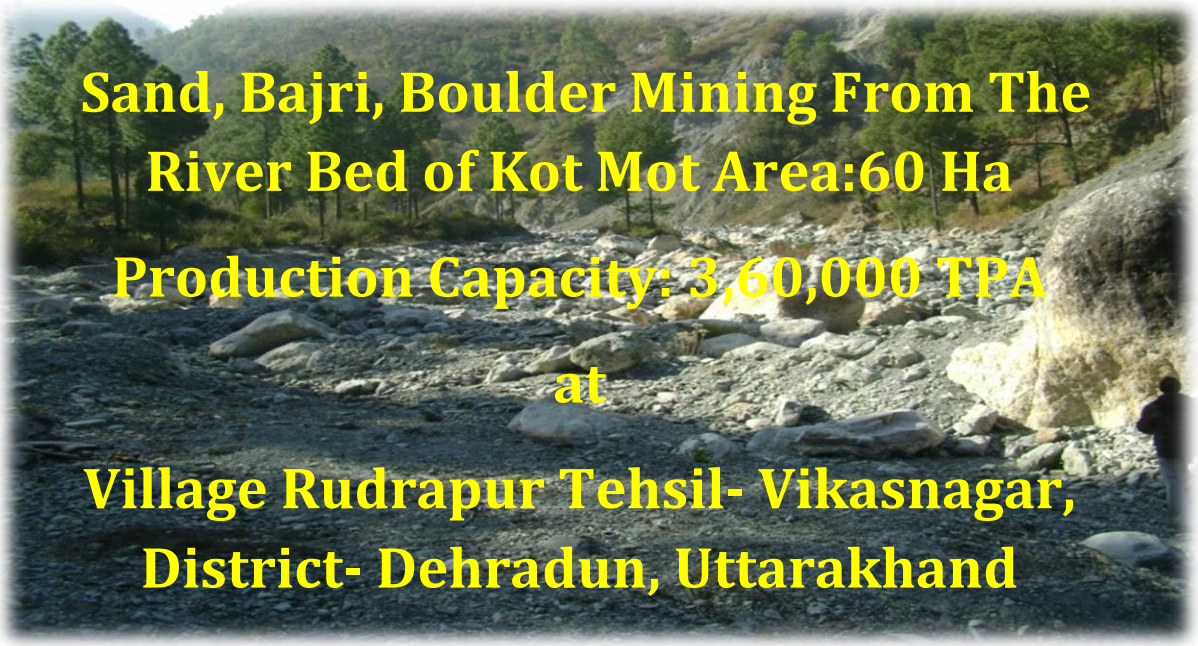
EXECUTIVE SUMMARY



Sand, Bajri, Boulder Mining From The River Bed of Kot Mot Area:60 Ha

Production Capacity: 3,60,000 TPA

at

Village Rudrapur Tehsil- Vikasnagar, District- Dehradun, Uttarakhand

APPLICANT

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Executive Summary

10.1 INTRODUCTION

Mine has been allotted in the name of M/s UKFDC vide Letter of Intent (LOI) no. 584/BHU/KANI/E/2012-13 dated 23.01.2013 by Director of Mines & Geology Department, Uttarakhand.

The proposed project is categorized under category "A" 1 (a) (mining lease area $\geq$ 50 hectare) - {Mining of Minerals} as the lease area is 60 ha and will be considered at MoEF, New Delhi.

Mine lease area is located in the bed of river Kot Mot at near villages Rudrapur Tehsil-Vikasnagar District Dehradun, Uttarakhand. The total lease area is 60 ha and has been proposed for an annual production of 3,60,000 tonnes of Sand/Bajri/Boulder by open cast manual extraction method in river bed.

Total number of working days will be 270. The mine will be worked in the day shift only. This project will provide employment to 600 Person including skilled, semi- skilled & unskilled. Total water requirement will be 30 KLD for domestic purpose, dust suppression & green belt development which shall be met by tanker supply.

