

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT
AND
ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

**FOR
KHULDAUDI SOAPSTONE MINING PROJECT
LOCATED AT
VILLAGE: KHULDAUDI,
TEHSIL & DISTRICT: BAGESHWAR, STATE: UTTARAKHAND
LEASE AREA: 3.834 Hectare.**



PREPARED AND SUBMITTED BY:

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PROJECT PROPONENT DETAILS:

**SMT. NIRMALA DEVI
W/O SHRI NARENDRA SINGH
R/O-VILLAGE-SHISHAKANI,
TEHSIL & DISTT-BAGESHWAR (U.K).**

कार्यालय राज्य स्तर पर्यावरण समाघात निर्धारण प्राधिकरण (SEIAA) व

राज्य विशेषज्ञ अंकन समिति (SEAC), उत्तराखण्ड।

653, इन्दिरा नगर कालोनी, सीमाद्वार रोड, देहरादून-248006 ।

पत्र संख्या-259/SEAC

दिनांक- 11 नवम्बर, 2021

To,

Smt. Nirmala Devi W/o Shri Narendra Singh,
R/o- Village - Shishakani, Tehsil & Distt- Bageshwar.

Sub- Regarding Environmental Clearance for Proposed Extraction of Soapstone at Village- Khuldaudi,
Tehsil & District- Bageshwar. (Area- 3.834 Ha.).

Dear Sir/Madam,

Kindly take reference of your submitted vide proposal no SIA/UK/MIN/68750/2021 on dated 26th October, 2021 regarding above proposal. The SEAC in its meeting dated 8th November, 2021 examined the proposal submitted by you. After through discussion and deliberation, it has been conveyed that SEAC desires Rapid EIA report of this proposal after due public consultation conducted by Uttarakhand Environment Protection and Pollution Control Board. The terms of reference (TOR) for the EIA report is being out lined below:-

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

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee. The above reports should also match with the latest District Survey Report (DSR) notification no- 2827 dated 25th July, 2018. **Data obtained from this DSR should be incorporated in the EIA Report for Impact Identification, Interpretation, Prediction, Carrying Capacity and Mitigation.**
- 4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
- 5) Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
- 6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
- 7) It should be clearly stated whether the proponent Company has a well laid down Environment. Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.
- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
- 9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
- 10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features

- should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
 - 12) A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
 - 13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
 - 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
 - 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
 - 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
 - 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
 - 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled- I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
 - 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.
 - 20) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements; and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.
 - 21) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.
 - 22) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
 - 23) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
 - 24) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

- 25) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
- 26) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
- 27) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
- 28) Details of any stream, seasonal or otherwise, passing through the lease area and modification/diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
- 29) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
- 30) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
- 31) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
- 32) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 33) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 34) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
- 35) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- 36) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
- 37) Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
- 38) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
- 39) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 40) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 41) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
- 42) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 43) **Besides the above, the below mentioned general points are also to be followed:-**
 - a) Executive Summary of the EIA/EMP Report
 - b) All documents to be properly referenced with index and continuous page numbering.
 - c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
 - d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
 - e) Where the documents provided are in a language other than English, an English translation should be provided.

- f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
- g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
- h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
- i) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
- j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

Note: 1) The study area shall comprise of radial distance of 10 KM from the project site and the study period is three months. The impact on each of the above parameter as a result of mining shall be assessed through appropriate modeling and prediction methods considering base line data.

2) District Survey Report should be submitted as per the latest notification no- 2827 dated- 25-7-2018

Hence you are kindly requested to kindly submit EIA report for further necessary action.

(Rajiv Dhiman)
Member Secretary,
SEAC, Uttarakhand

Copy to:- Member Secretary, Gaura Devi Paryavaran Bhavan Environment Protection and Pollution Control Board, IT, Park Dehradun for necessary action.

(Rajiv Dhiman)
Member Secretary,
SEAC, Uttarakhand

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CHAPTER-1

INTRODUCTION

1.1 PURPOSE OF THEREPORT

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, Uttarakhand, under EIA Notification of the MoEF dated 19-8-2006, and its subsequent amendments and EIA Guidance Manual for Mining of Minerals of MoEF, Govt. of India, for seeking environmental clearance for mining of soapstone in the applied mining lease area measuring 3.834 Ha. The proposed project falls under Category “B1” as per NGT order dated 13.09.2018 & OM dated 12th December 2018 by MOEF & CC which states that all 5-25 Ha projects falling under B-2 category will be considered as B1 & will be appraised by SEAC/SEIAA.

1.2 IDENTIFICATION OF PROJECT & PROJECTPROPONENT

The proposed project is for soapstone mining which covers an area of 3.834 Ha.near Village: Khuldaudi,Tehsil & District: Bageshwar, State: Uttarakhand, Uttarakhand. LOI has been granted in favor of Smt Nirmala Devi for 50 yrs

The applications for prior Environmental Clearance (Form-1, PFR) for the proposed project was submitted online vide Proposal no. **SIA/UK/MIN/68750/2021** on **26th Oct, 2021** was considered by the SEAC (Uttarakhand) in its meeting dated **8th Nov, 2021** for determination of the Terms of Reference (ToR) for preparation of the Environmental Impact Assessment (EIA) report. The Committee has issued Terms of Reference (ToR) for preparation of the EIA report and Environmental Management Plan vide letter No. **259/SEAC dated 11.11.2021** attached as Annexure- I

Soapstone finds its uses in all aspects of life and commercial business. Soapstone has wide applications across various industries. Some uses for soapstone or talc are paper, textile, cosmetics, paint, ceramics, detergents, animal feed, insecticide, plastics and various drying powder. Soapstone, also known as Talc or Talcum Powder, is a mineral that is naturally found in nature. The chemical name for Talc or Talcum Powder is hydrated magnesium silicate. The region Uttarakhand accounts for 29% of India's soapstone production.

1.2.1 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.	Parameters	Description
1.	Name of the Project	Khuldaudi Soapstone Mining project
2.	Location of the Project	Area: 3.834 Ha, Village: Khuldaudi, Tehsil & District: Bageshwar, State: Uttarakhand
3.	Project Proponent	Smt Nirmala Devi
4.	Lease period validity	50years/specific year will be calculated w.e.f grant of lease deed.
5.	Lease Details	It is fresh grant case of mining lease. State Govt. has given its consent to grant mining lease for a period of 50 years.
6.	Location of the Project	
	Village	Khuldaudi,
	Tehsil	Bageshwar

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

CHAPTER – 1

INTRODUCTION

	District	Bageshwar		
	State	Uttarakhand		
7.	Total Lease Area	3.834 Ha		
8.	Category of the Project	“B1”		
9.	Capacity of the Project	8008 TPA upto 10721 TPA (1st to 5th Year) Maximum Production: 10721 TPA (end of 5 th Year)		
10.	Topography	The highest level of lease hold is 1430.20mRL towards eastern side & while lowest level is 1238.10mRL towards north west.		
11.	Lease Area Coordinate			
		Pillar No	N	E
		1.	29°52'22.33"N	79°47'59.78"E
		2.	29°52'22.43"N	79°48'3.51"E
		3.	29°52'21.31"N	79°48'3.06"E
		4.	29°52'18.31"N	79°48'6.27"E
		5.	29°52'16.57"N	79°48'6.59"E
		6.	29°52'17.42"N	79°48'4.72"E
		7.	29°52'15.74"N	79°48'4.70"E
		8.	29°52'13.18"N	79°48'8.19"E
		9.	29°52'13.95"N	79°48'9.56"E
		10.	29°52'13.39"N	79°48'10.65"E
		11.	79°48'10.78"E	79°48'10.78"E
		12.	29°52'12.17"N	79°48'7.61"E
		13.	29°52'9.72"N	79°48'7.36"E
		14.	29°52'10.76"N	79°48'2.81"E
		15.	29°52'9.80"N	79°48'3.50"E
		16.	29°52'9.51"N	79°48'3.17"E
		17.	29°52'9.80"N	79°48'0.90"E
		18.	29°52'12.02"N	79°48'0.22"E
		19.	29°52'12.18"N	79°47'58.45"E
		20.	29°52'13.80"N	79°47'59.40"E
		21.	29°52'12.92"N	79°48'2.24"E
		22.	29°52'11.42"N	79°48'2.48"E

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

CHAPTER – 1

INTRODUCTION

		23.	29°52'10.95"N	79°48'6.09"E
		24.	29°52'13.33"N	79°48'6.66"E
		25.	29°52'15.60"N	79°48'3.68"E
		26.	29°52'18.53"N	79°48'3.70"E
		27.	29°52'18.62"N	79°48'3.25"E
		28.	79°48'2.90"E	79°48'2.90"E
		29.	29°52'19.05"N	79°48'0.05"E
12.	Land Type	Agriculture land, waste land, State Govt. Land & Public Utility Land		
13.	Method of Mining	Opencast, Mechanized Method		
14.	Operational days/ Year	240 Days		
15.	Total Water Requirement	7.85 KLD of water will be used for the project site (Drinking use, Sprinkling & Plantation)		
16.	Source of Water	Potable tankers		
17.	Man power requirement	30 persons		
18.	Nearest railway Station/ Airport along with distance in Kms	Kathgodam, 71.22 Km, SW Airport: Naini Saini Airport, Pithoragarh, 46.48 km, SE		
19.	Nearest Town, City, District Head Quarters along with distance in Kms	Nearest Town/District: Bageshwar, 8.0 km, W		
20.	Ecological sensitive areas (Wild life Sanctuaries, National Parks, Biosphere Reserves, etc.)	Not Available		
21.	Historical Places	None		
22.	Financial & Social benefit	This Project will provide employment to local people directly and indirectly, which will improve their socio- economic status.		
23.	Proposed Project Cost	Rs. 64.213 Lakhs		
24.	Proposed CER Cost	Rs. 3.21 Lakhs		
25.	EMP Expenditure	Rs. 11.22 Lakhs		

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

CHAPTER – 1

INTRODUCTION

LOCATION MAP

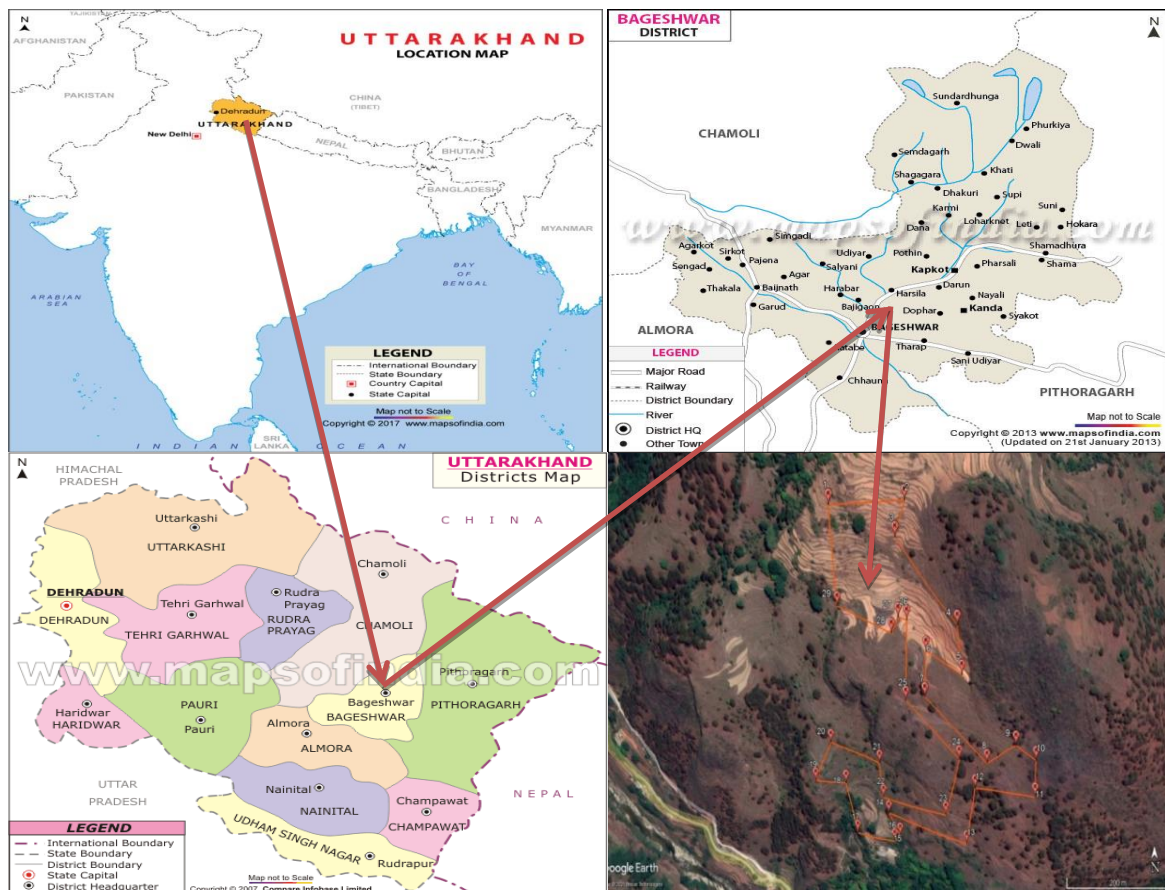


Figure: 1.1- Project Location



Figure: 1.2 – 500m Map of Study Area

1.3 STATUS OF REGULATORY CLEARANCES OF THE PROJECT

There is no National Park, Wildlife Sanctuary & National Monument, within core zone or 10 km radius of the ML area.

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

1.4 SCOPE OF THE STUDY

The applications for prior Environmental Clearance (Form-1, PFR) for the proposed project was submitted online vide Proposal no. **SIA/UK/MIN/68750/2021** on **26th Oct, 2021** was considered by the SEAC (Uttarakhand) in its meeting dated **8th Nov, 2021** for determination of the Terms of Reference (ToR) for preparation of the Environmental Impact Assessment (EIA) report. The Committee has issued Terms of Reference (ToR) for preparation of the EIA report and Environmental Management Plan vide letter No. **259/SEAC dated 11.11.2021** attached as Annexure- I

1.5 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.

