.	Mining Lease Area	12.59 Ha.
3.	lease period	5 years
4.	Mining Plan period	5 Years
5.	Lease Details	The highest bidder was issued letter of intent (LOI) by state government vide letter no. 40/VII-1/19/02(3)/2019 dated 05.02.2019 and after fresh demarcation revised letter of intent issued vide letter no.1450/VII-A-1/2021/2(3)/19 dated 25th August 2021.
6.	Location of mine	
	Village	Ukrauli & Meravarana
	Tehsil	Sitarganj
	District :	Udham Singh Nagar
	State :	Uttarakhand
	Site Coordinates:	

Pillar Name	N	E
A	29^0 2’ 50.212”	79^0 41’ 28.230”
B	29^0 2’ 43.442”	79^0 41’ 30.398”
C	29^0 2’ 39.396”	79^0 41’ 31.584”
D	29^0 2’ 32.674”	79^0 41’ 35.131”
E	29^0 2’ 30.510”	79^0 41’ 34.941”
F	29^0 2’ 26.110”	79^0 41’ 36.301”
G	29^0 2’ 24.840”	79^0 41’ 38.881”
H	29^0 2’ 25.218”	79^0 41’ 41.016”
I	29^0 2’ 29.350”	79^0 41’ 39.869”
J	29^0 2’ 33.590”	79^0 41’ 39.209”
K	29^0 2’ 40.613”	79^0 41’ 36.577”
L	29^0 2’ 45.710”	79^0 41’ 36.283”

			M	29^0 2’ 46.284”	79^0 41’ 38.891”
			N	29^0 2’ 49.756”	79^0 41’ 37.939”
			O	29^0 2’ 51.305”	79^0 41’ 37.289”
6.	Land Type	Government waste land			
7.	Minerals of mine	Sand, boulder and bajri			
8.	Proposed Production	Maximum Production 498564 tonnes at the end of 5th year.			
9.	Bulk Density	2.2 Tones per m^3			
10.	Method of mining	Opencast, Semi mechanized Method			
11.	Drilling or Blasting	Not Required			
12.	No of working days	240 days			
	Water demand	Drinking Water :0.42 KLD			
		Dust Suppression: 5.2 KLD			
		Plantation: 12 KLD			
		Other(if any): 1KLD			
		Total Water Requirement:18.62 KLD			
13.	Man Power	28Person			
14.	Nearest railway station	Pantnagar Railway station, towards west direction (17.2 km*)			
15.	Nearest state highway/national highway	⁾ National Highway (NH-74) approx. 13.68km* towards S direction. ⁾ State Highway (SH-37) approx. 17.11km* km towards W direction. ⁾ Metalled road (Sidcul Road) approx.0.65 km* towards WSW			
16.	Nearest air port	Pantnagar Airport, towards West direction (approx. 21.88 Km*)			
17.	Nearest Town, City, District Head Quarters along with distance in Kms	Nearest Town/District: Sitarganj, 12.96km, in South Direction			
18.	Ecological sensitive areas (Wild life Sanctuaries,	Nandhaur Wildlife Sanctuary approx 9.8km towards North.			

	National Parks, Biosphere Reserves, etc.)	
19.	Historical Places	None
20.	Financial & Social benefit	This Project will provide employment to local people directly and indirectly, which will improve their socioeconomic status.
21.	Proposed Project Cost	Rs. 76.24Lakhs
22.	Proposed CER Cost	Rs. 3.812Lakhs
24.	EMP Expenditure	Rs. 18.625 lakhs

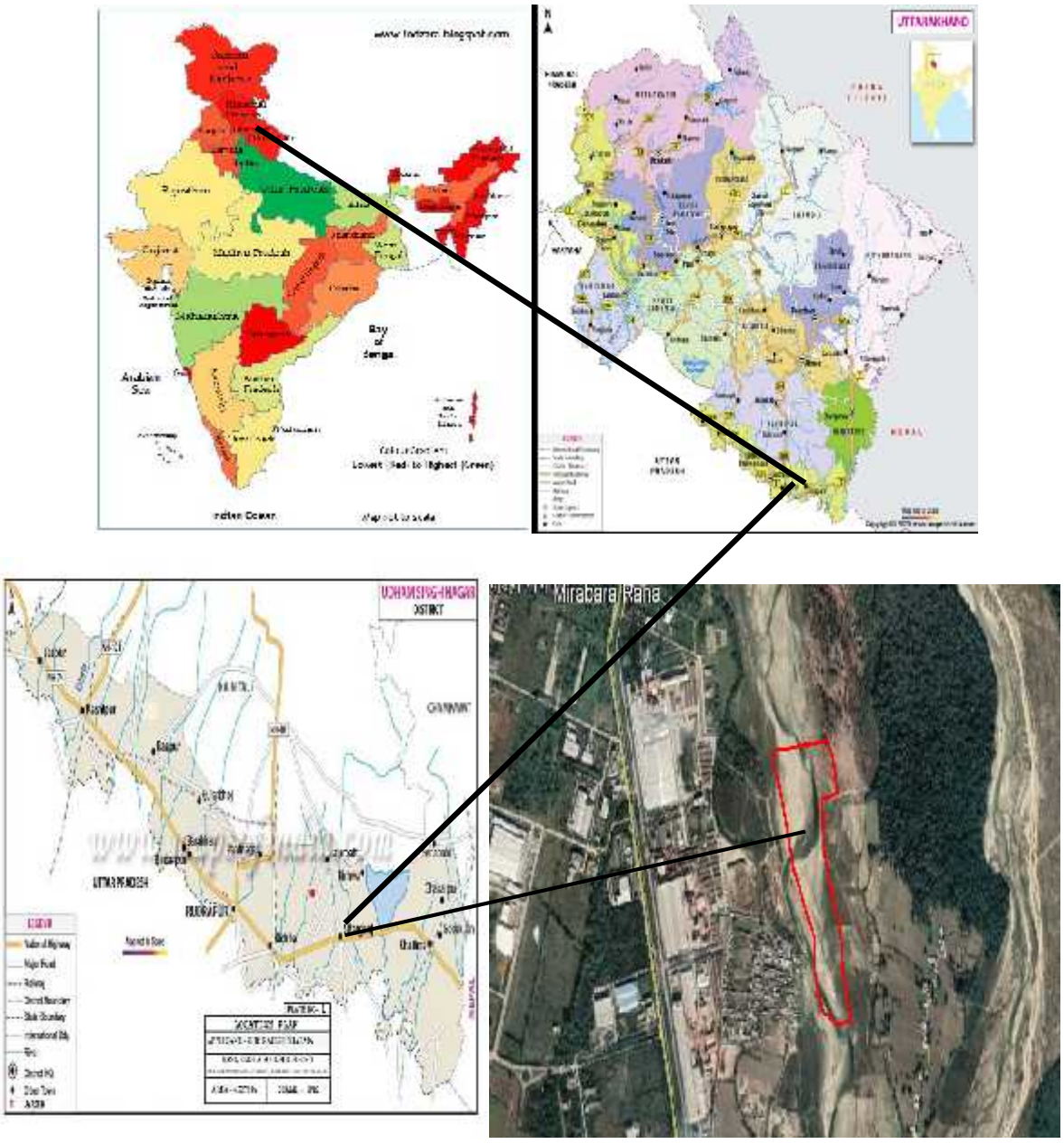

Figure 1.1- Location Map

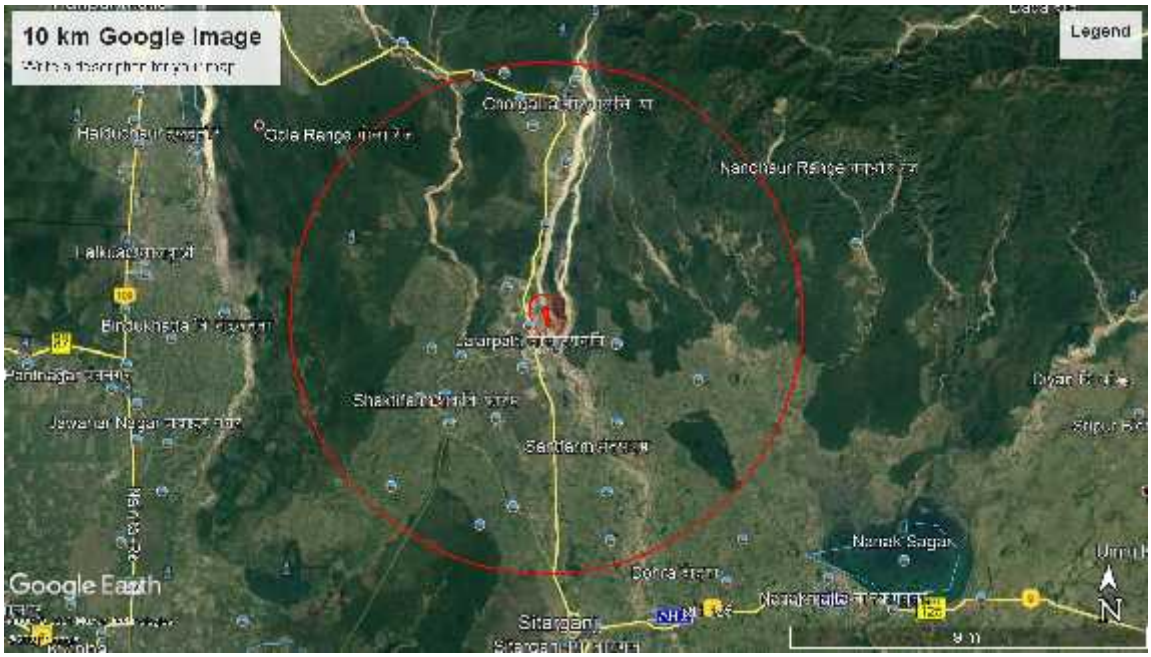

Figure -1.2 10m Buffer map of Study area

STATUS OF REGULATORY CLEARANCES OF THEPROJECT

Nandhaur Wildlife Sanctuary approx 9.8km towards North lies in 10km buffer zone

There is no legal issue against the project in the court of law.

1.4 SCOPE OF THE STUDY

The application for prior Environmental Clearance (Form-1, PFR) for the proposed project was submitted. The SEIAA-SEAC-Uttrakhand prescribed the TOR**.** The Committee has issued Terms of Reference (ToR) for preparation of the DEIA report and Environmental Management Plan.

GENERIC STRUCTURE OF ENVIRONMENT IMPACT ASSESSMENT REPORT

The environmental impact assessment has been carried out to assess the impact of the project on various environmental components. The methodologies and findings of the study are detailed in the EIA Report along with other relevant information under the different chapter headings as under:

1.Introduction

2. Project description of the Environment

4. Anticipated Environmental Impacts & Mitigation Measures

5. Analysis of Alternatives (Technology and site)

6. Environmental Monitoring Program

7. Additional Studies

8. Project Benefits

9. Environment Management Plan

10. Summary & Conclusion

11. Disclosure of Consultants engaged

Chapter-2

Project Description

CHAPTER – 2

PROJECT DESCRIPTION

2.1 TYPE OF PROJECT

Meravarana Sand, Bajri & Boulder Mining Project

2.2 NEED FOR THE PROJECT

The RBM will be used for making buildings, bridges, infrastructure etc. The RBM of lease area is soft, medium to coarse grained yellowish in color. RBM is an essential minor mineral used extensively across the country for construction purposes. Besides this, the project will prove beneficial in terms of socio economic development.

2.3 LOCATION DETAILS

Table No.2.1:- Details of the Project

S.No.	Information	Details
1.	Project name	Ukrauli & Meravarana Sand, Boulder & Bajri Mining Project
2.	Mining Lease Area	12.59 Ha.
3.	lease period	5 years
4.	Mining Plan period	5 Years
5.	Lease Details	The highest bidder was issued letter of intent (LOI) by state government vide letter no. 40/VII-1/19/02(3)/2019 dated 05.02.2019 and after fresh demarcation revised letter of intent issued vide letter no.1450/VII-A-1/2021/2(3)/19 dated 25th August 2021.
6.	Location of mine	
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	Site Coordinates:	

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11.	Drilling or Blasting	Not Required
12.	No of working days	240 days
	Water demand	Drinking Water :0.42 KLD
		Dust Suppression: 5.2 KLD
		Plantation: 12 KLD

		Other(if any): 1KLD
		Total Water Requirement:18.62 KLD
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14.	Nearest railway station	Pantnagar Railway station, towards west direction (17.2 km*)
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16.	Nearest air port	Pantnagar Airport, towards West direction (approx. 21.88 Km*)
17.	Nearest Town, City, District Head Quarters along with distance in Kms	Nearest Town/District: Sitarganj, 12.96km, in South Direction
18.	Ecological sensitive areas (Wild life Sanctuaries, National Parks, Biosphere Reserves, etc.)	Nandhaur Wildlife Sanctuary approx 9.8km towards North.
19.	Historical Places	None
20.	Financial & Social benefit	This Project will provide employment to local people directly and indirectly, which will improve their socioeconomic status.
21.	Proposed Project Cost	Rs. 76.24Lakhs
22.	Proposed CER Cost	Rs. 3.812Lakhs
24.	EMP Expenditure	Rs. 18.625 lakhs

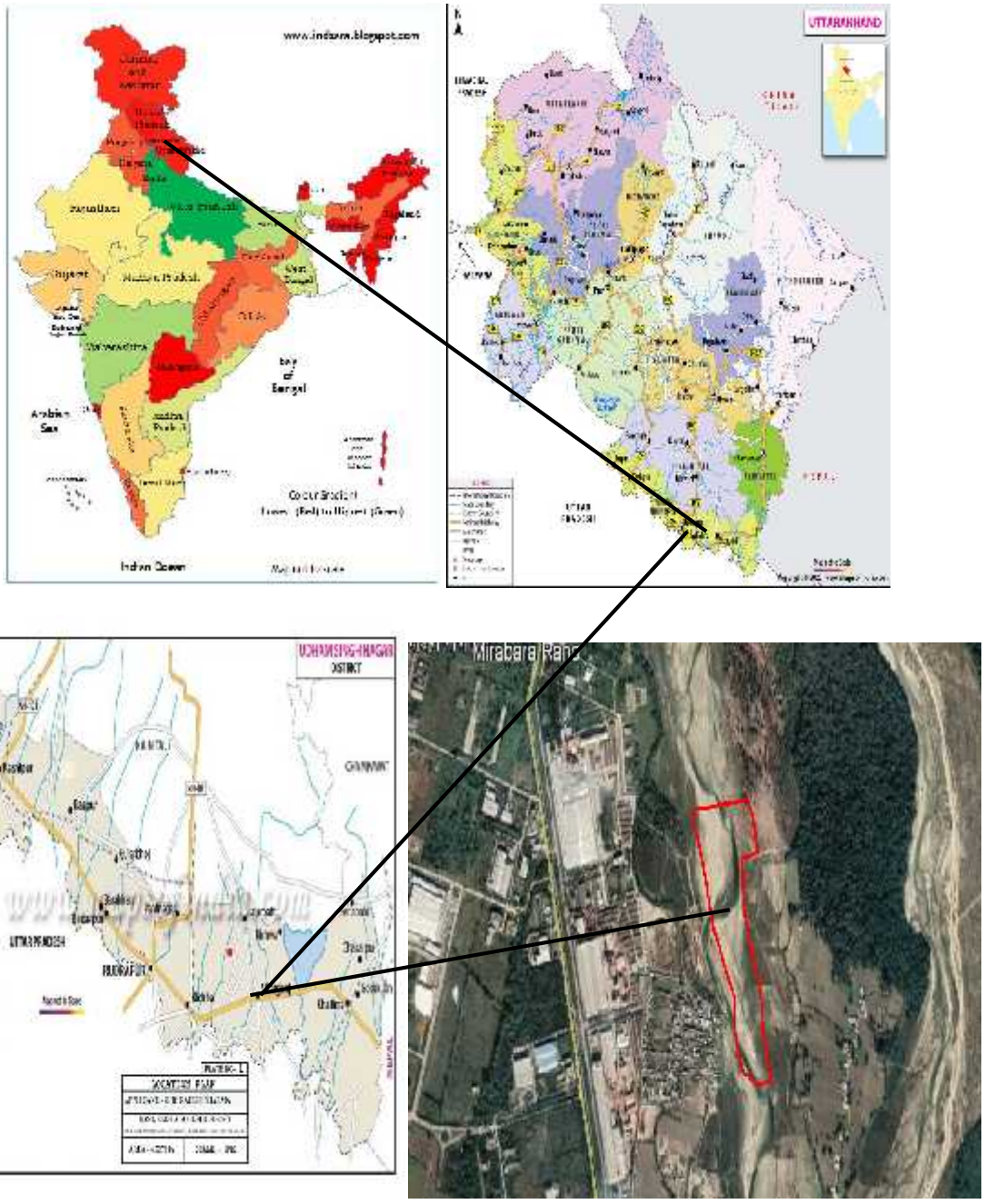


Figure-2.1 –Project Location

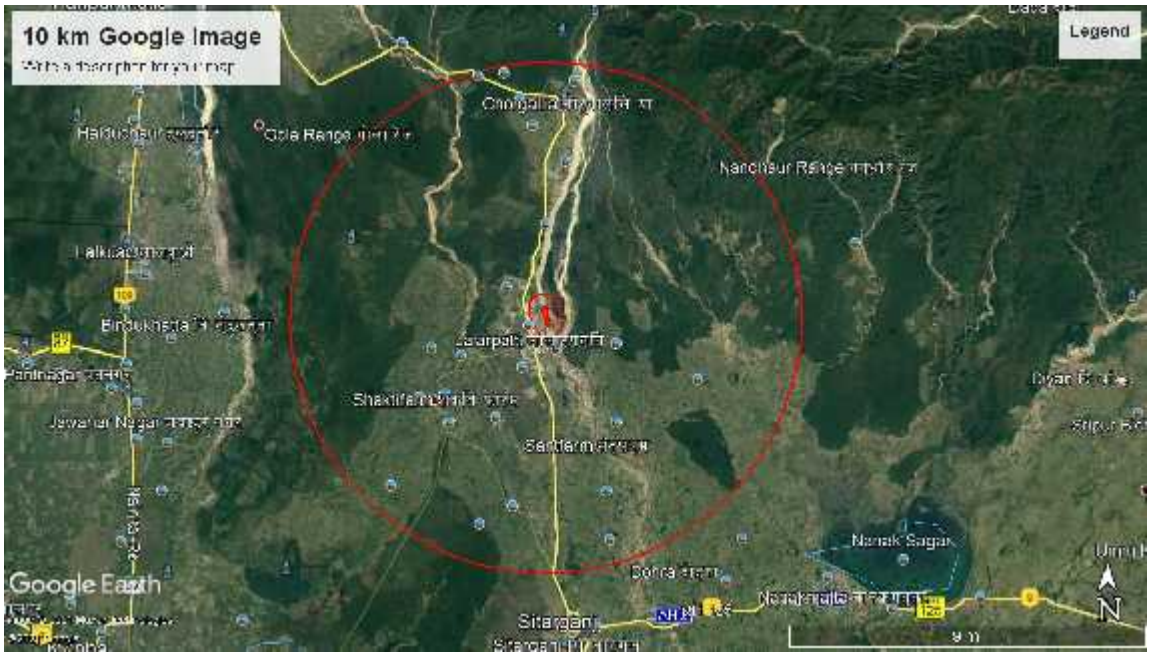


Figure -2.2 10 Km Buffer map of Study area

2.4TOPOGRAPHY & GEOLOGY

a) Briefly describe the topography & general geology & local mine geology of the mineral deposit including draining pattern.

TOPOGRAPHY:

The applied area falls on the bank of river Kailash. General slope of area is towards West direction. The highest level is 217.50mRL towards North direction while lowest level is 214.0mRL towards North West direction. River Kailash is seasonal one & flow from north to south direction.

REGIONAL GEOLOGY:

The geology of the study area. Broadly, it can be divided into two formations viz. Bhabar and Tarai. These are characterized by distinct lithology, grain size distribution, variation of degree of sorting etc. a generalized geological succession, of the area, is as follows:

Table 4. Geological details of district Udham Singh Nagar, Uttarakhand

Age	Morphotectonic Unit	Divisions	Lithology
Recent to Quaternary	Piedmont	Bhabar	Boulder sand and clay
	Alluvial plain	Tarai	Sand, clay and slit.

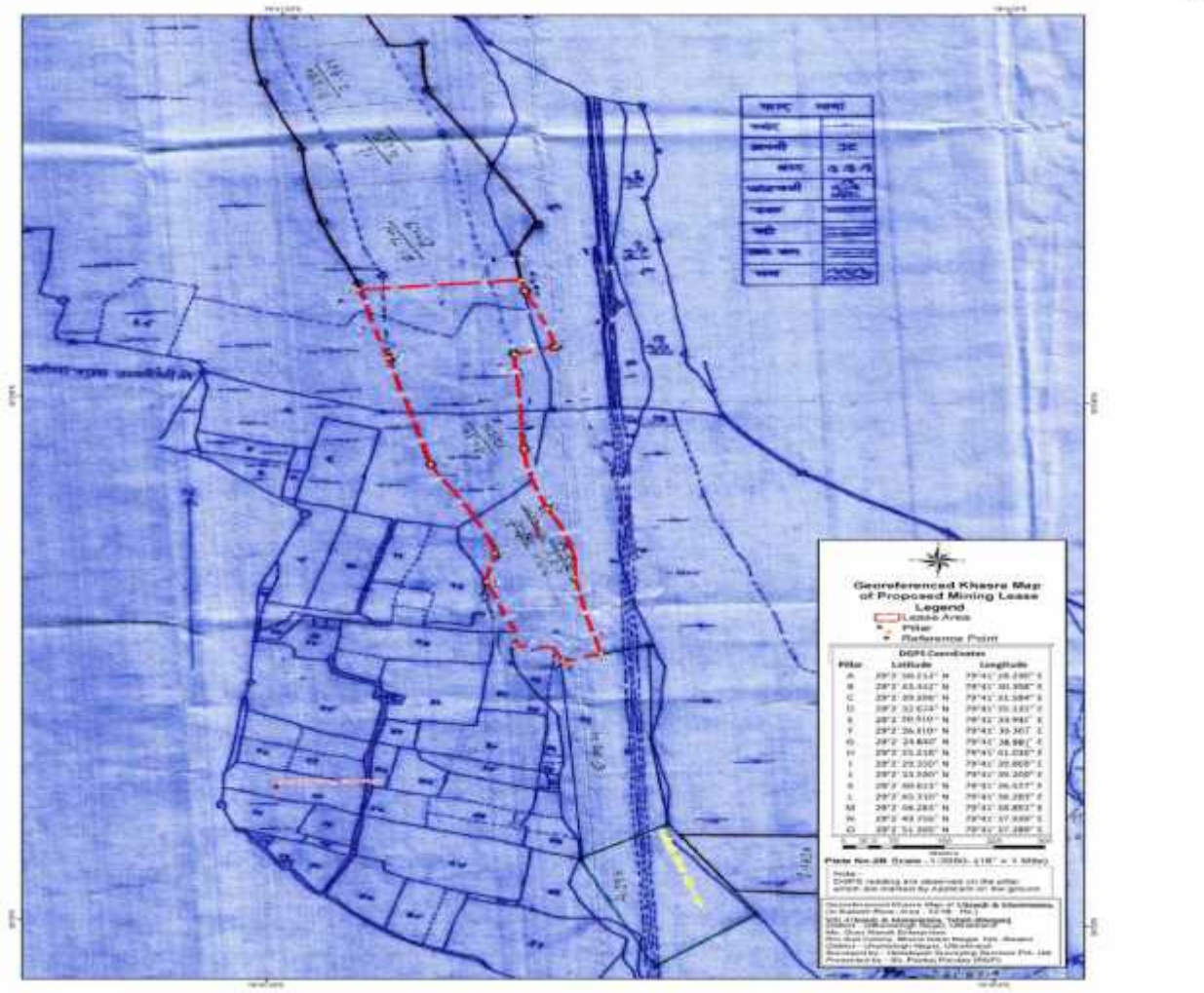


Fig. 2.3- Pillar co-ordinate map

(i) BHABAR FORMATION

Bhabar formation is essentially constituted of alluvial deposits lying on the sloping plains in the Himalayan foothills. It is primarily constituted of unconsolidated sediments like sand, gravel, boulder and clays. The grain size varies from material of sand grade (2 mm) through granules,

pebbles, cobbles to boulders size i.e. >256 mm, sometimes the boulders have dimensions in feet. The clays are generally brown in color and clay bed sequences tend to pinch and for the same reason have short lateral continuity. The Bhabar formation is exposed immediately south of the Siwaliks of the Himalayan foothills, observed at northern parts of the Bazpur, Siatargunj and Khatima blocks. The exact trend and disposition of Bhabar formation depends largely upon the disposition of the Siwaliks. The extreme northern portion of the Bhabar zone is marked by the contact with Siwalik Ranges, whereas the southern limit is defined by the contact between Bhabar and Tarai, which forms the spring line or marshy conditions.

(ii) TARAI FORMATION:

The Tarai formation is exposed immediately south of the Bhabar formation, and the name itself being derived from marshy conditions. Tarai formation consists of clays, sandy clays, fine to medium sand and occasional gravels. In this formation there is a dominance of clayey successions over sandy horizons. The granular zones mostly occur as lenses and have inter–tonguing relationships with clastic and non-clastic units .The northern limits of the zone is demarcated by the spring line, i.e. the contact between Bhabar and Tarai, whereas the southern limit of this zone is taken to be the region where auto flow conditions cease to exist in the tube wells. The Tarai sediments representing the finer portion of the channel bed load and the load in suspension and solution, which are brought by the streams and evenly sorted out by the river action. Tarai formation is better sorted as compared to the Bhabar.

GEOMORPHOLOGY:

Geomorphic evolution of the Himalaya is attributed to northward push and under thrusting of the Indian plate. The geographic evidence cited for recent movement & along thrust & faults is sudden change in the stream courses deep gorges, huge fans & debris avalanches, entrenched meanders & unlighted fluvial terraces. The transverse faults & displacing the longitudinal thrusts in parts of kumaun lesser Himalaya are equally active & geographic development along Kailash river valley testifies to the recent movement along these faults.

Temperature:

The temperature pattern is a regional behavior & is not likely to be affected by river bed mining activity over a small area. Some local effect may be perceived due to mining , afforestation & creation of voids in the area.