The baseline collected data for land, soil, water, air and noise shows all values found are within the limits, prescribed by CPCB. Plantation is proposed along the slope on both bank of the river. Plantation was carried out on approach road and nearby vicinity of the river bank.

All possible environment aspects have been adequately assessed and necessary control measures have been formulated to meet statutory requirements. Thus implementing this project will have positive impacts.

10.2 PROJECT DESCRIPTION

The project for collection of minor minerals (sand, bajri, boulder) from the river bed of Kot Mot has been proposed for an annual production of 3,60,000 TPA by Open Cast Manual Extraction method. The lease area measuring 60 ha is falling totally under the forest land. Some of the salient features of the project are given below in the **Table no-1**

Table.1: Salient Features of the Proposed Project

Project Name	Extraction/Collection of Sand, Bajri & Boulder (minor minerals) from Kot Mot River Bed
Area	60 ha
Coordinates	**Latitude** 30°26'34.69"N to 30°25'40.72"N **Longitude** 77°52'47.00"E to 77°49'39.22"E
Capacity	3,60,000 TPA
New/Expansion/Modernization	New Mine
Category	A
Land Use	River bed in Forest land
Elevation	595 m AMSL (highest) & 529 m AMSL (lowest)
Seismic Zone	Zone-IV (As per 1893:2002)
Method of Mining	Open-cast Manual
Minerals to be Mined	Sand, Bajri, Boulder
Life of Mine	Continuous, being replenished yearly
Water Demand	30 KLD
Sources of Water	Tanker supply
Man Power	600
No of Working Days In A Year	270
Cost of Project	Rs.20,00,00

10.3 RESERVE ESTIMATION & YEARWISE PRODUCTION

The sandy soil will be removed from river bank with the help of crowbar & spade and stacked separately. Each bench will be of 1.5m high. The net recovery of RBM has been

considered 90 % of total excavation. The net saleable production of RBM will be 3,60,000 Tonnes. The Year wise proposed quantity, production and closing recoverable reserves are given below:

Table 2: The Year wise proposed quantity, production and closing recoverable reserves

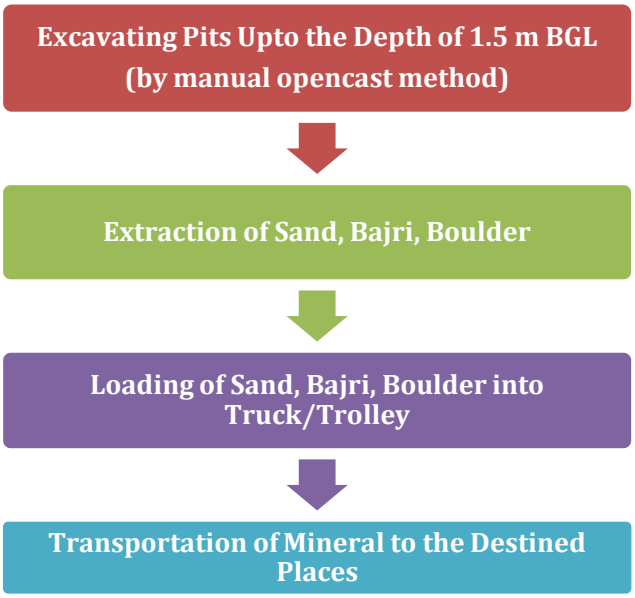
Years	Bench Level(m)	Quantity of the mineral(Tonnes)	Production (Tonnes)	Balance (Tonnes)
I Year	529-593.5	365400.83	360,000	5400.83
II Year	529-593.5	365400.83	360,000	5400.83
III Year	529-593.5	365400.83	360,000	5400.83
IV Year	529-593.5	365400.83	360,000	5400.83
V Year	529-593.5	365400.83	360,000	5400.83

10.4 METHOD OF MINING

The project does not involve any processes such as drilling, blasting and beneficiation. The mining process involves collection of material by simple hand tool such as shovel, pans and sieves. This is followed by sorting and manual picking, stacking and loading into trucks/tractor-trolley for transporting.