The points have been raised by the SEAC, in the TOR and the EIA cover the below points:

S.No.	TOR Points	Reply
1.	Year wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t the highest production achieved prior to 1994.	Not applicable as it's a fresh lease.
2.	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	LOI has been granted in favour of Smt Nirmala Devi for a period of 50 years. attached as Annexure II.
3.	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee. The above reports should also match with the latest District Survey Report (DSR) notification no.- 2827 dated 25 th July, 2018. Data obtained from this DSR, should be incorporated in the EIA report for impact identification, interpretation, prediction,	The mine lease area, production levels, waste generation and its managements, mining technologies is compatible in all documents i.e Mine Plan & LOI Attached

	Carrying Capacity and Mitigation .	
4.	All corners coordinates of the mine lease area, superimposed on High Resolution Imagery/toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All corner coordinates map of the mine lease area given in Chapter-1,2& 3
5.	Information should be provided in Survey of India Toposheet in 1:50000 scale indicating geological map of the area, geomorphology of the land forms of the area, existing mineral and mining history of the area, important water bodies, streams and rivers and soil characteristics.	Details given in Chapter-3
6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the state; land diversion for mining should have approval from state land use board or the concerned authority.	The land proposed for mining conforms the Land Policy of state State Govt. has given its consent to grant mining for a period of 50 years. The letter of Intent is enclosed
7.	It should be clearly	Detail given in chapter-6&8

	stated whether the proponent company has a well laid down environment. Policy approved by its Board of Directors? If So, it may be spelt out in the EIA Report with description of the prescribed operating process/ procedure to bring into focus any infringement/deviation /violation of environment norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in EIA Report.	
8.	Issues relating to Mine Safety, including subsidence study in case of underground mining and slop study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	Details given Chapter-2,8
9.	The study area will comprise of 10 Km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of mine/ lease period.	The 10 km zone from periphery of the lease has been considered as the study area. The Buffer map of the study area is attached with report in chapter-1 All the details in the EIA report are for the life of the mine period
10.	Land use of the study area delineating forest area, agricultural land,	Details given in chapter-3.

	grazing land, Wildlife Sanctuary, National Park, migratory routes of fauna, water bodies, human settlements and the other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any of change of land use should be given.	
11.	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R &R issues, if any, should be given.	Details given in Chapter-2,3&4.
12.	A certificate from Competent Authority in State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this	No Forest Area involved within Project site. The entire lease Area land details is summarized below: Total land is acquired 3.834 Ha.

	regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.							
13.	Status of forest clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	No Forest Area involved within Project site.						
14.	Implementation status of recognition of Forest rights under Schedule Tribes and other Traditional Forest Dweller (Recognition of Forest Rights) Act, 2006 should be indicated.	Detail given in Chapter-3.						
15.	The vegetation in the RF/PF areas in the study area, with necessary details, should be given.	Detail given in Chapter-3.						
16.	A study shall be got done to ascertain the impact of the Mining project on wildlife of the study area and details furnished. Impact of the project on wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures	<div>The area is rich in ecology and apt for places of ecological research studies. Nearest ecological sensitive areas are listed in the table below:<table><tr><td>Ecological Sensitive Area</td><td>Distance & Direction</td></tr><tr><td colspan="2">Protected Area</td></tr><tr><td>Binsar WLS</td><td>18.5km (South West Direction)</td></tr></table></div> <div>However impacts and mitigation on wildlife present within the study area has been detailed in the report.</div>	Ecological Sensitive Area	Distance & Direction	Protected Area		Binsar WLS	18.5km (South West Direction)
Ecological Sensitive Area	Distance & Direction							
Protected Area								
Binsar WLS	18.5km (South West Direction)							

	required, should be worked out with cost implications and submitted.	
17.	Location of National Parks, Sanctuaries, Biosphere Reserve, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 Km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such project due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the standing committee of National Board of Wildlife and copy furnished .	There is no area which is protected under EPA, 1986 within study area.
18.	A detailed biological study of the study area (core zone and buffer zone [(10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered endemic and RET Species duly authenticated, separately for the core and buffer zone should be furnished	Detail given in Chapter-3.

	based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area , the necessary plan along with budgetary provision for their conservation should be prepared in consultation with state Forest and Wildlife Department and details furnished . Necessary allocation of funds for implementing the same should be made as part of the project cost.	
19.	Proximity to Areas declared as ‘Critically polluted’ or the project areas likely to come under the ‘AravaliRange’ (attracting court restriction for mining operations), should also be indicated and where so required, clearance certification from the prescribed Authorities, such as the SPCB or state Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	Not Applicable
20.	R&R plan/compensation details for the project Affected people (PAP) should be furnished. While preparing the	Not Applicable

	<p>R&R plan, the relevant State/National Rehabilitation & Resettlement policy should be kept in view. In respect of SCs/ STs and other weaker section of the society in the study area, a need based sample survey , family-wise , should be undertaken to assess their requirement, and action programmers prepared and submitted accordingly, integrating the sectoral programmers of line department of the State Government. It may be clearly brought out whether the villages located in the mine lease area will be shifted or not. The issues relating of villages including their R&R and socio-economic aspects should be discussed in the report.</p>	
21.	<p>One season (non-monsoon) [i.e. March-May(Summer Season); October- December (post monsoon season); December- February (winter season)] baseline data on ambient air quality as per CPCB Notification of 2009, water quality , noise level, soil and flora and fauna shall be collected and the AAQ and other</p>	Detail given in Chapter-3.

	<p>data so complied presented date- wise in the EIA and EMP report . Site - specific metrological data should also be collected. The location of the monitoring stations should be such as represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM 10, particularly for free silica, should be given.</p>	
22.	<p>Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should be also take into account the impact of movement of vehicles for transportation of minerals. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive</p>	<p>Applicable details are provided in chapter-3 & 4. There is no point source of Air Pollution as boiler/ DG Sets. The fugitive emission has such will be minimal yet impact of vehicle movement is very minimal.</p>

	receptors, if any and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	
23.	The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.	The water requirement for the project is 7.85 KLD for drinking, dust suppression and green belt development. Details are given Chapter 2 . It is proposed to obtain water for drinking and operations from private water tankers.
24.	Necessary clearance from the Competent Authority for drawl of requisite quality of water for the project should be provided.	Water requirement will be fulfilled by private water tanker. So, no clearance is required.
25.	Description of water conservation measures proposed to be adopted in the project should be given. Details of rainwater harvesting proposed in the project, if any should be provided.	Detail given in chapter-4
26.	Impact of the project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	Detail given in chapter-4
27.	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and	Water table in hills is usually very deep and does not have any relevance with mining activities. Due to mining activity the working will not intersect the groundwater table. Mining will be restricted to above ground water table.

	documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological study should be undertaken and Report furnished. The report inter-alia shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	
28.	Details of any stream, seasonal or otherwise, passing through the lease area and modification/diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	Not Applicable.
29.	Information on site elevation, working depth, groundwater table etc. should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	The highest level of lease hold is 1430.20mRL towards eastern side & while lowest level is 1238.10mRL towards north west. Mine plan attached as Annexure-V
30.	A time bound progressive Greenbelt Development plan shall be prepared in a tabular form (indicating the	Detail given in chapter-4&8

	linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind; the same will have to be executed up front on commencement of the project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	
31.	Impact on local transport infrastructures due to the project should be indicated, projected increase in truck traffic as a result of the project in the present road network (including those outside the project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if	From the traffic analysis it can be seen that the V/C ratio is likely to be changed to 0.21 and 0.33 with LOS being “A” which is “Excellent” to B” which is “Very Good” respectively as per classification. So the additional load on the carrying capacity of the concerned roads is not likely to have any significant adverse effect. Impact on local transport infrastructure due to the project is detailed in Section 3.10 of Chapter-3.

	contemplated (including action to be taken by other agencies such as State Government) should be covered. Project proponent shall conduct impact of transportation study as per Indian Road Congress Guidelines.	
32.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA report.	Detail given in chapter-2
33.	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of section) should be given in the EIA report.	Detail given in chapter-2
34.	Occupational Health impacts of the project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Detail given in chapter-8
35.	Public health	Public health implications of the project, remedial measures&

	implications of the project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	budget allocated are detailed in chapter-8
36.	Measures of socio economics significance and influence to the local community proposed to be provided by the project proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	Measures of socio-economic influence to the local community have been furnished and described in Chapter 3 .
37.	Detailed environmental management plan (EMP) to mitigate the environment impact which, should inter-alia include the impact of change of land use, loss of agricultural and grazing land, if any, occupational health impact besides other impacts specifics to the proposed project.	Environmental Management Plan have been covered in Chapter-6 &Chapter-8 .
38.	Public hearing points raised and commitment of the project proponent on the same along with time bound Action plan with budgetary provisions to implement the same should be	Public hearing detail will be given in Final EIA Report. .

	provided and also incorporated in the final EIA/EMP Report of the project.	
39.	Details of litigation pending against the project, if any with direction /order passed by any Court of Law against the project should be given.	No Litigation Pending.
40.	The cost of project (capital cost and recurring cost) as well as the cost towards implementations of EMP should be clearly spelt out.	Total cost of the project is 64.0 Lakhs lakhs and of EMP is estimated 11.225 Lakhs. Details are given in Chapter-10 .
41.	A Disaster management plan shall be prepared and included in the EIA/EMP Report.	Detail given in chapter-7
42.	Benefits of the project if the project is implemented should be spelt out. The benefits of the project shall clearly indicates environmental, social, economic, employment potential, etc.	Detail given in chapter- 9.
43.	Besides the above , the blow mentioned general points are also to be followed:- a) Executive Summary of the EIA/EMP Report b) All documents to be properly referenced with index and continuous page numbering. c) Where data are	Compiled Compiled

	presented in the Report especially in tables, the period in which the data were collected and the sources should be indicated.	Compiled
d)	Project proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MOEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the project.	Compiled
e)	Where the documents provided are in a language other than English, as English translation should be provided.	Compiled
f)	The Questionnaire for environment appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Compiled
g)	While preparing the EIA report, the instructions for the proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-	Compiled With EIA report

CHAPTER – 1

INTRODUCTION

<p>11013/41/2006 - IA.II (I) dated 4th August, 2009, which are available on the websites of this Ministry, should be followed.</p> <p>h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post public hearing changes in structure and content of the draft EIA/ EMP (other than modification arising out of the P.H. process) will entail conducting the PH again with the revised documentation.</p> <p>i) As per the circular no. J- 11011/618/2010-IA. II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the</p>	<p>No changes done in report</p> <p>This is new case for Mining. No certified compliance report is required.</p>
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	<p>existing operations of the project, should be obtained from Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.</p> <p>j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.</p>	Complied
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CHAPTER – 2

PROJECT DESCRIPTION

2.1 TYPE OF PROJECT

The project is proposed for the excavation of soapstone from the hill slope. It is an opencast mining project where the entire activity will be done by semi mechanized method.

2.2 NEED FOR THE PROJECT

The project site lies on hill slope which is agricultural land. With the rapidly increasing demand of Soapstone raw materials, The Industry's demand for fine powder is continuously prompting technological advancements to meet this purpose. The pulverizers/hammer mills developed and manufactured in India are capable of producing up to 700 mesh powder. The world market prefers fine powder which can be produced by adopting new processing techniques like micronising and sterilization of the product. Talc, in pulverized form, is mostly used as filler in paper, textile, rubber, insecticides and fertilizer industries. Pure talc after calcining, called 'Lava' is used in the manufacture of low-loss ceramic materials essential for radio, radar television, etc. In roofing products, such as, tar paper, asphalt shingles and roll roofing, talc acts as a fire retardant and increases weather resistance. Body and face powders (talcum powder) are prepared from the finest quality talc after adding deodorant and perfumes.

Talc is used mostly in pulverized form as a filler and extender in various industries. The non-pulverized talc is used in refractory, etc. Total reported consumption of talc/steatite/ soapstone in the organized sector was at 368 thousand tonnes in 2012-13. About 56% consumption in 2012-13, was in Paper Industry, followed by Paint (20%), Pesticide (11%), Ceramic (8%) and Cosmetic (4%) industries. Nominal consumption was shared by Fertilizer, Rubber, Textile, Chemicals and other industries.

The demand in the domestic market is high for Soapstone. The Industry's demand for fine powder is continuously prompting technological advancements to meet this purpose. Mineral is available in abundant quantity in area and can be extracted indigenously.

The proposed mining activity is for indigenous consumption only for Pharmaceutical Industry, Cosmetic Industry, Textile, Ceramic, Paint, Rubber, Plastic, Detergent etc.

2.3 LOCATION DETAILS

Project location & surroundings of the project are described in the Table No. 2.1 given below:

S. No.	Parameters	Description									
1.	Name of the Project	Khuldaudi Soapstone Mining project									
2.	Location of the Project	Area: 3.834 Ha, Village: Khuldaudi, Tehsil & District: Bageshwar, State: Uttarakhand									
3.	Project Proponent	Smt Nirmala Devi									
4.	Lease period validity	50years/specific year will be calculated w.e.f grant of lease deed.									
5.	Lease Details	It is fresh grant case of mining lease. State Govt. has given its consent to grant mining lease for a period of 50 years.									
6.	Location of the Project										
	Village	Khuldaudi,									
	Tehsil	Bageshwar									
	District	Bageshwar									
	State	Uttarakhand									
7.	Total Lease Area	3.834 Ha									
8.	Category of the Project	“B1”									
9.	Capacity of the Project	8008 TPA upto 10721 TPA (1st to 5th Year) Maximum Production: 10721 TPA (end of 5 th Year)									
10.	Topography	The highest level of lease hold is 1430.20mRL towards eastern side & while lowest level is 1238.10mRL towards north west.									
11.	Lease Area Coordinate										
		<table><tr><td>Pillar No</td><td>N</td><td>E</td></tr><tr><td>1.</td><td>29°52'22.33"N</td><td>79°47'59.78"E</td></tr><tr><td>2.</td><td>29°52'22.43"N</td><td>79°48'3.51"E</td></tr></table>	Pillar No	N	E	1.	29°52'22.33"N	79°47'59.78"E	2.	29°52'22.43"N	79°48'3.51"E
		Pillar No	N	E							
1.	29°52'22.33"N	79°47'59.78"E									
2.	29°52'22.43"N	79°48'3.51"E									

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

CHAPTER – 2

PROJECT DESCRIPTION

		3.	29°52'21.31"N	79°48'3.06"E
		4.	29°52'18.31"N	79°48'6.27"E
		5.	29°52'16.57"N	79°48'6.59"E
		6.	29°52'17.42"N	79°48'4.72"E
		7.	29°52'15.74"N	79°48'4.70"E
		8.	29°52'13.18"N	79°48'8.19"E
		9.	29°52'13.95"N	79°48'9.56"E
		10.	29°52'13.39"N	79°48'10.65"E
		11.	79°48'10.78"E	79°48'10.78"E
		12.	29°52'12.17"N	79°48'7.61"E
		13.	29°52'9.72"N	79°48'7.36"E
		14.	29°52'10.76"N	79°48'2.81"E
		15.	29°52'9.80"N	79°48'3.50"E
		16.	29°52'9.51"N	79°48'3.17"E
		17.	29°52'9.80"N	79°48'0.90"E
		18.	29°52'12.02"N	79°48'0.22"E
		19.	29°52'12.18"N	79°47'58.45"E
		20.	29°52'13.80"N	79°47'59.40"E
		21.	29°52'12.92"N	79°48'2.24"E
		22.	29°52'11.42"N	79°48'2.48"E
		23.	29°52'10.95"N	79°48'6.09"E
		24.	29°52'13.33"N	79°48'6.66"E
		25.	29°52'15.60"N	79°48'3.68"E
		26.	29°52'18.53"N	79°48'3.70"E
		27.	29°52'18.62"N	79°48'3.25"E
		28.	79°48'2.90"E	79°48'2.90"E
		29.	29°52'19.05"N	79°48'0.05"E
12.	Land Type	Agriculture land, waste land, State Govt. Land & Public Utility Land		
13.	Method of Mining	Opencast, Mechanized Method		
14.	Operational days/ Year	240 Days		
15.	Total Water Requirement	7.85 KLD of water will be used for the project site (Drinking use, Sprinkling & Plantation)		
16.	Source of Water	Potable tankers		
17.	Man power requirement	30 persons		

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

CHAPTER – 2

PROJECT DESCRIPTION

18.	Nearest railway Station/ Airport along with distance in Kms	Kathgodam, 71.22 Km, SW Airport: Naini Saini Airport, Pithoragarh, 46.48 km, SE
19.	Nearest Town, City, District Head Quarters along with distance in Kms	Nearest Town/District: Bageshwar, 8.0 km, W
20.	Ecological sensitive areas (Wild life Sanctuaries, National Parks, Biosphere Reserves, etc.)	Not Available
21.	Historical Places	None
22.	Financial & Social benefit	This Project will provide employment to local people directly and indirectly, which will improve their socio- economic status.
23.	Proposed Project Cost	Rs. 64.213 Lakhs
24.	Proposed CER Cost	Rs. 3.21 Lakhs
25.	EMP Expenditure	Rs. 11.22 Lakhs