Rainfall:

The trend of rainfall forms part of regional pattern, not dependent on the relatively small area of river bed mining activity. The mining operation, therefore is not likely to have any adverse impact on rainfall pattern.

Humidity:

The pattern of relative humidity depends mainly on the rainfall, wind, temperature & other weather phenomenon that regional in behavior. The mining operation is not likely to have any impact on the relative humidity in the surrounding.

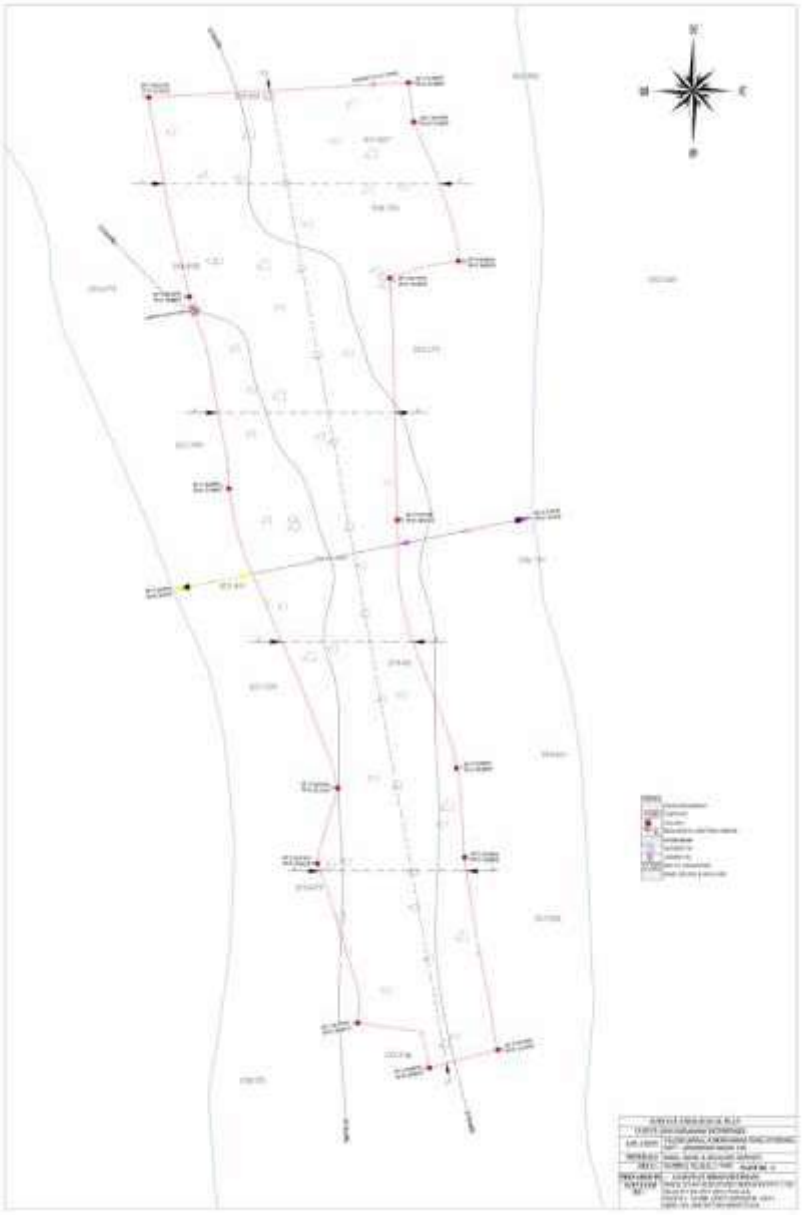


Fig 2.4 surface/ geological plan

Nature of wall rock:

Since the deposit is river borne material & it has no hangwall & footwall.

GEOLOGICAL RESERVES:

15% distance of total width of river bank has been left on right bank side & 15% distance of total width of river bank has been left towards left bank side, thus total 30% of total area of river bank width has been left from both flank of river. Total width of river bank is 320m & 120m horizontal distance from left bank & 71m distance from right bank has been left, which is 30% of total width of river bank. The coordinates of right & left bank of river is as below:

Right Bank: 29002’37.64”N, 79041’42.32”

Left Bank: 29002’35.84”N, 79041’30.52”

The geological reserves have been estimated as per UNFC in all the three axis is as below.

Economic Axis (E-1): The RBM is exists within the entire stretch & having no problem selling in the market. The road is near the applied area & RBM shall loaded into tipper & transport to crusher. On the feasibility study, economic viability of deposit has been established &RBM in economic viable, therefore economic axis has been considered as E-1.

Feasibility Status (F-1): Feasibility study has been carried out & is considered to be feasibility status. A feasibility study provides a preliminary assessment with a level of confidence as compared to that of feasibility study. It has been revealed that exploitation of RBM is feasible & economic viable & feasibility axis under UNFC code has been considered as F-1:

Geological Axis: The exposure of RBM is seen in the entire stretch & thickness of RBM varies 2.0m to 3.0m from existing surface profile. Therefore geological axis has been considered as G-1.

As per Sustainable Sand Mining Management Guidelines 2016 mining shall be restricted to 3m depth & recovery of mineral has been taken as 60% of total mineral potential.

Ground survey for feasibility of minor mineral blocks has been conducted by the Department of Geology & Mining which formed the basis for Auctioning of minor mineral block keeping in consideration the made of deposition & occurrence of minor mineral, the entire reserves in the

block has been considered as of proved category. The reserves have been calculated volumetrically with strike influence of mineralization in the area of block by multiplying the following parameters:

a) Thickness of the bed upto depth of 3m from river bed surface has been taken for reserves estimation.

b) The bulk density of river bed material is considered 2.2.

Details of UNFC classification.

UNFC is a three digit code based system, the economic viability axis representing the first digit, the feasibility axis the second digit and the geological axis the third digit. Each digit provided.

Codes 1, 2 and 3 in decreasing order. The highest category of resources under UNFC system has code (111) and for lowest category the code is (334).

Code (111):(Proved Mineral reserves) This code is provided for the economically mineable part of the measured mineral resources. The proved mineral reserves has a high level of confidence at the time of reporting that extraction is justified.

Code (121 & 122): (Probable Mineral Reserves) This code is provided for the economically mineable part of the indicating measured mineral resources. A probable mineral reserve has a lower level of confidence than proved mineral reserves.

Code (211)(Feasibility Mineral Resources): The part of the measured mineral resources (proved category) which as per feasibility study has not found economically mineable. 7.5m wide strip has been left all along applied boundary considered as a barrier zone & reserves blocked with in buffer zone.

Code (222)(Pre-Feasibility Mineral Resources): The part of the measured mineral resources (proved category) which as per feasibility study has not found economically mineable. The reserves blocked in 7.5 meters buffer zone.

Code (333):(Inferred Mineral Resources) An Inferred Mineral Resources is that part of a mineral resources for which tonnage, Grade and mineral contents can be estimated with low level of confidence. An Inferred Mineral Resources has a lower level of confidence than that applied to indicate mineral resources.

Area of Minor Mineral Block (in hactares)	Area of Minor Mineral Block (in Sqm)	Total Mineral Potential (MT)=Area x Depth x Bulk density (UNFC code 111)	Mineable Mineral Potential in metric (tonnes) (60% of total mineral potential) in the block (UNFC code 111)
12.59	125900	830940	498564

The existence of Mineable/Recoverable reserves of the order of 830940MT signifies that the block will fulfill requirement of 498564MT of RBM per annum.

Reserves for production target:

The reserves for meeting the saved target of annual production from the block have been estimated up to the depth of 3.0m only from the surface contours by surface area method which can be safely recovered taking into consideration the thickness, established width an strike influences of mineralized formation in the block which can be replenished after every monsoon by maintaining the natural gradient of the river bed without disturbing the river morphology.

Reserves for production target:

The reserves for meeting the saved target of annual production from the block have been estimated up to the depth of 3.0m only from the surface contours by surface area method which can be safely recovered taking into consideration the thickness, established width an strike influences of mineralized formation in the block which can be replenished after every monsoon by maintaining the natural gradient of the river bed without disturbing the river morphology.

Note- Bulk density of RBM is taken as 2.2. In the past approval mining plans approved in Distt-Udham Singh Nagar where specify gravity has been taken as 2.2. Hence bulk density in the present case has been taken as 2.2.

Geological axis with in applied area is as below:

G Axis	Area in (ha.)	Depth (m)	Total Mineral Potential (tonnes)	Mineable Mineral Potential in metric (tonnes) (60% of total mineral potential)
G1	12.59	3.0	830940	498564
G2	-	-	-	-
G3	-	-	-	-
(Submerge area)	-	-	-	-
Total (Reserve)	**12.59**	**-**	**830940**	**498564**

The summary of reserves is as below:

Classification	Code	Total Mineral Potential (tonnes)	Mineable Mineral Potential in metric (tonnes) (60% of total mineral potential)
A) Mineral Reserves			
1) Proved Mineral Reserves	111	830940	498564

2) Probable Mineral Reserves	122	Nil	Nil
B) Mineral Reserves			
1) Feasibility Mineral Resources	211	Nil	Nil
2) Pre-Feasibility Mineral Resources	222	Nil	Nil
3) Inferred Mineral Resources	333	Nil	Nil
Grand Total		**830940**	**498564**

2.5 MINING

a) Briefly describe the existing/proposed method for developing/working the deposit with all design parameters:

Existing Method of mining:

Mining is yet to be commenced as it is fresh grant case of mining lease.

b) Proposed method of mining:

It shall be opencast semi-mechanized mine. Mining depth should be restricted upto 3.0m. The height of benches shall be kept 3.0mwith face slope 18deg & over all pit slope shall be maintained less than 16°. Mining shall be carried out without adoption of drilling & blasting.

The working period for mining will be restricted to 240days (Eight months) & during three months of rainy season, no mining shall be undertaken.

The mining operations in the lease area would be confined day light hours from 7 a.m to 5 p.m. Due to scarcity of workers it is proposed that 30% of total RBM production shall be achieved manually while balance 70% of RBM production shall b achieved by machinery. It is proposed that light excavators will be used for digging & loading of mineral in tippers. Ultimate depth of pit shall be kept 3.0mfrom the surface.

The salient feature of proposed method of mining is as below:

1. Mining activity will be carried out by open cast semi-mechanized method.
2. Light weight excavators will be used for digging & loading of mineral in tippers.

3. No OB/Waste material will be produced.
4. Roads will be properly made and sprayed by water for suppression of dust.
5. Roads in the lease area for the movement of loaded trippers/trucks will not have slopes more than 1 in 20.
6. Extraction activities will start in the block from the upstream side to downstream side. This will not obstruct the movement of water, it any, during monsoon period in the river course.
7. Removal of material upto bed level is essential to control river flow in its central part to check the bank cutting.
8. Sustainable mining is extremely important to promote environment protection, hydrological & social effects. This should be carried out in following:

- To ensure adequate quantity of aggregation.
- To ensure there is no obstruction of river flow.
- To maintained the river equilibrium with the application of transport & quantity to be extracted.
- To avoid pollution of river water leading to water quality deterioration.
- The sustainable sand mining management guidelines (SSMMG)-2016 shall be strictly adhered.

Description for the mining layout.

Consider 240 working days in a year,

Production per day=2077tonnes/day

Proposed depth=3.0

Bulk density of mineral=2.2

Volume to be broken per day=Production per day/Bulk density of mineral

=2077/2.2

=944m3

Area to be broken per day = Volume /Bench Height

= 944/3.0

= 315Sqm

Indicate quantum of development of production expected as in table below:

Year	Over burden (cum)	Total Mineral Potential (tonnes)	Mineable Mineral Potential in metric (tonnes) (60% of total mineral potential)	Sub grade mineral	Mineral reject
Ist	-	830940	498564	-	-
IInd	-	830940	498564	-	-
IIIrd	-	830940	498564	-	-
IVth	-	830940	498564	-	-
Vth	-	830940	498564	-	-
Total	**-**	**4985640**	**2492820**	**-**	**-**

C) Proposed year wise development for five years.

Applied area forms flood plain of Kailash river and remains submerged under river water nearly for 120 days in a year. As a result the working period in a year is reduced to about 240 days. It is envisaged that excavated pit in a year will be restored to its original topography in the preceding year due to the position of suspension by water action of consecutive flood during monsoon periods. The harvesting of the river born material deposit in the block proposed to be made on rotation basis from the surface are up to the depth of 3.0 meter. During monsoon period that is month of July to September every year for the five consecutive years the block in the riverbed accordingly shall be recouped with respect to river born material thereby rejuvenating to its original profile and topography. The river bed material is exposed and does not have any overburden so no development work will be required for the mining of river bed.

Year wise Production of five years.

Year	Production Rate (Tones)	Required Production %

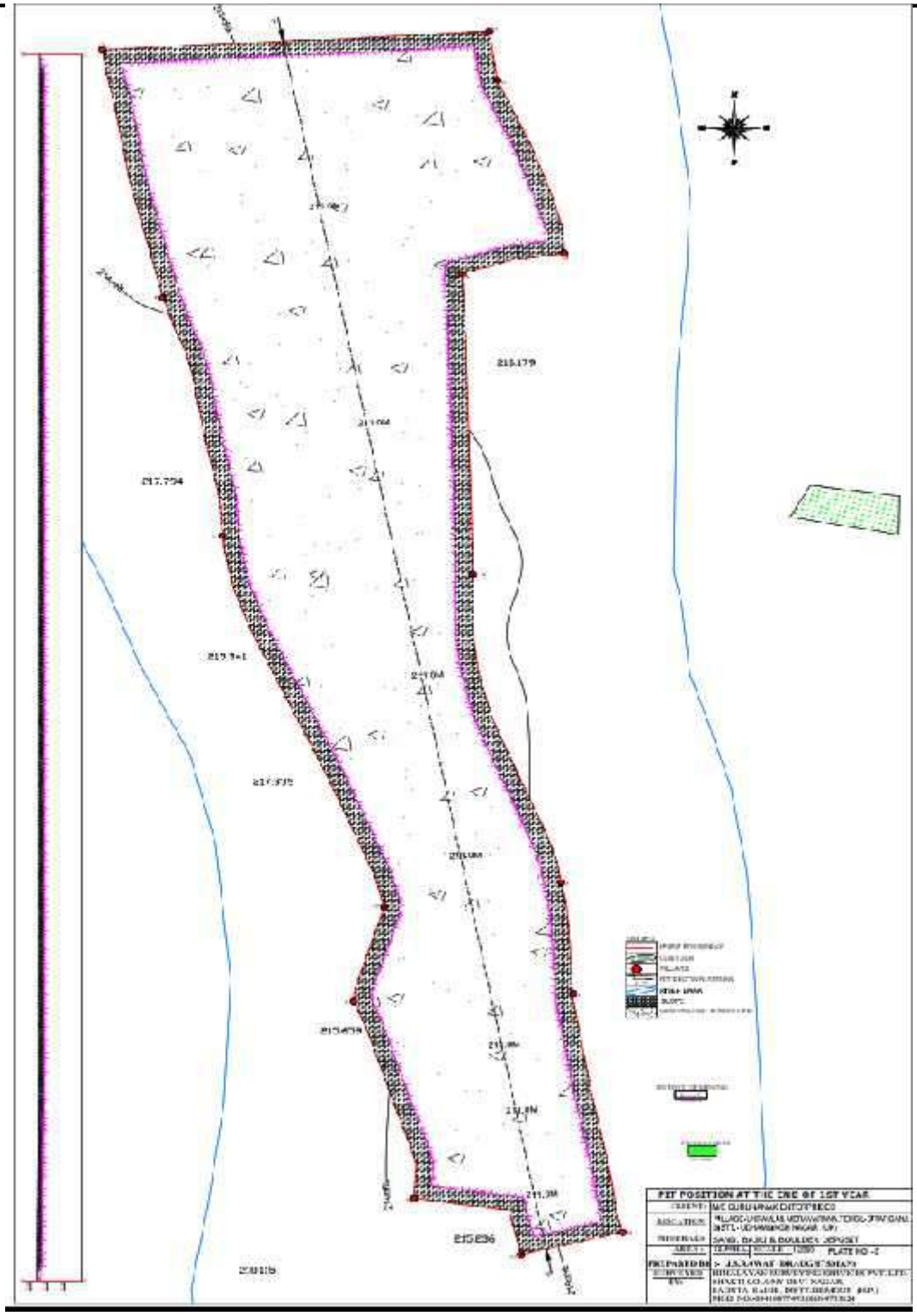
1st	498564	60
2nd	498564	60
3rd	498564	60
4th	498564	60
5th	498564	60

1st Year

Mining faces shall be opened from upper level to lower level maintaining depth of pit 3.0m from river bed profile Mining bench slope 18deg. During course of mining, one bench shall be opened & advance maintaining depth 3.0m from river bed profile. The bottom pit level shall be formed 211.0mRL towards slope of area. During the year 498564tonnes of RBM shall be exploited.

Bench Level (mRL)	**Face length (m)**	**Face Advancement (m)**	**Height (m)**	**Volume (Cum)**	**Saleable Quantities of RBM (Tonnes)**
214-211	862	146.056	3.0	377000	498564
Total					**498564**

The pit position showing the advancement of faces & section is shown below

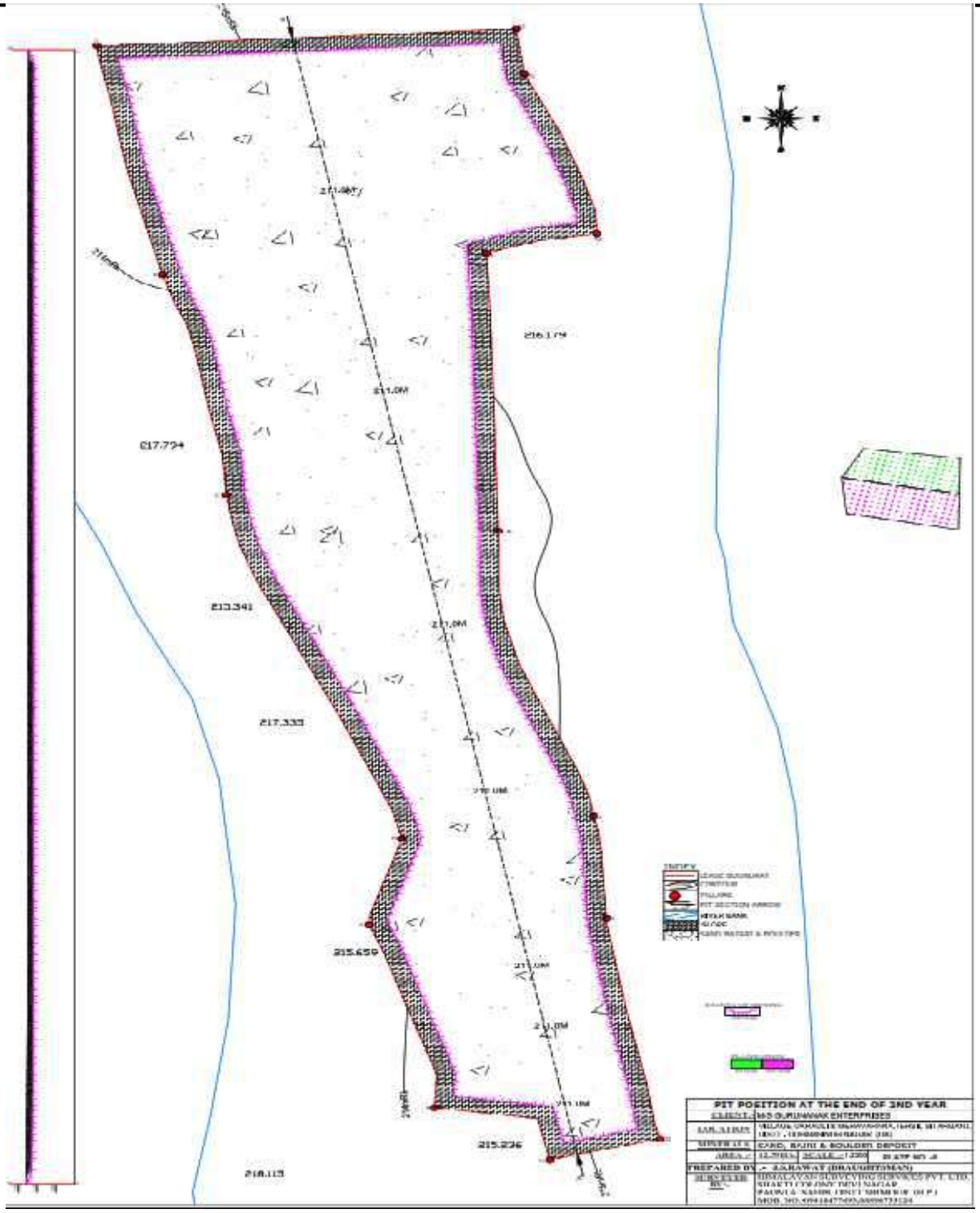

PIT POSITION AT THE END OF 1ST YEAR

2nd Year

Mining faces shall be opened from upper level to lower level maintaining depth of pit 3.0m from river bed profile Mining bench slope 18deg. During course of mining, one bench shall be opened & advance maintaining depth 3.0m from river bed profile. The bottom pit level shall be formed 211.0mRL towards slope of area. During the year 498564tonnes of RBM shall be exploited.

Bench Level (mRL)	**Face length (m)**	**Face Advancement (m)**	**Height (m)**	**Volume (Cum)**	**Saleable Quantities of RBM (Tonnes)**
214-211	862	146.056	3.0	377000	498564
Total					**498564**

The pit position showing the advancement of faces & section is shown below

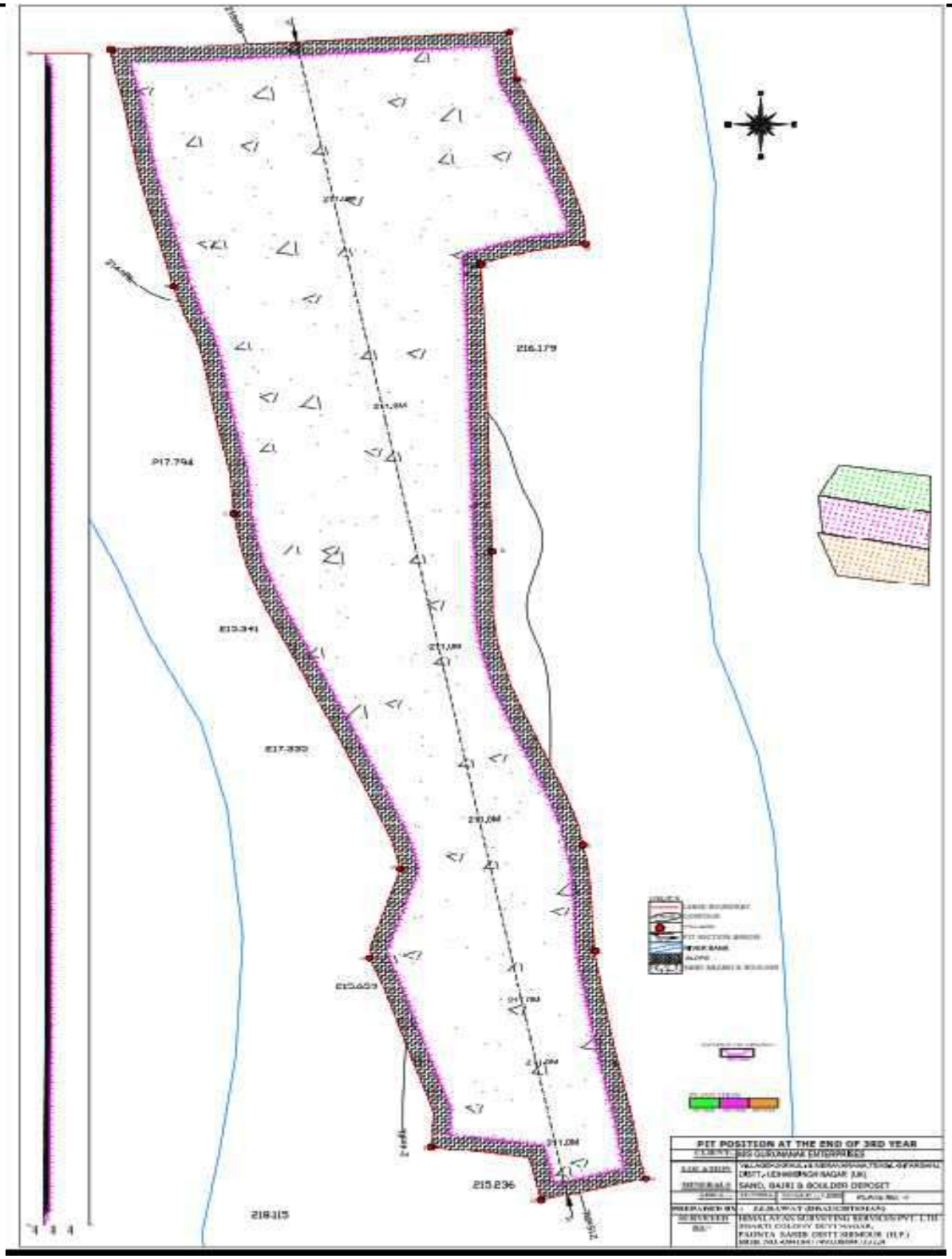

217.724
213.341
217.333
215.659
215.236
218.113
PIT POSITION AT THE END OF 2ND YEAR

3rd Year

Mining faces shall be opened from upper level to lower level maintaining depth of pit 3.0m from river bed profile mining bench slope 18deg. During course of mining, one bench shall be opened & advance maintaining depth 3.0m from river bed profile. The bottom pit level shall be formed 211.0mRL towards slope of area. During the year 498564tonnes of RBM shall be exploited.