The pits from where the material is picked are not deeper than 1.5m as allowed in mining area and shall follow the normal channel direction of the river. These get replenished during monsoon. The only waste is silt/clay which is recycled back to the pits. Mining will be carried out only during the day time. The mineral extraction will be done for a period of 270 days in a year.

Figure 1: Schematic Flowchart of Sand, Bajri, Boulder Mining Process



10.5 PROJECT REQUIREMENT

10.5.1 EMPLOYMENT POTENTIAL

About 600 workers including skilled, semi-skilled & unskilled labours shall be engaged through project proponent for extraction of sand, bajri, boulder (minor mineral) and loading & handling of mineral in mining area.

Table 3: Manpower Requirement

S. No.	Type of Manpower	Number
1	Manager/Foreman	11
2	Skilled	59
3	Unskilled Labours	530
	Total	**600**

10.5.2 WATER REQUIREMENT

Water requirement for the proposed project for domestic use, dust suppression and plantation, Total water requirement shall be 30 KLD.

Table 4: Total Water Requirement

S. No.	Activity	Water Required (KLD)	Source
1.	Domestic	18	Tanker Supply
2.	Dust Suppression	8.0	
3.	Green Belt	12.0	
Total		**30**	

10.6 DESCRIPTION OF THE ENVIRONMENT

Study area of proposed mine for baseline study covers the total area covering a 10 Km radius from the mine lease periphery. Further the study area has been divided into two zones namely "Core Zone" and "Buffer Zone". Core zone comprises of the mine lease area within the mine lease boundary while the area around the mine lease periphery covering 10 Km radius area constitutes the Buffer Zone.

10.6.1 LAND USE/ LAND COVER PATTERN OF THE STUDY AREA

The existing land use pattern of the study area based on the latest satellite imagery is given in **Table 5**.

Table 5: Land Use Pattern of the Study Area

S.No	Classes	Area (sq.km)	Area in %
1	Agriculture	390.87	63.29
2	Settlement	21.79	3.53
3	Forest Land	175.45	28.41
4	Waste Land	1.51	0.25
6	Water Bodies	27.95	4.53
Total		**617.58**	**100**

10.6.2 SOIL ENVIRONMENT

Monitoring data shows that the texture of soil at all locations is Sandy Loam. The monitoring sites have sand ranging from 76% to 80% in soil samples. Silt content varies from 10% to 12%, while Clay content varies from 10% to 13% in the soil samples.

- The data shows that value of pH ranges from 7.45 at Mine site and Khusalpur to 7.65 at Rampur indicating that all soil samples are Slightly Alkaline.
- Khusalpur location shows maximum conductivity of 512 µmhos/cm, while Rampur shows minimum conductivity of 381 µmhos/cm.
- Values of CEC ranges from 2.2 meq/100gm as lowest at Mine Site and 2.8 meq/100gm maximum at Khusalpur and Vikasnagar.

10.6.3 WATER ENVIRONMENT

Ground water quality comprises the physical, chemical and biological qualities of ground water. Temperature, colour, turbidity, odour and taste make up the list of physical water quality parameters.

The physico-chemical characteristics of groundwater were analyzed as per relevant parts of IS: 3025 and compared with the drinking water specifications, prescribed in IS: 10500.The groundwater analysis data for the monitoring period i.e. March-May' 2015.
The value of Ground Water pH ranges from 7.42 to 7.56, indicating that water is neutral to slightly alkaline in the study area. Maximum Conductivity observed is 448 µmhos/cm at Vikasnagar whereas minimum conductivity was observed at Rampur as 436 µmhos/cm. Total hardness of ground water ranges from 3.58 to 3.6 mg/l. The observed values of Chloride vary from 14 mg/l at Vikasnagar to 15 mg/l at Rampur. The ground water quality is in good conditions at mostly all locations.