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

CHAPTER – 2

PROJECT DESCRIPTION

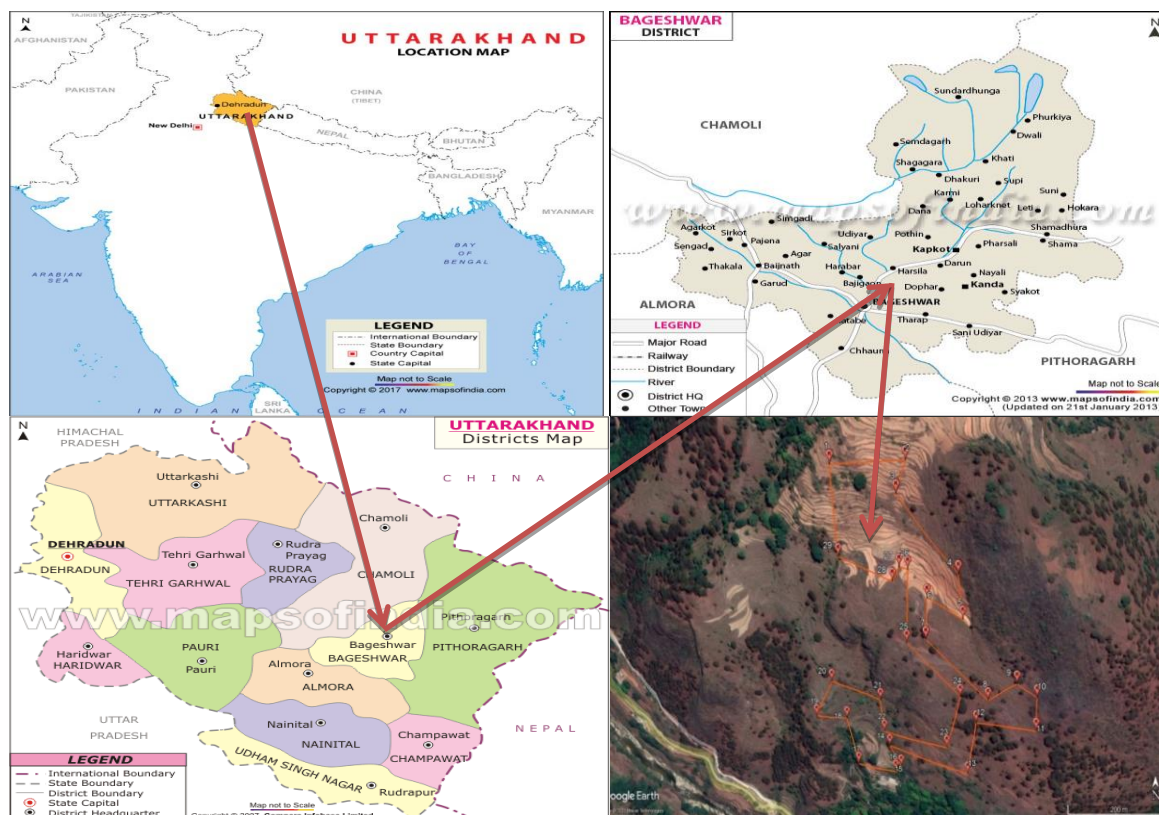


Figure: 2.1- Project Location

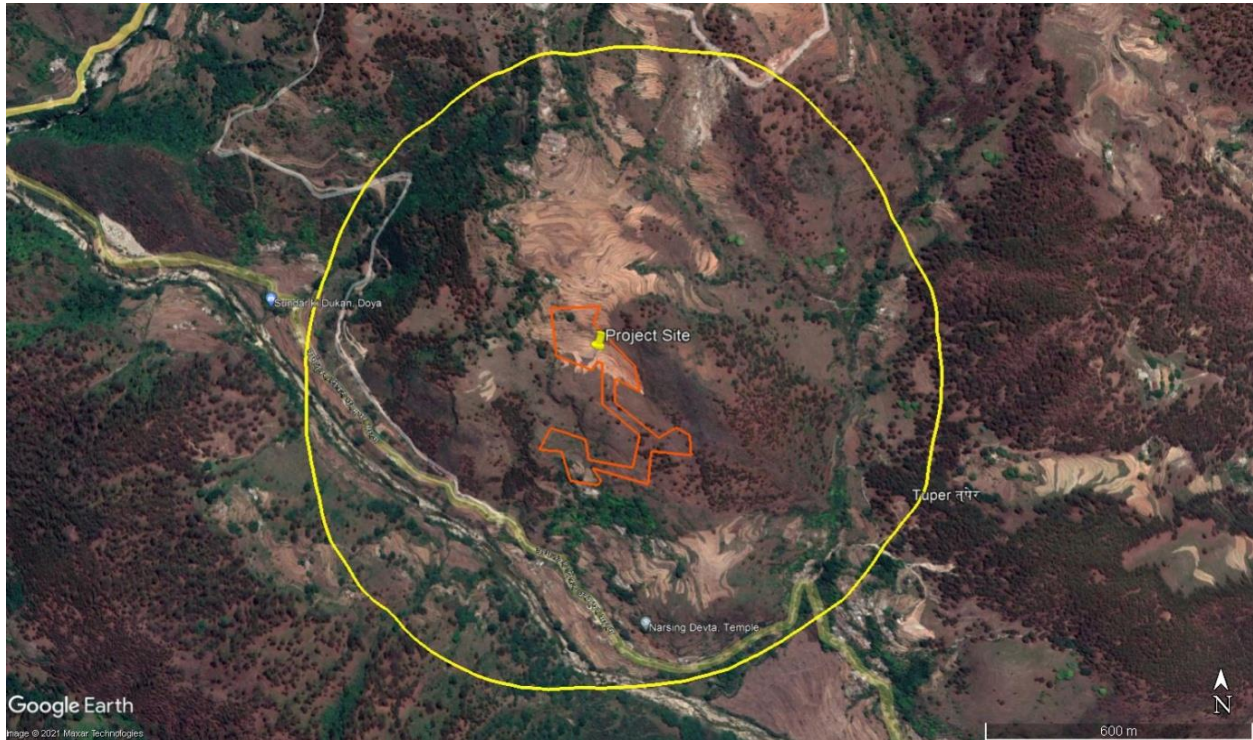


Figure-2.2 500m Map of Study area

2.4 TOPOGRAPHY & GEOLOGY

Topography

The lease area comprises of terraced agricultural field showing undulating topography. Slope of the area varies from low to moderate & general slope of the area is towards north west & south west. The highest level of lease hold is 1430.20mRL towards eastern side & while lowest level is 1238.10mRL towards northwest near pillar no. 9. Seasonal drainage exists within the area & flows by & large east to west direction & confluence & other drainage exists outside the area which flows east to west & south to north direction. One seasonal drainage exists towards western flank of lease area & it is outside the area & flows north to south direction & meet the river Pungar which is the main catchment of the area.

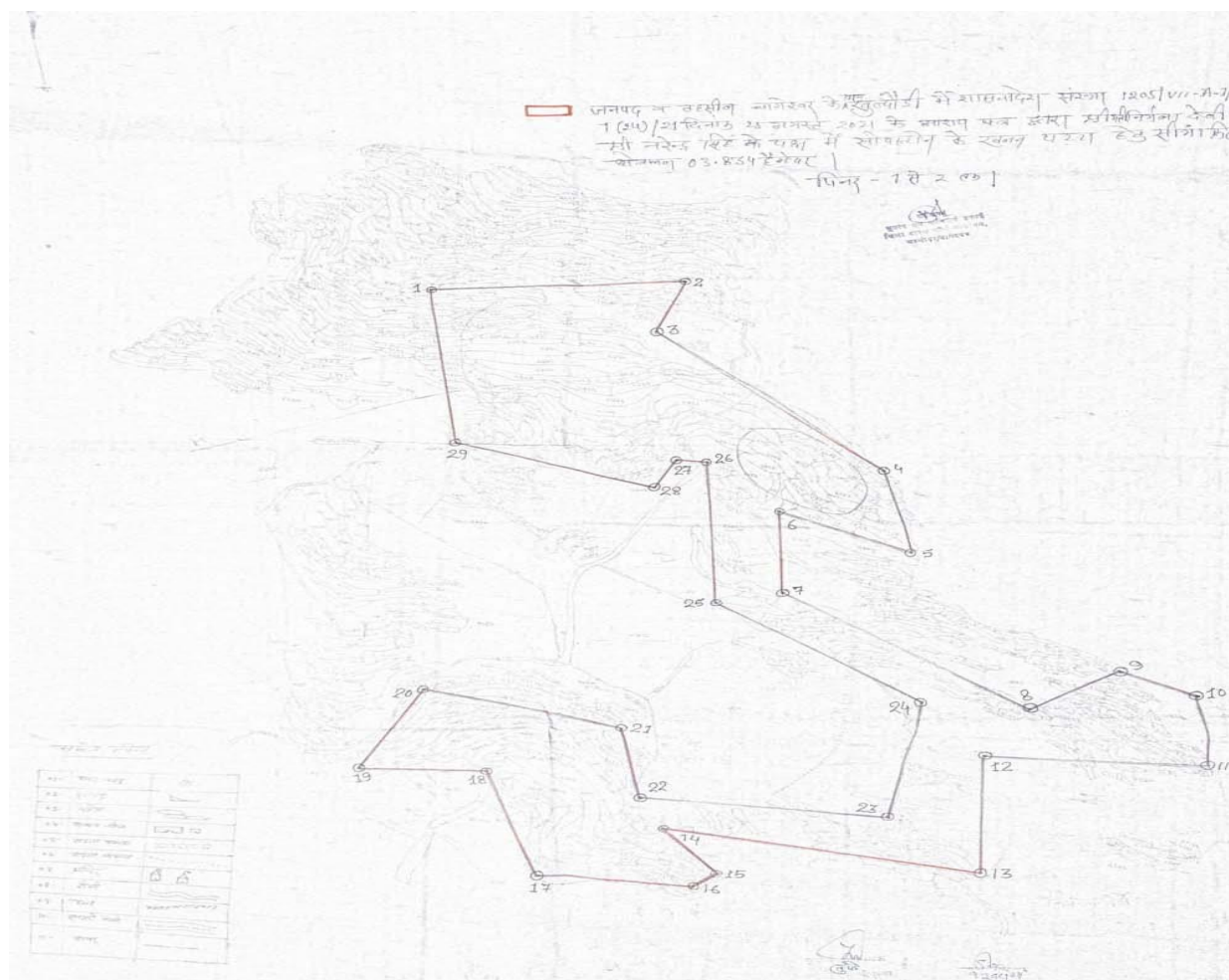


Fig 2.3- Pillar coordinate map

Geology

Regional Geology

The area forms the part of Calc Zone of Tejam. The stratigraphical sequence of the region as per monumental work (Geology of Lesser Himalayas; 1980 of Prof. K.S. Valdiya is as below:

Group/ Formation	Lithology
Berinag formation	Quartzite, Meta quartzite, Longlomerate, Phyllite
~~~~~Unconformity ~~~~~	
Gangolihat Dolomite	Dolomite and dolomitic limestone with algal structures. Magnesite with minor talc/talcosephyllite and dolomite intercalations.
~~~~~Unconformity ~~~~~	
Sor Slates	Shales, Slates and Phyllites

The above sequence as observed in this region is considered to be an inverted one. Soapstone pocket occur within carbonates of Gangolihat Dolomite

Local Geology:

Alluvial cover:

A thin layer of brownish color of soil exists in the whole area. Thin soil cover lies within the area having average thickness 0.30m. The thickness of soil varies from 0.20m to 0.40m.

Soapstone bearing with Magnesite rock:

Below overburden soapstone bearing strata is explored. The soapstone mineral in Kumaon Himalaya is an alteration product of magnesium bearing mineable & Soapstone occurs as pockets and sometimes confined to the upper part of the magnesium bearing zones. The mineral body occurs in irregular shape & size. The foliation in the soapstone trending 305° to 310°,

amount of dip varies 40 deg. to 45 deg. and dip direction varies 35 deg. to 40deg. Due to past exploration, area degraded by three trial pits & depth of pit varies 7.0m to 8.0m & occurrence of soapstone intermixed with low grade magnesite boulders exists in all the pits & further persist in depth. The pits were dug at different levels in the agricultural field & all the pits have temporarily backfilled/reclaimed. On this assumption, 12m depth from surface has been considered as proved category (excluding 2m average thickness of topsoil & overburden), 6m depth below proved category as probable. The soapstone occurring in these area is weakly foliated, fairly compact, fine grained white to off white in color with its characteristic soapy feel. The recovery of soapstone has been considered as 40% on the basis of present exploration & mining activities in adjoining areas.

Low Grade Magnesite/Dolomitic Rock:

Low grade magnesite boulders are intermixed with soapstone body. It is fine to medium grained, compact & massive well jointed & light grey to dark grey in colour & same is considered as interburden & its recovery has been taken as 60% on the basis of present exploration in the applied area & from existing mining activities in the vicinity of the area.

Climate

The climate in Bageshwar district is temperate to sub-humid. The northern part of district experiences sub-zero temperature almost throughout the year whereas the central and southern parts are comparatively warm and humid. Severe winter is the chief climatic feature in the district. In general, the district experience a tropical to sub-tropical and sub-humid climate except for the northern part where a cold temperature climate prevails.

Temperature, Relative Humidity and Wind

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 maximum temperature recorded in the district was 43°C (May 2003) whereas the minimum temperature recorded was 4°C (January 2003).

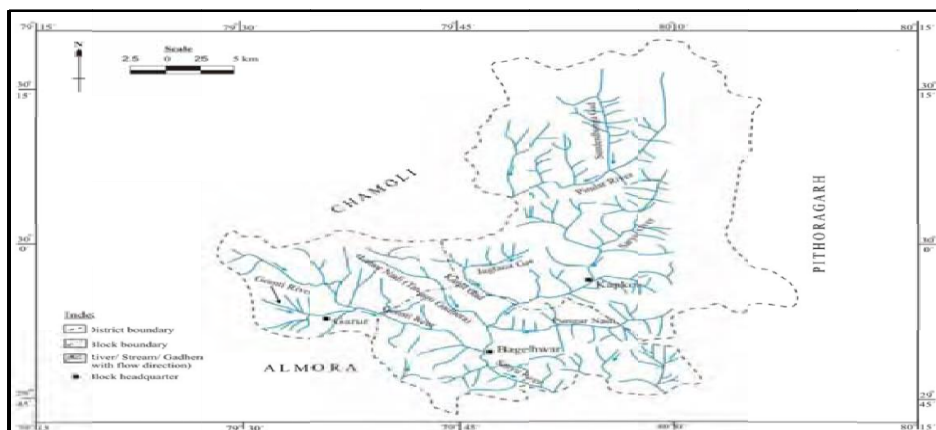
The relative Humidity increase rapidly with the onset of monsoon and reaches at about 80% during July to September. The driest part of the year is the pre-monsoon period, when the humidity is as low as 30% in the afternoons. Skies are heavily clouded during the monsoon months and for short spells when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

Rainfall:

Month the rainfall, about 75% of the annual value, occurs during monsoon months of June to September. July is the rainiest followed by August. In September, depressions from Bay of Bengal occasionally reach Uttarakhand and affect the weather of Bageshwar District also. The phenomenon may cause heavy rains. With the withdrawal of monsoon in September, the intensity of rainfall rapidly decreases. The decrease continues till November, which is a practically rainless month. Winter precipitation is associated with the passage of the western Disturbances and is in the form of snowfall over higher elevations. The monthly and annual average rainfall data of District Bageshwar in year 2012, 2014, 2015, 2016 is 1697mm, 1157.38mm, 1241.52mm and 1346.34mm respectively. Maximum rainfall occurred in July 2016 is 1684.05mm.