Bench Level (mRL)	Face length (m)	Face Advancement (m)	Height (m)	Volume (Cum)	Saleable Quantities of RBM (Tonnes)
214-211	862	146.056	3.0	377000	498564
Total					**498564**

The pit position showing the advancement of faces & section is shown below

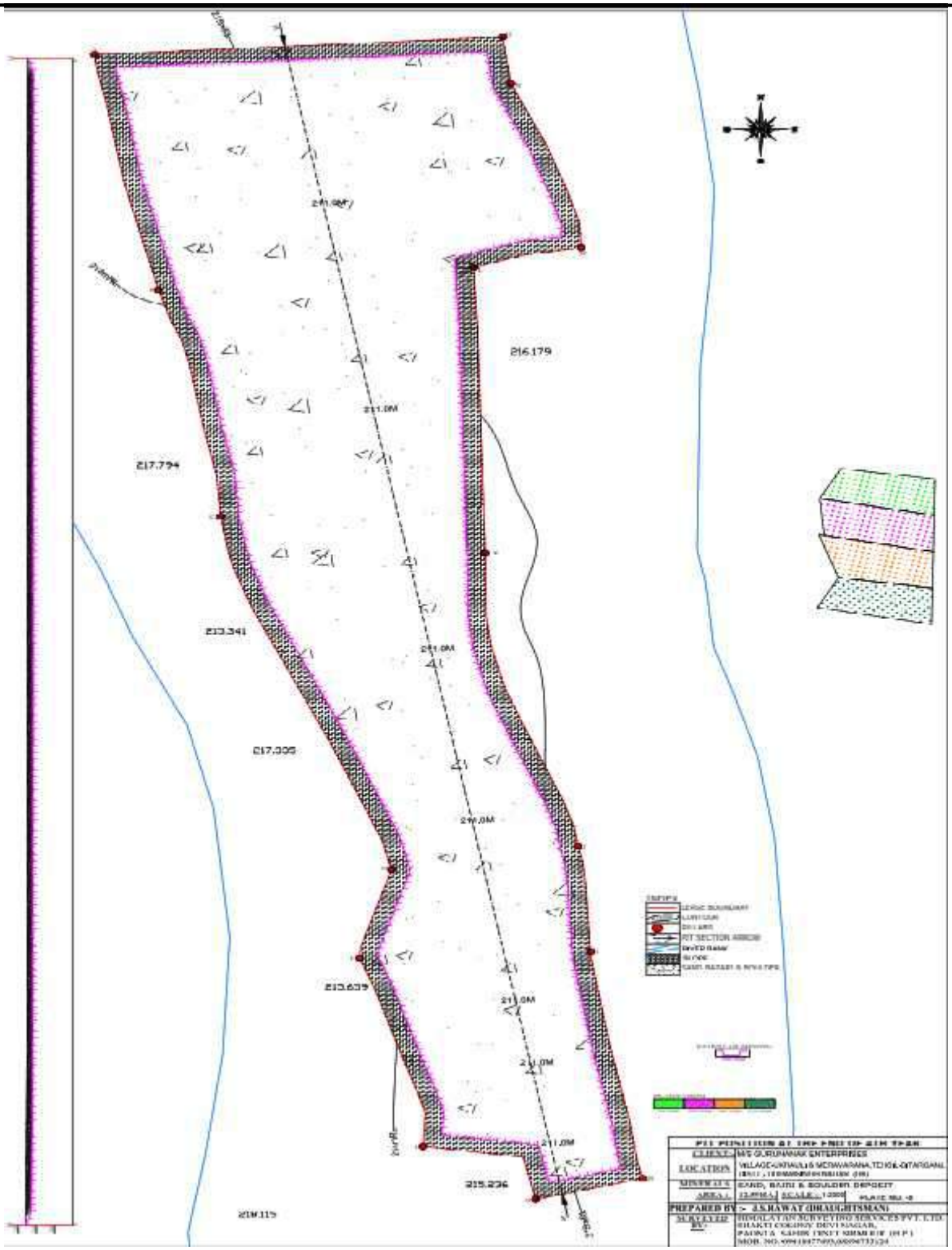

216.179
217.794
215.236
218.15
PIT POSITION AT THE END OF 3RD YEAR

4th Year

Mining faces shall be opened from upper level to lower level maintaining depth of pit 3.0m from river bed profile Mining bench slope 18deg. During course of mining, one bench shall be opened & advance maintaining depth 3.0m from river bed profile. The bottom pit level shall be formed 211.0mRL towards slope of area. During the year 498564tonnes of RBM shall be exploited.

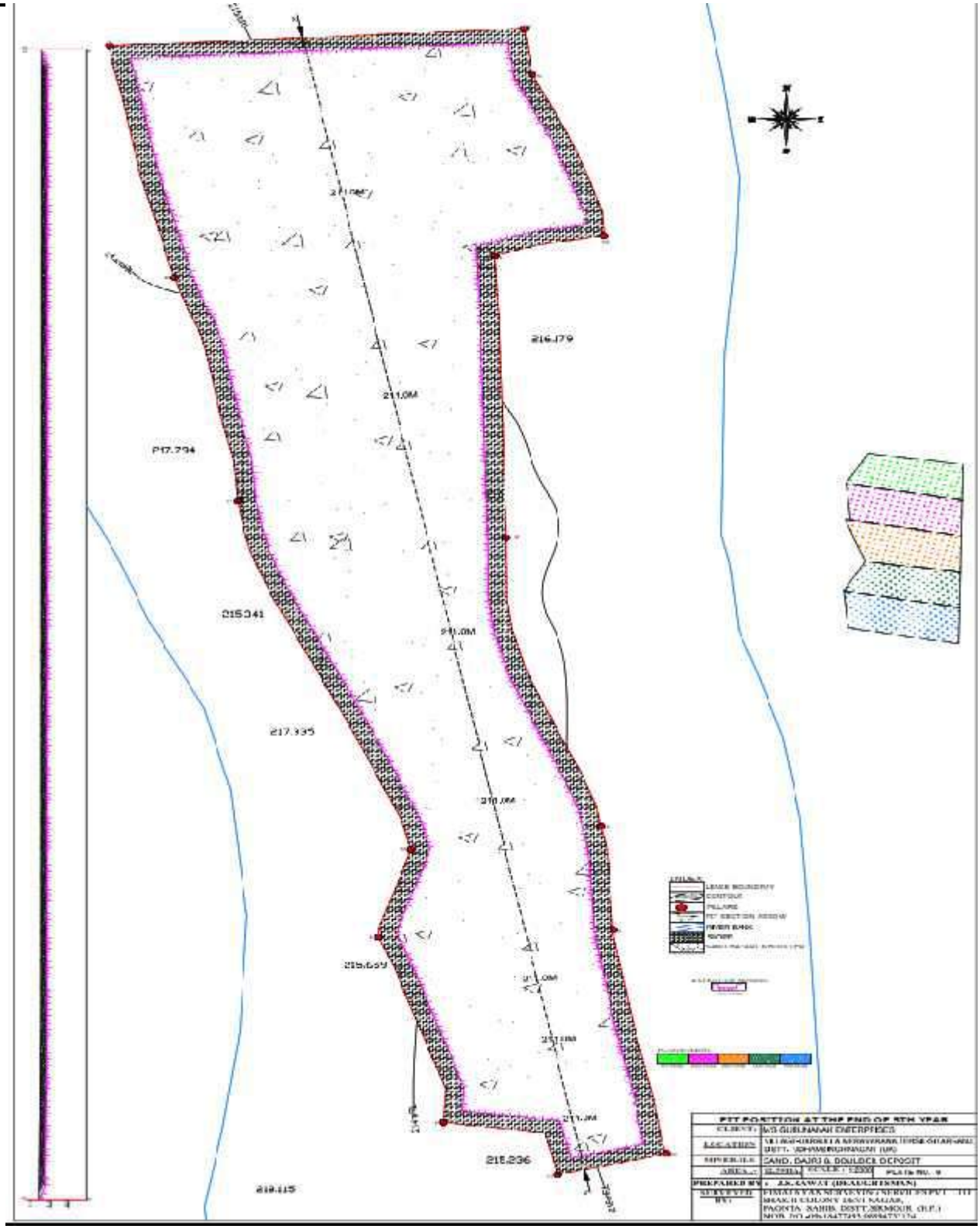
Bench Level (mRL)	Face length (m)	Face Advancement (m)	Height (m)	Volume (Cum)	Saleable Quantities of RBM (Tonnes)
214-211	862	146.056	3.0	377000	498564
Total					**498564**

The pit position showing the advancement of faces & section is shown below


216.179
217.794
213.341
217.305
213.639
215.236
218.115
211.0M
PIT SECTION ARROW
PREPARED BY :- J.S.RAWAT (DRAUGHTSMAN)

Mining faces shall be opened from upper level to lower level maintaining depth of pit 3.0m from river bed profile Mining bench slope 18deg. During course of mining, one bench shall be opened & advance maintaining depth 3.0m from river bed profile. The bottom pit level shall be formed 211.0mRL towards slope of area. During the year 498564 tonnes of RBM shall be exploited.

Bench Level (mRL)	**Face length (m)**	**Face Advancement (m)**	**Height (m)**	**Volume (Cum)**	**Saleable Quantities of RBM (Tonnes)**
214-211	862	146.056	3.0	377000	498564
Total					**498564**


216.179
217.794
215.341
217.335
215.659
218.236
219.115
PIT POSITION AT THE END OF 5TH YEAR
CLIENT: M/S GURUNANAK ENTERPRISES
LOCATION: VILLAGE-UKRAULI & MERAVARANA TEHSIL-SITARGANJ DISTT. UDHAMSINGHNAGAR (UK)
MINERALS: SAND, BAJRI & BOULDER DEPOSIT
AREA: 12.59HA
SCALE: 1:2000
PLATE NO. 9
PREPARED BY: J.K.JAWAT (DEAD/CHEMIST)
SURVEYED BY: PAONTA SAHIB DISTT.SIRMOUR (H.P.)

2.6 SITE FACILITIES AND UTILITIES

2.6.1 Manpower requirement

There will be 28 workers employed from nearby villages. Semi-skilled and unskilled operators and labors required for the mines will be recruited from neighboring village while some technically Qualified personnel will be hired from outside.

Thus category-wise employments will be as below:

S. No.	Particulars	Nos. Required
1.	Mining Engineer (Part time)	1
2.	Geologist (Part time)	1
3.	Foreman (full time)	1
4.	Piece rated workers (unskilled)	25
TOTAL		**28 Person**

Temporary Rest Shelter:

A temporary rest shelter will be provided for the workers near to the site for rest.

- Provisions will also be made for following in the rest shelter
- First aid box along with anti-venoms to counteract poison produced by certain species of small insects, if any.
- Sanitation facility i.e. septic tank or community toilet facility will be provided.

2.6.2 Water Supply

Water for drinking purpose will be supplied from nearby villages. This water will be supplied by private tankers. For dust suppression,Plantation and Flushing. The water is supplied nearby talabs/ponds and treated water.

Table 2.3- Water Requirement for project

S.NO.	Purpose	Manpower/Area	Water Demand (KLD)	Source
1.	Drinking	Manpower (28)	0.42	Nearby village

		28*15L =420lpcd		
2.	Plantation	6000 trees *2L = 1000L	12.0	Private tanker(Treated Water /Pond Water)
3.	Dust Suppression	Length= 520m Width= 5m Area= 520x5 =2600m^2 2600*2L =5200 L	5.2	Private Tanker(Treated Water /Pond Water
4.	Other		1	Private tanker
Total			**18.62**	

2.6.3 Power: The operation will be done only during the day light; hence there is no power requirement for the project at site.

2.6.4 Solid Waste Generation& its Disposal:

No solid waste generation is expected from the mining procedure. Waste generated will be collected on regular basis and will be disposed as per the Municipal Solid Waste Management (Management & Handling) Rule 2000 and its subsequent amendments.

2.6.5 Liquid Effluent:

No liquid effluent will be generated from the proposed mining project.

2.7 Site Analysis

During Transport operation

i)Transportation

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

Table 2.3 (i): Existing Traffic Scenario & LOS

Road	V	C	Existing V/C Ratio	LOS
Nalia Road	2500	15,000	0.167	A
Sidcul Road	2524	15,000	0.168	A

During Mine operation

Proposed Capacity of mine/annum : 498564TPA

No. of working days : 240 days

Proposed Capacity of mine/day : 2,077.35TPD

Trucks/Trippers Capacity : 20Tonnes

No. of tractor trolleys deployed/day : 104 trippers/trucks

PUC 104*3= 312 per day

Table- 2.3(ii) Existing and Modified Traffic Scenario & LOS

Road	V	C	Existing V/C Ratio	LOS
Nalia Road	2812	15,000	0.187	A
Sidcut Road	2836	15,000	0.189	A

Source: IRC 64-1990

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

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

Reference: ENVIS Technical Report, IISc, Bangalore

Results

From the above analysis it can be seen that the V/C ratio is likely to change to 0.187& 0.189 with LOS being "A" which is 'excellent, as per classification. So the additional load on the carrying capacity of the concerned roads is not likely to have any adverse effect.

ii) Site Connectivity

The transportation of Sand, bajri & Boulder will be carried out by the purchaser through their own transport. There are all weather an Unmetalled road and then a metalled road right up to the mines to dispatch the material from mines to the market. The haul road get connected to metalled road at a distance of 0.52km.

Figure 2.5: Connectivity Details from Project Site

Chapter-3

Baseline Environmental Studies

CHAPTER 3

BASELINE ENVIRONMENTAL STUDIES

3.1 INTRODUCTION

Information on the existing environmental status is essential for assessing the likely environmental impacts of the project. In order to get an idea about the existing state of the environment, various environmental attributes such as meteorology, air quality, water quality, soil quality, noise level, ecology and socio-economic environment have been studied/ monitored.

3.2STUDY PERIOD

Baseline environmental data generation for air, water, noise and soil quality monitoring has been conducted at project site and four other locations from October 2019 To December 2019. Apart from field monitoring, additional data was also collected from secondary sources like irrigation department, India Meteorological Department (IMD), Central Ground Water Board, Geological Survey of India, State Ground Water Department, State Pollution Control Board, Census of India and Local Forest Department, Non - Governmental Agencies, etc.

3.3 STUDY AREA

The present report covers baseline environmental data generated in the study area (10 Km radius around the project site for land use and the sample selection for air, water, soil and noise monitoring).

Baseline Monitoring Of Environmental Components

In order to get an idea about the existing state of the environment, various environmental attributes such as meteorology, air quality, water quality, soil quality, noise level, ecology and socio-economic environment have been studied/monitored.

3.4Meteorology

Climate

The climate varies from Sub-tropical and sub-humid with three distinct seasons i.e. summer, monsoon (rainy season) and winter. The rainy season starts from the month of middle June to September end, and followed by the winter season, which starts from the end of October and goes up to February. The winter rains are generally experienced in late December or early January, which brings down the temperature and that's how December and January are

the coldest months in the district. The summer season starts from March and it goes up to June. The hottest months of the year are May and June. The maximum temperature in the district goes up to 42ºC during the summers and the minimum temperature is between 1 and 4ºC, further north of the district, the temperature comes down to 0.4ºC in winter season.

Rainfall, spatially, is highly variable depending upon the altitude. The intensity of the rainfall increases from south to north and the amount of rainfall decreases in generally from west to east. About 90% of the rainfall received during the monsoon period, and th remaining 10% of the rainfall in non-monsoon period.

3.5 METHODS FOR MONITORING

Table 3.1: Methods adopted for $PM_{2.5}$, PM_{10}, SO_2 and NO_X (as NO_2)

Parameters	Technique	Technical Protocol	Minimum Detectable Limit
$PM_{2.5}$	Gravimetric method	US EPA Method	5 ($\mu g/m^3$)
PM_{10}	Gravimetric method	IS 5182 (Part-XXIII)	5 ($\mu g/m^3$)
Sulphur Dioxide	West and Gaeke	IS-5182 (Part-II)	3 ($\mu g/m^3$)
Nitrogen Oxide	Jacob &Hochheiser	IS-5182 (Part-VI)	7 ($\mu g/m^3$)

3.6 BASELINE DATA

3.6.1Air environment

Ambient air quality monitoring stations were selected primarily on the basis of surface influence, demographic influence and meteorological influence. 24 hr hourly monitoring was carried out for SO_2, NO_x, $PM_{2.5}$& PM_{10} twice a week at each station for a study period of 3months (October 2019 to December 2019).

Observations:

• Pre-dominant upwind direction is North East and downwind is south west during Post Monsoon season. Average wind speed 3.35m/s.

• Calm is 25.59%.

b. Method of monitoring

The Central Pollution Control Board (CPCB) has published comprehensive document on emission testing regulations ("Emission Regulations Part-3, 985"). Those procedures relevant to the particulate monitoring are summarized below:

i. Particulate Matter (PM):-

The CPCB method and IS5182 (Part-XXIII) adopt a very similar approach to particulate sampling. There are some differences in the expressions used, but they are generally of no practical significance. It is recommended that CPCB method is adapted.

ii. Equipment calculation:

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

The ambient air quality data were collected to find the existing emissions / condition. The data is given in Table No. 3.3

Table 3.2

Ambient air quality monitoring stations

Location Code	Location	Direction	Distance	Project area/Study Area
AAQ1	Near Project Site	E	0.23Km	Project Area
AAQ2	Baikuntpur Village	W	5Km	Study Area
AAQ3	Kalyanpur village	S	4.30Km	Study Area
AAQ4	Ghoosapur village	N	4.75Km	Study Area
AAQ5	Lalarpatti	SW	2Km	Study Area

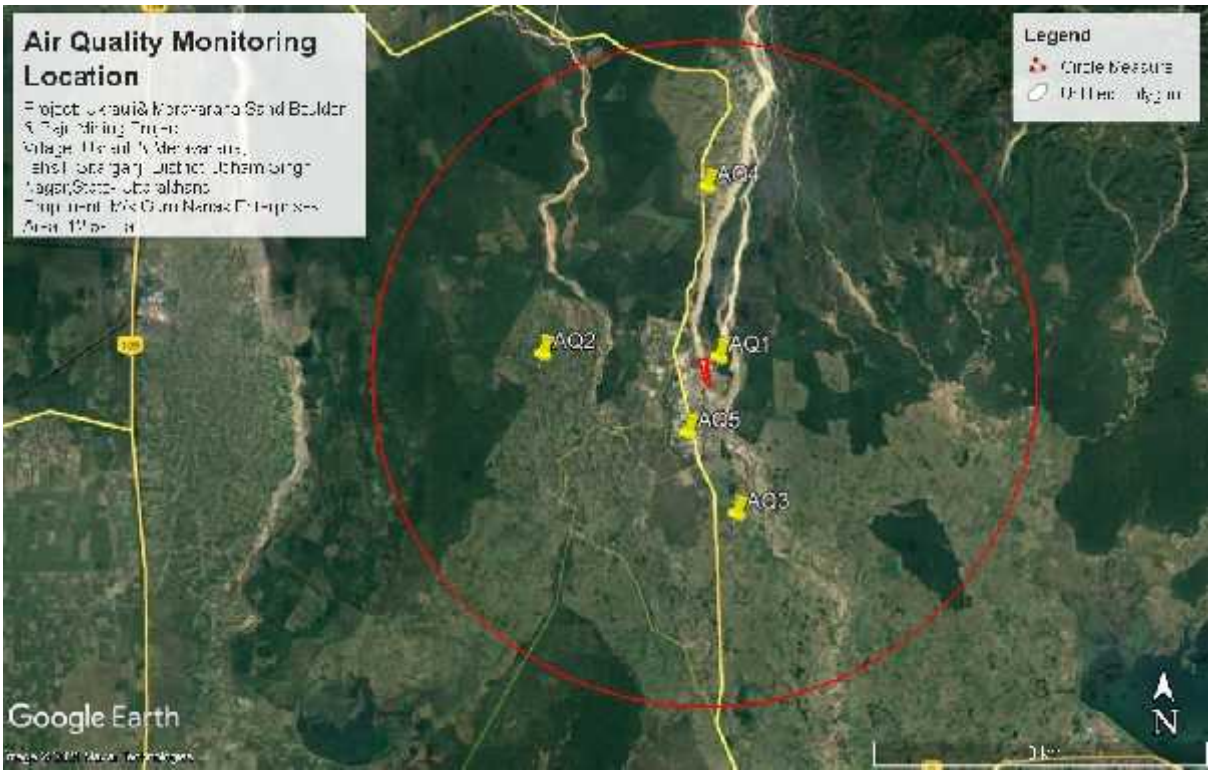


Fig-3.1: Air quality monitoring location

Table 3.3Ambient Air Quality Status

S.No.	Pollutant	Location	No. of observation	Minimum	Maximum	Average	98th Percentile	CPCB Standards
1.	SO_2 ($\mu g/m^3$)	AQ1	24	4.1	8.8	5.8	8.1	80.0
		AQ2		4.9	9.8	6.8	9.5	
		AQ3		4.3	9.7	6.2	8.8	
		AQ4		5.3	10.2	7.1	9.7	
		AQ5		4.4	9.8	6.2	9.0	
2.	NO_2 ($\mu g/m^3$)	AQ1	24	8.9	17.6	11.9	16.6	80.0
		AQ2		9.4	20.1	14.6	19.2	
		AQ3		8.5	17.6	12.7	17.4	
		AQ4		9.8	20.4	15.3	20.1	
		AQ5		8.1	19.9	13.2	18.5	
3.	PM10 ($\mu g/m^3$)	AQ1	24	70.8	85.0	79.0	84.6	100.0
		AQ2		64.9	90.3	83.2	89.5	
		AQ3		61.4	85.2	77.8	84.0	
		AQ4		65.9	92.6	83.8	94.2	
		AQ5		71.5	91.9	77.6	90.9	
4.	PM2.5	AQ1	24	37.2	49.6	42.5	48.4	60.0

	($\mu g/m^3$)	AQ2		38.3	50.8	43.7	49.6	
		AQ3		37.6	49.6	43.0	48.6	
		AQ4		38.9	51.3	44.2	50.1	
		AQ5		38.1	50.6	43.5	49.4	

Observations:

Ambient Air Quality Monitoring reveals that the minimum & maximum concentrations of PM_{10} for all the 5 AQ monitoring stations were found to be 61.4$\mu g/m^3$ at AQ3 and 92.6 $\mu g/m^3$ at AQ4, respectively.

As far as the gaseous pollutants SO_2 and NO_2 are concerned, the prescribed CPCB limit of 80$\mu g/m^3$ for residential and rural areas has never surpassed at any station. The maximum & minimum concentrations of SO_2 were found to be 10.2$\mu g/m^3$ at AQ4 & 4.1$\mu g/m^3$ at AQ1, respectively. The maximum & minimum concentrations of NO_2 were found to be 20.4 $\mu g/m^3$ at AQ4 & 8.1 µg/m3 at AQ5 respectively.

Free SiO_2:

SiO_2	AQ1	AQ2	AQ3	AQ4	AQ5
Minimum	1.37	1.41	1.38	1.42	1.40
Maximum	1.79	1.83	1.81	1.85	1.84

The standard for Respirable dust is 3 mg/m^3 for 8 hour of working period where Free silica content should not exceed 5% as prescribed by Directorate General of Mines Safety.

Observations:

The minimum & maximum concentrations of SiO_2 were found to be 1.37$\mu g/m^3$ at AQ1 & 1.85$\mu g/m^3$ at AQ4 respectively.