The value of Surface Water pH ranges from 7.47-7.65, indicating that water is neutral to slightly alkaline in the study area. Conductivity of surface water ranges from 400-405

µmhos/cm. Total hardness of surface water ranges from 3.2 mg/l -3.14 mg/l. TDS ranges from 157-160 mg/l.

The physico-chemical characteristics of Surface water are found within the limits, prescribed by CPCB.

10.6.4 AIR ENVIRONMENT

PARTICULATE MATTER 10 (PM_{10}): The maximum value for PM_{10} is observed, as 80.0 µg/m^3 at Vikasnagar and minimum value of 57 µg/m^3 at Herbertpur while 24 hours applicable limit is 100µg/m^3 for industrial and mixed use areas. The average value ranges between 67.44 to 71.0 µg/m^3.

PARTICULATE MATTER 2.5 ($PM_{2.5}$): The maximum value for $PM_{2.5}$ is observed, as 50.0 µg/m^3 at Mine Site Rudrapur and minimum value of 32µg/m^3 at Herbertpur while 24 hours applicable limit is 100µg/m^3 for industrial and mixed use areas. The average value ranges between 37.71 to 42.0 µg/m^3.

SO_2: The maximum value for SO_2 is observed, as 10.8 µg/m^3 at Vikasnagar and minimum value is beyond detention limit less than 4 µg/m^3 at all location. Average value of SO_2 is between 6.0 to 6.92 µg/m^3. The area observes SO_2 well below the prescribed range.

NO_2: The maximum value for NO_2 is observed, as 28.0 µg/m^3 at Vikasnagar & minimum values is 12 µg/m^3 at Herbertpur and Rampur, while 24 hours applicable limit is of 80µg/m^3 for residential, industrial and other areas. Average value of NO_2 is between 18.25 to 20.83 µg/m^3. The area observes NO_2 well below the prescribed range.

10.6.5 NOISE ENVIRONMENT

In mine area, Leq (day) noise level are ranging between 49.7 dB recorded Herbertpur to 52.5 dB recorded at Vikasnagar during day time and Leq (night) of 40.6 dB recorded at Vikasnagar to 43.4 dB recorded at Sahaspur during night time. During daytime and night time noise level within the mine lease area are well within the prescribed limit.

10.6.6 BIOLOGICAL ENVIRONMENT

The core zone comprises of Kot Mot river bed, where mining operation is proposed. This area consists of riparian vegetation in which aquatic and marshland plants are the main component. Most among them are weeds. No ecologically sensitive plant species has been reported from this area. Riparian vegetation is found along the river side. In stagnant water growth of hydrophytes likes *Hydrolea zeylanica*, *Ipomoea carnea*, *Ludwigiaadscendens*, *Sagittaria sagittifolia*, *Spilanthes paniculata*, *Typha latifolia*, etc. can be commonly observed. Buffer zone of the proposed project is Doon Valley.The tree observed in the area are Aam (Magifera Indica), Jamun(*Syzygium cumini),* Peepal *(Felis reliosa),* Neem*(Azarichta Indica),* Bargad*(Ficus Bangalensis)* Popular (*Populas deltoids)* Sisham*(Dalbergia sissoo*) etc

Small mammals like Indian palm squirrel (*Funambulus palmarum*) and field mouse (*Apodemus sylvaticus*) are noticed in vicinity of village. Inquiry from village people regarding wild animals reveals that Rhesus macaque (*Macaca mulatta*), Indian hare (*Lepus nigricollis*), fruits bat (*Pteropus conspicillatus*), Nilgai (*Boselaphus tragocamelus*), etc. are often seen in the area.