SURFACE DRAINAGE PATTERN

Drainage of the area is mainly controlled by Saryu, Gomti and Pindar Rivers and their tributaries (locally called Nadi, Gad or Gadhera) viz. PungarNadi, Khir Ganga Nadi, BhadrapatiNadi, Revti Ganga, Kanal Gad, LahorNadi, Jagtana Gad, Kulur Gad, Sukunda Gad etc. Sub-trellis, sub-rectangular and sub-dendritic are the most common drainage patterns in the area. The Central and North-Central parts of the district are drained by Saryu River. Gomti River drains the western and south eastern parts whereas Pindar River drains the northern part. These rivers are primarily fed by snowmelt with relatively smaller contribution from ground water. However, during the lean period, the rivers are fed by ground water occurring as base flow. The surface drainage pattern map is given in **Fig. 2.2**



Feasibility mineral Resource (211)

Section Line	Section Area		Strike Influence	Volume (Cum)		Blocked Reserves (Tonnes)	
	Blocked in (UPL)	Blocked Under 45 deg		Blocked in (UPL)	Blocked Under 45 deg	Blocked in (UPL)	Blocked Under 45 deg
1-1'	279	135	30	8370	4050	8705	4212
2-2'	153	117	40	6120	4680	6365	4867
3-3'	144	92	40	5760	3680	5990	3827
4-4'	351	96	40	14040	3840	14602	3994
5-5'	188	84	35	6580	2940	6843	3058
Total						42505	19958

Pre-Feasibility mineral Resource (222)

Section Line	Section Area		Strike Influence	Volume (Cum)		Blocked Reserves (Tonnes)	
	Blocked in (UPL)	Blocked Under 45 deg		Blocked in (UPL)	Blocked Under 45 deg	Blocked in (UPL)	Blocked Under 45 deg
1-1'	93	90	30	2790	2700	2902	2808

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

CHAPTER – 2

PROJECT DESCRIPTION

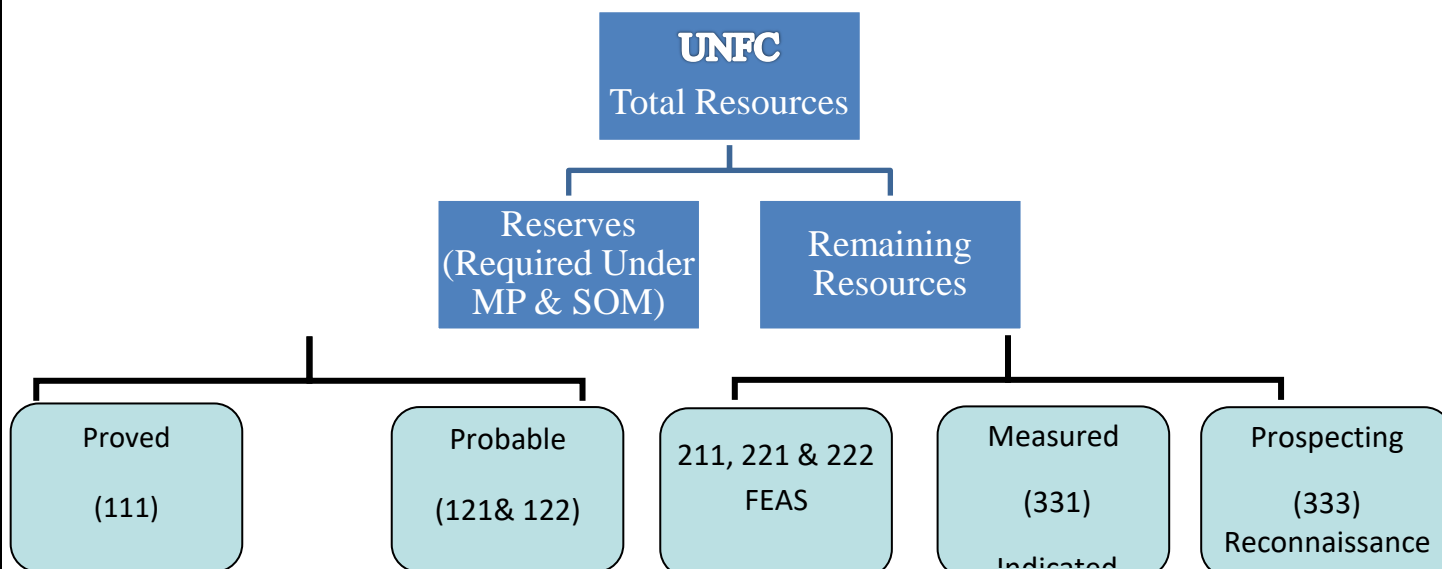
2-2'	48	84	40	1920	3360	1997	3494
3-3'	52	66	40	2080	2640	2163	2746
4-4'	120	62	40	4800	2480	4992	2579
5-5'	62	54	35	2170	1890	2257	1966
Total						14311	13593

Mineral Reserves/Resources As per UNFC classification:

i) Details of UNFC Classification:

UNFC is three digit code based system, the economical viability axis representing the first digit, the feasibility axis the second digit & geological axis the third digit.

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



Code (111): This code is provided for the economically mineable part of the measured mineral resources (Proved category reserves).

Code (121, 122): This code is provided for the economically mineable part of the indicated mineral resources (Probable category reserves).

Code (211): This part of the measured mineral resources (Proved Category), which as per feasibility study has not found economically mineable. The reserves blocked in 7.5m buffer zone of the distances restriction from permanent structure.

Code (222): The part of indicated mineral resources(probable category) which has pre feasibility study has not found economically mineable. The reserves blocked 7.5m buffer zone & distances restricted from permanent structure.

Code (333): Tonnage, grade & mineral contents can be estimated with low level of confidence & resources are also inferred from geological part.

The mineral reserves/resources calculated within lease areas per UNFC is as below:-

Category	UNFC Code	Quantity in million tonnes	Grade
A. Total Mineral Reserve			

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

CHAPTER – 2

PROJECT DESCRIPTION

Proved Mineral Reserve	111	0.100153	Paper & Detergent
Probable mineral Resource	121	-	-
	122	0.024211	Paper & Detergent
B. Total Remaining Resources			
Feasibility mineral Resource	211	0.062463	Paper & Detergent
Prefeasibility mineral resource	221 & 222	0.027904	Paper & Detergent
Measured mineral resource	331	-	Nil
Indicated mineral resource	332	-	Nil
Inferred mineral resource	333	0.063085	Paper & Detergent
Reconnaissance mineral resource	334	-	Nil
Total Reserves + Resources		0.214731	

Table No. 2

Categorization of Geological Reserves

PROVED MINERAL RESERVES (111)

Section Line	Area in m²	Strike Influence (m)	Volume (cum)	ROM of Soapstone 40% (tonnes)
1-1'	450	30	13500	14040
2-2'	900	40	36000	37440
3-3'	576	40	23040	23962
4-4'	468	40	18720	19469
5-5'	144	35	5040	5242
Total				100153

PROBABLE MINERAL RESERVES (122)

Section Line	Area in m²	Strike Influence (m)	Volume (cum)	ROM of Soapstone 40% (tonnes)
1-1'	96	30	2880	2995
2-2'	252	40	10080	10483
3-3'	162	40	6480	6739
4-4'	96	40	3840	3994
Total				24211

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

CHAPTER – 2

PROJECT DESCRIPTION

INFERRED MINERAL RESOURCES (333)

Section Line	Area m2 (333)	Strike Influence (m)	Volume (cum)	ROM of Soapstone
				40% (tonnes)
2-2'	162	40	6480	6739
3-3'	192	40	7680	7987
4-4'	234	40	9360	9734
5-5'	186	35	6510	6770
6-6'	150	40	6000	6240
7-7'	360	40	14400	14976
8-8'	150	40	6000	6240
9-9'	141	30	4230	4399
Total				63085

Availability of Mineral: The soapstone of area is weakly foliated & whiteness of soapstone is 82% to 90% is being used in soapstone, detergent & paper industries.

Anticipated Life of Mine: As per present data the total proved & probable reserves upto depth 15m comes out **124364** tonnes & same has been considered as mineable reserves also with an envisaged rate of production of soapstone **10721**tonnes/annum at the end of fifth year, the anticipated life of mine comes out 12 year. With the proposed exploration in future, the mineable reserves may be enhanced & accordingly life of mine may be increased.

Geologist engaged for mineral exploration: Since it will be open cast semi mechanized mine therefore full time geologist shall be employed for supervision of mining operations & for core hole drilling & for trial pitting Core shall be preserved in core box & study of logging & structural features shall be carried out in the presence of geologist.

Khasra map of lease area:

- i) All surface features occurring within lease area is shown in demarcated khasra map (**Annexure no.8**)

MINING

OPEN CAST MINING:

(i) Existing Method of Mining:

It is fresh grant case of mining lease & mining operations yet to be commenced.

(ii) Proposed method of Mining:

It will be open cast mechanized mine. Excavator shall be deployed for the removal of overburden & interburden. The overburden consists of weathered boulders of low grade magnesite & dolomitic stone intermixed with yellowish soil cover & average thickness has been considered as 3.0m. Below overburden, soapstone intermixed with low grade, magnesite & dolomitic boulders occurs. The overburden/interburden will be dumped separately towards slope of working pit secured with Gravity retaining walls. Mining shall be carried out in one pit viz. pit I. The width of benches shall be kept 8m, height of benches shall be kept 6m with face slope 68°. The soapstone will be extracted manually with the help of crow bar, chisels, pickaxe, hammers, spade etc. Soapstone is soft mineral therefore no drilling & blasting shall be required. No further beneficiation will be required except breaking & sorting. The different grade of soapstone will be filled into 50 kg plastic bags & transported up to road side by manually. From road side the soapstone bags will be loaded into trucks through manually and transported to Haldwani.

The salient points of proposed method of mining are given below:-

Mining shall be carried out in one pit viz pit I.

It will be open cast mechanized. Average thickness of soil has been considered as 0.10m & it shall be used for the purpose of plantation therefore no such proposal has been envisaged for its separate stacking.

Bench height will be kept 6.0m width of benches shall be kept 8.0m with face slope 68°.

Development work will be construction of foot track to different working benches and removal of the top soil. Mined out pit shall be premature back filled before the commencement of monsoon to avoid the wash off the debries during heavy showers. After over the monsoon, the backfilled material shall be rehandled by means of an excavator & dump towards slope side of working pit secured with retaining walls adverse impact. Mining pit I shall reach its maximum economical depth at the end of second year, therefore programme of reclamation shall be carried out from second year onwards.

In future no mining & allied activities shall be carried out with in 7.5m barrier zone. Gravity retaining walls having width & height 1.5m & 1.0m shall be provided at the base & sides of waste dump.

In future, proposal of mining is given in one pit. The proposed mining area, proposed dumping area along with khasra details & ownership/occupancy is given below:

Mining pits	Khasra no.	Name of land owner
Pit –I	2348, 2349, 2354, 2362, 2364, 2366, 2367 to 2390, 2392, 2394,	Shri Joga Singh, Smt. Khimuli Devi, Shri Trilok

	2396	Singh Manral etc.
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Dump no.	Khasra no.	Name of land owner
D ₁	2260, 2261, 2246, 2222, 2227, 2226, 2231, 2242	Shri Joga Singh, , Shri Trilok Singh Manral, Shri Bishan Singh etc.

All quantities of waste material generated from pit I during first year shall be accumulated in dump D-1 & all quantities shall be backfilled in the mined out pit from second year, therefore there shall be no waste dump from third year in pit I. The year wise development activities is also marked in khasra map (**Plate no. 11**).

All quantities of waste material to be generated each year shall be dumped with in lease area secured with Gravity retaining wall.

The broad parameters of working benches:

Item	Details
i) Method of Mining	Mining operation has been proposed by mechanized open cast method.
ii) Benches parameters	The broad parameters of working benches:
Bench Height	6.0m
Width	8.0m
Haul road width	6.0m
Bench slope	68deg
Over all Pit slope	34deg
Overall depth of mine during plan period	In pit I 24m (from 1224mRL to 1200mRL)
Gradient of Haul Road	1:16
Grid reference of proposed working location	Pit I will be in between local coordinates N1330 to N1402 & E1025 to E1140
Water table	No water table will be encountered due to proposed mining activities.
Pumping of water	No water will accumulate in the mining pit therefore no such proposal has given for pumping water.

Surface water management	Seasonal drainage exist vicinity of area & flows north to south direction & confluence to other drainage outside the area. Mining activities are proposed far away from drainage & mining operations shall be temporarily suspended during monsoon period. During monsoon period all mining pits shall be backfilled, therefore there shall be no adverse impact on water on water regime.
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Gravity retaining wall having width & height 1.0m shall also be erected at the base of backfilled pit and at the base & side of dump.

The year wise schedule of completion of activities is as below:

Pit-I

Activities	I st	II nd	III rd	IV th	V th
i) Gravity Retaining Wall at the base of dump	80m	To be Maintained	To be Maintained	To be Maintained	To be Maintained
ii) Gravity Retaining wall at the base of backfilled pit	Nil	50m	50m	50m	50m
iii) Gravity wall sides of waste dump	80m	To be Maintained	To be Maintained	To be Maintained	To be Maintained

(iii) Last five Year production Target & achievement:

Not applicable.

Geotechnical Studies:- Geotechnical Studies like slope failure, slip failure, rock failure etc. shall be carried out yearly. The retaining wall having proper shape & size shall be erected considering all technical parameters.

The width of benches shall kept 8m height of benches shall be kept 6.0m & slope of faces shall be kept 68°. Approach road having width 6.0m gradient 1:16 shall be provided to connect each mining faces. Waste to be generated during first year from pit I shall be dumped towards slope side & from second year onwards all quantities shall be backfilled in the mine out pit. In Pit I mining faces shall advance towards north & north east direction & alignment of faces by & large east-west direction. Interburden to be generated during first year from pit I shall be dumped separately towards slope of working pits & from second year onwards all quantities shall be used for backfilling. Initially interburden will be filled in the mined out pit & lateral on soil shall be spread over it, to restore to its maximum original topography. After backfilling the mined out area shall be used for agriculture purpose.

Extent of Mechanization:

Excavator shall be deployed to remove the interburden & dump on dumping ground. For the breaking of hard rock/boulders, rock breaker shall be used.

The make & model of excavator is as below:

Make & Model	Bucket Capacity	Aron length	Boom length	No. of units
Tata Hitachi Ex 200LC	1.5cum	2.85m	3mm	2 nos
Rock Breaker	1mtr length		Dia 6"	1 nos

Mining activities shall be carried out in one shift only & excavator/rock breaker shall be deployed from 8.0am to 5.0pm in day time.

Future proposal of mining is given in one pit and by the end of fifth year, both the pits merge together & forms the single pit & 0.75ha area shall be broken during first five years.

In pit I, mining pit shall reach its maximum economical by the end of second year, therefore backfilling shall be commenced from second year, therefore backfilling shall be commenced from second year onwards. Therefore backfilling shall be commenced from third year onwards to restore maximum original topography of the area. The ultimate depression with respect to original topography shall be 2m to 2.5m. 0.214ha area shall be occupied by waste dump.

The total year wise quantities of soapstone exploited are tabulated below:

YEAR	Quantities of soapstone (tonnes)	Quantities of Waste (Cum)	Stripping ratio Tonnes/Cum
	Pit-I	Pit-I	
Ist	8008	13845	0.58:1
IInd	8499	7249	1.17:1
IIIrd	9015	6701	1.35:1
IVth	9589	9052	1.06:1
Vth	10721	9405	1.14:1
Total	45832	46252	0.99:1

(iv) Proposed five year production target:

The year wise production schedule of soapstone from different benches in different pits are given below:

1st Year:

Pit I

Section Line	Bench Level (mRL)	Top Soil (m)	Bench Area (m ²)		Face Length (m)	Volume (Cum)		Quantities of Soapstone (Tonnes)	IB (Cum)	Total Waste (Cum)	Top Soil (Cum)	Stripping Ratio (T/Cum)
			OB	SBS		OB	SBS					
2-2'	1218-1212	1.2	35	20	115	4025	2300	2392	1380	5405	138	0.44:1
	1212-1206	1.8	52	42	100	5200	4200	4368	2520	7720	180	0.57:1
	1206-1200	0	0	50	24	0	1200	1248	720	720	0	1.73:1
Total								8008		13845	318	

2nd Year:

Pit I

Section Line	Bench Level (mRL)	Top Soil (m)	Bench Area (m ²)		Face Length (m)	Volume (Cum)		Quantities of Soapstone (Tonnes)	IB (Cum)	Total Waste (Cum)	Top Soil (Cum)	Stripping Ratio (T/Cum)
			OB	SBS		OB	SBS					
2-2'	1218-1212	0.8	23	36	102	2346	3672	3819	2203	4549	82	0.84:1
	1212-1206	0	0	42	90	0	3780	3931	2268	2268	0	1.73:1
	1206-1200	0	0	24	30	0	720	749	432	432	0	1.73:1
Total								8499		7249	82	

3rd Year:

Pit I

Section Line	Bench Level (mRL)	Top Soil (m)	Bench Area (m ²)		Face Length (m)	Volume (Cum)		Quantities of Soapstone (Tonnes)	IB (Cum)	Total Waste (Cum)	Top Soil (Cum)	Stripping Ratio (T/Cum)
			OB	SBS		OB	SBS					
2-2'	1218-1212	0.5	15	40	100	1500	4000	4160	2400	3900	50	1.07:1
	1212-1206	0	0	36	90	0	3240	3370	1944	1944	0	1.73:1
	1206-1200	0	0	34	42	0	1428	1485	857	857	0	1.73:1
Total								9015		6701	50	

4th Year

Pit I

Section Line	Bench Level (mRL)	Top Soil (m)	Bench Area (m ²)		Strike Influence (m)	Volume (Cum)		Quantities of Soapstone (Tonnes)	IB (Cum)	Total Waste (Cum)	Top Soil (Cum)	Stripping Ratio (T/Cum)
			OB	SBS		OB	SBS					
2-2'	1224-1218	1.5	44	44	80	3520	3520	3661	2112	5632	120	0.65:1
	1218-1212	0	0	36	70	0	2520	2621	1512	1512	0	1.73:1
	1212-1206	0	0	18	60	0	1080	1123	648	648	0	1.73:1
	1206-1200			30	70	0	2100	2184	1260	1260	0	1.73:1
Total								9589		9052	120	

5th Year

Pit I

Section Line	Bench Level (mRL)	Top Soil (m)	Bench Area (m ²)		Strike Influence (m)	Volume (Cum)		Quantities of Soapstone (Tonnes)	IB (Cum)	Total Waste (Cum)	Top Soil (Cum)	Stripping Ratio (T/Cum)
			OB	SBS		OB	SBS					
2-2'	1230-1224	1.6	46	70	70	3220	4900	5096	2940	6160	112	0.83:1
	1224-1218	0	0	34	60	0	2040	2122	1224	1224	0	1.73:1
	1218-1212	0	0	30	54	0	1620	1685	972	972	0	1.73:1
	1212-1206	0	0	38	46	0	1748	1818	1049	1049	0	1.73:1
Total								10721		9405	112	

2.4 SITE FACILITIES AND UTILITIES

Water Supply

Water requirement for the proposed project will be provided for the workers for drinking & domestic purpose. Water will also be provided for dust suppression. Fresh water will be only

used for drinking purpose. The total water required is approximately 6.61KLD the break up with its uses is given below:

Temporary Rest Shelter:

Source	Purpose	Detail	Avg. Demand/Day
Portable Tanker	Drinking@15lpcd/worker	30 workers x 15 lpcd = 450 lpcd	0.45 KLD
	Mine operation/others	-	1.0 KLD
	Land reclamation / plantation @1 Lit/Tree	4000Trees x 1 lpcd = 2000 lpcd	4.0KLD
	Dust suppression @2 Lit/Sq.m (Twice in a day)	Haul Road Area = (200 m Length x 6m Width = 1200 m ²) x 2lpcd/Sq.m = 2400 lpcd	2.4 KLD
Total			7.85 KLD

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 for the workers.