3.6.2 Water environment

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

The water quality at project site and other locations within the 10 km impact zone was monitored during October 2021 to December2021. The locations of the monitoring are given below in Table – 3.4 Results of monitoring of ground water quality is presented in table given below:

a. Ground water

Three water samples were collected from the study area. The physico-chemical analysis of the water samples is given in the Table 3.5

Table 3.4

Ground water sampling locations

Location Code	Sample collected from	Direction	Distance	Project area/Study Area
GW – 1	Baikuntpur Village	W	5Km	Study Area
GW – 2	Kalyanpur village	S	4.30Km	Study Area
GW – 3	Ghoosapur village	N	4.75Km	Study Area

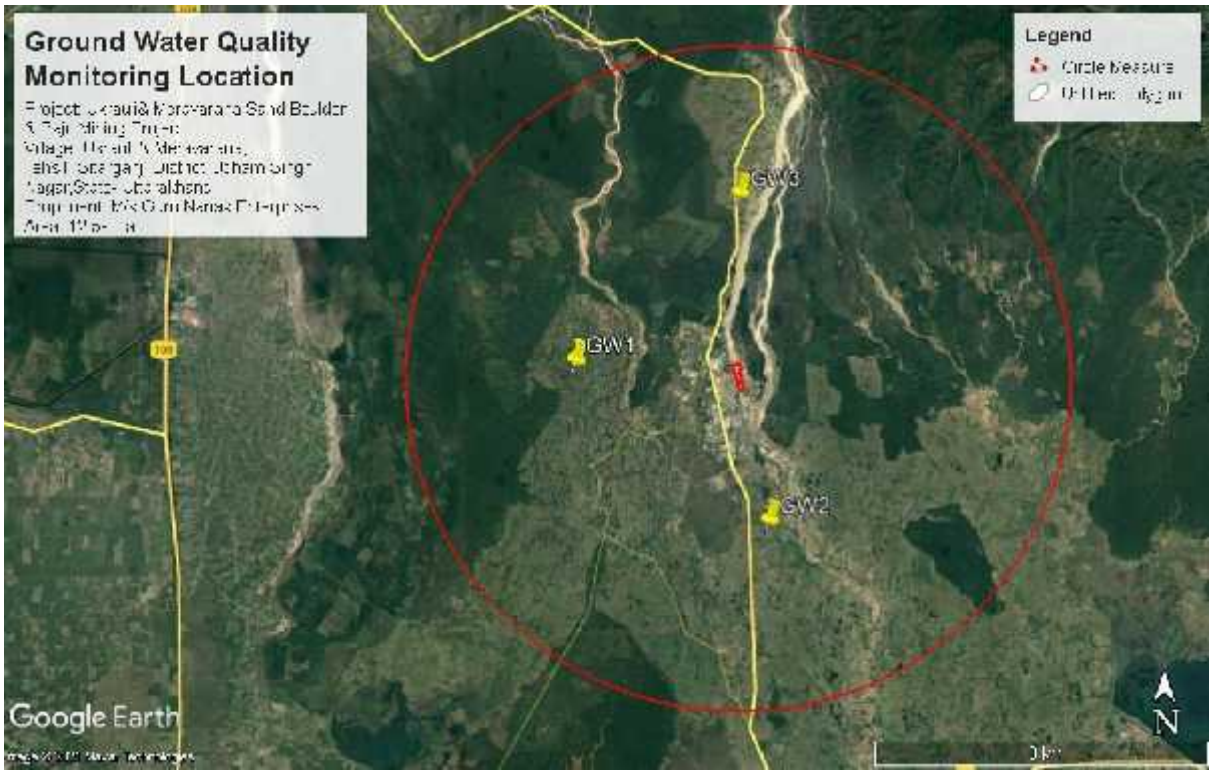


Fig- 3.2 Ground water monitoring locations

Table 3.5(i)Physico-chemical properties of ground water Study Period –October, 2019

S. No.	Parameter	Unit	Limit (as per IS:10500)		GW1	GW2	GW3
			Desirable	Permissible			
1	Colour	Hazen	5	25	<2	<2	<2
2	Odour	-	Un	-	Un	Un	Un
3	Taste	-	Agreeable	-	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	10	<1	<1	<1
5	pH	-	6.5-8.5	No Relaxation	7.69	7.75	7.67
6	Total Hardness (as CaCO3)	mg/l	300	600	312	330	322
7	Iron (as Fe)	mg/l	0.3	1	0.24	0.18	0.24
8	Chlorides (as Cl)	mg/l	250	1000	56	44	58
9	Fluoride (as F)	mg/l	1	1.5	0.5	0.8	0.5
10	TDS	mg/l	500	2000	483	502	456
11	Calcium(as Ca2+)	mg/l	75	200	74	78	72
12	Magnesium (as Mg2+)	mg/l	30	100	30	33	30
13	Copper (as Cu)	mg/l	0.05	1.5	<0.01	<0.01	<0.01
14	Manganese(as Mn)	mg/l	0.1	0.3	0.03	0.03	0.03
15	Sulphate (as SO4)	mg/l	200	400	14	18	19
16	Nitrate(as NO3)	mg/l	45	No Relaxation	3	5	2
17	Phenolic Compounds (as C6H5OH)	mg/l	0.001	0.002	<0.001	<0.001	<0.001
18	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	<0.001	<0.001
19	Cadmium (as Cd)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
20	Selenium (as Se)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
21	Arsenic (as As)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
22	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01
23	Lead (as Pb)	mg/l	0.05	No Relaxation	0.04	0.05	0.04
24	Zinc (as Zn)	mg/l	5	15	0.09	0.07	0.08
25	Anionic Detergent (as MBAS)	mg/l	0.2	1	<0.01	<0.01	<0.01
26	Chromium (as Cr6+)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01
27	Mineral oil	mg/l	0.01	0.03	<0.01	<0.01	<0.01
28	Alkalinity as CaCO3	mg/l	200	600	310	342	315
29	Aluminium (as Al)	mg/l	0.03	0.2	<0.02	<0.02	<0.02
30	Boron (as B)	mg/l	1	5	<0.1	<0.1	<0.1
	Microbiological Parameter						
31	Total Coliform	MPN /100ml	10 , Max	-	<2	<2	<2
32	*E. coli*	E.coli /100ml	Absent	-	Absent	Absent	Absent

Note: Un- Unobjectionable

Table 3.5(ii)Physico-chemical properties of ground water Study Period –November,2019

S. No.	Parameter	Unit	Limit (as per IS:10500)		GW1	GW2	GW3
			Desirable	Permissible			
1	Colour	Hazen	5	25	<2	<2	<2
2	Odour	-	Un	-	Un	Un	Un
3	Taste	-	Agreeable	-	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	10	<1	<1	<1
5	pH	-	6.5-8.5	No Relaxation	7.55	7.69	7.62
6	Total Hardness (as CaCO3)	mg/l	300	600	298	318	317
7	Iron (as Fe)	mg/l	0.3	1	0.28	0.21	0.23
8	Chlorides (as Cl)	mg/l	250	1000	48	38	37
9	Fluoride (as F)	mg/l	1	1.5	0.6	0.8	0.7
10	TDS	mg/l	500	2000	432	469	458
11	Calcium(as Ca2+)	mg/l	75	200	70	76	73
12	Magnesium (as Mg2+)	mg/l	30	100	29	32	34
13	Copper (as Cu)	mg/l	0.05	1.5	<0.01	<0.01	<0.01
14	Manganese(as Mn)	mg/l	0.1	0.3	0.01	0.01	0.01
15	Sulphate (as SO4)	mg/l	200	400	10	15	13
16	Nitrate(as NO3)	mg/l	45	No Relaxation	4	6	5
17	Phenolic Compounds (as C6H5OH)	mg/l	0.001	0.002	<0.001	<0.001	<0.001
18	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	<0.001	<0.001
19	Cadmium (as Cd)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
20	Selenium (as Se)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
21	Arsenic (as As)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
22	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01
23	Lead (as Pb)	mg/l	0.05	No Relaxation	0.05	0.05	0.05
24	Zinc (as Zn)	mg/l	5	15	0.12	0.08	0.08
25	Anionic Detergent (as MBAS)	mg/l	0.2	1	<0.01	<0.01	<0.01
26	Chromium (as Cr6+)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01
27	Mineral oil	mg/l	0.01	0.03	<0.01	<0.01	<0.01
28	Alkalinity as CaCO3	mg/l	200	600	284	325	318
29	Aluminium (as Al)	mg/l	0.03	0.2	<0.02	<0.02	<0.02
30	Boron (as B)	mg/l	1	5	<0.1	<0.1	<0.1
	Microbiological Parameter						
31	Total Coliform	MPN /100ml	10 , Max	-	<2	<2	<2
32	*E. coli*	E.coli /100ml	Absent	-	Absent	Absent	Absent

Note: Un- Unobjectionable

Table 3.5(iii)Physico-chemical properties of ground water Study Period – December, 2019

S. No.	Parameter	Unit	Limit (as per IS:10500)		GW1	GW2	GW3
			Desirable	Permissible			
1	Colour	Hazen	5	25	<2	<2	<2
2	Odour	-	Un	-	Un	Un	Un
3	Taste	-	Agreeable	-	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	10	<1	<1	<1
5	pH	-	6.5-8.5	No Relaxation	7.47	7.76	7.62
6	Total Hardness (as CaCO3)	mg/l	300	600	279	296	302
7	Iron (as Fe)	mg/l	0.3	1	0.22	0.17	0.34
8	Chlorides (as Cl)	mg/l	250	1000	40	32	44
9	Fluoride (as F)	mg/l	1	1.5	0.7	0.7	0.8
10	TDS	mg/l	500	2000	394	408	476
11	Calcium(as Ca2+)	mg/l	75	200	65	72	70
12	Magnesium (as Mg2+)	mg/l	30	100	28	26	30
13	Copper (as Cu)	mg/l	0.05	1.5	<0.01	<0.01	<0.01
14	Manganese(as Mn)	mg/l	0.1	0.3	0.01	0.01	0.02
15	Sulphate (as SO4)	mg/l	200	400	8	12	14
16	Nitrate(as NO3)	mg/l	45	No Relaxation	5	6	4
17	Phenolic Compounds (as C6H5OH)	mg/l	0.001	0.002	<0.001	<0.001	<0.001
18	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	<0.001	<0.001
19	Cadmium (as Cd)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
20	Selenium (as Se)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
21	Arsenic (as As)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
22	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01
23	Lead (as Pb)	mg/l	0.05	No Relaxation	0.04	0.05	0.05
24	Zinc (as Zn)	mg/l	5	15	0.11	0.09	0.1
25	Anionic Detergent (as MBAS)	mg/l	0.2	1	<0.01	<0.01	<0.01
26	Chromium (as Cr6+)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01
27	Mineral oil	mg/l	0.01	0.03	<0.01	<0.01	<0.01
28	Alkalinity as CaCO3	mg/l	200	600	264	284	322
29	Aluminium (as Al)	mg/l	0.03	0.2	<0.02	<0.02	<0.02
30	Boron (as B)	mg/l	1	5	<0.1	<0.1	<0.1
	Microbiological Parameter						
31	Total Coliform	MPN /100ml	10 , Max	-	<2	<2	<2
32	*E. coli*	E.coli /100ml	Absent	-	Absent	Absent	Absent

Observation:

Analysis results of ground water reveal the following: -

- pH varies from 7.47 to 7.75
- Total hardness varies from 279 mg/l to 330mg/l
- Total dissolved solids vary from 394 mg/l to 502 mg/l

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

Fluorides and nitrates are within the permissible limits. Most of the parameter in ground water sources are well within the permissible limits as per IS – 10500, drinking water standards.

b. Surface water

Three water samples were collected from the study area. The physico-chemical analysis of the water samples is given in the Table 3.7.

Table 3.6
Surface water sampling locations

Location Code	Sample collected from	Direction	Distance	Project area/Study Area
SW – 1	Kailash River	SSE	2Km	Study area
SW – 2	Kailash River	S	5Km	Study Area

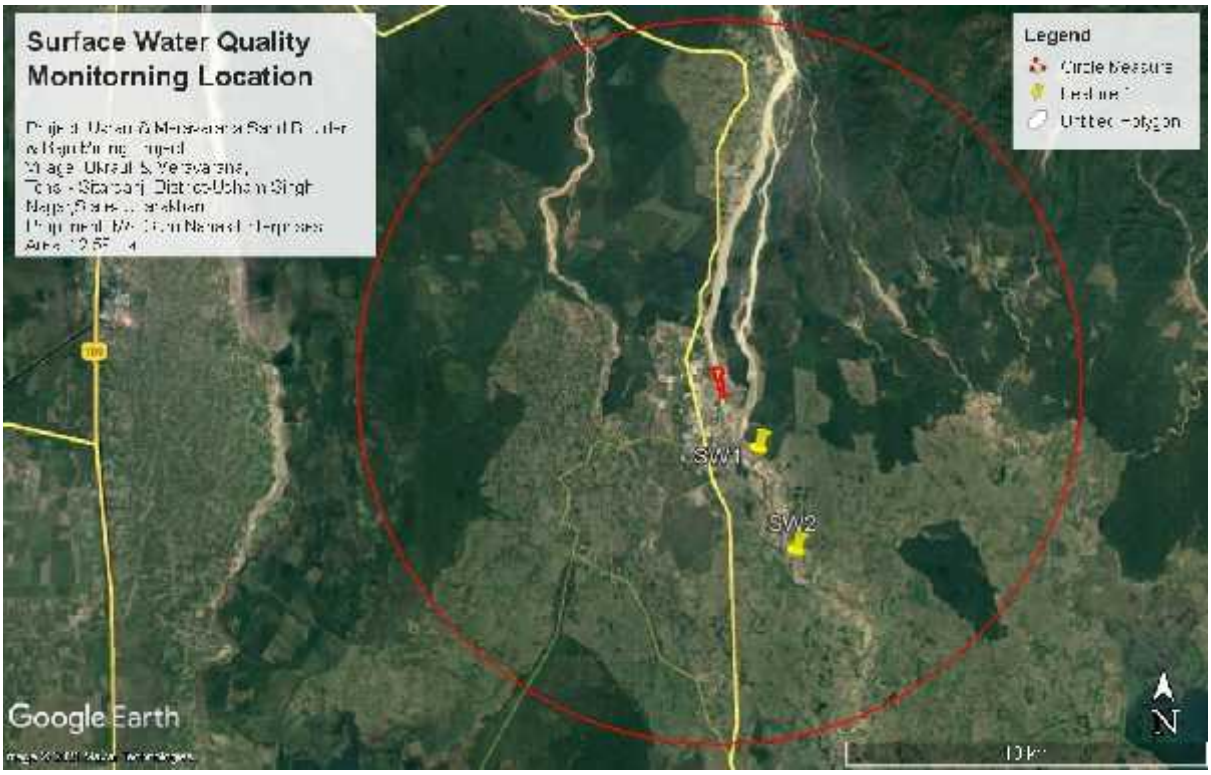


Figure- 3.3 Surface water quality monitoring location

Table 3.7 (i) Physico-chemical properties of surface water (October, 2019)

S. No.	Parameter	Unit	S.W. 1	S.W. 2
1	pH	-	7.80	7.68
2	Dissolved oxygen	mg/l	7.8	7.3
3	BOD (3 Days at 27°C)	mg/l	2	3
4	Free Ammonia (as N)	mg/l	<0.1	<0.1
5	Sodium Adsorption Ratio	-	1.26	0.96
6	Boron	mg/l	0.1	0.2
7	Conductivity	µmhos/cm	312	368
8	Turbidity	NTU	3	6
9	Magnesium Hardness (as $CaCO_3$)	mg/l	42	50
10	Total Alkalinity (as $CaCO_3$)	mg/l	108	136
11	Chloride (as Cl)	mg/l	24	22

12	Sulphate (as SO_4)	mg/l	7	8
13	Nitrate (as NO_3)	mg/l	0.8	1.1
14	Fluoride (as F)	mg/l	0.5	0.6
15	Sodium (as Na)	mg/l	27	24
16	Potassium (as K)	mg/l	2.8	3.4
17	TKN (as N)	mg/l	0.9	1.1
18	Total Phosphorous (as PO_4)	mg/l	0.15	0.12
19	COD	mg/l	12	16
20	Phenolic compounds (as C_6H_5OH)	mg/l	<0.001	<0.001
21	Iron (as Fe)	mg/l	0.09	0.14
22	Zinc (as Zn)	mg/l	0.04	0.05
23	Arsenic (as As)	mg/l	<0.01	<0.01
24	Mercury (as Hg)	mg/l	<0.001	<0.001
25	TDS	mg/l	186	236
26	Total Coliform	MPN/100ml	2100	3000
27	Faecal Coliform	MPN/100ml	900	1400

Table 3.7 (ii) Physico-chemical properties of surface water

(November 2019)

S. No.	Parameter	Unit	S.W. 1	S.W. 2
1	pH	-	7.43	7.20
2	Dissolved oxygen	mg/l	7.4	7.6
3	BOD (3 Days at 27°C)	mg/l	3	2
4	Free Ammonia (as N)	mg/l	<0.1	<0.1
5	Sodium Adsorption Ratio	-	1.52	1.68
6	Boron	mg/l	0.2	0.1
7	Conductivity	µmhos/cm	322	356
8	Turbidity	NTU	5	7
9	Magnesium Hardness (as	mg/l	38	36

	$CaCO_3$)			
10	Total Alkalinity (as $CaCO_3$)	mg/l	116	134
11	Chloride (as Cl)	mg/l	26	20
12	Sulphate (as SO_4)	mg/l	6	8
13	Nitrate (as NO_3)	mg/l	1.7	2.4
14	Fluoride (as F)	mg/l	0.6	0.4
15	Sodium (as Na)	mg/l	32	36
16	Potassium (as K)	mg/l	2.8	4.6
17	TKN (as N)	mg/l	1.5	1.8
18	Total Phosphorous (as PO_4)	mg/l	0.16	0.12
19	COD	mg/l	12	10
20	Phenolic compounds (as C_6H_5OH)	mg/l	<0.001	<0.001
21	Iron (as Fe)	mg/l	0.18	0.22
22	Zinc (as Zn)	mg/l	0.03	0.03
23	Arsenic (as As)	mg/l	<0.01	<0.01
24	Mercury (as Hg)	mg/l	<0.001	<0.001
25	TDS	mg/l	192	232
26	Total Coliform	MPN/100ml	1700	2700
27	Faecal Coliform	MPN/100ml	800	1300

Table 3.7 (iii) Physico-chemical properties of surface water

(December 2019)

S. No.	Parameter	Unit	S.W. 1	S.W. 2
1	pH	-	7.54	7.72
2	Dissolved oxygen	mg/l	7.5	7.3
3	BOD (3 Days at 27°C)	mg/l	2	2
4	Free Ammonia (as N)	mg/l	<0.1	<0.1
5	Sodium Adsorption Ratio	-	1.92	1.82
6	Boron	mg/l	0.1	0.1

7	Conductivity	µmhos/cm	342	426
8	Turbidity	NTU	3	5
9	Magnesium Hardness (as $CaCO_3$)	mg/l	42	36
10	Total Alkalinity (as $CaCO_3$)	mg/l	126	155
11	Chloride (as Cl)	mg/l	28	32
12	Sulphate (as SO_4)	mg/l	8	7
13	Nitrate (as NO_3)	mg/l	1.5	1.6
14	Fluoride (as F)	mg/l	0.7	0.5
15	Sodium (as Na)	mg/l	40	44
16	Potassium (as K)	mg/l	3.6	2.4
17	TKN (as N)	mg/l	1.2	1.6
18	Total Phosphorous (as PO_4)	mg/l	0.18	0.11
19	COD	mg/l	8	10
20	Phenolic compounds (as C_6H_5OH)	mg/l	<0.001	<0.001
21	Iron (as Fe)	mg/l	0.12	0.14
22	Zinc (as Zn)	mg/l	0.05	0.04
23	Arsenic (as As)	mg/l	<0.01	<0.01
24	Mercury (as Hg)	mg/l	<0.001	<0.001
25	TDS	mg/l	214	252
26	Total Coliform	MPN/100ml	700	1300
27	Faecal Coliform	MPN/100ml	300	500

Observation:

The analysis results indicate that the pH ranges between 7.20 and 7.80.

Dissolved Oxygen (DO) was observed in the range of 7.3 to 7.8 mg/l. BOD values were observed to be in the range of 3.

The chlorides and Sulphates were found to be in the range of 20-32.0 mg/l and 6-8 mg/l respectively.

Bacteriological examination of surface water samples revealed the presence of total coliform in range of 700 MPN/100 ml to 3000 MPN/100 ml.

Based on the results it is evident that most of the parameters of the samples comply with 'Category B' standards of CPCB, indicating drinking water source after conventional treatment and disinfection.

3.6.3 SOIL ENVIRONMENT

a)Type & characteristics: To assess the soil quality, following stations were selected. Soil profile and quality was studied at 4 locations.

Location Code	Location	Direction	Distance	Project area/Study Area
SQ1	Near Project Site	E	0.23Km	Project Area
SQ2	Baikuntpur Village	W	5Km	Study Area
SQ3	Kalyanpur village	S	4.30Km	Study Area

Table 3.8: Location of Soil Sampling Stations

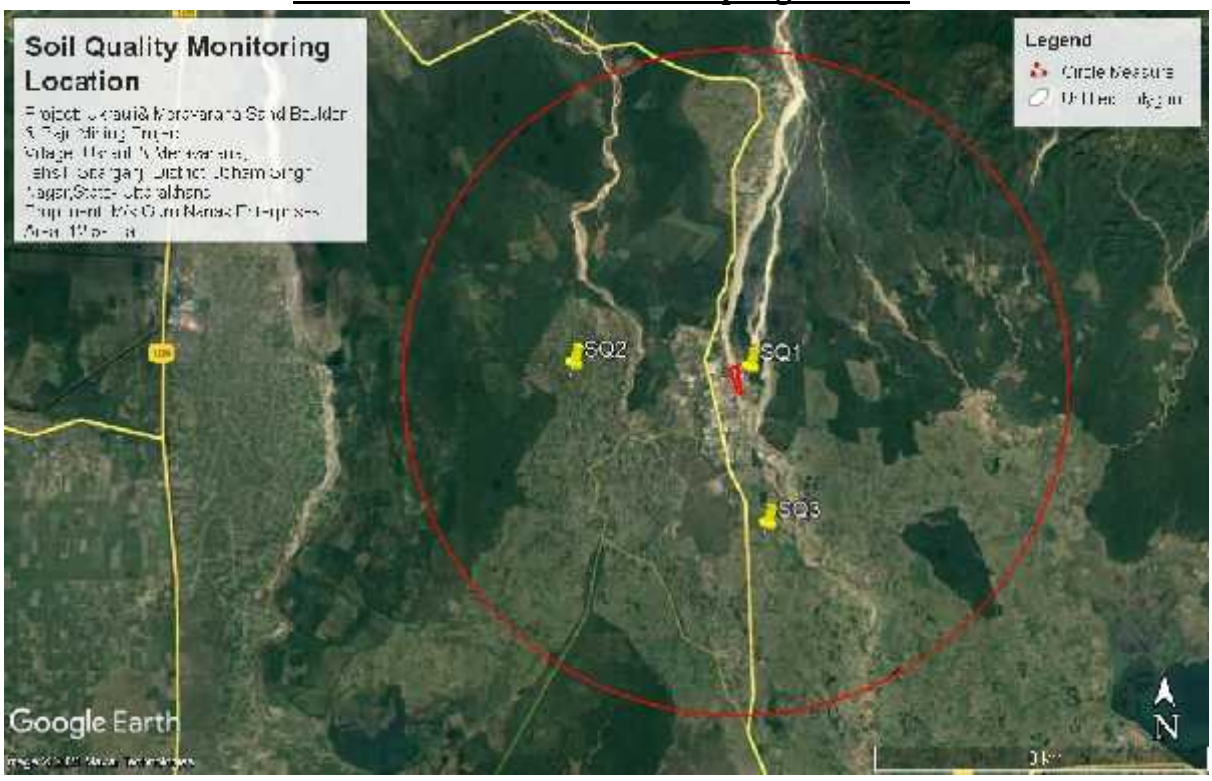


Figure- 3.4 Soil quality monitoring location

Table No. 3.9Physico-chemical properties of soil

S.No	Parameter	Unit	SQ-1	SQ-2	SQ-3
1.	Texture	-	Sandy Loam	Loamy Sand	Loamy Sand
	Silt	%	13.52	9.02	9.01
	Clay	%	13.62	6.70	6.74
	Sand	%	72.86	84.25	84.25
2.	pH	-	8.09	8.20	8.17
3.	Electrical Conductivity	µmhos/cm	178	103	105
4.	Cation exchange capacity	meq/100 gm	16.6	11.0	12.0
5.	Potassium	meq/100	0.32	0.20	0.23
6.	Sodium	meq/100	0.42	0.28	0.25
7.	Calcium	meq/100	12.74	9.27	9.23
8.	Magnesium	meq/100	3.14	3.30	2.30
9.	Sodium Absorption Ratio	-	0.48	0.38	0.32
10.	Water Holding Capacity	%	24.5	25.68	22.67
11.	Porosity	%	46.81	47.07	48.03
12.	Permeability	cm/hrs	2.7	3.3	3.6
13.	Total kjehdahl Nitrogen	%	0.0574	0.0398	0.0365
14.	Phosphorus(Olsen's)	mg/kg	21.3	12.6	11.3
15.	Bulk Density	gm/cc	1.32	1.43	1.42
16.	Organic Matter	%	0.39	0.24	0.23

Observations:

Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 8.09 to 8.17, which shows that the soil is alkaline in nature. Potassium is found to be from 0.20meq/100 to 0.32meq/100. The water holding capacity is found in between 22.67% to 25.86%.

3.6.4Noise environnent

The noise levels within the study area were recorded using Sound Level Meter and noise monitoring results were compared with the Ambient Noise Quality Standard notified under Environment Protection Act, 1986.The levels recorded are as stated in Table 3.11.

Table 3.10Noise quality monitoring stations

Location Code	Location	Direction	Distance	Project area/Study Area
NQ1	Near Project Site	E	0.23Km	Project Area
NQ2	Baikuntpur Village	W	5Km	Study Area
NQ3	Kalyanpur village	S	4.30Km	Study Area
NQ4	Ghoosapur village	N	4.75Km	Study Area

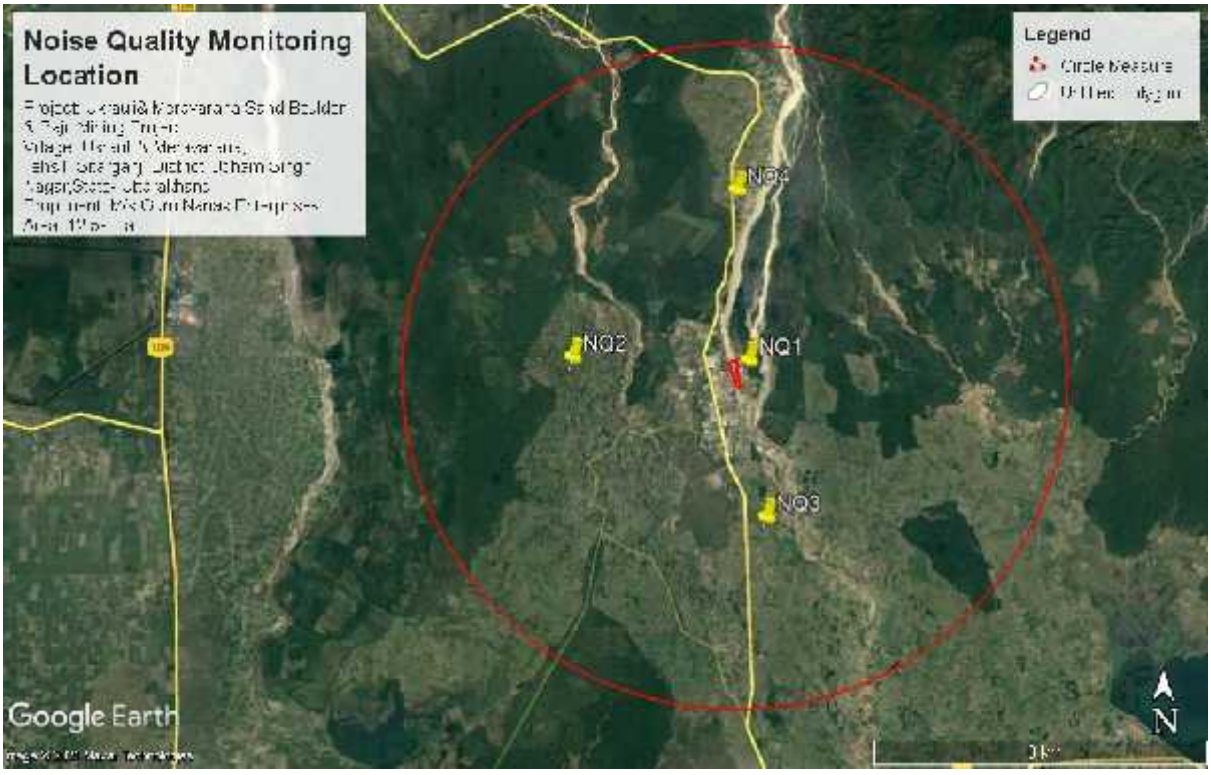


Figure – 3.5 Noise quality monitoring location

Table No. 3.11 Noise level status

S.No.	PROJECT SITE	ZONE	Leq LIMIT (as per CPCB Guidelines),	Leq Value monitored, in

			in dB(A)		dB(A)	
			DAY*	**NIGHT***	**DAY***	**NIGHT***
1	NQ-1	Project site	75	70	52.1	40.3
2	NQ-2	Residential Zone	55	45	50.6	38.2
3	NQ-3	Residential Zone	55	45	51.6	41.5
4	NQ-4	Residential Zone	55	45	49.3	37.3

***** Day time Leq in **dB(A)** (6.00AM TO 10.00PM)
Night time Leq in **dB(A)** (10.00PM TO 6.00AM)

Results

Noise monitoring reveals that the maximum & minimum noise levels at day time were recorded as 52.1 dB (A) at NQ1 & 49.3 dB (A) at NQ4, respectively. The maximum & minimum noise levels at night time were found to be 41.5 dB (A) at NQ3 Village & 37.3 dB (A) at NQ4.