10.6.7 SOCIO-ECONOMIC ENVIRONMENT

The Proposed Sand, Bajri And Boulder (Minor Minerals) mining in Kot mot River bed (60.00 Ha.) project covers 80 major villages of Dehradun District in the state of Uttarakhand. A study was under taken with respect to demography, occupational pattern, literacy rate and other important socio-economic indicators of these districts to reveal the socio-economic structure of the entire project area. The total population of study area is **502658** the percentages of male & female population are **52.38%** & **47.61%** respectively. The total number of literate within the study area is **336349** which are **66.91%** of total population. Male literacy rate of the study area is **56.86%** and female literacy rate is **43.14%.**peoples of that area are engaged with agriculture and other allied activities for their livelihood.

10.7 ANTICIPATED IMPACT & MITIGATION MEASURES

10.7.1 LAND ENVIRONMENT

Since mining is being carried out by opencast manual method, it is expected to affect the land environment essentially. Impact assessment study on land environment can be done by considering land use pattern/ land cover, topography, drainage pattern and geological features of the mine site as well as the study area.

Anticipated Impact

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

Mitigation Measures

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

10.7.2 WATER ENVIRONMENT

Anticipated Impact

- River recharges the groundwater; excessive mining will reduce the thickness of the natural filter materials (sediments), through which the ground water is recharged.
- Mining activity may intersect groundwater level.
- Waste water generated from the mining activity will cause water pollution.

Mitigation Measures

- Restriction in excavation depth will be made compulsory to avoid reduction in the thickness of the natural filter materials
- 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.
- No waste water will be generated from the mining activity of minor minerals as the project only involves extraction of Sand, Bajri & boulders from river bed.

10.7.3 AIR ENVIRONMENT

Anticipated Impact

- Mining Operation carried out by opencast manual method generate dust particles due to loading & unloading of sand/bajri/boulder and during transportation.
- The dust liberated in mining and other related operations is injurious to heath if inhaled in sufficient quantity.
- Gases, such as, Sulphur Dioxide, Oxides of Nitrogen etc. from vehicular exhaust.

Mitigation Measures

- Proper mitigation measures like water sprinkling will be adopted to control dust emissions.
- Masks will be provided to workers.
- To control the emissions regular preventive maintenance of equipment will be carried out on contractual basis.

10.7.4 NOISE ENVIRONMENT

Anticipated Impact

- The source of Noise pollution will be the vehicular movements.
- Noise will be generated by the digging of mine area using shovels, crowbars etc.

Mitigation Measures

- Proper maintenance of all transportation vehicles will be carried out which help in reducing noise during operations. No other equipments except the transportation vehicles will be allowed.
- Noise generated by hand equipments shall be intermittent and does not cause much adverse impact.

10.7.5 BIOLOGICAL ENVIRONMENT

Anticipated Impact

Flora

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

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

Fauna

Animals are sensitive to noise and avoid human territory. The project stretch of the river is not an identified drinking water point for the animals. However, any animal desirous of accessing the river can continue to do so upstream or downstream of the stretch during the mining activities, as there will not be any damming or diverting of water.

Hence, no significant impact is anticipated from the proposed project.

Mitigation Measures

Flora

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

Fauna

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

10.7.6 SOCIO-ECONOMIC ENVIRONMENT

The Socio–Economic Impact Assessment is the systematic analysis used during EIA to identify and evaluate the potential socio-economic and cultural impacts of a proposed development on the lives and circumstances of people, their families and their communities. It can identify and distinguish numerous measurable impacts of a proposed development but not every impact may be significant. The populations who are impacted either directly or indirectly have a say whether the impacts are significant or not.

Anticipated Impact

- From the primary Socio-economic survey & through secondary data available from established literature and census data 2001 & 2011, it is found that there would be positive impact on Socio-economic condition of the nearby area.
- As the project is proposed Government forest land, no Resettlement & Rehabilitation is required.
- Increased funding to improve social infrastructure and cultural maintenance programs. Since the surrounding study area is an undeveloped area, the overall Socio-economic status of the local population is below average. People are mostly engaged in farming activities and primarily involve in various social activities.
- There are some people who are engaged in trading of sand, stone and bajri, therefore

due to mining of sand, stone and bajri the per capita income of local people have been improved.