2.5 STATUTORY REQUIREMENTS

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

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

- Uttarakhand Mineral Policy, 2011
- Uttarakhand Minor Mineral Concession Rules, 2001
- The Mines Act, 1952
- The Mines and Mineral (Development and Regulation) Act, 1957
- Mines Rules, 1955
- Mineral Concession Rules, 1960
- Mineral Conservation and Development Rules, 1988
- The Water (Prevention and Control of Pollution) Act, 1974
- The Air (Prevention and Control of Pollution) Act, 1981
- The Environment (Protection) Act, 1986
- The Forest (Conservation) Act, 1980

CHAPTER3

BASELINE ENVIRONMENT STATUS

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.

3.2 STUDY PERIOD

Baseline environmental data generation for air, water, noise and soil quality monitoring has been conducted at project site and four other locations from Oct 2021 to Dec 2021. 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.

3.4 Meteorology

Climate

The climate in Bageshwar district is temperate to sub-humid. The northern part of district experiences sub-zero temperature almost throughout the year whereas the central and southern parts are comparatively warm and humid. Severe winter is the chief climatic feature in the district. In general, the district experiences a tropical to sub-tropical and sub-humid climate except for the northern part where a cold temperature climate prevails. Two broad wind pattern are observed in the district viz north easterly to easterly (May to September) and south easterly to westerly (October and March). Month the rainfall, about 75% of the annual value, occurs during monsoon months of June to September. July is the rainiest followed by August. In September, depressions from Bay of Bengal occasionally reach Uttarakhand and affect the weather of Bageshwar District also.

3.5 Air Environment

The prime objective of the baseline study with respect to ambient air quality is to establish the present air quality and its conformity to National Ambient Air Quality Standards. This data has been further used during impact assessment to predict the final air quality. This section describes the sampling locations, frequency of sampling and methodology adopted for monitoring ambient air quality.

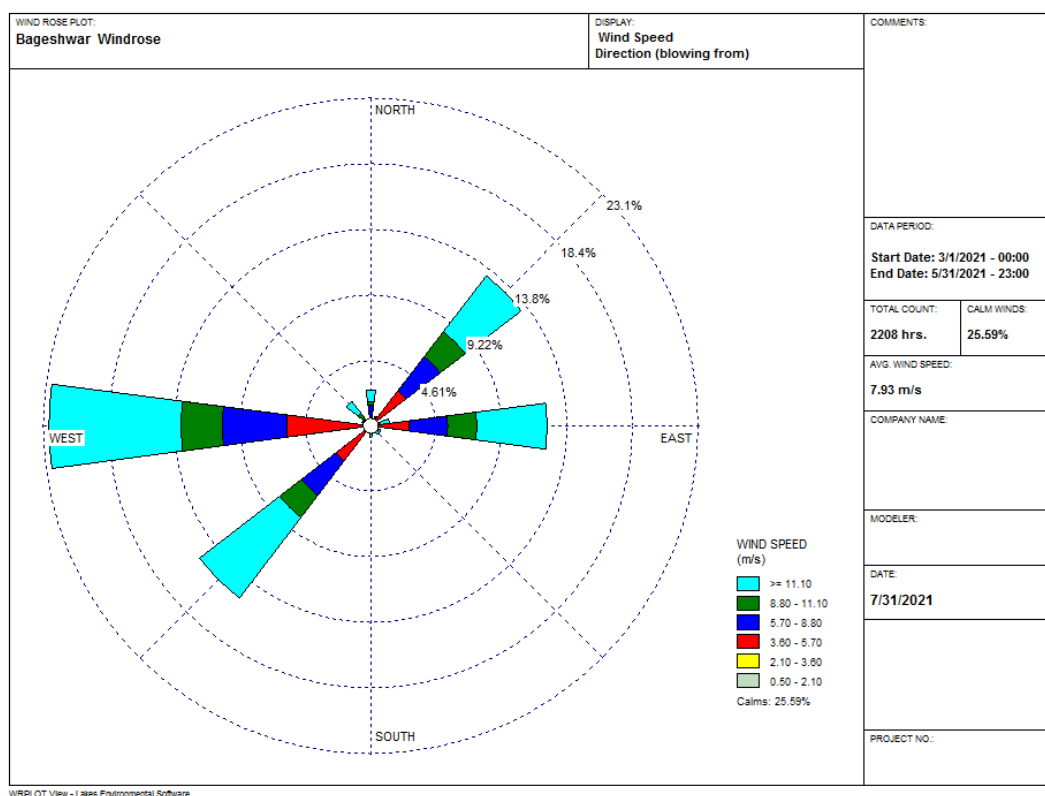


Fig 3.1 – Wind rose Diagram (Oct 2021 to Dec 2021)

Observation- The predominant upwind direction is in West & downwind direction is in East.

To quantify the impact of the project on the ambient air quality, it is necessary at first to evaluate the existing ambient air quality of the area. The existing ambient air quality, in terms of Particulate Matter – 10 (PM₁₀), Particulate Matter- 2.5 (PM_{2.5}), Sulphur-dioxide (SO₂) and Oxides of Nitrogen (NO₂), has been measured through a planned field monitoring.

To assess the ambient air quality level, 5 monitoring stations were set up. Table 3.1 gives location of the ambient air quality monitoring stations.

(a) Monitoring Schedule

Ambient air quality monitoring was carried out twice a week with a frequency of 24 hours for 12 weeks.

(b) Methods of Sampling and Analysis

The brief methodology of the parameter analyzed is as follows:

- I. **Particulate Matter (PM_{2.5}):** (CPCB Method) Particulate Matter (PM_{2.5}) was analyzed by Fine Particulate Sampler Envirotech Model APM 550. PM 2.5 was collected on 47mm diameter filter paper. The mass concentration of (PM_{2.5}) fine particles in ambient air was calculated as the total mass of collected particles divided by the volume of air sampled.
- II. **Particulate Matter (PM₁₀):** Particulate Matter (PM₁₀) was carried out by RespirableDust Sampler Envirotech Model APM 460 BL. The cyclone of this instrument is used for fractionating the dust into two fractions. PM 10 dust is accumulated on the filter paper (8"×10" size) while coarse dust is collected in a cup placed under the cyclone. PM 10 was calculated as per IS: 5182 (Part 23):2006. The mass of these particles was determined by the difference in filter weight prior to and after sampling. The concentration of PM 10 in the designated size range was calculated by dividing the weight gain of the filter by the volume of air sampled.
- III. **Sulphur dioxide (SO₂):** SO₂ was monitored with the help of APM 411 assembly attached with APM 460 BL using the impinge. It was absorbed by aspirating a measured air sample through a solution of Potassium tetrachloromercurate (TCM). This procedure resulted in the formation of a dichlorosulphitemercurate complex. The complex was made to react with pararosaniline and methylsulphonic acid. The absorbance of the solution was measured by means of spectrophotometer.
- IV. **Nitrogen Dioxides: NO₂** was monitored with the help of APM 411 assembly attached with APM 460 BL using the impinge. It was collected by bubbling air through a solution of sodium hydroxide and sodium arsenite. The concentration of nitrite ion produced during sampling was determined calorimetrically by reacting with the nitrite ion with phosphoric acid, sulphanilamide and NEDA and absorbance of highly colored azo-dye was measured at 540nm.

(c) Results and Discussion

The results of AAQ are given and summarized in the tables below. The results on comparison with National Ambient Air Quality Standards (NAAQS), 2009 of Central Pollution Control Board (CPCB) show that the values of ambient air quality parameters are well within the stipulated limits at various monitoring locations.

The results of ambient air quality monitoring are summarized below in the Tables 3.2:

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

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Ambient Air Quality Data				AAQ- 1 (Mine Site)	
S.No	Date	PM _{2.5} , µg/m ³	PM ₁₀ , µg/m ³	SO ₂ µg/m ³ ,	NO ₂ , µg/m ³
		Gravimetric	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	01.10.2021	27.30	65.12	6.3	16.4
2	04.10.2021	23.38	63.54	6.7	17.5
3	08.10.2021	25.12	67.10	6.2	17.8
4	12.10.2021	23.38	64.17	6.9	18.2
5	16.10.2021	23.45	67.50	6.6	17.8
6	20.10.2021	24.90	66.26	6.8	16.9
7	24.10.2021	26.65	70.65	7.1	18.2
8	28.10.2021	30.78	73.26	7.5	19.2
9	01.11.2021	32.46	74.35	8.3	18.9
10	04.11.2021	30.17	76.20	9.4	18.0
11	08.11.2021	26.39	69.37	9.3	17.8
12	12.11.2021	29.73	71.54	8.8	17.6
13	16.11.2021	38.49	73.59	8.3	17.9
14	20.11.2021	38.53	77.46	7.9	18.7
15	24.11.2021	35.64	69.82	7.6	20.4
16	28.11.2021	33.19	65.47	7.2	18.7
17	01.12.2021	29.60	70.19	6.9	17.8
18	04.12.2021	32.74	72.90	7.1	18.4
19	08.12.2021	37.54	75.68	7.6	17.7
20	12.12.2021	34.56	73.43	7.3	18.3
21	16.12.2021	32.43	76.50	7.2	17.5
22	20.12.2021	31.10	78.90	8.2	18.7
23	24.12.2021	27.30	74.35	9.1	17.4
24	28.12.2021	25.70	70.43	9.6	17.9
	Min	23.38	63.54	6.2	16.4
	Max	38.53	78.9	9.6	20.4
	Average	30.02	71.16	7.66	18.07
	98 Percentile	38.51	78.24	9.51	19.85
NAAQS, For 24 hourly		60	100	80	80

Ambient Air Quality Data				AAQ- 2	
S.No	Date	PM _{2.5} , µg/m ³	PM ₁₀ , µg/m ³	SO ₂ µg/m ³ ,	NO ₂ , µg/m ³
		Gravimetric	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	01.10.2021	26.95	68.31	6.9	16.7
2	04.10.2021	27.29	67.83	6.4	17.8
3	08.10.2021	29.45	72.67	5.9	16.7
4	12.10.2021	31.73	77.43	6.4	16.3
5	16.10.2021	32.06	78.33	6.7	18.1
6	20.10.2021	30.48	74.52	6.4	17.4
7	24.10.2021	33.57	80.43	6.9	16.3
8	28.10.2021	36.68	77.49	6.4	16.8
9	01.11.2021	34.50	73.70	6.5	15.7
10	04.11.2021	32.23	76.58	7.4	15.3
11	08.11.2021	34.12	82.94	7.2	16.3
12	12.11.2021	31.70	78.63	7.8	17.4
13	16.11.2021	32.28	73.76	8.4	17.9
14	20.11.2021	33.57	78.83	8.8	18.7
15	24.11.2021	35.74	74.92	9.6	18.2
16	28.11.2021	32.90	77.26	8.5	21.7
17	01.12.2021	29.27	76.77	7.9	20.9
18	04.12.2021	28.70	74.58	7.2	19.6
19	08.12.2021	30.18	73.49	7.7	16.9
20	12.12.2021	32.76	72.87	6.3	17.8
21	16.12.2021	33.18	74.48	6.9	17.9
22	20.12.2021	29.72	72.47	7.2	16.5
23	24.12.2021	32.47	76.24	7.8	17.5
24	28.12.2021	31.89	75.87	7.2	16.8
	Min	26.95	67.83	5.9	15.3
	Max	36.68	82.94	9.6	21.7
	Average	31.81	75.43	7.27	17.55
	98 Percentile	36.25	81.79	9.23	21.33
NAAQS, For 24 hourly		60	100	80	80

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Proponent: Smt Nirmala Devi
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Ambient Air Quality Data				AAQ- 3	
S.No	Date	PM _{2.5} , µg/m ³	PM ₁₀ , µg/m ³	SO ₂ µg/m ³ ,	NO ₂ , µg/m ³
		Gravimetric	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	01.10.2021	27.75	63.21	5.8	16.4
2	04.10.2021	26.87	67.28	5.5	16.9
3	08.10.2021	25.78	65.48	6.2	15.7
4	12.10.2021	28.74	67.39	5.9	15.5
5	16.10.2021	31.59	71.49	5.4	14.5
6	20.10.2021	32.83	75.43	5.7	15.2
7	24.10.2021	34.27	72.78	6.1	15.7
8	28.10.2021	32.28	74.60	6.3	15.4
9	01.11.2021	34.73	78.10	5.9	16.2
10	04.11.2021	31.29	76.38	6.4	15.7
11	08.11.2021	29.13	74.76	5.9	15.8
12	12.11.2021	28.25	73.27	6.3	15.9
13	16.11.2021	27.32	69.50	6.5	15.3
14	20.11.2021	29.48	73.63	6.7	14.7
15	24.11.2021	32.76	78.32	6.2	15.9
16	28.11.2021	34.40	78.93	6.8	16.4
17	01.12.2021	33.67	77.36	6.5	16.3
18	04.12.2021	34.69	79.86	6.8	15.8
19	08.12.2021	29.73	74.68	6.3	17.3
20	12.12.2021	29.97	73.80	6.6	17.9
21	16.12.2021	32.29	77.67	6.1	16.4
22	20.12.2021	29.58	74.55	5.7	15.8
23	24.12.2021	30.93	76.85	5.9	15.3
24	28.12.2021	31.62	78.67	6.3	16.4
	Min	25.78	63.21	5.4	14.5
	Max	34.73	79.86	6.8	17.9
	Average	30.83	73.92	6.16	15.93
	98 Percentile	34.71	79.43	6.80	17.62
NAAQS, For 24 hourly		60	100	80	80

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BASELINE ENVIRONMENT STATUS

Ambient Air Quality Data				AAQ-4	
S.No	Date	PM _{2.5} , µg/m ³	PM ₁₀ , µg/m ³	SO ₂ µg/m ³ ,	NO ₂ , µg/m ³
		Gravimetric	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	01.10.2021	28.53	70.67	6.7	16.3
2	04.10.2021	29.57	74.45	6.2	17.4
3	08.10.2021	29.76	76.84	7.8	16.9
4	12.10.2021	32.17	79.73	7.2	15.5
5	16.10.2021	34.28	82.67	7.8	16.7
6	20.10.2021	31.67	73.49	6.6	15.9
7	24.10.2021	29.74	74.17	5.9	14.7
8	28.10.2021	32.34	82.00	6.7	14.3
9	01.11.2021	32.43	79.69	6.4	15.3
10	04.11.2021	32.15	81.28	5.9	15.8
11	08.11.2021	34.89	82.67	5.8	16.2
12	12.11.2021	30.75	79.75	7.6	16.7
13	16.11.2021	29.56	77.53	6.7	17.3
14	20.11.2021	32.82	76.23	5.8	17.7
15	24.11.2021	34.38	79.89	6.2	16.5
16	28.11.2021	35.42	75.40	7.4	15.6
17	01.12.2021	36.74	82.63	8.2	17.4
18	04.12.2021	34.32	87.26	8.6	18.9
19	08.12.2021	35.69	84.87	9.2	19.7
20	12.12.2021	34.48	79.63	8.6	20.9
21	16.12.2021	35.87	74.53	7.3	19.6
22	20.12.2021	33.45	77.12	6.9	18.3
23	24.12.2021	29.34	78.37	8.7	17.8
24	28.12.2021	30.64	79.67	7.4	16.9
	Min	28.53	70.67	5.8	14.3
	Max	36.74	87.26	9.2	20.9
	Average	32.54	78.77	7.15	17.01
	98 Percentile	36.34	86.16	8.97	20.35
NAAQS, For 24 hourly		60	100	80	80