There are several other sources in the 10 km radius of study area, which contributes to the local noise level of the area. Traffic activities as well as activities in nearby villages and agricultural fields add to the ambient noise level of the area.

3.7 BIOLOGICAL ENVIRONMENT

Biological diversity comprises the variability of species, genus and ecosystems and is very crucial for maintaining the basic processes on which the life depends. Broadly, it can be divided into two types i.e. the floral diversity and faunal diversity. Conservation of the biodiversity is essential for the sustainable development as it not only provides the food, fodder and medicine, but also contributes in improvement of essential environmental attributes like air, water, soil, etc.

Udham Singh Nagar is Tarai region of Kumaon division. It was separated by district nainital on basis of its physiographical condition. The geographical area of the district is 3055km^2. The district lies between latitudes 28º53' and 29º23' N and longitudes 78º45' and 80º08' E

Drainage of the area is mainly controlled by Kailash River, Gola River, Dabka River, kosi, sharda River etc. and their tributaries (locally called Nadi, Gad or Gadhera).project site falls on River Kailash.

January is the coldest month with mean maximum temperature of 10°C, the mean minimum temperature being about 2°C. Temperature drops down to – 6°C during January and February in the northern part of the district. June is the warmest month with the mean maximum and

the mean minimum temperatures of 25°C and 15°C respectively. The Relative Humidity increases rapidly with the onset of monsoon and reaches at about 80% during July to September. The driest part of the year is the pre-monsoon period, when the humidity is as low as 30% in the afternoons. Skies are heavily clouded during the monsoon months and for short spells when the district is affected by Western Disturbances. Two broad wind patterns are observed in the district viz. north easterly to easterly (May to September) and south easterly to westerly (October to March).

a) Forests cover and Forest Type:

The forest of the district includes the vast range found in the Himalayas, varying from the sub-tropical species which grow in the outer ranges of low hills to the rich Alpine flowers in the north. The forest cover in the Uttarakhand state, based on interpretation of satellite data of October-November 2008 mentioned in the India State of Forest Report 2011, is 45.80% of the state's geographical area. In terms of forest canopy density classes, the state has 4762 km^2 area under very dense forest, 14167 km^2 areas under moderately dense forest and 5567 km^2 area under open forest. The forest type falls in the category of subtropical forests of 'Champion and Seth classification of vegetation in India'. In the study area they vary from open forest to moderately dense forest.

b) Agriculture:

Agriculture is the main occupation of the people. However, intensive cultivation is not possible as major part of the district is mountainous. Agricultural activities are common on gentle hill slopes and in relatively plain, broad river valley of kailash River. Rice, wheat, mandua, barley, maize and sawan are the principal crops grown in the district.

Nearest Protected Area

The area is rich in ecology and apt for places of ecological research studies. Nearest protected area is Nandhaur WLS which is at a distance of 9.8 km (North direction). There is no protected area within the impact zone of the project.

c) Study period and methodology

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. Secondary data was collected from published literature.

The details are given as below:

Survey sites : Around the project site in 10 km radius

Core zone : At the project site

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

Methodology:

Table 3.12: Mode of data collection & parameters considered during the survey

Aspect	Data	Mode of data collection	Parameters monitored
Terrestrial Ecology	Primary data Collection	Field survey	Floral
	Secondary data collection	From authentic sources like Range office and Forest Department of Uttarakhand and available published literatures	Floral and Faunal diversity and study of Vegetation, forest type, importance etc.
River Ecology			
	Secondary data collection	From authentic sources like published literatures	Fish fauna

(g) General Vegetation Study of the area:

Area supports moderately healthy vegetation, the main forest species are scattered all over the hills, riparian vegetation found along the Kailash River and upper reaches of hills covered with pine forest.

Flora of the Core zone

The core zone comprises of private agriculture land, where mining operation is proposed. Few invasive species like *Partheniumhysterosporus*, *lantanacamara,* shrubs like *Cannabissativa*etc. are present. No ecologically sensitive plant species has been reported from core area.

Flora of the Buffer zone: Buffer zone of the proposed project falls in lesser and Greater Himalaya region. Many tree species are planted in the area because of their usefulness, economic and aesthetic values. The tree species observed in the area are, Aam (*Mangiferaindica*), Jamun (*Syzygiumcumini*), Bail (*Aeglemarmelos*), Dakain

(*Meliaazedarach*), Neem (*Azadirachtaindica*), Peepal (*Ficusreligiosa*), Bhimal (*Grewiaoptiva*) etc.

In agricultural waste land and along the road side, growth of shrubs (including invasive species) like *Argemonemexicana*, *Cannabis sativa*, *Cenchrusciliaris*, *Partheniumhysterosporus*, etc. are very common. These weeds are affecting the agricultural productivity of the region due to fast growth, short life cycle and enormous production of seeds.

Vegetation in and around human settlement:

Vegetation pattern in villages and surrounding areas are slightly different from the rest of the areas. The common species grown near villages are mostly edible or useful plants such as *Mangiferaindica, Azadirachtaindica, Albizialebbeck, Delonixregia, Ficusreligiosa*, etc.

A list of flora of the study area is enclosed as Table 3.12 (i).

Table 3.13 (i): Flora of the Core Zone

S.No.	***Local Name***	***Botanical Name***	***Family***	***Habit***
1	***KantaChaulai***	*Amaranthusspinosus*	*Amaranthaceae*	*Herb*
2	***Arbi***	*Colocasiaesculenta*	*Araceae*	*Herb*
4	***Doob, dobri***	*Cynodondactylon*	*Poaceae*	*Herb*
5	***Kaans***	*Saccharumspontaneum*	*Poaceae*	*Herb*
7	***Aak***	*Calotropisprocera*	*Asclepiadaceae*	*Shrub*
8	***Kasunda***	*Cassia occidentalis*	*Fabaceae*	*Shrub*
9	***Kanghi***	*Abutilon indicum*	*Malvaceae*	*Shrub*
10	***Ber***	*Ziziphusmauritiana*	*Rhamnaceae*	*Shrub*
11	***Dhatura***	*Daturainnoxia*	*Solanaceae*	*Shrub*
12	***Raimuniya***	*Lantana camara*	*Verbenaceae*	*Shrub*
13	***Sawani, farash***	*Lagerstroemia indica*	*Lythraceae*	*Tree*
14	***Goat weed, ghabuti***	*Ageratum conyzoides L.*	*Asteraceae*	*Herb*
15	***Kantachaulai***	*Amaranthusspinosus L.*	*Amaranthaceae*	*Herb*

16	***TivraGandha***	*Chromoleanaodorata (L.)*	*Asteraceae*	*Shrub*
17	***Bhang,hemp***	*Cannabis sativa L.*	*Canabaceae*	*Herb/ Shrub*
18	***Bathuwa***	*Chenopodium album L.*	*Chenopodiaceae*	*Herb*
26	***Ban kakari***	*Podophyllumhexandrum*	*Podophyllaceae*	*Herb*
28	***Giloe***	*Tinosporasinensis*	*Menispermaceae*	*Climber*
29	***Kilmora***	*Berberisaristata*	*Berberidaceae*	*Shrub*
30	***Lajvanti***	*Mimosa pudica*	*Mimosaceae*	*Herb*
31	***Bajardanti***	*Potentillafulgens*	*Rosaceae*	*Herb*
32	***JangliJira***	*Carumcarvi L.*	*Apiaceae*	*Herb*
33	***Jhinti***	*Barleriacristala*	*Acanthaceae*	*Shrub*
34	***Kalihari***	*Gloriosasuperba L.*	*Lilliaceae*	*Herb*
35	***Jambu***	*Allium stracheyi*	*Lilliaceae*	*Herb*
36	***Rsabhak***	*Malaxismuscifera*	*Orchidaceae*	*Herb*
37	***Atis***	*Aconitum heterophyllum*	*Ranunculaceae*	*Herb*
38	***Angeli***	*Anemone rivularis*	*Ranunculaceae*	*Herb*
39	***Banafsa***	*Viola biflora L.*	*Violaceae*	*Herb*
40	***Majethi***	*Rubiacordifolia L.*	*Rubiaceae*	*Climber*

Table 3.13 (ii): Flora of the Buffer zone

Flora Of Buffer Zone				
S. No.	***Local Name***	***Botanical Name***	***Family***	***Habit***
1	***Garundi***	*Alternantheraparonychioides*	*Amaranthaceae*	*Herb*
2	***Garundi***	*Alternantherapungens*	*Amaranthaceae*	*Herb*
3	***Kantachaulai***	*Amaranthusspinosus*	*Amaranthaceae*	*Herb*

4	***Arbi***	*Colocasiaesculenta*	*Araceae*	*Herb*
5	***Goat weed, ghabuti***	*Ageratum conyzoides*	*Asteraceae*	*Herb*
6	***Madras carpet***	*Grangeamaderaspatana*	*Asteraceae*	*Herb*
7	***Wild carrot, gajarghas***	*Partheniumhysterophorus*	*Asteraceae*	*Herb*
8	***Chakunda***	*Cassia tora*	*Fabaceae*	*Herb*
9	***Bhang , hemp***	*Cannabis sativa*	*Cannabaceae*	*Herb*
10	***Bathuwa***	*Chenopodium album*	*Chenopodiaceae*	*Herb*
11	***Mexican poopy***	*Argemone Mexicana*	*Papaveraceae*	*Herb*
12	***Doob,dobri***	*Cynodondactylon*	*Poaceae*	*Herb*
13	***Malankuri,wiregrass***	*Eleusineindica*	*Poaceae*	*Herb*
14	***Bharbhusi***	*Eragrostistenella*	*Poaceae*	*Herb*
15	***Kaans***	*Saccharumspontaneum*	*Poaceae*	*Herb*
16	***Chirpati, rasbhari***	*Physalis minima*	*Solanaceae*	*Herb*
17	***Fern***	*Adiantumsps.*	*Adiantaceae*	*Herb*
18	***Ladder fern***	*Pterissps.*	*Pteridaceae*	*Herb*
19	***Aak***	*Calotropisprocera*	*Asclepiadaceae*	*Shrub*
20	***Kasunda,chakunda***	*Cassia occidentalis*	*Fabaceae*	*Shrub*
21	***Ban tulsi***	*Croton bonplandianum*	*Euphorbiaceae*	*Shrub*
21	***Kanghi,atibala***	*Abutilon indicum*	*Malvaceae*	*Shrub*
22	***Booganbel***	*Bougainvillea spectabilis*	*Nyctaginaceae*	*Shrub*
23	***Ber***	*Ziziphusmauritiana*	*Rhamnaceae*	*Shrub*
24	***Datura***	*Daturainnoxia*	*Solanaceae*	*Shrub*
25	***Kateli***	*Solanumvirginianum*	*Solanaceae*	*Shrub*

26	***Raimuniya***	*Lantana camara*	*Verbenaceae*	*Shrub*
27	***Barbeery,rasaut***	*Berberis vulgaris*	*Berberidaceae*	*Shrub*
28	***Curry leaf***	*Murrayakoenigii*	*Rutaceae*	*Shrub*
29	***Ratanjot***	*Jatrophacurcas*	*Euphorbiaceae*	*Tree*
30	***Aam***	*Mangiferaindica*	*Anacardiaceae*	*Tree*
31	***Sawani , farash***	*Lagerstroemia indica*	*Lythraceae*	*Tree*
32	***Moral***	*Ulmuswallichiana*	*Ulmaceae*	*Tree*
33	***Bay leaf ,Tejpatta***	*Cinnamomumtamala*	*Lauraceae*	*Tree*
34	***Walnut, Akhrot***	*Juglansregia*	*Judlandaceae*	*Tree*
35	***Himalayan maple***	*Acer oblongum*	*Sapindaceae*	*Tree*
36	***Peepal***	*Ficusreligiosa*	*Moraceae*	*Tree*
37	***Goolar***	*Ficusracemosa*	*Moraceae*	*Tree*
38	***Amaltas***	*Cassia fistula*	*Fabaceae*	*Tree*
39	***Arandi***	*Ricinuscommunis*	*Euphorbiaceae*	*Tree*
40	***Saras***	*Albizialebbeck*	*Fabaceae*	*Tree*
41	***White kachnar***	*Bauhinia acuminate*	*Fabaceae*	*Tree*
42	***Banjh***	*Quercusleucotricophera*	*Lauraceae*	*Tree*
43	***Bakain***	*Meliaazedarach*	*Meliaceae*	*Tree*
44	***White babool***	*Leucaenaleucocephala*	*Fabaceae*	*Tree*
45	***Kachnar***	*Bauhinia variegate*	*Fabaceae*	*Tree*
46	***Baheda***	*Terminaliabellerica*	*Combretaceae*	*Tree*
47	***Harad***	*Terminaliachebula*	*Combretaceae*	*Tree*
48	***Gulmohar***	*Delonixregia*	*Fabaceae*	*Tree*
49	***Chir, pine***	*Pinusroxburghii*	*Pinaceae*	*Tree*

50	***Khirk***	*Celtisaustralis*	*Cannabaceae*	*Tree*
51	***Bihul, bhimal***	*Grewiaoptiva*	*Tiliaceae*	*Tree*
52	***Chilbil, papri***	*Holopteleaintegrifolia*	*Ulmaceae*	*Tree*
53	***Semal***	*Bombaxceiba L.*	*Bombacaceae*	*Tree*
54	***Timur***	*Zanthoxylumarmatum*	*Rutaceae*	*Shrub*
55	***Jamun***	*Syzygiumcumini L.*	*Mytaceae*	*Tree*
56	***Podina***	*Menthaarevensis L.*	*Lamiaceae*	*Herb*
57	***Amla***	*Emblicaofficinalis*	*Euphorbiaceae*	*Herb*
58	***Bichhughas***	*Urticadioca L.*	*Urticaceae*	*Shrub*
59	***Kaphal***	*Myricaesculenta*	*Myricaceae*	*Tree*
60	***Bhojpatra***	*Betulautilis D.*	*Betulaceae*	*Tree*
61	***Rambans***	*Agave Americana L.*	*Agavaceae*	*Shrub*
62	***Thuner***	*Taxusbaccata L.*	*Taxaceae*	*Tree*
63	***Deodar***	*Cedrusdeodara*	*Pinaceae*	*Tree*

Fauna of the study area:

As far as the reptile community was concerned, Indian cobra, garden gecko and house lizard are recorded from the study area. A list of wild fauna of the study area has been prepared on the basis of local inquiry from the village people and from the available published literatures. The species with conservation status as per Wildlife Protection Act, 1972 are identified. Moreover, global conservation status of species was estimated from Red data book of IUCN.

Mammals:

Rodents like Indian palm squirrel (*Funambuluspalmarum*) and field mouse (*Apodemussylvaticus*) are noticed in vicinity of village. Inquiry from village people regarding wild animals reveals that Rhesus macaque (*Macacamulatta*), Indian hare (*Lepusnigricollis*), fruits bat (*Pteropusconspicillatus*), Goral (*Naemorhedus goral*) Yellow throated marten (*Martesflavigula*) are often seen in the area. Many domesticated mammal species are reported

from buffer zone during the field survey. Common grazing animals like cow and goat,. can be noticed in open grass fields.

Avifauna: House crow (*Corvussplendens*), Common Myna (*Acridotherestristis*)), Red-rumped Swallow (*Cecropisdaurica*), Hoopoe (*Upupaepopsceylonensis*) Warblers and Tits are of common occurrence.

Reptiles: The reptilians species commonly reported are Agama (*Laudakiatuberculata*) in settlement area, Garden lizard (*Calotesversicolor*) and *Eutropismacularia* along shady places in agricultural field or where growth of bushes is noticed.

Amphibian: Amphibians are commonly found at the places along the margin of aquatic and terrestrial systems. Due to presence of water bodies like river, nalas, etc. the study area is providing shelter to many amphibian species. Some of the commonly reported species are *Bufomelanostictus* (common Indian toad), *Euphlyctiscyanophlyctis* (Indian skipper frog),) etc.

Table 3.13 (iii):Fauna of The Core Zone

S. No.	***Common Name***	***Scientific Name***	***IWPA***	***IUCN***
AVIFAUNA				
1	*Common Myna*	*Acridotherestristis*	*IV*	*LC*
2	*Indian Cormorant*	*Phalacrocoraxfuscicollis*	*IV*	*VU*
3	*House Crow*	*Corvussplendens*	*V*	*LC*
4	*Ashy Drongo*	*Dicrurusleucophaeus*	*IV*	*LC*
5	*Koel*	*Eudynamysscolopacea*	*IV*	*NA*
6	*Sparrow*	*Passer domesticus*	*IV*	*LC*
7	*Yellow Bellied Blue Magpie*	*Urocissaflavirostris*	*IV*	*LC*
10	*Himalayan Quail*	*Ophrysiasuperciliosa*	*IV*	*CR*
MAMMALS				
1	*Squirrel*	*Funambulus pennant*	*IV*	*DD*
2	*Rat*	*Rattusrattus*	*V*	*LC*
Note:*LC:LeastConcern,NA:NotAssessed,DD:Datadeficient,VU:Vulnerable*				

Fauna of the Buffer Zone				
S.No.	***Common Name***	***Scientific name***	***IWPA***	***IUCN***
MAMMALS				
1	*Squirrel*	*Funambulus pennant*	*IV*	*DD*
2	*Rat*	*Rattusrattus*	*V*	*LC*
3	*Wild pig*	*Susscrofa*	*III*	*LC*
4	*Yellow throated marten*	*Martesflavigula*	*III*	*LC*
5	*Monkey*	*Macacamulata*	*II*	*LC*
6	*Fruit bat*	*Rousettusleshenaulti*	*IV*	*LC*
7	*Common languor*	*Presbytis entellus*	*II*	*LC*
8	*Indian Porcupine*	*Hystrixindica*	*IV*	*LC*
9	*Barking deer (kakar)*	*Muntiacusmuntjac*	*III*	---
10	*Golden Jackal*	*Canisaureus*	*II*	*LC*
REPTILES & AMPHIBIANS				
1	*Common Toad*	*Duttaphrynusmelanostictus*	*IV*	*NA*
2	*India bull frog*	*Ranatigrina*	*IV*	*DD*
3	*Indian tree frog*	*Polypedatesmaculatus*	*IV*	*NA*
4	*Skipping frog*	*Bufostomaticus*	*IV*	*NA*
5	*Garden lizard*	*Calotesversicolor*	-	*NA*
6	*House lizard*	*Hemidactylus sp.*	*IV*	*NA*
FISHES				
1	*Unera*	*Labeodero*	---	*NA*
2	*Kali Rohu*	*Labeodyocheilus*	---	*LC*
3	*Gadera*	*Nemacheilusrupicola*	---	*NA*
4	*Dhaur , Hill Trout*	*Bariliusbendelisis*	---	*LC*
5	*Bhagnera*	*Garralamta*	---	*LC*
6	*Mahseer*	*Tor putitora*	---	*EN*
7	*Asela, Snow Trout*	*Schizothoraxrichardsoni*	---	*VU*
8	*Gotyla*	*Garragotyla*	---	*LC*
9	*Pathar-chatti*	*Glyptothoraxpectinopterus*	---	*LC*
AVIFAUNA				
1.	*Jungle Myna*	*Acridotheresfuscus*	*IV*	*LC*
2.	*Common Myna*	*Acridotherestristis*	*IV*	*LC*
3.	*Blyth's Reed Warbler*	*Acrocephalusdumetorum*	*IV*	*LC*

4.	*Clamorous Reed Warbler*	*Acrocephalusstentoreus*	*IV*	*LC*
5.	*Common Kingfisher*	*Alcedoatthis*	*IV*	*LC*
6.	*House Crow*	*Corvussplendens*	*IV*	*LC*
7.	*Grey-hooded Warbler*	*Seicercusxanthoschistos*	*IV*	*LC*
8.	*Ashy Drongo*	*Dicrurusleucophaeus*	*IV*	*LC*
9.	*Asian Koel*	*Eudynamysscolopacea*	*IV*	*LC*
10.	*Cattle Egret*	*Bubulcus ibis*	*IV*	*LC*
11.	*Common Rosefinch*	*Carpodacuserythrinus*	*IV*	*LC*
12.	*Rock Dove*	*Columba livia*	*IV*	*LC*
13.	*Greater Coucal*	*Centropussinensis*	*IV*	*LC*
14.	*Oriental Magpie Robin*	*Copsychussaularis*	*IV*	*LC*
15.	*Black Drongo*	*Dicrurusmacrocercus*	*IV*	*LC*
16.	*Coppersmith Barbet*	*Megalaimahaemacephala*	*IV*	*LC*
17.	*Lineated Barbet*	*Megalaimalineata*	*IV*	*LC*
18.	*White Wagtail*	*Motacilla alba*	*IV*	*LC*
19.	*Common Babbler*	*Turdoidescaudatus*	*IV*	*LC*
20.	*Jungle Babbler*	*Turdoidesstriatus*	*IV*	*LC*
21.	*House Sparrow*	*Passer domesticus*	*IV*	*LC*
22.	*Red-vented Bulbul*	*Pycnonotuscafer*	*IV*	*LC*
23.	*Himalayan Bulbul*	*Pycnonotusleucogenys*	*IV*	*LC*
24.	*Alexandrine Parakeet*	*Psittaculaeupatria*	*IV*	*LC*
25.	*Spotted Dove*	*Streptopeliachinensis*	*IV*	*LC*
26.	*Red-wattled Lapwing*	*Vanellusindicus*	*IV*	*LC*
27	*Red junglefowl*	*Gallus gallus*	*IV*	*LC*
28	*Asian barred owlet*	*Glaucidiumcuculoides*	*IV*	*LC*
29	*Rusty Tail Flycatcher*	*Ficedularuficauda*	*IV*	*LC*
30	*Laughing Thrush*	*Pterorhinusalbogularis*	*IV*	*LC*
BUTTERFLY SPECIES				
2	*Threering plain*	*Ypthimalycuslycus*	*II*	---
3	*Keeled Apollo*	*Parnassiusjacquemontii*	*II*	---
4	*Great Blackvein*	*Aporianabellica*	*IV*	---
Note:*LC:LeastConcern, NA:NotAssessed, DD:Datadeficient, NT:Near Threatened,*				

A list of Fauna of the study area is presented in Table 3.16 (iii) and Table 3.16

CONCLUSION: There is no area which is protected under EPA, 1986 within study area.

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

A detailed Socio Economic Assessment has been performed, which is given below:

INTRODUCTION

In this section of the report an attempt has been made to measure Socio-economic impact of the proposed project of M/s Guru Nanak Enterprises for Ukrauli& Meravarana Sand Boulder & Bajri Mining Project which covers an area of 12.59 ha Located at Khasra No-38, 40, 41, 55/1,Village- Ukrauli & Meravarana, Tehsil-Sitarganj ,District:Udham Singh Nagar, State-Uttarakhand The various attributes that have been taken into account are population composition, employment generation, occupational ,shift, household income, consumption pattern, ethnic issue and law & order problem. The key objective of the study is to assess possible impact of the project on socio-economic life of the people in the neighborhood known as study area.

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

a) To collect baseline data of the study area.

b) To know the socio-economic status of the people living in the study area of the proposed mining project.

c) To assess the possible impact of the project on socio-economic aspects in the study area.

d) To measure the impact of the project on Quality of life of the people in the study area.

APPROACH

Research approach plays an important role to decide suitable methodology. It helps to develop research design and increase the effectiveness of research study. In the present study inductive approach has been adopted, which is a bottom top approach. Under this approach first data is collected both from primary and secondary sources. After scrutiny, tables are generated in pre-designed formats. Subsequently, draft report is prepared after detail analysis of data. The final report is prepared after incorporating the comments and suggestions of the client.

OBJECTIVES OF SEIA

The prime objective of the current study is to assess the likely impact of the project on socio-economic characteristics of people living in the study area. Further, it is to be gauged whether the impact would be direct or indirect and whether the said impact would be positive or

negative. Lastly, it is to be comprehended if the impact is negative and how the same could be mitigated.

SCOPE

The Scope of the study is as follows:

a)Collection of baseline data of the study area.
b)Collation of data, analyses and generation of tables.
c) Comprehension of socio-economic status of the people living in the study area.
d)Identification and inventory of probable impacts of the project on social and economic aspects in the study area.
e)Assessment of the probable impacts of the project on the people living in the study area.
f)Suggestion of mitigation measures in case of adverse impact.

METHODOLOGY

For composite Socio-Economic Impact Assessment of projects, GRC India carries out systematic analysis of the various socio-economic characteristics, both in terms of quality and quantity. Accordingly, both qualitative and quantitative data was collected from secondary sources. The secondary data was collected from the published data / information of the Census Authority. Records of the state and district administration were also referred to.

For collection of primary data, a sample survey was conducted in the study area which spans a radius of 10 km from the periphery of the boundary of the project site. In each selected habitation, a specified number of representative households were selected for collection of information through face to face interviews with head of the household or any responsible member of the family.

Census and Sample Survey

To assess the likely impacts of the project, Census data (viz. Population Census Abstract and Amenities- 2011) of all the habitations identified were taken into consideration to prepare the data base. It is treated as a census survey because all habitations located in the area were considered for the collection of information. Sample Survey was conducted for substantiating of socio-economic data got through the Census. Further, in selected habitation a household

survey was conducted by drawing representative sample of households. Since, collection of information from all the households in a habitation is time consuming and expensive, the sample survey approach was adopted for collection of information from the selection of villages and households in the village(s) / town(s).

Sample Design

Two-Stage Sampling Design was adopted in the study area. The First Stage Units were Census village(s) / town(s) and the Ultimate Stage Units were households in the selected village(s) / town(s).

Method of selection of First Stage Units

Probability Proportional to size without replacement and vicinity to the project site was taken into consideration while selecting the habitations from the list of Census village(s) / town(s).