- The area is poor in the health care facilities. The project authorities would provide mobile vans for emergency services in the area.
- Various direct and indirect employment opportunities will be generated.

Mitigation Measures

- Increased funding to improve social infrastructure and cultural maintenance programs.
- It is suggested that during mining all safety provision has to be ensured to negate any likely impact on social environment due to associated hazards.
- A better standard of living due to increased access to employment, business opportunities training and education.

10.7.7 SOLID WASTE

Anticipated Impact

- This RBM project does involve negligible quantity of waste generation in form of slit/silty clay which gets deposited as crust material on the bed profile and is extracted during mining process.
- No municipal waste other than domestic sewage shall be generated,
- However, there will be about 600 workers on site. While cooking at site will not be allowed, some food wastes can be expected to be generated which if not disposed properly will render the site dirty.

Mitigation Measures

- Silt/Silt clay generated during mining process will be either back-filled into mine pits/in the upper terraces or can be used for plantation purpose.
- Domestic sewage shall be disposed into septic tank followed by soak pits.

- However, solid wastes generated from the personal habits of people such as used bidis, waste paper, food remains etc. cannot be ruled out. Dustbins shall be provided at the rest places.

10.7.8 TRAFFIC ENVIRONMENT

Anticipated Impact

- Increase in traffic density will lead to air pollution.
- Movement of vehicles will cause noise pollution.
- Increased traffic may cause accidental incidences.

Mitigation Measures

- Vehicles with PUC Certificate will be hired. Regular maintenance of vehicles will be done to ensure smooth running of vehicle.
- Un- necessary blowing of horn will be avoided.
- To avoid accidents the speed of vehicles will be low near habitation areas.

10.8 ENVIRONMENTAL MONITORING

Details of the proposed environmental monitoring schedule, which will be undertaken for various environmental components, are detailed below in **Table 6**:

Table 6: Proposed Environmental Monitoring Programme

S. N.	Activity	Schedule
Air Pollution Monitoring		
1.	Ambient air monitoring of parameters specified by CPCB in their air consents from time to time within the mining lease	Once in every season except monsoon
2.	Ambient air monitoring of parameters specified by CPCB in their air consents from time to time at stations outside the mining lease	Once in every season except monsoon

Water Quality Monitoring		
3.	Monitoring of Ground Water sample as per IS: 10500	Once in every season
4.	Monitoring of Surface Water sample as per IS: 2296	Once in every season
Noise Quality Monitoring		
5.	Noise in the ambient atmosphere near the mine lease area	Once in every season
Greenbelt Maintenance		
6.	Monitor schedule for Greenbelt development as per approved mining plan	Once in a year
Soil Quality Monitoring		
7.	Soil quality analysis from the samples collected from the mine site and nearby areas	Twice in a year on the basis of 6 months interval

10.9 ENVIRONMENTAL MANAGEMENT

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

In order to minimize impacts of mining on different environmental parameters and to keep air and water quality within prescribed limits of CPCB, an EMP has been prepared which is to be implemented in the project and covers the following phases of the project:

- Air Pollution
- Water Pollution

- Noise Pollution
- Biological reclamation measures
- Land use planning and mine closure
- Occupational Safety and Health
- Socio-economic and cultural environment
- EMP Budget

10.10 CONCLUSION

The project has positive impact to the local people as direct and indirect employment opportunity have been generated. There will be no significant pollution of air, water, soil and noise. Regular monitoring of all the components of environment will be done. Increased social welfare measures taken by the company. All possible environment aspects have been adequately assessed and necessary control measures have been formulated to meet statutory requirement