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Ambient Air Quality Data				AAQ- 5	
S.No	Date	PM _{2.5} , µg/m ³	PM ₁₀ , µg/m ³	SO ₂ µg/m ³ ,	NO ₂ , µg/m ³
		Gravimetric	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	01.10.2021	32.13	72.9	7.3	19.4
2	04.10.2021	30.62	71.5	6.8	19.8
3	08.10.2021	31.83	74.2	7.5	17.8
4	12.10.2021	28.57	68.5	7.9	18.3
5	16.10.2021	31.29	70.3	8.3	18.9
6	20.10.2021	29.26	69.8	6.9	19.8
7	24.10.2021	32.10	72.6	7.7	20.6
8	28.10.2021	29.84	67.9	7.3	18.9
9	01.11.2021	30.87	74.2	7.9	19.0
10	04.11.2021	32.75	76.9	7.6	21.4
11	08.11.2021	31.97	73.6	8.3	18.9
12	12.11.2021	29.78	74.1	8.9	19.2
13	16.11.2021	30.45	78.6	7.3	18.7
14	20.11.2021	31.01	77.2	7.9	20.3
15	24.11.2021	33.17	74.1	8.2	19.2
16	28.11.2021	32.73	82.6	8.6	18.7
17	01.12.2021	34.65	84.1	7.5	17.2
18	04.12.2021	27.46	85.3	7.6	18.6
19	08.12.2021	29.73	84.3	6.2	17.8
20	12.12.2021	29.18	81.2	6.9	17.5
21	16.12.2021	31.19	84.8	7.2	18.5
22	20.12.2021	32.74	79.6	7.7	19.2
23	24.12.2021	31.44	77.6	6.8	18.4
24	28.12.2021	30.29	75.7	6.7	19.3
	Min	27.46	67.9	6.2	17.2
	Max	34.65	85.3	8.9	21.4
	Average	31.04	76.32	7.54	18.98
	98 Percentile	33.97	85.07	8.76	21.03
NAAQS, For 24 hourly		60	100	80	80

Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) has been carried out at five locations during pre-monsoon season from Oct to Dec 2021. The minimum and maximum level of PM₁₀ recorded within the study area was in the range of 63.21 $\mu\text{g}/\text{m}^3$ to 87.26 $\mu\text{g}/\text{m}^3$ with the 98th percentile 86.16 $\mu\text{g}/\text{m}^3$. The minimum and maximum level of PM_{2.5} recorded within the study area was in the range of 23.38 $\mu\text{g}/\text{m}^3$ to 38.53 $\mu\text{g}/\text{m}^3$ with the 98th percentile 38.51 $\mu\text{g}/\text{m}^3$. The minimum and maximum concentration of SO₂ recorded within the study area was 5.4 / m^3 to 9.6 $\mu\text{g}/\text{m}^3$ with the 98th percentile 9.65 $\mu\text{g}/\text{m}^3$. The minimum and maximum level of NO₂ recorded within the study area was in the range of was 14.3 $\mu\text{g}/\text{m}^3$ to 21.7 $\mu\text{g}/\text{m}^3$ with the 98th percentile 21.33 $\mu\text{g}/\text{m}^3$. The results thus obtained indicate that the concentrations of PM₁₀, PM_{2.5}, SO₂ and NO₂ in the Ambient Air are well within the National Ambient Air Quality (NAAQ) standards for Industrial, Residential, Rural and other areas.

The values of PM_{2.5}, PM₁₀, SO₂ & NO₂ at project site and four other monitoring locations are presented above in Table 3.2. All the parameters are well within the stipulated limits of NAAQS, 2009.

3.6 Noise Levels

Noise is one of the most undesirable and unwanted by-products of our modern life style. It may not seem as insidious or harmful as air and water pollutants but it affects human health and well-being and can contribute to deterioration of human well-being in general and can cause neurological disturbances and physiological damage to the hearing mechanism in particular. It is therefore, necessary to measure both the quality as well as the quantity of noise in and around the site.

(a) Methodology

The intensity of sound energy in the environment is measured in a logarithmic scale and is expressed in a decibel, dB (A) scale. In a sophisticated type of sound level meter, an additional circuit (filters) is provided, which modifies the received signal in such a way that it replicates the sound signal as received by the human ear and the magnitude of sound level in this scale is denoted as dB (A). The sound levels are expressed in dB (A) scale for the purpose of comparison of noise levels, which is universally accepted by the international community.

Noise levels were measured using an Integrating sound level meter manufactured by Pulsar Instruments Plc, Model NO. 91(SL.No.B21625). It has an indicating mode of L_p and L_{eq}

Keeping the mode in Lp for few minutes and setting the corresponding range and the weighting network in “A” weighting set the sound level meter was run for one hour time and Leq was measured at all locations. The day noise levels have been monitored during 6.00 am to 10.00 pm and night noise levels, during 10.00 pm to 6.00 am at all the 4 locations, which covers residential areas, commercial, industrial areas, silence area within 10 km radius of the study area.

(b) Sampling Locations

A preliminary survey was undertaken to identify the major noise generating sources in the area. The noise survey was conducted to assess the background noise levels in different zones. Gazettes Notification (S.O. 123(E)) of MoEF&CC dated December 14, 2000 on ambient air quality standards has different noise levels for different zones viz. industrial, residential and silence zones. Five sampling locations were selected for sampling of noise levels. The sampling locations are given in Table - 3.3 below.

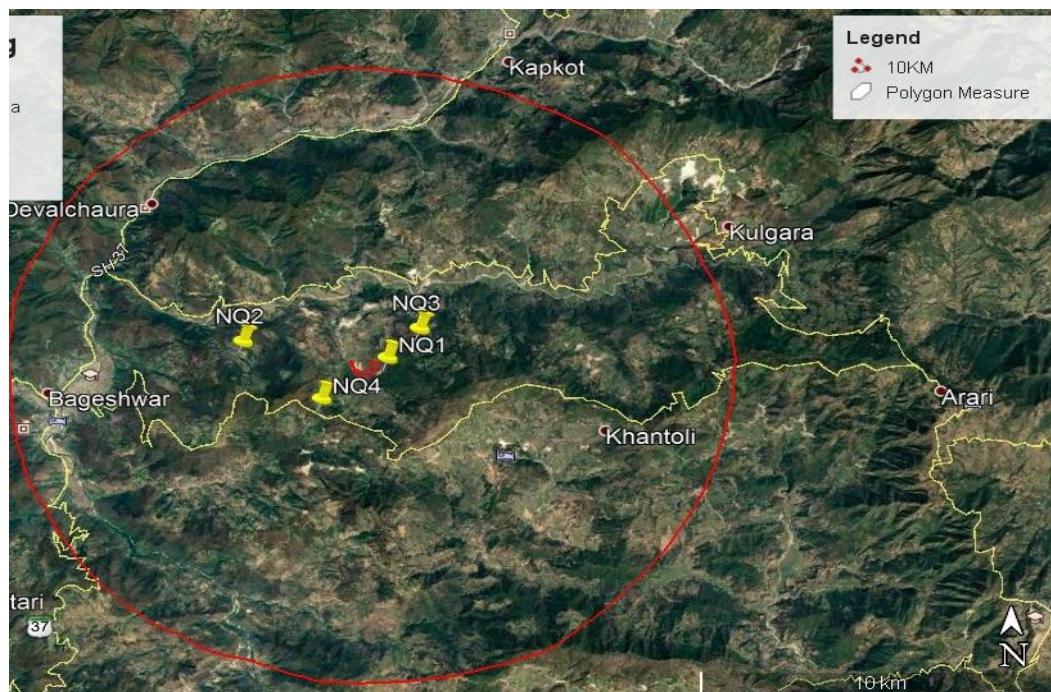


Figure – 3.2 Noise quality monitoring location

Ministry of Environment Forests and Climate Change (MoEF&CC) has notified the noise standards vide gazette notification dated December 14, 2000 for different zones under the Environment Protection Act (1986). These standards are given in Table - 3.4.

Table 3.4 Ambient Noise Quality Standards

Area Code	Category of Area	Noise dB(A) Leq	
		Day time*	Night time*
A	Residential Zone	55	45
B	Silence zone	50	40
C	Industrial Zone	75	70
D	Commercial Zone	65	55

Note:

1. Daytime is from 6.00am to 10.00 pm and Night time is from 10.00 pm to 6.00 am.
2. Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle horns, loud speakers and bursting of crackers are banned in these zones.

(c) Results and Discussion

The noise level monitoring results of Oct 21 to Dec 21 are presented below in Table 3.5. The ambient noise level in study area during the day time varies from 45.87 to 40.23dB (A) and 41.27 to 36.15dB (A) during night which is within the specified limits of CPCB.

Table 3.5: Hourly Leq Noise Level in Study Area

S. No.	Locations		Equivalent Noise Level, dB (A)			
			Limit (as per CPCB Guidelines), Leq, dB(A)		Observed value Leq, dB(A)	
			DAY*	NIGHT*	DAY*	NIGHT*
1	Project Site	Residential Zone	55	45	45.87	41.27
2	NQ2	Residential Zone	55	45	43.12	38.25
3	NQ3	Residential Zone	55	45	40.23	36.15
4	NQ4	Residential Zone	55	45	45.35	39.46

3.7 WATER ENVIRONMENT

(a) Water Quality

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 Oct 21 to Dec 2021. The locations of the monitoring are given below in



Fig No. 3.3 Ground water quality monitoring location

Table 3.7: Location of water quality sampling

Location Code	Sample collected from	Direction	Distance	Project area/Study Area
SW – 1	Saryu River (up-stream)	NW	7.85Km	Study area
SW – 2	Saryu River (Downstream)	WNW	8.2Km	Study Area

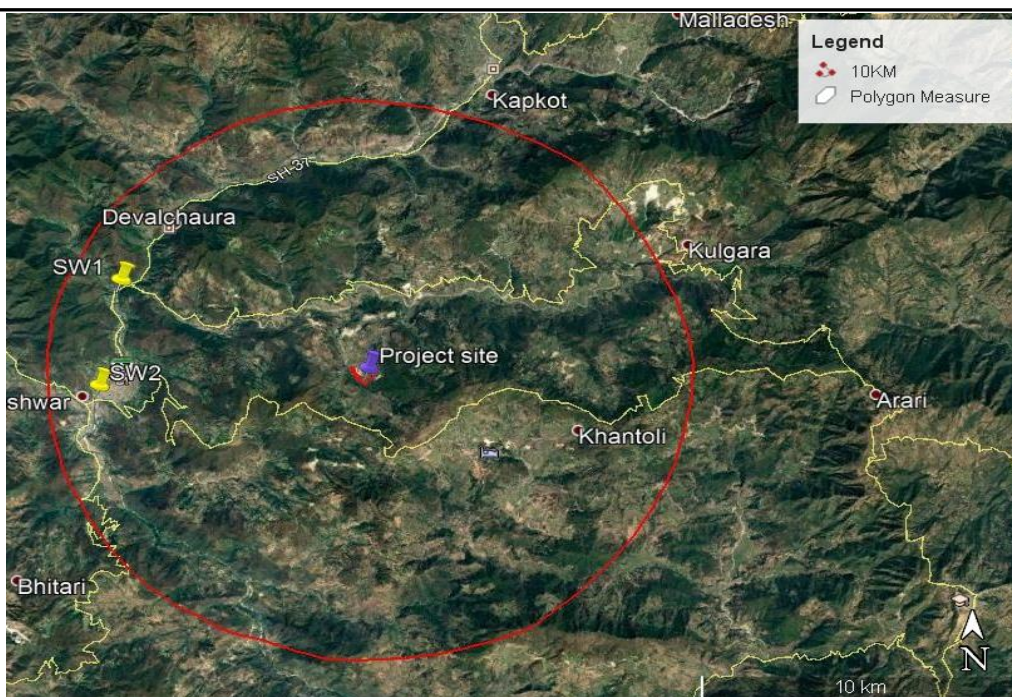


Figure- 3.4 Surface water quality monitoring location

(b) Sampling Frequency and Sampling Techniques

Quality of ground water was compared with IS: 10500: 1991 (Reaffirmed 1993 with Amendment No.3 July 2010) for drinking purposes. Water samples were collected in a 5 liter plastic jerry can and 500ml sterilized clean glass bottles for physio-chemical and bacteriological tests respectively. GW sampling was done after flushing out the source (minimum 10 minutes) to get the fresh ground water and grab sampling method was used. The samples were analyzed as per Indian standard /APHA latest edition.

The water quality in the impact zone was assessed through physico-chemical and bacteriological analysis of ground samples. CPCB's water quality criteria are presented below in Table 3.8:

Table 3.8: Water Quality Criteria as per Central Pollution Control Board

Designated-best-use	Class	Criteria
Drinking water source without conventional treatment but after disinfection	A	Total Coliform Organism MPN/100ml will be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6mg/l or more Biochemical Oxygen Demand 5 days 20°C 2mg/l or less

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Designated-best-use	Class	Criteria
Outdoor bathing (Organized)	B	Total Coliform Organism MPN/100ml will be 500 or less pH between 6.5 and 8.5; Dissolved Oxygen 5mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	Total Coliform Organism MPN/100ml will be 5000 or less pH between 6 to 9; Dissolved Oxygen 4mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Propagation of Wild life and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25°C micro mhos/cm Max.2250 Sodium absorption Ratio Max. 26 Boron Max. 2mg/l
	Below-E	Not Meeting A, B, C, D & E Criteria

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Table 3.9 Ground water Monitoring Result

Sl. No.	Parameter	Limit (as per IS:10500)		Unit	GW1	GW2	GW3
		Desirable Limit	Permissible Limit				
1	Colour	5	25	Hazen	<5	<5	<5
2	Odour	Un	-	-	Un	Un	Un
3	Taste	Agreeable	-	-	Agreeable	Agreeable	Agreeable
4	Turbidity	5	10	NTU	<1	<1	<1
5	pH	6.5-8.5	No Relaxation	-	7.24	7.23	7.32
6	Total Hardness (as CaCO ₃)	300	600	mg/l	172.8	182	180.8
7	Iron (as Fe)	0.3	1	mg/l	0.27	0.20	0.24
8	Chlorides (as Cl)	250	1000	mg/l	23	21	19
9	Fluoride (as F)	1	1.5	mg/l	0.2	0.5	0.6
10	TDS	500	2000	mg/l	263	268	275
11	Calcium(as Ca ²⁺)	75	200	mg/l	45.4	40.9	43.0
12	Magnesium (as Mg ²⁺)	30	100	mg/l	18	16	20
13	Copper (as Cu)	0.05	1.5	mg/l	0.03	0.04	0.04
14	Manganese(as Mn)	0.1	0.3	mg/l	0.04	0.05	0.05
15	Sulphate (as SO ₄)	200	400	mg/l	19	16	19.8
16	Nitrate(as NO ₃)	45	No Relaxation	mg/l	2	5	4.7
17	Phenolic Compounds	0.001	0.002	mg/l	<0.001	<0.001	<0.001

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	(as C ₆ H ₅ OH)						
18	Mercury (as Hg)	0.001	No Relaxation	mg/l	<0.001	<0.001	<0.001
19	Cadmium (as Cd)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
20	Selenium (as Se)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
21	Arsenic (as As)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
22	Cyanide (as CN)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
23	Lead (as Pb)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
24	Zinc (as Zn)	5	15	mg/l	0.03	0.04	0.06
25	Anionic Detergent (as MBAS)	0.2	1	mg/l	<0.01	<0.01	<0.01
26	Chromium (as Cr ⁶⁺)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
27	Mineral oil	0.01	0.03	mg/l	<0.01	<0.01	<0.01
28	Alkalinity (as CaCO ₃)	200	600	mg/l	178	188	192
29	Aluminum (as Al)	0.03	0.2	mg/l	0.02	0.04	0.03
30	Boron (as B)	1	5	mg/l	0.24	0.31	0.25
Microbiological Parameter							
1	Total Coliform	10 , Max	-	MPN/100ml	<2	<2	<2
2	E.coli	Absent	-	E.coli /100ml	Absent	Absent	Absent

Surface Water Monitoring Result table 3.10

S.No.	Parameter	Unit	S.W. 1	S.W. 2
			SaryuRiver (up-stream)	SaryuRiver (downstream)
1	pH	-	7.64	7.72
2	Dissolved Oxygen	mg/l	6.7	6.0
3	BOD (3 Days at 27 °C)	mg/l	2.3	2.5
4	Free Ammonia (as N)	mg/l	<0.1	<0.1
5	Sodium Adsorption Ratio	-	0.53	0.62
6	Boron	mg/l	BDL	BDL
7	Conductivity	µmhos/cm	228	223
8	Turbidity	NTU	3.0	2.8
9	Magnesium hardness (as CaCO ₃)	mg/l	23	25
10	Total Alkalinity (as CaCO ₃)	mg/l	67	64
11	Chloride (as Cl)	mg/l	19	13
12	Sulphate (as SO ₄)	mg/l	11	12
13	Nitrate (as NO ₃)	mg/l	0.05	0.06
14	Fluoride (as F)	mg/l	0.44	0.37
15	Sodium (as Na)	mg/l	11.6	10.4
16	Potassium (as K)	mg/l	2.3	2.7
18	Total Phosphorous (as P)	mg/l	0.003	0.002
19	COD	mg/l	8	7
20	Phenolic compounds (as C ₆ H ₅ OH)	mg/l	<0.001	<0.001
21	Iron (as Fe)	mg/l	0.11	0.14
22	Zinc (as Zn)	mg/l	0.5	0.84
23	Arsenic (as As)	mg/l	<0.01	<0.01
24	Mercury (as Hg)	mg/l	<0.001	<0.001
25	TDS	mg/l	139	128
	Microbiological Parameters			
1	Total Coliform	MPN/100ml	315	310
2	Faecal Coliform	MPN/100ml	60	70

(c) The water quality in the impact zone was assessed through physico-chemical and Microbiological analysis of ground water samples. The results have been compared with the drinking water quality standards specified in IS: 10500. It was observed that all the physico-chemical parameters and heavy metals from ground water samples are below stipulated limits for drinking water standards.