Method of selection of Ultimate Stage Units

The ultimate stage sampling unit is households. The households for survey are selected by simple random sampling technique.

Sample Size

While deciding the sample size the following factors were taken into account: Confidence Level (95%, Table value: 1.96); Degree of precision (Δ): 0.5; Variation in population / Standard Deviation (σ); The sample size at each level (village and household) was decided by using the formula $n = \sqrt{\{(1.96*\sigma) / \Delta\}}$; where n=Sample Size, 1.96 is the Table Value of Confidence Limit, σ = Standard Deviation and Δ = Degree of Precision.

Survey Instruments

The following Schedules / Questionnaires were developed for collection of primary data from the households and villages / towns:

- Questionnaire / Schedule for Village / Town Particulars
- Questionnaire / Schedule for Household Details and Project Perception

Each of these data instruments has segment blocks and there are both open-ended and closed-ended questions.

METHOD OF SELECTION OF FIRST STAGE UNIT (VILLAGE)

Probability Proportional to Size (PPS) and vicinity to the project site was adopted to select the villages from the list of villages the size being number of households in a given village.

SELECTION OF ULTIMATE STAGE UNITs (HOUSEHOLDS)

After completing listing of each structure in a village a list of households was prepared. The sample households were selected by adopting Systematic Sampling method. This method was adopted since the sampling frame i.e. the complete list of households was readily available. Under this method every kth unit was selected. The value of k was determined from the population size (N) and sample size (n) and k was taken as the integer nearest to and sampling interval. The above procedure ensured each element in the population equal probability of selection. Number of households selected for survey in each village was 12.

RESPONDENTS

The head of the selected household was the respondent for face to face interview and subsequent collection of information.

TOOLS FOR DATA COLLECTION

The following schedules/questionnaires were developed to collect information from the head of the households during field survey.

1) **Questionnaire 1A: Village Questionnaire**

The village Questionnaire was developed for collection of village particulars from the Sarpanch or other village officials.

2) **Questionnaire 2: Household Questionnaire**

The Household Questionnaire was developed to collect information on various parameters from the selected households in a village.

Each questionnaire was divided into several blocks. There were open ended and close ended questions. In the household questionnaire an attempt was made to collect information about the perception of the local people about the upcoming Soapstone mining project.

a) A mixture of both quantitative and qualitative approach has been adopted in the current socio-economic study.

b) The study has been conducted based on primary and secondary data. While primary data has been collected through a sample survey of selected households in the study area, the secondary data has been collected from the administrative records of the, Census 2011, district hand books and from the Government portal.

c) The details regarding population composition, number of literates, workers, etc have been collected from secondary sources and analyzed. Also village/city/town wise details regarding amenities available in the study area have been collected from secondary sources like Census2011, and analyzed.

d) Two stage sampling design has been adopted to select the sampling units. The first stage units are census villages in the rural areas and towns/cities in urban areas. The ultimate stage units are households in the selected villages and towns/cities. Probability sampling has been adopted to select the sampling units.

e) Estimation of various parameters has been made based on sample data and bottom top approach has been adopted.

f) On the basis of a preliminary reconnaissance survey, two questionnaires were developed to make it suitable to fulfill the objectives of the study. The questionnaires contained both open ended and close ended questions

g) The data collected during the above survey was analyzed to evaluate the prevailing socio-economic profile of the area.

h) Based on the above data, impacts due to mining operation on the community have been assessed and recommendations for improvement have been made.

POSSIBLE IMPACT ASSESSMENT

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 Mining Project is expected to provide employment opportunities to 28 persons. 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 indirect employment to about 45people who will be involved in segregation of extracted mining materials, petty business and service oriented industries.

SUGGESTIONS

Provision of First Aid at mining site

Extraction of minor mineral cause health risks due to dusting, quarrying. The effects vary depending on the nature of the dust particles in it and the size of the particle. To meet any emergency during extraction of the mineral and subsequent loading in the transport vehicles, provision for First Aid should be made by the project proponent. Before the affected person is removed to a doctor or health institution for necessary medical aid, the miner should be provided with First Aid.

Tie up with the nearest PHC for medical help

To meet the medical needs of the mine workers it is suggested that tie-ups with nearest hospital or Primary Health Center (PHC) may be made. Few beds may be exclusively reserved for the mine workers in the above health institutions. This will ensure timely medical aid to the affected persons.

Supply of Mask and Gloves

The mine workers are subject to respiratory diseases, muscular-skeletal and gastro-intestinal disorders and skin diseases. For protection from dust it may be made compulsory for all mine workers to wear masks and gloves while working in the mines.

Regular health checkups

The miners may be encouraged to undergo health checkups at regular intervals in order to protect themselves from various diseases. The health Department of Uttarakhand Government must Organize Health Camps at regular intervals preferably in every quarter. Further, free medical facilities may be made available to the workers and their family members.

Special telephone number

A special telephone number may be made available to the mine workers. In case of emergency the miners can dial the above number for medical assistance. Vehicle may be provided to the patients in short duration for shifting to the health institution.

Special Group Insurance Scheme

All the mine workers may be covered under a Group Insurance Scheme of LIC or any other Insurance company, if not so far.

Distribution of Blankets and Quilts

During winter season the mine workers may be distributed blankets and quilts free of cost.

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Chapter-4

Anticipated Environmental Impacts And Mitigation Measures

CHAPTER-4
ANTICIPATED ENVIRONMENTAL IMPACT AND MITIGATION MEASURES

4.0 GENERAL

All industrial and/or development projects are likely to have an impact on the natural set up of the environment. This impact may be beneficial or adverse, depending on the improvement or the deterioration it brings, about change in the status of air, water, land, ecology, natural systems, socio-cultural life styles and economics of the population. Depending on the nature of activities and baseline environment status, the impacts are assessed for their importance. On the basis of the impact analysis, the mitigating action and future monitoring requirement are paid attention to in the Environmental Management Plan for countering or minimizing the impacts. Keeping in mind, the environmental baseline scenario as detailed in Section III and the proposed mining activity described in Section II, it is attempted to assess the likely impact and its extent on various environmental parameters and likely mitigation measures to be adopted.

4.1 LAND ENVIRONMENT

Various components of land environment have been identified for study of impact of the mine operations. Details of the same are given below:

4.1.1 Solid waste generation and management

No solid waste generation is expected from the mining procedure. 28 persons including the works man and the administrative staff are supposed to produce negligible waste like gutka pouches, smoking litter, and newspapers etc. belonging to biodegradable category waste. Waste generated will be collected on regular basis and will be disposed as per the Municipal Solid Waste Management (Management & Handling) Rule 2000 and its subsequent amendments.

4.1.2 Impact on land use & reclamation of mined out areas

The mine lease area spreads in 12.59 Ha, which is State government owned land. The land form is mostly river bed and non-forest land. Moreover there will be no change in land use as the mining will be confined to river bed, which will get replenished naturally in the subsequent monsoon season.

4.2 WATER ENVIRONMENT

Damage in the water body, depends on its assimilative capacity. To find out assimilative capacity of receiving water body, water samples were collected from different groundwater and surface water sources. The study indicates that assimilative capacity of the River water bodies still exists, but effective measures shall be taken to check water pollution. To find out the effect on ground water an extensive hydro-geological study has been conducted and from the study it can be safely concluded that there is no noticeable adverse effect on surrounding ground water resource due to mining. The mining activity does not require water.

The main drinking water requirement will be for mine workers. The strength of workers will be 28. It can be seen that drinking water requirement will be 0.42KLD. The drinking water is provided through Hand-pump and bore well.

4.3 AIR ENVIRONMENT

It has already been explained that mining will be in a very small scale. One of the most crucial elements for air pollution is vehicular transport. Due limited movement tippers/tractor trolley air quality will not undergo any significant change.

However the only cause of concern in future will be SPM content. The daily average SPM will be less than 220 micrograms per meter cube. Considering the Semi-mechanized operation for next five years, if safely believed that SPM content will seldom exceed 250 micrograms per meter cube. However, if required, water sprinkling on dry month may be undertaken on the haul road where the maximum traffic will be observed.

- To control the emissions regular preventive maintenance of equipment will be carried out on contractual basis.
- Proper mitigation measures like water sprinkling will be adopted to control dust emissions.
- Plantation will be carried out on approach roads & nearby vicinity of river bank.

- It is being ensured that all transportation vehicles will carry a valid PUC certificate.

4.4 NOISE ENVIRONMENT

Impact on environment

Noise generated at the mine is due to semi-mechanized mining operations, drilling, blasting, mechanized loading and truck transportation activities. The noise generated by the mining activity dissipates within the mine. There is no major impact of the mining activity on the nearby villages. However, pronounced effect of above noise levels is felt only near the active working area.

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

Table 4.1: Noise impact

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

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

In this case the impact of noise on the nearby settlements is negligible as they are far located from the mine workings.

a. Mitigation measures

I. On-site

A) Blasting only if required will be done by a licensed blaster.

B) Maintenance of Machinery: Regular maintenance of machinery will keep the generated noise level below the minimum prescribed limit i.e. not exceeding 90 dB (A) at a distance of 2 m from the machine. All machines will be as per stipulated standards and will be used at their optimum capacity.

C) Trained Operators: Only trained operators will be allowed to operate machines during mining to reduce any chance of safety failures.

D) Vegetation: Plantation of trees along the barrier zone will be done to dampen the noise, if possible.

E) Hearing Protection: All the miners will be provided with Personal Protective Equipments such as ear-muffs.

f) Phasing out the old and worn out trucks.

II. Off-site

The off-site receptors are not significantly affected as they are located far away from the mine site. But some disturbances due to vehicle movement cannot be avoided. Plantation will be done along the barrier zone and roadsides etc. which will more or less dampen the off-site noise level.

4.5 BIOLOGICAL ENVIRONMENT

Impacts on Biodiversity

Present data have been collected through direct inventory as well as various Government Departments such as forests, agriculture, fisheries, animal husbandry and various offices to establish the pre-project biological environmental conditions. There are no endangered species, wildlife sanctuary, wildlife corridors, faunal migratory routes or eco sensitive area near the whole study area. For this, mine owner planted a good roadside plantation along both side of the mine road.

Impacts on agriculture

The area around the mine lease area is all barren and no agriculture activity is going on at least 2-3 km away from the mine site. Therefore no significant impact on the agriculture around the project site is expected.

Impacts on aquatic ecology

Mining activities may result in affecting the riverine ecology by polluting the river water. But in this case, river lies in mine site but nothing is being discharged into the river. However, indiscriminate fishing by laborers etc. may reduce fish stock availability for commercial and sport fishermen. Thus, it is recommended that adequate surveillance measures are implemented during project operation phase to ameliorate such impacts.

Mitigation measures

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

- Improvement of Soil quality,
- Quick vegetative cover to check soil erosion,
- Improvement in mining site stability,
- Conservation of biological diversity of plants, birds and animals,
- As dust receptor and dust filter, this is likely to be produced during mining.
- If birds are noticed crossing the core zone, they will not be disturbed at all;
- Labors will not be allowed to discards food, plastic etc., which can attract animals/birds near the core site;
- Only low polluting vehicles having PUC will be allowed for carrying mining materials.
- Noise level will be maintained within permissible limit (silent zone- 50dB (A) during day time or residential zone 55dB (A)) as per noise pollution (regulation and control), rules, 2000, CPCB norms.

4.6 STATUATORY REQUIREMENTS

It is accepted that effective resource management cannot be done in isolation. The Department therefore pursues approaches towards coordination and integration where possible, which has led to coordinated regulatory systems.

A regulatory system consists of both statutory and non-statutory components. In the Sectoral-specific strategy for prospecting and mining, the Department participates within an integrated environmental management system which is administered in terms of the Acts and Rules. Other Acts dealing with matters relating to the conservation and protection of the environment and which a holder of a mining authorization must also take cognizance of include *inter alia*, the following:

- The Mines Act, 1952
- The Mines and Mineral (Development and Regulation) Act, 1957
- Mines Rules, 1955
- Mineral Concession Rules, 1960
- Mineral Conservation and Development Rules, 1988
- State Minor Mineral Concession Rules, 1963
- The Water (Prevention and Control of Pollution) Act, 1974
- The Air (Prevention and Control of Pollution) Act, 1981
- The Environment (Protection) Act, 1986
- The Forest (Conservation) Act, 1980
- The Wildlife (Protection) Act, 1972

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Chapter-5

Analysis of Alternative Technology & Site

CHAPTER-5

ANALYSIS OF ALTERNATIVE TECHNOLOGY AND SITE

5.1 Site Alternatives under Consideration

The Minor Mineral has been identified based on the result of geological investigations and exploration carried out by the Geological Survey of India (GSI).

The mining projects are site specific as such alternate sites were not considered.

5.2 Analysis of Alternative Technology

Choice of Method of Mining

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 mineral deposits. Mineral is excavated, loaded into trucks, and hauled to a facility where it is crushed and ground to a uniform size for further processing. Surface mining requires the removal and disposal of layers of top soil and underlying rock commonly called the overburden. Mining must be planned so that the combine of mining processing and reclaiming the land is taken up concurrently.

It shall be opencast Semi mechanized. RBM shall be scrapped manually with conventional hand tools. Mining depth should be restricted upto 3.0m. The height of benches shall be kept 3.0m with face slope 18deg & over all pit slope shall be maintained less than 16°. Mining shall be carried out without adoption of drilling & blasting. Due to scarcity of workers it is proposed that 30% of total RBM production shall be achieved manually while balance 70% of RBM production shall be achieved by machinery. It is proposed that light excavators will be used for digging & loading of mineral in tippers. Ultimate depth of pit shall be kept 3.0m from the surface.

Chapter-6

Environmental Monitoring Programme

CHAPTER-6

ENVIRONMENTAL MONITORING PROGRAMME

6.0 Introduction

The industrial development of any area needs to be intertwined with judicious utilization of non-renewable resources of the study area and within the limits of permissible assimilative capacity. The assimilative capacity of the study area is the maximum amount of pollution load that can be discharged into the environment without affecting the designated use and is governed by dilution, dispersion and removal due to physico-chemical and biological processes.

The Environment Monitoring Programme is required to ensure sustainable development in the study area (10 km) of the project site, hence it needs to be an all-encompassing plan for which the plant authorities, Government, Regulating agencies like Pollution Control Board etc. working in the region and more importantly the affected population of the study area need to extend their co-operation and contribution.

6.1 Implementation Schedule of Mitigation Measures

The mitigation measures suggested in Chapter-4 will be implemented so as to reduce the impact on the environment due to the operations of the proposed project. Implementation schedule of mitigation measures is given in **Table-6.1**.

Table-6.1 Implementation Schedule

Sr. No.	Recommendations	Time Requirement	Schedule
1	Air pollution control measures	Before commissioning of respective units	Immediate
2	Water pollution control measures	Before commissioning of the mine	Immediate
3	Noise control measures	Along with the commissioning of the mine	Immediate
4	Ecological preservation and up gradation	Stage-wise implementation	Immediate & Progressive

Administrative Aspects &Environmental Monitoring Program

Regular monitoring of environmental parameters is of immense importance to assess the status of environment during project operation. With the knowledge of baseline conditions, the monitoring programme will serve as an indicator for any deterioration in environmental conditions due to operation of the project, to enable taking up suitable mitigatory steps in time to safeguard the environment. Monitoring is as important as that of control of pollution since the efficiency of control measures can only be determined by monitoring. Usually, as in the case of the study, an Impact Assessment study is carried over short period of time and the data cannot bring out all variations induced by the natural or human activities. Therefore, regular monitoring programme of the environmental parameters is essential to take into account the changes in the environmental quality.

6.2 Institutional Arrangements for Environment Protection and Conservation

The mine will be supervised and controlled by an independent Mines Manager supported by adequate team of technically and statutorily qualified personnel apart from the operating staff of skilled, semi-skilled, unskilled and other categories. This Environment Cell is responsible for the management and implementation of the environmental control measures. Basically, this department will supervise the reclamation planning & management, air & water pollution control management, dealing with State & Central Statutory agency & Committee.

In case the monitored results of environmental pollution are found to exceed the allowable limits, the Environment Management Cell will suggest remedial action and get these suggestions implemented through the concerned authorities. The Environment Management Cell wills also co-ordinate all the related activities such as collection of statistics of health of workers and population of the region, afforestation and greenbelt development. The Environment Management Cell will review Corporate Environmental performance along with the reporting of non-compliances.

6.3 Environment Monitoring Programme

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, emissions and wastes, for measurement against corporate or statutory standards, consent limits or targets. It may also require measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local activities or even assessment of complaints. The environmental monitoring will be conducted in the mine operations as follows:

- Air quality;
- Water and wastewater quality;
- Noise levels;
- Soil Quality; and
- Greenbelt Development

6.4 Reporting Schedules

Project monitoring will be carried during operation phase as per conditions stipulated in environmental clearance letter issued by MoEF, consent issued by SPCB as well as according to CPCB guidelines. The project site is considered as core zone and the area lying within 10 km radius from the mine site is considered as buffer zone, where some impacts may be observed on physical and biological environment.

Table-6.2 Post Project Monitoring Programme

Attributes	**Sampling**		**Measurement Method**	**Test Procedure**
	Network	**Frequency**		
A. Air Environment				
Pollutants PM2.5, PM_{10}	5 locations inthe project impact area (Minimum3 Locations in		Gravimetric method	-
			Gravimetric method	-
			EPA Modified	Absorption inPotassium

SO_2	upwind side,3 sites in Downwind side /impact zone and 1 in core zone)	Once in a season.	West & Geake method	Tetra Chloromercurate followed by colorimetric estimation usingP-Rosanilinehydrochloride and Formaldehyde (IS:5182 Part - II).
NO_2			Arsenite modified Jacob Hochheiser	Absorption indil. NaOH and then estimated calorimetrically with sulphanilamide and N (I-Nepthyle) Ethylene diamineDihydrochlorideand HydrogenPeroxide (CPCB Method).
B. Water Environment				
pH, Turbidity, Colour, Odour, Taste, TDS, Total Hardness, Calcium hardness, Magnesium hardness, Chloride, Fluoride, Sulphate, Nitrates, Alkalinity, Iron, Copper, Manganese, Mercury, Cadmium, Selenium, Arsenic, Cyanide, Lead, Zinc, Chromium, Aluminum, Boron, Phenolic Compounds	Set of grab samples during pre and post-monsoon for ground and surface Water in the vicinity.	Diurnal and Season wise	As per IS 10500	Samples for water quality should be collected and analyzed as per : IS : 2488 (Part 1-5) methods for sampling and testing of Industrial effluents Standard methods for examination of water and wastewater analysis published by American Public Health association.
C. Noise				
Noise levels at Day & night time - Leq dB (A)	Mine Boundary High noise generating areas within the lease	Quarterly/ Half yearly	As per CPCB norms	As perCPCB norms

D. Soil				
pH, Bulk Density, Soil texture,	3locations in the project impact area	Yearly/ half yearly	As per USDA Method	As perUSDA Method
Nitrogen, Available Phosphorus, Potassium, Calcium, Magnesium, Sodium, Electrical conductivity, Organic Matter,Chloride				
E. Socioeconomic				
Demographic structure Infrastructure resource base Economic resource base Health status: Morbidity pattern Cultural and Aesthetic attributes Education	Socioeconomic survey is based on proportionate, stratified and random sampling method	Minimum for two phases of the project	Primary	Secondary data from census records, statistical hard books, topo sheets, health Recordsand relevant official records available withGovt. Agencies

Chapter-7

Additional Studies

CHAPTER-7

ADDITIONAL STUDIES

7.0 PUBLIC CONSULTATION

Detail of public hearing will be given in the Final EIA/EMP Report.

7.1 RISK ASSESSMENT

Human health and Environmental risk from developmental activities is mainly due to occurrence of some accident consisting of an event or sequence of events like explosion, fire and toxic hazards. Risk analysis provides a numerical measure of the risk that a particular facility poses to the public. It begins with the identification of probable hazardous events at an operational area and categorization as per the predetermined criteria. The consequences of major events or accidents are calculated for different combinations of weather conditions to stimulate worst possible scenario.

These predictions of consequences are combined to provide numerical measures of the risk for the entire facility. Risk assessment should be done on the basis of past accident analysis at similar projects, previous judgments and expertise in the field of risk analysis especially in accident analysis.

7.2 DISASTER MANAGEMENT AND RISK ASSESSMENT:

There is no problem of ground water/ surface water. No causes of disaster have been apprehended during mining activity, but possibility of disaster cannot be ruled out. Therefore all the statutory precautions shall be undertaken into account as per mines act.1952, mines rules 1955, MMR 1961. Disaster management plan is comprehensive and structured system for ensuring the prevention of risks/ disasters involved. The principles used to priorities work are as follows:

Priority must be given to human safety and health, where it is seriously threatened.

- Acute problem must be addressed before long – term problem.

- Measures affecting a large population must be given priority over measures benefiting a smaller number of people.

A major emergency in a mine is one that may cause injury or loss to the workers engaged in

the mining and allied operations. Therefore the first action under the disaster management is the identification of risks involved and their priorities. From this risk assessment the identified are as below:

1. Use of explosives and the blasting operations, inducing vibrations due to blasting.

2. Slope Failures in open pit.

3. Solid waste generation, their disposal and rehabilitation.

4. Proper training on the use of equipments.

5. Development of green barrier to contain air and noise pollution.

Each parameter is discussed below:

Each parameter is discussed below:

1. Use of explosive and the blasting operation:

The firm has a magazine. Driling and blasting will be undertaken periodically and gelatin will be used for blasting.

2. Slope failures:

The mining is proposed from top level and gradually advance towards lower levels. Height of benches will be kept 3.0m. In that case chances of slope will be negligible. However considering for steeper slope failure studies will be undertaken in future.

3. Solid waste generation, their disposal and rehabilitation:

Soil shall be generated during course of mining & stacked separately. No waste shall be generated therefore no proposal & management.

4. Proper training on the use of equipments:

Machineries will be employed in the mine. Vocational training programme will be organize in every in every week to train the workers about mine workings & operating the machines.

5. Development of Green belt:

The green belt development programme will help in:

- Prevention of dust (leaves acting as a sink) and screening noise.

- Maintaining ecological balance.

- Increasing as the tic value. Plantation will be under taken towards the slope of the area.

Care and Maintenance during temporary Discontinuance:

At the time of temporary discontinuance of mine, notice of Directorate General of Mine safety as well as to district administration, all precautionary steps shall be taken into account in respect of care &maintenance.

7.1 RISK ABATEMENT

The following precautionary measures shall be taken to prevent any accident

- Elimination of the source of hazard
- Substitution of hazardous process and materials by those which are less hazardous.
- Geographical/ physical isolation of hazards from vulnerable communities.
- Use of engineering controls to reduce the health risk.
- Adoption of safe working practices such as regular equipment maintenance.
- Use of Personal Protective Equipment should be mandatory.
- Top edge of opencast workings shall be kept properly fenced.
- Quarrying shall be done from top downwards. No overhang will be allowed.
- Special attention and requisite provisions shall be taken while working in areas of geological weakness like existence of slip, fault etc.
- Regular dressing of bench sides to ensure safety of workers employed within 5m or working face.
- Spoil banks not to be retained by artificial means at an angle of repose in excess of its natural angle.
- Drafting and implementation of preventive maintenance schedule for various kinds of machinery deployed in opencast workings.
- Provision of maintenance of properly laid haul roads with parapet wall fencing or guards and road signs at strategic points.

- Proper maintenance of vehicles and weekly examination by an engineer and daily examination by a competent person.
- Training and retraining (at specified interval) of the machinery operators.
- Use of controlled blasting techniques. 500 m radius danger zone to be followed strictly.
- Provision of blasting shelters – properly constructed and maintained.
- Adequate maintenance of electrical equipments.
- Adequate illumination after daylight.

7.2 Fire Fighting Facilities

Sufficient fire extinguishers will be installed at selected locations such as mine office, garage, stores etc.

7.3 Emergency Medical Facilities

An ambulance with driver availability in all the shifts, emergency shift vehicle would be ensured and maintained to transport injured or affected persons. Number of persons would be trained in first aid so that, in every shift first aid personnel would be available.

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Chapter-8

Project Benefits

CHAPTER-8
PROJECT BENEFITS

8.0 GENERAL

Mining Lessee of RBM at Khasra no. 38, 40, 41, 55/1, Village- Ukrauli & Meravarana, Tehsil-Sitarganj, District: Udham Singh Nagar, State-Uttarakhand. Upstream is very much conscious of their obligations to society at large. The management will help in overall development of the area. The project has lot of positive factors for development & growth of local peoples.

8.1 EMPLOYMENT

The socio-economic conditions of the surrounding villages indicate that employment generation is seasonally. The occupational activities are agriculture, cattle rearing and employment in mines but on daily wages. The mining activity will provide employment to local people which will increase socio- economic status of the area. The total direct manpower requirement for the proposed mining operation will be around 28 Significant. An indirect employment is also expected due to the associated activities. This project operation will provide livelihood to the poorest section of the society.

Table -8.1: **category-wise employments will be as below**

S. No.	Particulars	Nos. Required
1.	Mining Engineer (Part time)	1
2.	Geologist (Part time)	1
3.	Foreman (full time)	1
6.	Piece rated workers (unskilled)	25
TOTAL		**28 Person**

8.2 IMPROVEMENTS IN PHYSICAL AND SOCIAL INFRASTRUCTURE

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

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

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

1. Social welfare program like provision of medical facilities educational facilities, water supply for the employees as well as for nearby villagers will be taken.
2. A well laid plan for employment of the local people has been prepared by giving priority to local people.
3. Supplementing Govt. efforts in health monitoring camps, social welfare and various awareness programs among the rural population.
4. General developments of nearby villages
5. Supply of water to villages.

8.2.1 IMPROVEMENTS IN PHYSICAL INFRASTRUCTURE

The opening of the proposed project will improve the physical infrastructure of the adjoining areas. This will include the following:-

- Improved road communication due to opening of the proposed project.
- Strengthening of existing community facilities through the Community Development Programme.
- 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.
- Skill development & capacity building like vocational training, income generation programs and entrepreneurship development program.
- Literacy program, adult education, assists formation of Village Working Group (VWG), Mahila Mandal etc.

- Awareness program and community activities, like health camps, medical aids, family welfare programs, immunization camp sports & cultural activities, plantation etc.

Corporate Environment Responsibility:

CER plan is given below:

Budget for Corporate Environmental Responsibility (CER)/Year

Yearly CER cost for the project, i.e. 5% of the total project cost

Rs. 76,24,000 x 0.05 = Rs. (3.812Lakhs)

This is the proposed cost CER Plan, Activities and actual cost will be finalized as per the Actual need of the area.

(ON THE BASIS OF NEED BASE ASSESSMENT SURVEY)

Table No-8.2 Budget allotted for CER

S. No.	Activity	Cost per Unit (Rs)	Quantity	Total (Rs.)
1.	Installation of Hand pump for nearby Villagers	40,000	03	1,60,000
2.	Installation of Solar street light in nearby Villages	14,000	05	70,000
3.	Construction of Toilets for Women in nearby villages	65,000	02	1,30,000
4.	Distribute Stationary nearby School	21,200		21,200
	Total Proposed CER Cost			**3,81,200**

8.2.2. IMPROVEMENTS IN SOCIAL INFRASTRUCTURE

There will be some obvious changes in various environmental parameters due to mining activity. Increase socio-economic activities, creation of new employment opportunities, infra-structural development, better educational and health facilities. About 2 to 5 percent of the total cost will be used for CER activities. The list of beneficiary will be provided along with compliance report.

Following are the specific impacts:-

Socio-Economic: - There will be positive impact in socio-economic area due to increased economic activities, creation of new employment opportunities, infrastructural development and better educational and health facilities.

- There will be direct and indirect employment at the first instance. The employment will be given protocals.
- Further, the share of indirect employment like increased purchasing power, dhabas and retail shops etc. is largely shared by local residents.
- The most important aspect of the project is the land under mining is almost agricultural land and not providing any income to the owner, implying that there will be no significant impact on the livelihood of residents.
- Finally, all aggregate will be used in construction of road, which otherwise is a contribution towards building nation.

Financial and social benefits with special emphasis on the benefit to the local people including tribal population, If any, in the area, No tribal population is residing in the study area. There will be social benefits from the mining operations.

Table - 8.2: Estimated project cost along with analysis in terms of economic viability of the project

S. No.	Description	Unit	Total (Rs.)
A. Project Operation Cost			
1.	**Manpower Cost:** Mining Engineer (Part time) 1 Geologist (Part time) 1 Foreman (full time) 1	(Total Man power 28) Assuming 240days Rs. 25,000/ month= 3,00,000 Rs. 35,000/ month= 4,20,000 Rs. 500/ day= 1,20,000 x 1=1,20,000 Rs.370 / day=	30,60,000

	Un-skilled: Piece rated workers 25 **Total 28**	88800x25=22,20,000	
2.	**Expenditure on Occupational Health:** PPE Kit, First Aid Facility, Mask, Hand wash & Sanitizer Medical checkup and Medicine (Once in a month)	3000/worker (3000 x 25)= 2,55,000 *Doctor's visit*: 10,000/ month (8 working months) =80,000 *Medicines* (Assuming 500/worker) 500 x 25 = 12,500 (Mine operation Month: 8) = 1,44,000	4,91,500
3.	**Equipment's/Tools/Machineries**	240 days Assuming Rs.5000/day	12,00,000
4.	**Drinking and Sanitary Facilities**	➢ Rs. 4000/day for drinking/domestic (240 days) ➢ Rs. 50,000/ Bio-toilets x 2	10,10,000
	Total Project Operation Cost (A)		**Rs. 57,61,500 (lakhs)**
B. Break-up of Expenditure on Environment Protection & Environment Management			
5.	Haulage Road Repair & Maintenance) Filling, Leveling and widening of the road up to width of 5m and length of 520 m.) Setting & Fixing of Cut Stone on the leveled road.	Annual 520 m (L) x 5 m (W)=2600m^2	2,00,000

6.	Water Sprinkling on Haulage Road for Dust Suppression	Assuming Rs.2000/day for 240 days of working Tanker Cost: Rs. 1000/Tanker Tanker Capacity: 5000 liter, No. of Tankers required: 2	4,80,000
7.	Plantation along the road side & post plantation care	Plantation@100/sapling (6000 sapling) Post plantation care @500/day (For 60 Saplings Annually.i.e.365 days). ***Note: Annual cost will increase with increase in no. of sapling.***	6,00,000 1,82,500
8.	Environmental Monitoring & Compliances.	➢ **Half Yearly Monitoring of Environmental Parameters viz. Air, water, Noise & Soil.** ➢ Half Yearly Submission of Compliances.	4,00,000
	Total Environment Protection & Management Cost (B)		**Rs.18,62,500 (Lakhs)**
	Total Project Cost (A+B)		**Rs. (57.615 + 18.625) =76.24 lakhs**

Population dynamics: - Due to the direct and indirect employment potential, there is a scope of migration of people into project area and in the peripheral regions; from nearby areas.

Health Care facilities: - Lessee will undertake awareness program and community activities like health, camps, medical aids, family welfare camps program etc.

Employment Potential: - There is a possibility of creation of direct and indirect employment opportunities due to working of this mine.

The mine will also contribute to the Exchequer of State and Central Government.

8.3 PLANTATION

Green Belt/afforestation will be done as per programme i.e. along the road side and near civic amenities, which will be allotted by Government Bodies and also saplings should be dug out from the nursery with sufficient earth around the roots.

Total 6000 nos. of saplings will be planted per year to arrest dust & minimizes propagation of noise. For which Budget is mentioned in total Project cost. The tree species selected for plantation should have rapid growth, evergreen, large crown volume and small/ pendulous leaf with smooth surface.

Thick plantation will work as a pollutant arrestor, reduces floods as well as avoids the situation of erosion of soil during monsoon season.

About 6000 plants will be planted of different species like Aam, Jamun Bail, Dakain , Neem, Peepal , Bhimal will be planted in next five year. The Plantation will be done in nearby villages and haul road for Green belt development by planting and maintaining native species

Table 8.3-Year wise no. of saplings to be planted is as below:

Year	Area (Hec)	No. of Saplings
1st	0.50	1200
2nd	0.50	1200
3rd	0.50	1200
4th	0.50	1200
5th	0.50	1200
Total	**2.5**	**6000**

8.4 HEALTH

Periodic medical checkups as per Mines Act/ Rules and other social development and promotional activities will be undertaken. All this will lift the general health status of the residents of the area around mines.

8.5 CONCLUSION

The management will recruit the semi-skilled & unskilled workers from the nearby villagers.

The project activity and the management will definitely support the local Panchayat and provide other form of assistance for the development of public amenities in this region. The company management will contribute to the local schools, dispensaries for the welfare of the villagers. Green belt development/plantation will be taken up in the mine premises, along the approach roads, around Govt. buildings schools.

Chapter-9

Environment Management Plan

CHAPTER- 9
ENVIRONMENT MANAGEMENT PLAN

9.0 INTRODUCTION

To mitigate the adverse impact which will be caused due to the mining operation and overall scientific development of local habitat, environmental management plan (EMP) has been formulated and integrated with the mine planning. The details of the anticipated impacts and mitigate measures have been discussed in chapter IV of this report, based on the results of present environmental conditions and environmental impact assessment. The EMP has therefore been made considering implementation and monitoring of environmental protection measures during and after mining operations.

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.

9.1 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Proper environmental management plan are proposed for minor mineral mining project to mitigate the impact during the mining operation.

- Care will be taken that no labor camps will be allowed on river bed.
- Care will be taken that no cooking, or burning of woods will be allowed in the adjoining area.
- Prior to mining, short awareness program will be conducted for labors to make them aware to way of working.
- If some causality or injury to animal occurs, it will be informed to forest department and proper treatment will be given.
- No tree cutting, chopping, lumbering, uprooting of shrubs and herbs will be allowed.
- Corridor movement of wild mammals (If exists) will be avoided

- Care will be taken that noise produced during vehicles movement for carrying sand are within the permissible noise level.
- No pilling of material will be in adjoining area.

If wild animals are noticed crossing the river bed, it will not be disturbed or chased away, instead the labors will move away from their path.

9.2 ENVIRONMENTAL 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 implanted and monitored. Thus, an implementation and monitoring programme has to be prepared.

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 for eco-friendly mining plan:

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 in every year and analysis thereof with regard to deleterious constituents, if any.

c) 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.

d) Measurement of water level fluctuations in the nearby ponds, dug wells and bore wells.

e) Regular visual examination will be carried out to look for erosion of river banks. Any abnormal condition, if observed will be taken care of.

f) Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done in every quarter of the year.

g) 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 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.

An Environmental Management Cell (EMC) is envisaged which will be responsible for monitoring EMP and its implementation. EMC members should meet once in a month to assess the progress and analyze the data collected during the month. The EMC will function as per Fig. 6.1(Chapter VI).

EMC will be in regular touch with State Pollution Control Board and Indian Bureau of Mines and send them annual progress report. Any new regulations considered by State/Central Pollution Control Board for the industry will be taken care of.

9.3 PROPOSED SET UP

Keeping the utility of monitoring results in the implementation of the environmental management program in view, an organizational chart has been proposed, headed by General Manager as shown in Fig. 6.1(Chapter VI).

The said team will be responsible for:

(i) Collecting water and air samples from surrounding area and work zone monitoring for pollutants.

(ii) Analyzing the water and air samples.

(iii) Implementing the control and protective measures.

(iv) Co-coordinating the environment related activities within the project as well as with outside agencies.

(v) Collecting statistics of health of workers and population of surrounding villages.

(vi) Monitoring the progress of implementation of environmental management program.

(vii) Greenbelt development, etc.

The laboratory will be suitably equipped for sampling/testing for various environmental pollutants.

9.4 GREEN BELT DEVELOPMENT PLAN

Green belt is plantation of trees for reducing the pollution as they absorb both gaseous and particulate pollutant, thus removing them from atmosphere. Green plants form a surface capable of absorbing air pollutants and forming sinks for pollutants. It improves the aesthetic value of local environment. Under present project, green belt has been planned with emphasis on creating biodiversity; enhance natural surroundings and mitigating pollution.

These plantations will be carried out around mining zone. Most of the area recommended for mining will be used for afforestation/greenbelt as per the "Forest (Conservation) Amendment Rule, 2004".About 6000 trees will be planted in five years along both sides of roads and civic amenities in consultation with the local authorities.

The basic objectives of plantations are as follows:

- Soil quality should be improved
- Vegetative cover can check soil erosion
- River bank stability should be improved
- Conservation of biological diversity
- Habitation for wild life.

Plantation Method

Plantation will be done in nearby villages and connecting roads. The implementation for development of greenbelt will be of important as it will act as a pollution sink & maintain environmental ecological balance

Dust tolerant species of plants should be preferred for greenbelt development so that pollution can also be reduced. Movement of trucks & transportation of minerals produced dust particulate matter so plantation will be done in road side & near core area. Plantation will be done on both sides is the private agriculture land.

It is proposed to have plantation on both sides of the roads as greenbelt to provide cover against dust. River banks will be strengthened by way of plantation on the banks.

Plantation will also be carried out as social forestry programme in villages, school and the areas allocated by the Panchayat/ State authorities.

The tree species selected for plantation should have rapid growth, evergreen, large crown volume and small/ pendulous leaf with smooth surface.

Table 9.1 Details of Greenbelt Scheme

Year	Area (Hec)	No. of Saplings
1st	0.50	1200
2nd	0.50	1200
3rd	0.50	1200
4th	0.50	1200
5th	0.50	1200
Total	**2.5**	**6000**

A combination of trees that can grow fast and also have good leaf cover shall be adopted to develop the greenbelt.

9.5 BUDGET ALLOCATION FOR EMP IMPLEMENTATION

Annual budget for EMP is very essential for successful implementation of EMP. As there are no pollution control systems, no capital cost of Pollution Control system is envisaged. Costs will be annual operating costs as given below. The fund allocated will not be diverted for any other purposes and the top management will be responsible for this. The budget will take into consideration the following capital and operating expenses:

1. Field cost for monitoring of parameters.
2. Cost of any defined outsourcing
3. Cost of chemicals, consumables and transport for data generation
4. Man power cost for environmental cell
5. Any other cost as per EC condition.

Table 9.2 Budget allotted for the Environmental Management Plan

1.	Haulage Road Repair & Maintenance) Filling, Leveling and widening of the road up to width of 5m and length of 520 m.) Setting & Fixing of Cut Stone on the leveled road.	Annual 520m (L) x 5 m (W)=2600m^2	2,00,000
2.	Water Sprinkling on Haulage Road for Dust Suppression	Assuming Rs.2000/day for 240 days of working Tanker Cost: Rs. 1000/Tanker Tanker Capacity: 5000 liter, No. of Tankers required: 2	4,80,000
3.	Plantation along the road side & post plantation care	Plantation@100/sapling (6000 sapling) Post plantation care @500/day (For 60 Saplings Annually.i.e.365 days).	6,00,000 1,82,500

		Note: Annual cost will increase with increase in no. of sapling.	
4.	Environmental Monitoring & Compliances.	➢ **Half Yearly Monitoring of Environmental Parameters viz. Air, water, Noise & Soil.** ➢ Half Yearly Submission of Compliances.	4,00,000
	Total Environment Protection & Management Cost (B)		**Rs.18,62,500 (18.625 Lakhs)**

9.6 MONITORING SCHEDULE AND PARAMETERS

To evaluate the effectiveness of environmental management program regular monitoring of the important environmental parameters to be monitored are shown in Table. 9.3.

Table9.3- Implementation Schedule

Sr. No.	Recommendations	Time Requirement	Schedule
1	Air pollution control measures	Before commissioning of respective units	Immediate
2	Water pollution control measures	Before commissioning of the mine	Immediate
3	Noise control measures	Along with the commissioning of the mine	Immediate
4	Ecological preservation and up gradation	Stage-wise implementation	Immediate & Progressive

Chapter-10

Summary and Conclusion

CHAPTER-10

SUMMARY & CONCLUSION

10.0 PURPOSE OF THE REPORT

Environmental Impact Assessment (EIA) is a decision making tool, in the hands of the Authorities 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 found having deleterious overall 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 and Forests for sustainable development and the final decision is arrived at only, when those to whom it matters are made known of the salient features of the project being envisaged close to them and their opinion has been sought in a widely advertised Public Hearing Event under the chairmanship of the district authorities so that public could also express their opinion free, without favour and fear. Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from SEIAA, Uttrakhand, under EIA Notification of the MoEF dated 14-9-2006, and its subsequent amendments and EIA Guidance Manual for Mining of Minerals of MoEF, Govt. of India, for seeking environmental clearance for mining of Ukrauli& Meravarana Sand Boulder & Bajri Mining Project in the applied mining lease area measuring 12.59Ha. The proposed project falls under Category “B1” as per EIA Notification2006 its amendment 2009, 2011, 2012& 2018 of the Ministry of Environment and Forests, New Delhi and NGT order dated 13.09.2018 & OM dated 12th December 2018 by MOEF & CC.

10.1 IDENTIFICATION OF PROJECT & PROJECTPROPONENT

The proposed project of Guru Nanak Enterprises for Ukrauli & Meravarana Sand, Boulder &

Bajri Mining Project which covers an area of 12.59Ha Located at Khasra No-38, 40, 41, 55/1, Village- Ukrauli & Meravarana ,Tehsil- Sitarganj, District- Udham singh Nagar, State- Uttarakhand. LOI has been granted in favour of Guru Nanak Enterprises, being the highest bidder was issued letter of intent (LOI) by state government vide letter no. 40/VII-1/19/02(3)/2019 dated 05.02.2019 and after fresh demarcation revised letter of intent issued vide letter no.1450/VII-A-1/2021/2(3)/19 dated 25th August 2021.

The RBM will be used for making buildings, bridges, infrastructure etc. The RBM of lease area is soft, medium to coarse grained yellowish in color. RBM is an essential minor mineral used extensively across the country for construction purposes.

Minor Minerals are mainly consumed by infrastructure & housing industries & development. Virtually there is no construction or infrastructure building work is possible without these minor minerals, hence the same can be assumed as backbone of the infrastructural growth of India. The production per year will be **498564tonnes** which shall be achieved by the end of 5th year

The proposed mining project has been categorized as Category B1 project.

Proponent & Address

M/s Guru Nanak Enterprises

R/o-Sood Colony, Bhoona Islam Nagar, Tehsil- Bajpur,

Distt- Udhamsingh Nagar, State- Uttarakhand.

10.2 Brief description of nature, size and location of the project:

Brief details of the project are described in the Table No. 10.1 given below:

Table No.10.1:- Details of the Project

S.No.	Information	Details
1.	Project name	Ukrauli & Meravarana Sand, Boulder & Bajri Mining Project
2.	Mining Lease Area	12.59 Ha.
3.	lease period	5 years

4.	Mining Plan period	5 Years
5.	Lease Details	The highest bidder was issued letter of intent (LOI) by state government vide letter no. 40/VII-1/19/02(3)/2019 dated 05.02.2019 and after fresh demarcation revised letter of intent issued vide letter no.1450/VII-A-1/2021/2(3)/19 dated 25th August 2021.
6.	Location of mine	
	Village	Ukrauli & Meravarana
	Tehsil	Sitarganj
	District :	Udham Singh Nagar
	State :	Uttarakhand
	Site Coordinates:	

Pillar Name	**N**	**E**
A	29^0 2’ 50.212”	79^0 41’ 28.230”
B	29^0 2’ 43.442”	79^0 41’ 30.398”
C	29^0 2’ 39.396”	79^0 41’ 31.584”
D	29^0 2’ 32.674”	79^0 41’ 35.131”
E	29^0 2’ 30.510”	79^0 41’ 34.941”
F	29^0 2’ 26.110”	79^0 41’ 36.301”
G	29^0 2’ 24.840”	79^0 41’ 38.881”
H	29^0 2’ 25.218”	79^0 41’ 41.016”
I	29^0 2’ 29.350”	79^0 41’ 39.869”
J	29^0 2’ 33.590”	79^0 41’ 39.209”
K	29^0 2’ 40.613”	79^0 41’ 36.577”
L	29^0 2’ 45.710”	79^0 41’ 36.283”
M	29^0 2’ 46.284”	79^0 41’ 38.891”
N	29^0 2’ 49.756”	79^0 41’ 37.939”
O	29^0 2’ 51.305”	79^0 41’ 37.289”

6.	Land Type	Government waste land

7.	Minerals of mine	Sand, boulder and bajri
8.	Proposed Production	Maximum Production 498564 tonnes at the end of 5th year.
9.	Bulk Density	2.2 Tones per m^3
10.	Method of mining	Opencast, Semi mechanized Method
11.	Drilling or Blasting	Not Required
12.	No of working days	240 days
	Water demand	Drinking Water :0.42 KLD
		Dust Suppression: 5.2 KLD
		Plantation: 12 KLD
		Other(if any): 1KLD
		Total Water Requirement:18.62 KLD
13.	Man Power	28Person
14.	Nearest railway station	Pantnagar Railway station, towards west direction (17.2 km*)
15.	Nearest state highway/national highway	) National Highway (NH-74) approx. 13.68km* towards S direction.) State Highway (SH-37) approx. 17.11km* km towards W direction.) Metalled road (Sidcul Road) approx.0.65 km* towards WSW
16.	Nearest air port	Pantnagar Airport, towards West direction (approx. 21.88 Km*)
17.	Nearest Town, City, District Head Quarters along with distance in Kms	Nearest Town/District: Sitarganj, 12.96km, in South Direction
18.	Ecological sensitive areas (Wild life Sanctuaries, National Parks, Biosphere Reserves, etc.)	Nandhaur Wildlife Sanctuary approx 9.8km towards North.
19.	Historical Places	None

20.	Financial & Social benefit	This Project will provide employment to local people directly and indirectly, which will improve their socioeconomic status.
21.	Proposed Project Cost	Rs. 76.24Lakhs
22.	Proposed CER Cost	Rs. 3.812Lakhs
24.	EMP Expenditure	Rs. 18.625 lakhs

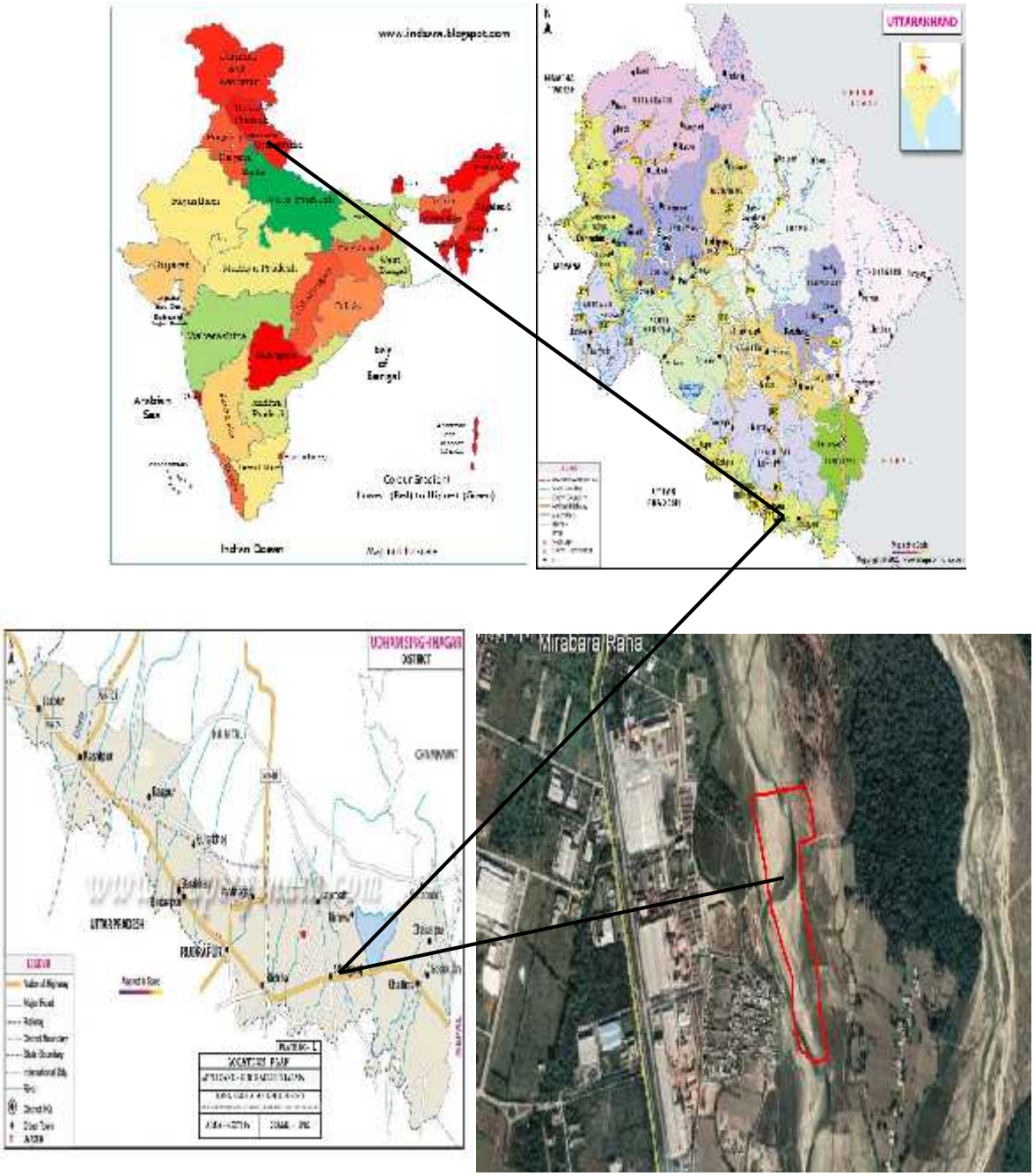

Figure-10.1 –Project Location

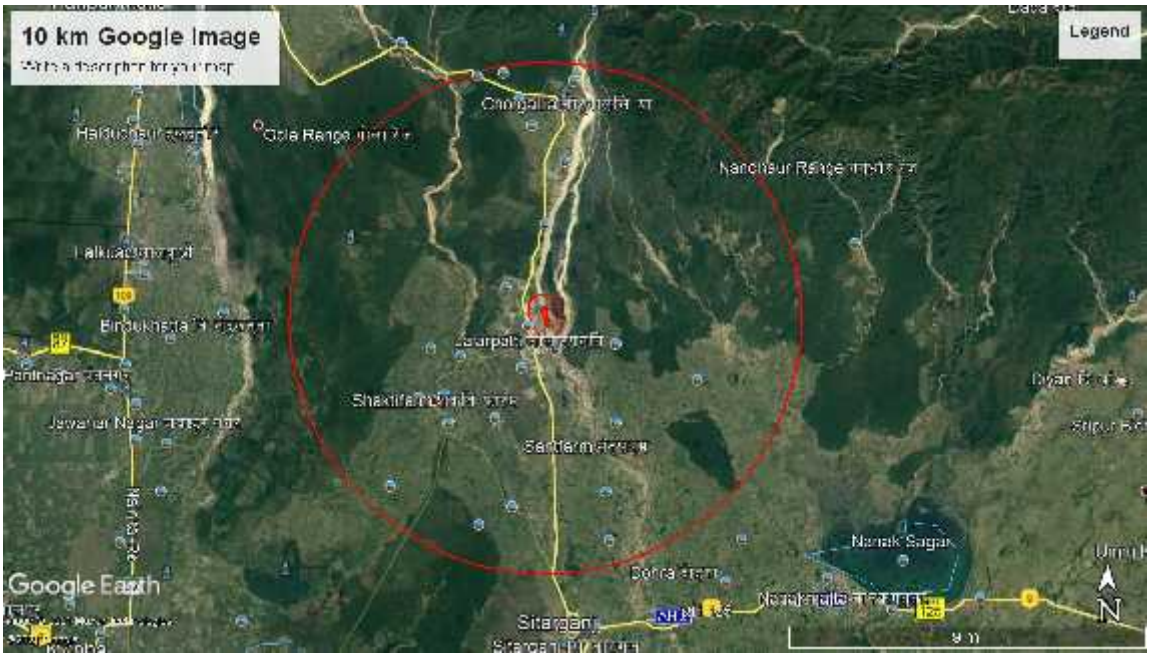

Figure -10.3 10 Km Buffer map of Study area

10.4 STATUS OF REGULATORY CLEARANCES OF THE PROJECT

Nandhaur Wildlife Sanctuary approx 9.8km towards North lies in 10km buffer zone.