- The pH limit fixed for drinking water samples as per IS-10500 Standards is 6.5 to 8.5 beyond this range the water will affect the mucus membrane or water supply system. During the study period, the pH was varying for ground waters from 7.23 to 7.32 and the surface waters are 7.64 to 7.72. The pH values for all the samples collected in the study area during study period were found to be within the limits.
- The desirable limit for total dissolved solids as per IS-10500 Standards is 500 mg/l whereas the permissible limits in absence of alternate source is 2000 mg/l, beyond this palatability decreases and may cause gastro intestinal irritation. In ground water samples collected from the study area, the total dissolved solids are varying from 263 mg/l to 275 mg/l. The TDS of the samples were above the desirable limit but within the permissible limit of 2000 mg/l.
- The desirable limit for chlorides is 250 mg/l as per IS-10500 Standards whereas, permissible limit of the same is 1000 mg/l beyond this limit taste, corrosion and palatability are affected. The chloride level in the surface water samples collected in the study area were ranging from 13 mg/l to a maximum of 19 mg/l, in ground water samples 19 mg/l to 23 mg/l. The chloride samples are within the desirable limits.
- The desirable limit as per IS-10500 Standards for hardness is 200 mg/l whereas the permissible limit for the same is 600 mg/l beyond this limit encrustation in water supply structure and adverse effects on domestic use will be observed. In the ground water samples collected from the study area, the hardness is varying from 172.8 mg/l to 182 mg/l.
- Fluoride is the other important parameter, which has the desirable limit of 1 mg/l and permissible limit of 1.5 mg/l. however the optimum content of fluoride in the drinking water is 0.6 to 1.5 mg/l. If fluoride content is less than 0.6 mg/l it causes dental carries, above 1.5 mg/l causes fluorosis. In the ground water samples of study area the fluoride value were in the range of 0.2 mg/l to 0.6 mg/l. In surface water 0.37 mg/l to 0.44 mg/l.

Overall all the samples collected from the study area were found to be fit for consumption, Most of ground water samples are well within the permissible limits, as per IS-10500. Most of the heavy metals in all samples are below detectable limits.

3.8 SOIL

Majority of soil type in Bageshwar district is sandy loam which covers around 84% of total geographical area. The alluvium in area comprises of silt, sand, gravel, clay and kankar.

The composite soil samples were collected from site and study area and analyzed for characterization. The locations of monitoring stations are depicted in Table 3.10 and results of monitoring are presented in the Table 3.11.

(a) Type & characteristics: To assess the soil quality, following stations were selected. Soil profile and quality was studied at 3 locations.

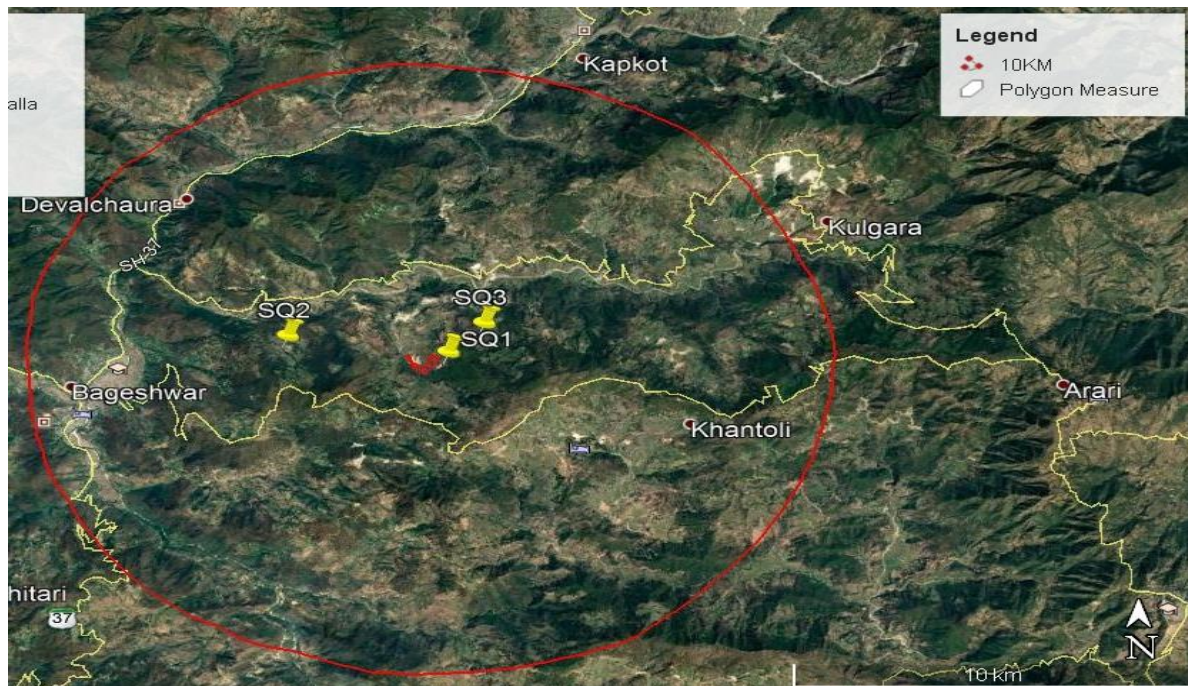


Figure – 3.5 Soil quality monitoring location

(b) Methodology

The soil samples were collected in the Oct 21 to Dec 21 from 3 locations as stated above. At each of the location, 3 sub-locations were identified randomly from where soil was collected from up to 30 cm below the surface. The final samples represent homogeneously mixed soil from these 3 sub-locations for each location. The samples were filled in polythene bags, labeled in the field with number and site name and sent to laboratory for analysis. Table 3.12

gives information of frequency and methodology for selection of soil sampling locations and monitoring process.

Table 3.12: Frequency and Methodology for Soil Sampling

Particulars	Details
Frequency	One grab sample from each station– once during the Study Period
Methodology	Composite grab samples of the topsoil were collected from 3 depths, and mixed to provide a representative sample for analysis. They were stored in airtight Polythene Bags and analyzed at the laboratory

Table 3.12: Physio-chemical Properties of Soil Quality Data

S.No	Parameter	Unit	SQ-1	SQ-2	SQ-3
			Near Project Site	Bilkhet	Thaklan
1	Silt	%	24.4	21.3	23.2
	Clay	%	18.3	19.3	18.5
	Sand	%	56.3	59.4	55.3
2	pH	-	7.15	7.37	7.48
3	Electrical Conductivity	µmhos/cm	264	298	267
4	Cation exchange capacity	meq/100 gm	15.3	16.9	17.2
5	Potassium	mg/kg	121.7	114.2	123.3
6	Sodium	mg/kg	87.3	84.3	116.3
7	Calcium	mg/kg	2385	2467	2453
8	Magnesium	mg/kg	387	482	459
9	Sodium Absorption Ratio	-	0.92	0.43	0.85
10	Water Holding Capacity	%	38.7	36.4	36.8
11	Porosity	%	34.8	36.7	39.7

(c) Results:

Physical characteristics of soil were characterized through specific parameters viz bulk density, porosity, water holding capacity, pH, electrical conductivity and texture. Soil pH plays an important role in the availability of nutrients. Soil microbial activity as well as solubility of metal ions is also dependent on pH. In the study area, variations in the pH of the soil were found to be slightly basic (7.15 to 7.48). Electrical conductivity (EC) is a measure of the soluble salts and ionic activity in the soil. In the collected soil samples the conductivity ranged from 264-298µmhos/cm.

The soils with low bulk density have favorable physical condition where as those with high bulk density exhibit poor physical conditions for agriculture crops.

3.9 LAND USE/LAND COVER MAPPING

- Coordinates of the mine lease area

Map with all corner coordinates of the mine lease area are super imposed on the Google image to assess the land use pattern surrounding the 10 km radius of the site, a detailed study was carried out. The land use pattern study reveals that the 10 km environs is predominantly forest and agriculture area. The land use details are given in Table-3.13

SI. No	Description	Area (ha)	Area in %
1	Settlements	124.0	0.38
2	River	460.01	1.40
3	Forest	23978.71	72.79
4	Barren land	6781.32	20.59
5	Agriculture land	1594.36	4.84
Total		32938.40	100.00

3.10 TRAFFIC STUDY

Traffic study is carried out by understanding the existing carrying capacity of the road in the vicinity of site and flow towards State highway in the area. Then depending on the capacity of the mine, the number of trucks that will be added to the present scenario will be compared to the carrying capacity as recommended by Indian Road Congress (IRC). The existing volume of traffic and, the Level of Service are given in Table-3.14

Table 3.14 (i): Existing Traffic Scenario & LOS

Table 3.14 (i): Existing Traffic Scenario & LOS

Road	V (PCU/day)	C (PCU/day)	Existing V/C Ratio	LOS
Bageshwar-Dofar-dharamgarh Road	900	4500	0.20	A
Bageshwar-Munsiyari Road	600	2000	0.30	B

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

During Mine operation

Total Capacity of mine	: 25784TPA
No. of working days	: 240days
Total Capacity of mine/day	: $18250/240 = 107$ tonnes
Truck Capacity	: 9tonnes
No. of trucks deployed per day	: $107/9 = 12$ trucksperday
No. of trucks deployed/day to & fro	: $12*2 = 24$
Trucks Increase in PCU/day	: 72

The addition to traffic by the proposed project during its operation is given in Table-3.21(iii).

Table 3.14(ii): Additional Traffic Scenario & LOS due to proposed project

Road	V	C	Modified V/C Ratio	LOS
Bageshwar-Dofar-dharamgarh Road	972	4500	0.21	A
Bageshwar-Munsiyari Road	672	2000	0.33	B

From the above analysis it can be seen that the V/C ratio is likely to be changed to 0.21 and with LOS respectively on Bageshwar-Dofar-dharamgarh Road remains "A" which is "Excellent" as per classification and on Near By road its "B" which is "Very Good". So

the additional load on the carrying capacity of the concerned roads is not likely to have much significant adverse effect.

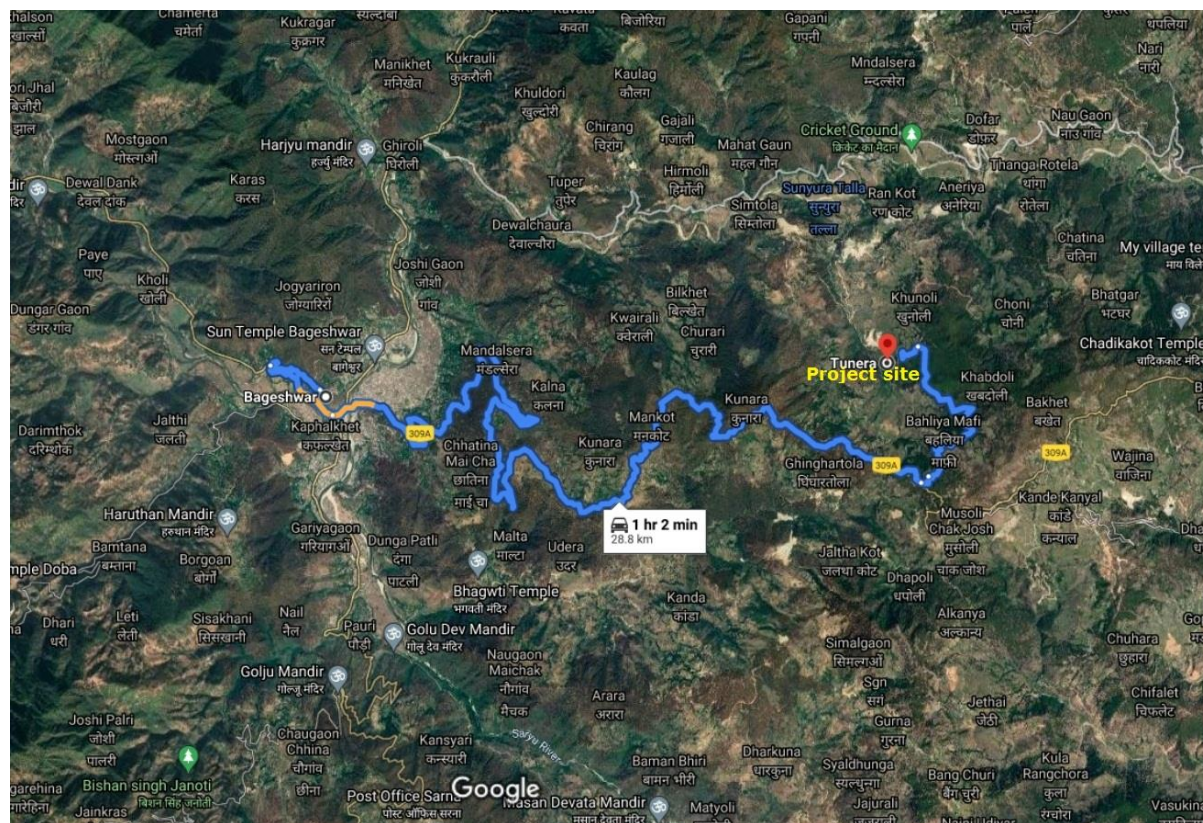


Fig 3.6- Transportation Route Map

3.11 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.

Bageshwar is one of the mountainous districts of Uttarakhand State. Prior to its formation as a separate district, Bageshwar constituted a part of Almora district. The district was included in Uttarakhand State after the state was carved out of Uttar Pradesh on 9th November 2000. The district lies between latitudes 29°40' and 30°20' N and longitudes 79°25' and 80°10' E (Survey of India Degree Sheet Nos. 53N and 53O). The district is bounded by Almora district in the south, Chamoli district in the north.

Drainage of the area is mainly controlled by Ramganga and Gori ganga and their tributaries (locally called Nadi, Gad or Gadhera) viz. PungarNadi, Khir Ganga Nadi, BhadrapatiNadi,

Revti Ganga, Kanal Gad, LahorNadi, Jagtana Gad, Kulur Gad, Sukunda Gad etc River Saryu falls within 10 km study area from our project boundary.