There is no legal issue against the project in the court of law.

10.5 SCOPE OF THE STUDY

The application for prior Environmental Clearance (Form-1, PFR) for the proposed project was submitted. The SEIAA-SEAC-Uttarakhand prescribed the TOR. The Committee has issued Terms of Reference (ToR) for preparation of the EIA report and Environmental Management Plan.

10.6 MINE DEVELOPMENT AND PRODUCTION

Proposed Method of Mining:

It shall be opencast semi-mechanized mine. Mining depth should be restricted upto 3.0m. The height of benches shall be kept 3.0mwith face slope 18deg & over all pit slope shall be maintained less than 16°. Mining shall be carried out without adoption of drilling & blasting.

The working period for mining will be restricted to 240days (Eight months) & during three months of rainy season, no mining shall be undertaken.

The mining operations in the lease area would be confined day light hours from 7 a.m to 5 p.m. Due to scarcity of workers it is proposed that 30% of total RBM production shall be achieved manually while balance 70% of RBM production shall b achieved by machinery. It is proposed that light excavators will be used for digging & loading of mineral in tippers. Ultimate depth of pit shall be kept 3.0mfrom the surface.

Proposed Method of Mining:

The salient points of proposed methods of mining are as below.

1. Mining activity will be carried out by open cast semi-mechanized method.
2. Light weight excavators will be used for digging & loading of mineral in tippers.
3. No OB/Waste material will be produced.
4. Roads will be properly made and sprayed by water for suppression of dust.
5. Roads in the lease area for the movement of loaded trippers/trucks will not have slopes more than 1 in 20.
6. Extraction activities will start in the block from the upstream side to downstream side. This will not obstruct the movement of water, it any, during monsoon period in the river course.
7. Removal of material upto bed level is essential to control river flow in its central part to check the bank cutting.
8. Sustainable mining is extremely important to promote environment protection, hydrological & social effects. This should be carried out in following:

- To ensure adequate quantity of aggregation.
- To ensure there is no obstruction of river flow.
- To maintained the river equilibrium with the application of transport & quantity to be extracted.
- To avoid pollution of river water leading to water quality deterioration.

- The sustainable sand mining management guidelines (SSMMG)-2016 shall be strictly adhered.

Summary of geological reserves is as below:

Classification	Code	Total Mineral Potential (tonnes)	Mineable Mineral Potential in metric (tonnes) (60% of total mineral potential)
A) Mineral Reserves			
1) Proved Mineral Reserves	111	830940	498564
2) Probable Mineral Reserves	122	Nil	Nil
B) Mineral Reserves			
1) Feasibility Mineral Resources	211	Nil	Nil
2) Pre-Feasibility Mineral Resources	222	Nil	Nil
3) Inferred Mineral Resources	333	Nil	Nil
Grand Total		**830940**	**498564**

Production Details

Production per year will be **498564tonnes** which shall be achieved by the end of the 5 year.

Table-10.2-Year wise production detail

Year	Over burden (cum)	Total Mineral Potential (tonnes)	Mineable Mineral Potential in metric (tonnes) (60% of total mineral potential)	Sub grade mineral	Mineral reject
Ist	-	830940	498564	-	-

IInd	-	830940	498564	-	-
IIIrd	-	830940	498564	-	-
IVth	-	830940	498564	-	-
Vth	-	830940	498564	-	-
Total	-	**4985640**	**2492820**	-	-

10.7 LAND USE PATTERN

The area is Barren land (nonagricultural land). The existing land use of area is given below:

Sr. No.	Land use	Agriculture land (ha)	Forest Land (ha)	Waste land (ha)	Grazing Land (ha)
1	Mining pits Quarry	-	-	-	-
2	Approach Road	-	-	-	-
3	Dumps	-	-	-	-
4	Office, Resht Shelter etc.	-	-	-	-
5	Balance undisturbed land	-	-	12.59	-
	Total	**-**	**-**	**12.59**	**-**

10.8 BASE LINE DATA

This section contains the description of baseline studies of the 10 km radius of the area surrounding proposed by M/s Guru Nanak Enterprises for Ukrauli& Meravarana Sand Boulder & Bajri Mining Project located at khasra No-38, 40, 41&55/1, Village-Meravarana, Tehsil-Sitarganj, District: Udham Singh Nagar, State-Uttarakhand. Lease Area: 12.59Ha.The data collected has

been used to understand the existing environment scenario around the proposed mining project against which the potential impacts of the project can be assessed.

Environmental data has been collected in relation to proposed mining for:-

(a) Air

(b) Noise

(c) Water

(d) Soil

(e) Ecology and Biodiversity

(f) Socio-economy

Table 10.3BASELINE ENVIRONMENTAL STATUS

Attribute	Baseline status
Ambient Air Quality	Ambient Air Quality Monitoring reveals that the minimum & maximum concentrations of PM_{10} for all the 5 AQ monitoring stations were found to be 61.4µg/m^3 at AQ3 and 92.6µg/m^3 at AQ4, respectively. As far as the gaseous pollutants SO_2 and NO_2 are concerned, the prescribed CPCB limit of 80µg/m^3 for residential and rural areas has never surpassed at any station. The maximum & minimum concentrations of SO_2 were found to be 10.2µg/m^3 at AQ4 & 4.1 µg/m^3 at AQ1, respectively. The maximum & minimum concentrations of NO_2 were found to be 20.4µg/m^3 at AQ4 & 8.1µg/m^3 at AQ5 respectively.
Noise Levels	Noise monitoring reveals that the maximum & minimum noise levels at day time were recorded as 52.1 dB (A) at NQ1 & 49.3 dB (A) at NQ4, respectively. The maximum & minimum noise levels at night time were found to be 41.5 dB (A) at NQ3 Village & 37.3 dB (A) at NQ4.

Water Quality	**Ground Water** Analysis results of ground water reveal the following: - - pH varies from 7.47to 7.75 - Total hardness varies from 279 mg/l to 330 mg/l - Total dissolved solids vary from 394 mg/l to 502 mg/l **Surface Water** The analysis results indicate that the pH ranges between 7.20 and 7.80. Dissolved Oxygen (DO) was observed in the range of 7.3 to 7.8 mg/l. BOD values were observed to be in the range of 3. The chlorides and Sulphates were found to be in the range of 20-32.0 mg/l and 6-8 mg/l respectively.
Soil Quality	Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 8.09 to 8.17, which shows that the soil is alkaline in nature. Potassium is found to be from 0.20 meq/100 to 0.32 meq/100. The water holding capacity is found in between 22.67% to 25.86%.
Ecology and Biodiversity	No species was reported from the project area (Core Zone) which is listed under Schedule I of Wildlife Protection Act, 1972. However, there are many species which are reported to be present in the buffer zone. The project is not likely to affect the terrestrial species as it does not fall into habitat of above mentioned species. However, for species dependent on aquatic life, mine run-off might be an issue. Trees plantation will be proposed in subsequent chapters (under Environment Management Plan), which will eventually mitigate any adverse impact from run-off

10.9BIOLOGICAL ENVIRONMENT

Methodology for Floral & Faunal study:

Biological diversity comprises the variability of species, genus and ecosystems and is very crucial for maintaining the basic processes on which the life depends. Broadly, it can be divided into two types i.e. the floral diversity and faunal diversity. Conservation of the biodiversity is essential for the sustainable development as it not only provides the food, fodder and medicine, but also contributes in improvement of essential environmental attributes like air, water, soil, etc.

Udham Singh Nagar is Tarai region of Kumaon division. It was separated by district nainital on basis of its physiographical condition. The geographical area of the district is 3055km^2. The district lies between latitudes 28º53' and 29º23' N and longitudes 78º45' and 80º08' E

Drainage of the area is mainly controlled by Kailash River, Gola River, Dabka River, kosi, sharda River etc. and their tributaries (locally called Nadi, Gad or Gadhera).project site falls on River Kailash.

January is the coldest month with mean maximum temperature of 10°C, the mean minimum temperature being about 2°C. Temperature drops down to – 6°C during January and February in the northern part of the district. June is the warmest month with the mean maximum and the mean minimum temperatures of 25°C and 15°C respectively. The Relative Humidity increases rapidly with the onset of monsoon and reaches at about 80% during July to September. The driest part of the year is the pre-monsoon period, when the humidity is as low as 30% in the afternoons. Skies are heavily clouded during the monsoon months and for short spells when the district is affected by Western Disturbances. Two broad wind patterns are observed in the district viz. north easterly to easterly (May to September) and south easterly to westerly (October to March).

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. Secondary data was collected from published literature.

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. Secondary data was collected from published literature.

The details are given as below:

Survey sites : Around the project site in 10 km radius

Core zone : At the project site

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

General vegetation & Forest Type of the study area:

Area supports moderately healthy vegetation, the main forest species are scattered all over the hills, riparian vegetation found along the Kailash River and upper reaches of hills covered with pine forest.

Flora of the Core zone

The core zone comprises of private agriculture land, where mining operation is proposed. Few invasive species like *Partheniumhysterosporus*, *lantanacamara,* shrubs like *Cannabissativa*etc. are present. No ecologically sensitive plant species has been reported from core area.

Flora of the Buffer zone: Buffer zone of the proposed project falls in lesser and Greater Himalaya region. Many tree species are planted in the area because of their usefulness, economic and aesthetic values. The tree species observed in the area are, Aam (*Mangiferaindica*), Jamun (*Syzygiumcumini*), Bail (*Aeglemarmelos*), Dakain (*Meliaazedarach*), Neem (*Azadirachtaindica*), Peepal (*Ficusreligiosa*), Bhimal (*Grewiaoptiva*) etc.

In agricultural waste land and along the road side, growth of shrubs (including invasive species) like *Argemonemexicana*, *Cannabis sativa*, *Cenchrusciliaris, Partheniumhysterosporus*, etc. are very common. These weeds are affecting the agricultural productivity of the region due to fast growth, short life cycle and enormous production of seeds.

Vegetation in and around human settlement:

Vegetation pattern in villages and surrounding areas are slightly different from the rest of the areas. The common species grown near villages are mostly edible or useful plants such as *Mangiferaindica, Azadirachtaindica, Albizialebbeck, Delonixregia, Ficusreligiosa*, etc.

Fauna of the study area:

As far as the reptile community was concerned, Indian cobra, garden gecko and house lizard are recorded from the study area. A list of wild fauna of the study area has been prepared on the basis of local inquiry from the village people and from the available published literatures. The

species with conservation status as per Wildlife Protection Act, 1972 are identified. Moreover, global conservation status of species was estimated from Red data book of IUCN.

Mammals:

Rodents like Indian palm squirrel (*Funambuluspalmarum*) and field mouse (*Apodemussylvaticus*) are noticed in vicinity of village. Inquiry from village people regarding wild animals reveals that Rhesus macaque (*Macacamulatta*), Indian hare (*Lepusnigricollis*), fruits bat (*Pteropusconspicillatus*), Goral (*Naemorhedus goral*) Yellow throated marten (*Martesflavigula*) are often seen in the area. Many domesticated mammal species are reported from buffer zone during the field survey. Common grazing animals like cow and goat,. can be noticed in open grass fields.

Avifauna: House crow (*Corvussplendens*), Common Myna (*Acridotherestristis*)), Red-rumped Swallow (*Cecropisdaurica*), Hoopoe (*Upupaepopsceylonensis*) Warblers and Tits are of common occurrence.

Reptiles: The reptilians species commonly reported are Agama (*Laudakiatuberculata*) in settlement area, Garden lizard (*Calotesversicolor*) and *Eutropismacularia* along shady places in agricultural field or where growth of bushes is noticed.

Amphibian: Amphibians are commonly found at the places along the margin of aquatic and terrestrial systems. Due to presence of water bodies like river, nalas, etc. the study area is providing shelter to many amphibian species. Some of the commonly reported species are *Bufomelanostictus* (common Indian toad), *Euphlyctiscyanophlyctis* (Indian skipper frog),) etc.

10.10 LAND ENVIRONMENT

Various components of land environment have been identified for study of impact of the mine operations. Details of the same are given below:

10.9.1 Solid waste generation and management

No solid waste generation is expected from the mining procedure. 28 persons including the works man and the administrative staff are supposed to produce negligible waste like gutka pouches, smoking litter,and newspapers etc. belonging to biodegradable category waste.Waste

generated will be collected on regular basis and will be disposed as per the Municipal Solid Waste Management (Management & Handling) Rule 2000 and its subsequent amendments.

10.9.2 Impact on land use & reclamation of mined out areas

The area likely to be degraded due to quarrying, pitting & roads:

The impact on the land form or Physiography will be limited to the modification of the slope.

i) Mine working will remain confined to river bed lot only & in no case disturbing any surface area outside which may affect topography or drainage.

ii) Mining pit will impact river bed topography by formation of excavation voids. This will be temporary & in first monsoon itself.

The impact on land use will also be limited. The various modifications due to mining allied & activities during plan period are given below:

Activity	Area Occupied (Ha.) During next five years	At the end of conceptual period (ha)
Mining and Existing pits	12.59	Nil
Waste dumps	0	Nil
Road	0	Nil
Area Replenished	12.59	Nil
Afforestation (outside the area)	2.5	Nil

Mitigation Measures:

- Unwanted material including mineral or spillage (if any) will not be stacked on the bank side as it will hinder the flow of water in monsoon season.
- The mining from river bed will not have any impact on natural drainage of surrounding

area as the excavated sand from river bed is filled with first heavy flow in river during monsoon season.

10.11AIR ENVIRONMENT

Anticipated impacts and mitigation measures

It has already been explained that mining will be in a very small scale. One of the most crucial elements for air pollution is vehicular transport. Due limited movement tippers/tractor trolley air quality will not undergo any significant change.

However the only cause of concern in future will be SPM content. The daily average SPM will be less than 220 micrograms per meter cube. Considering the Semi-mechanized operation for next five years, if safely believed that SPM content will seldom exceed 250 micrograms per meter cube. However, if required, water sprinkling on dry month may be undertaken on the haul road where the maximum traffic will be observed.

- To control the emissions regular preventive maintenance of equipment will be carried out on contractual basis.
- Proper mitigation measures like water sprinkling will be adopted to control dust emissions.
- Plantation will be carried out on approach roads & nearby vicinity of river bank.
- It is being ensured that all transportation vehicles will carry a valid PUC certificate

10.12 WATER ENVIRONMENT

Mining causes lowering of riverbed level as well as river bed water level resulting in lowering of groundwater table due to excessive extraction and draining out of groundwater from the adjacent areas, if general ground water table is higher than riverbed level. In case the general ground water level is lower than riverbed water level, then it will have positive impact as ground water table will be recharged vertically as well as laterally. The former case may cause shortage of water for the vegetation and human settlement in the vicinity, but in later case it will help improve situation.

River is recharging the ground water, excessive mining will reduce the thickness of the natural filter materials (sediments), infiltration through which the ground water is recharged, so restriction in depth becomes necessity.

Mitigation measures:

Mining in the area will be done well above the water table as well as river bed water level therefore; much impact on water regime is not anticipated. The water table is at 3-6 m below river bed level while the workings in the area are proposed up to a max. depth of 3.0m mining is proposed through the formation of two benches, so that water level is not touched. No waste water will be generated from the mining activity of minor minerals as the project only involves lifting of sand, Bajri& boulders from river bed.

10.13NOISE ENVIRONMENT

It has been explained earlier that proposed mining is of open cast semi mechanized with deployment of light excavator. Therefore noise level too will not show any significant increase.

The exposures to excessive noise levels can lead to:

a. Prevention of sleep, insomnia and fatigue.

b. Decrease in speech reception, communication, distraction and diminished concentration thus adversely affecting job performance efficiency.

c. Chronic psychological disturbance including impaired hearing.

d. Irreparable cardiovascular, respiratory and neuralgic damages in certain extreme cases.

The area is general represents calm surroundings. There is no heavy traffic, industry or noisy habitation in the area except the existing mine. The other major industry like minerals grinding and crusher plants is far away. With the increase in scale of mining operations, deployment of machinery and vehicles operation and men and noise levels are expected to increase.

Mitigation measures:

- Periodical monitoring of noise will be done.

- It is proposed that a light excavator (bucket capacity 0.50cum) shall be deployed for exploitation of RBM & loading the material from stackyard & noise generated by these equipments shall be intermittent and does not cause much adverse impact.

- Proper maintenance of all equipments/ machines will be carried out which help in reducing noise during operations.

- Plantation will be taken up along the approach roads and vicinity of river bank. The plantation minimizes propagation of noise and also arrests dust.

10.14 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

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, emissions and wastes, for measurement against corporate or statutory standards, consent limits or targets. It may also require measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints. The environmental monitoring will be conducted in the mine operations as follows:

- Air quality;
- Water and wastewater quality;
- Noise levels;
- Soil Quality; and
- Greenbelt Development

10.15 ENVIRONMENTAL MONITORING PROGRAMME

Table-10.5 Post Project Monitoring Programme

Attributes	**Sampling**		**Measurement Method**	**Test Procedure**
	Network	**Frequency**		
A. Air Environment				

Pollutants PM 2.5, PM_{10}	5 locations in the project impact area (Minimum 2 Locations in upwind side, 2 sitesin Downwind side / impact zone and 1 in core zone)	Once in a season.	Gravimetric method	-
			Gravimetric method	-
SO_2			EPA Modified West & Geake method	Absorption in Potassium Tetra Chloromercurate followed by colorimetric estimation using P-Rosaniline hydrochloride and Formaldehyde (IS: 5182 Part - II).
NO_2			Arsenite modified Jacob Hochheiser	Absorption in dil. NaOH and then estimated calorimetrically with sulphanilamide and N (I-Nepthyle) Ethylene diamineDihydrochlorideand HydrogenPeroxide (CPCB Method).
B. Water Environment				
pH, Turbidity, Colour, Odour, Taste, TDS, Total Hardness, Calcium hardness, Magnesium hardness, Chloride, Fluoride, Sulphate, Nitrates, Alkalinity, Iron, Copper, Manganese, Mercury, Cadmium, Selenium, Arsenic, Cyanide, Lead, Zinc, Chromium, Aluminum, Boron, Phenolic Compounds	Set of grab samples during pre and post-monsoon for ground and surface Water in the vicinity.	Diurnal and Season wise	As per IS 10500	Samples for water quality should be collected and analyzed as per : IS : 2488 (Part 1-5) methods for sampling and testing of Industrial effluents Standard methods for examination of water and wastewater analysis published by American Public Health association.
C. Noise				
Noise levels at	Mine	Quarterly/	As per CPCB	As per CPCB norms

Day & night time - Leq dB (A)	Boundary High noise generating areas within the lease	Half yearly	norms	
D. Soil				
pH, Bulk Density, Soil texture,	3 locations in the project impact area	Yearly/ half yearly	As per USDA Method	As per USDA Method
Nitrogen, Available Phosphorus, Potassium, Calcium, Magnesium, Sodium, Electrical conductivity, Organic Matter, Chloride				
E. Socioeconomic				
Demographic structure Infrastructure resource base Economic resource base Health status: Morbidity pattern Cultural and Aesthetic attributes Education	Socioeconomic survey is based on proportionate, stratified and random sampling method	Minimum for two phases of the project	Primary	Secondary data from census records, statistical hard books, topo sheets, health Records and relevant official records available withGovt. Agencies

10.16 BUDGET ALLOCATION FOR EMP IMPLEMENTATION

Corporate Environment Responsibility:

CER (Corporate Environment Responsibility) details for the Project

Budget for Corporate Environmental Responsibility (CER)/Year

Yearly CER cost for the project, i.e. 5% of the total project cost

Rs.76, 24, 000 x 0.05 = Rs. 3, 81, 200

This is the proposed cost CER Plan, Activities and actual cost will be finalized as per the Actual need of the area.

(ON THE BASIS OF NEED BASE ASSESSMENT SURVEY)

Table No-10.6 Budget allotted for CER

S. No.	Activity	Cost per Unit (Rs)	Quantity	Total (Rs.)
1.	Installation of Hand pump for nearby Villagers	40,000	03	1,60,000
2.	Installation of Solar street light in nearby Villages	14,000	05	70,000
3.	Construction of Toilets for Women in nearby villages	65,000	02	1,30,000
4.	Distribute Stationary nearby School	21,200		21,200
	Total Proposed CER Cost			**3,81,200**

Table – 10.7 Estimated project cost along with analysis in terms of economic viability of the project

S. No.	Description	Unit	Total (Rs.)
A. Project Operation Cost			
1.	**Manpower Cost:**	(Total Man power 28) Assuming 240days	30,60,000
	Mining Engineer (Part time) 1	Rs. 25,000/ month= 3,00,000	
	Geologist (Part time) 1	Rs. 35,000/ month= 4,20,000	
	Foreman (full time) 1	Rs. 500/ day= 1,20,000 x 1=1,20,000	
	Un-skilled:		
	Piece rated workers 25		
	Total 28	Rs.370 / day= 88800x25=22,20,000	

2.	**Expenditure on Occupational Health:** PPE Kit, First Aid Facility, Mask, Hand wash & Sanitizer Medical checkup and Medicine (Once in a month)	3000/worker (3000 x 25)= 2,55,000 *Doctor's visit*: 10,000/ month (8 working months) =80,000 *Medicines* (Assuming 500/worker) 500 x 25 = 12,500 (Mine operation Month: 8) = 1,44,000	4,91,500
3.	**Equipment's/Tools/Machineries**	240 days Assuming Rs.5000/day	12,00,000
4.	**Drinking and Sanitary Facilities**	➢ Rs. 4000/day for drinking/domestic (240 days) ➢ Rs. 50,000/ Bio-toilets x 2	10,10,000
	Total Project Operation Cost (A)		**Rs. 57,61,500 (lakhs)**
B. Break-up of Expenditure on Environment Protection & Environment Management			
5.	Haulage Road Repair & Maintenance) Filling, Leveling and widening of the road up to width of 5m and length of 520 m.) Setting & Fixing of Cut Stone on the leveled road.	Annual 520 m (L) x 5 m (W)=2600m^2	2,00,000
6.	Water Sprinkling on Haulage Road for Dust Suppression	Assuming Rs.2000/day for 240 days of working Tanker Cost: Rs. 1000/Tanker Tanker Capacity: 5000 liter, No. of Tankers required: 2	4,80,000
7.	Plantation along the road side & post plantation care	Plantation@100/sapling (6000 sapling)	6,00,000

		Post plantation care @500/day (For 60 Saplings Annually.i.e.365 days). ***Note: Annual cost will increase with increase in no. of sapling.***	1,82,500
8.	Environmental Monitoring & Compliances.	➢ **Half Yearly Monitoring of Environmental Parameters viz. Air, water, Noise & Soil.** ➢ Half Yearly Submission of Compliances.	4,00,000
	Total Environment Protection & Management Cost (B)		**Rs.18,62,500 (Lakhs)**
	Total Project Cost (A+B)		**Rs. (57.615 + 18.625) =76.24 lakhs**

10.17 ADDITIONAL STUDIES

Risk Assessment and Disaster Management Plan

The complete mining operation will be carried out under the management control and direction of a qualified mine manager holding Mines Manager's Certificate of Competency. Moreover, mining staff will be sent to refresher courses from time to time to keep them updated.

Disaster Management Plan

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

10.18 PUBLIC CONSULTATION

Public Hearing

In consonance with the EIA notification dated 14th September 2006, vide section 1 (a) related to Public Hearing, the draft EIA/EMP report shall be submitted to the Uttrakhand Pollution Control Board (UKPCB) for public hearing.

10.19 PROJECT BENEFITS

The impact on the civic amenities will be substantial after the commencement of mining activities. Medical facilities will be provided in the form of first-aid facility at the mine. These medical facilities will also be available to local people in the surrounding in case of emergencies.

- Generation of employment and improved standard of living;
- Increased revenue to the State by way of royalty, taxes and duties; and
- Superior communication and transport facilities etc.

The employment of local people in primary and secondary sectors of project will upgrade the prosperity of the region.

10.20 CONCLUSION

- The mining operations will meet the compliance requirements of MoEF&CC;
- Community impacts will be beneficial, as the project will generate significant economic benefits for the region;
- Adoption of Best Available Technology and Best Management Practices with more environmental friendly process; and
- With the effective implementation of the Environment Management Plan (EMP) during the mining activities, the proposed project can proceed without any significant negative impact on environment.

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Chapter-11

Disclosure of Consultants

CONSULTANTS ENGAGED

The consultant engaged for the preparation of the EIA/EMP of the project is M/s Cognizance Research India Private Ltd. The information about the company with address is as follows:

Name of the Consultant And Contact No.	**Cognizance Research India Private Ltd.** **M: 9910047760**
Address	**GT-20, Sector – 117, Noida -201301 – U.P**
Credentials	**Accredited by QCI/NABET**
Environmental Laboratory	**Noida Testing Laboratories** **NABL in Chemical and Biological Testing**
Address of the laboratory	**GT-20, Sector -117, Noida – 201301 – U.P**

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

Sr. No.	Name	EC/FAE	Details
01	Mr. Ankur Sharma	EC	EIA Coordinator (Mining of minerals opencast).
02	Mr. NimishSinghvi	FAE	AP, SHW & GEOLOGY
03	Mr. VineetPandey	FAE	SE
04	Ms. Neha	FAE	AQ & NV
05	Mr.Ankur Sharma	FAE	WP
05	Ms. Pooja	FAE	EB
06	Mr. ChakorGedam	FAE	RH
07	Dr.P Radhakrishna	FAE	HG & LU

	Moorthy		

11.1Accreditation Certificate of the Consultant Engaged:

Quality Council of India

National Accreditation Board for Education & Training

CERTIFICATE OF ACCREDITATION

Cognizance Research India Pvt. Ltd.
GT 20, Sector 117, Noida, Uttar Pradesh-201301

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

Sl. No.	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including opencast and underground mining	1	1 (a) (i)	A
2	Building and construction projects	38	8 (a)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RA AC minutes dated November 8 and Supplementary AC minutes dated December 6, 2019 posted on QCI NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/20/1222 dated February 11, 2020. The accreditation needs to be renewed before the expiry date by Cognizance Research India Pvt. Ltd., Noida, following due process of assessment.

Sr. Director, NABET
Dated: February 11, 2020

Certificate No.
NABET/ EIA/1922/ RA 0151

Valid till
February 3, 2022

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

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