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 km² area under very dense forest, 14167 km² areas under moderately dense forest and 5567 km² 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 Saryu in District. 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 Binsar WLS which is at a distance of more than 17.6 km (SW 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 3.15: 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 Saryu 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 *Mangifera indica*, *Azadirachta indica*, *Albizia lebbek*, *Delonix regia*, *Ficus religiosa*, etc.

A list of flora of the study area is enclosed as Table 3.16 (i).

Table 3.16 (i): Flora of the Core Zone

S.No.	Local Name	Botanical Name	Family	Habit
1	KantaChaulai	<i>Amaranthus spinosus</i>	<i>Amaranthaceae</i>	<i>Herb</i>
2	Arbi	<i>Colocasia esculenta</i>	<i>Araceae</i>	<i>Herb</i>
4	Doob, dobri	<i>Cynodon dactylon</i>	<i>Poaceae</i>	<i>Herb</i>
5	Kaans	<i>Saccharum spontaneum</i>	<i>Poaceae</i>	<i>Herb</i>
7	Aak	<i>Calotropis procera</i>	<i>Asclepiadaceae</i>	<i>Shrub</i>
8	Kasunda	<i>Cassia occidentalis</i>	<i>Fabaceae</i>	<i>Shrub</i>
9	Kanghi	<i>Abutilon indicum</i>	<i>Malvaceae</i>	<i>Shrub</i>
10	Ber	<i>Ziziphus mauritiana</i>	<i>Rhamnaceae</i>	<i>Shrub</i>
11	Dhatura	<i>Datura innoxia</i>	<i>Solanaceae</i>	<i>Shrub</i>
12	Raimuniya	<i>Lantana camara</i>	<i>Verbenaceae</i>	<i>Shrub</i>
13	Sawani, farash	<i>Lagerstroemia indica</i>	<i>Lythraceae</i>	<i>Tree</i>
14	Goat weed, ghabuti	<i>Ageratum conyzoides</i> L.	<i>Asteraceae</i>	<i>Herb</i>
15	Kantachaulai	<i>Amaranthus spinosus</i> L.	<i>Amaranthaceae</i>	<i>Herb</i>
16	TivraGandha	<i>Chromolaena odorata</i> (L.)	<i>Asteraceae</i>	<i>Shrub</i>
17	Bhang, hemp	<i>Cannabis sativa</i> L.	<i>Cannabaceae</i>	<i>Herb/ Shrub</i>
18	Bathuwa	<i>Chenopodium album</i> L.	<i>Chenopodiaceae</i>	<i>Herb</i>
26	Ban kakari	<i>Podophyllum hexandrum</i>	<i>Podophyllaceae</i>	<i>Herb</i>

**BASELINE ENVIRONMENT
STATUS**

28	Giloe	<i>Tinosporasinensis</i>	<i>Menispermaceae</i>	<i>Climber</i>
29	Kilmora	<i>Berberisaristata</i>	<i>Berberidaceae</i>	<i>Shrub</i>
30	Lajvanti	<i>Mimosa pudica</i>	<i>Mimosaceae</i>	<i>Herb</i>
31	Bajardanti	<i>Potentillafulgens</i>	<i>Rosaceae</i>	<i>Herb</i>
32	JangliJira	<i>Carumcarvi L.</i>	<i>Apiaceae</i>	<i>Herb</i>
33	Jhinti	<i>Barleriacristala</i>	<i>Acanthaceae</i>	<i>Shrub</i>
34	Kalihari	<i>Gloriosasuperba L.</i>	<i>Lilliaceae</i>	<i>Herb</i>
35	Jambu	<i>Allium stracheyi</i>	<i>Lilliaceae</i>	<i>Herb</i>
36	Rsabhak	<i>Malaxismuscifera</i>	<i>Orchidaceae</i>	<i>Herb</i>
37	Atis	<i>Aconitum heterophyllum</i>	<i>Ranunculaceae</i>	<i>Herb</i>
38	Angeli	<i>Anemone rivularis</i>	<i>Ranunculaceae</i>	<i>Herb</i>
39	Banafsa	<i>Viola biflora L.</i>	<i>Violaceae</i>	<i>Herb</i>
40	Majethi	<i>Rubiaccordifolia L.</i>	<i>Rubiaceae</i>	<i>Climber</i>

Table 3.16 (ii): Flora of the Buffer zone

Flora Of Buffer Zone				
S. No.	Local Name	Botanical Name	Family	Habit
1	Garundi	<i>Alternantheraparonychioides</i>	<i>Amaranthaceae</i>	<i>Herb</i>
2	Garundi	<i>Alternantherapungens</i>	<i>Amaranthaceae</i>	<i>Herb</i>
3	Kantachaulai	<i>Amaranthusspinosus</i>	<i>Amaranthaceae</i>	<i>Herb</i>
4	Arbi	<i>Colocasiaesculenta</i>	<i>Araceae</i>	<i>Herb</i>
5	Goat weed, ghabuti	<i>Ageratum conyzoides</i>	<i>Asteraceae</i>	<i>Herb</i>
6	Madras carpet	<i>Grangeamaderaspatana</i>	<i>Asteraceae</i>	<i>Herb</i>
7	Wild carrot, gajarghas	<i>Partheniumhysterophorus</i>	<i>Asteraceae</i>	<i>Herb</i>

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

CHAPTER 3

BASELINE ENVIRONMENT STATUS

8	Chakunda	<i>Cassia tora</i>	<i>Fabaceae</i>	<i>Herb</i>
9	Bhang , hemp	<i>Cannabis sativa</i>	<i>Cannabaceae</i>	<i>Herb</i>
10	Bathuwa	<i>Chenopodium album</i>	<i>Chenopodiaceae</i>	<i>Herb</i>
11	Mexican poopy	<i>Argemone Mexicana</i>	<i>Papaveraceae</i>	<i>Herb</i>
12	Doob,dobri	<i>Cynodondactylon</i>	<i>Poaceae</i>	<i>Herb</i>
13	Malankuri,wiregrass	<i>Eleusineindica</i>	<i>Poaceae</i>	<i>Herb</i>
14	Bharbhusi	<i>Eragrostistenella</i>	<i>Poaceae</i>	<i>Herb</i>
15	Kaans	<i>Saccharumspontaneum</i>	<i>Poaceae</i>	<i>Herb</i>
16	Chirpati, rasbhari	<i>Physalis minima</i>	<i>Solanaceae</i>	<i>Herb</i>
17	Fern	<i>Adiantumsp.</i>	<i>Adiantaceae</i>	<i>Herb</i>
18	Ladder fern	<i>Pterissps.</i>	<i>Pteridaceae</i>	<i>Herb</i>
19	Aak	<i>Calotropisprocera</i>	<i>Asclepiadaceae</i>	<i>Shrub</i>
20	Kasunda,chakunda	<i>Cassia occidentalis</i>	<i>Fabaceae</i>	<i>Shrub</i>
21	Ban tulsi	<i>Croton bonplandianum</i>	<i>Euphorbiaceae</i>	<i>Shrub</i>
21	Kanghi,atibala	<i>Abutilon indicum</i>	<i>Malvaceae</i>	<i>Shrub</i>
22	Booganbel	<i>Bougainvillea spectabilis</i>	<i>Nyctaginaceae</i>	<i>Shrub</i>
23	Ber	<i>Ziziphusmauritiana</i>	<i>Rhamnaceae</i>	<i>Shrub</i>
24	Datura	<i>Daturainnoxia</i>	<i>Solanaceae</i>	<i>Shrub</i>
25	Kateli	<i>Solanumvirginianum</i>	<i>Solanaceae</i>	<i>Shrub</i>
26	Raimuniya	<i>Lantana camara</i>	<i>Verbenaceae</i>	<i>Shrub</i>
27	Barbeery,rasaut	<i>Berberis vulgaris</i>	<i>Berberidaceae</i>	<i>Shrub</i>
28	Curry leaf	<i>Murrayakoenigii</i>	<i>Rutaceae</i>	<i>Shrub</i>
29	Ratanjot	<i>Jatropha curcas</i>	<i>Euphorbiaceae</i>	<i>Tree</i>
30	Aam	<i>Mangifera indica</i>	<i>Anacardiaceae</i>	<i>Tree</i>

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

CHAPTER 3

BASELINE ENVIRONMENT STATUS

31	Sawani , farash	<i>Lagerstroemia indica</i>	<i>Lythraceae</i>	Tree
32	Moral	<i>Ulmuswallichiana</i>	<i>Ulmaceae</i>	Tree
33	Bay leaf ,Tejpatta	<i>Cinnamomumtamala</i>	<i>Lauraceae</i>	Tree
34	Walnut, Akhrot	<i>Juglansregia</i>	<i>Judlandaceae</i>	Tree
35	Himalayan maple	<i>Acer oblongum</i>	<i>Sapindaceae</i>	Tree
36	Peepal	<i>Ficusreligiosa</i>	<i>Moraceae</i>	Tree
37	Goolar	<i>Ficusracemosa</i>	<i>Moraceae</i>	Tree
38	Amaltas	<i>Cassia fistula</i>	<i>Fabaceae</i>	Tree
39	Arandi	<i>Ricinuscommunis</i>	<i>Euphorbiaceae</i>	Tree
40	Saras	<i>Albizialebeck</i>	<i>Fabaceae</i>	Tree
41	White kachnar	<i>Bauhinia acuminata</i>	<i>Fabaceae</i>	Tree
42	Banjh	<i>Quercusleucotricophora</i>	<i>Lauraceae</i>	Tree
43	Bakain	<i>Meliaazedarach</i>	<i>Meliaceae</i>	Tree
44	White babool	<i>Leucaenaleucocephala</i>	<i>Fabaceae</i>	Tree
45	Kachnar	<i>Bauhinia variegata</i>	<i>Fabaceae</i>	Tree
46	Baheda	<i>Terminaliabellerica</i>	<i>Combretaceae</i>	Tree
47	Harad	<i>Terminaliachebula</i>	<i>Combretaceae</i>	Tree
48	Gulmohar	<i>Delonixregia</i>	<i>Fabaceae</i>	Tree
49	Chir, pine	<i>Pinusroxburghii</i>	<i>Pinaceae</i>	Tree
50	Khirk	<i>Celtisaustralis</i>	<i>Cannabaceae</i>	Tree
51	Bihul, bhimal	<i>Grewiaoptiva</i>	<i>Tiliaceae</i>	Tree
52	Chilbil, papri	<i>Holopteleaintegrifolia</i>	<i>Ulmaceae</i>	Tree
53	Semal	<i>Bombaxceiba L.</i>	<i>Bombacaceae</i>	Tree
54	Timur	<i>Zanthoxylumarmatum</i>	<i>Rutaceae</i>	Shrub

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55	Jamun	<i>Syzygiumcumini L.</i>	<i>Mytaceae</i>	Tree
56	Podina	<i>Menthaarevensis L.</i>	<i>Lamiaceae</i>	Herb
57	Amla	<i>Emblicaofficinalis</i>	<i>Euphorbiaceae</i>	Herb
58	Bichhughas	<i>Urticadioca L.</i>	<i>Urticaceae</i>	Shrub
59	Kaphal	<i>Myricaesculenta</i>	<i>Myricaceae</i>	Tree
60	Bhojpatra	<i>Betulautilis D.</i>	<i>Betulaceae</i>	Tree
61	Rambans	<i>Agave Americana L.</i>	<i>Agavaceae</i>	Shrub
62	Thuner	<i>Taxusbaccata L.</i>	<i>Taxaceae</i>	Tree
63	Deodar	<i>Cedrusdeodara</i>	<i>Pinaceae</i>	Tree

Fauna of the study area:

Two Schedule-I species (Leopard and Asiatic Black Bear) are found in the study. Saryu River flows near to the project site, river supports many aquatic wildlife including fish species, phytoplankton and zooplankton.

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: There are two Schedules-I species (Leopard and Asiatic black bear) found in the study area and for that conservation plan has been prepared. 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 (*Acridotherestrictis*), 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 3.16 (iii): Fauna of The Core Zone

S. No.	Common Name	Scientific Name	IWPA	IUCN
AVIFAUNA				
1	Common Myna	<i>Acridotherestrictis</i>	IV	LC
2	Indian Cormorant	<i>Phalacrocoraxfuscicollis</i>	IV	VU
3	House Crow	<i>Corvussplendens</i>	V	LC
4	Ashy Drongo	<i>Dicrurusleucophaeus</i>	IV	LC
5	Koel	<i>Eudynamysscolopacea</i>	IV	NA
6	Sparrow	<i>Passer domesticus</i>	IV	LC
7	Yellow Bellied Blue Magpie	<i>Urocissaflavirostris</i>	IV	LC
10	Himalayan Quail	<i>Ophrysiasuperciliosa</i>	IV	CR
MAMMALS				
1	Squirrel	<i>Funambulus pennant</i>	IV	DD
2	Rat	<i>Rattusrattus</i>	V	LC
Note: LC: Least Concern, NA: Not Assessed, DD: Data deficient, VU: Vulnerable				
Fauna of the Buffer Zone				
S.No.	Common Name	Scientific name	IWPA	IUCN
MAMMALS				
1	Squirrel	<i>Funambulus pennant</i>	IV	DD
2	Rat	<i>Rattusrattus</i>	V	LC
3	Wild pig	<i>Susscrofa</i>	III	LC
4	Yellow throated marten	<i>Martesflavigula</i>	III	LC
5	Monkey	<i>Macacamulata</i>	II	LC
6	Fruit bat	<i>Rousettusleshenaulti</i>	IV	LC
7	Common langur	<i>Presbytis entellus</i>	II	LC
8	Indian Porcupine	<i>Hystrixindica</i>	IV	LC
9	Indian Leopard	<i>Pantherapardus</i>	I	NT

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10	Asiatic black bear	<i>Ursus tibetanus</i>	I	VU
11	Barking deer (kakar)	<i>Muntiacus muntjac</i>	III	---
12	Golden Jackal	<i>Canis aureus</i>	II	LC
REPTILES & AMPHIBIANS				
1	Common Toad	<i>Duttaphrynus melanostictus</i>	IV	NA
2	India bull frog	<i>Rana tigrina</i>	IV	DD
3	Indian tree frog	<i>Polypedates maculatus</i>	IV	NA
4	Skipping frog	<i>Bufostomatus</i>	IV	NA
5	Garden lizard	<i>Calotes versicolor</i>	-	NA
6	House lizard	<i>Hemidactylus sp.</i>	IV	NA
FISHES				
1	Unera	<i>Labeo dero</i>	---	NA
2	Kali Rohu	<i>Labeo dyocheilus</i>	---	LC
3	Gadara	<i>Nemacheilus rupicola</i>	---	NA
4	Dhaur, Hill Trout	<i>Barilius bendelisis</i>	---	LC
5	Bhagnera	<i>Garralamta</i>	---	LC
6	Mahseer	<i>Tor putitora</i>	---	EN
7	Asela, Snow Trout	<i>Schizothorax richardsoni</i>	---	VU
8	Gotyla	<i>Garragotyla</i>	---	LC
9	Pathar-chatti	<i>Glyptothorax pectinopterus</i>	---	LC
AVIFAUNA				
1.	Jungle Myna	<i>Acridotheres fuscus</i>	IV	LC
2.	Common Myna	<i>Acridotheres tristis</i>	IV	LC
3.	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	IV	LC
4.	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	IV	LC
5.	Common Kingfisher	<i>Alcedo atthis</i>	IV	LC
6.	House Crow	<i>Corvus splendens</i>	IV	LC
7.	Grey-hooded Warbler	<i>Seicercus xanthoschistos</i>	IV	LC
8.	Ashy Drongo	<i>Dicrurus leucophaeus</i>	IV	LC
9.	Asian Koel	<i>Eudynamis scolopacea</i>	IV	LC
10.	Cattle Egret	<i>Bubulcus ibis</i>	IV	LC
11.	Common Rosefinch	<i>Carpodacus erythrinus</i>	IV	LC
12.	Rock Dove	<i>Columba livia</i>	IV	LC
13.	Greater Coucal	<i>Centropus sinensis</i>	IV	LC
14.	Oriental Magpie Robin	<i>Copsychus saularis</i>	IV	LC
15.	Black Drongo	<i>Dicrurus macrocercus</i>	IV	LC

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16.	<i>Coppersmith Barbet</i>	<i>Megalaimahaemacephala</i>	IV	LC
17.	<i>Lineated Barbet</i>	<i>Megalaimalineata</i>	IV	LC
18.	<i>White Wagtail</i>	<i>Motacilla alba</i>	IV	LC
19.	<i>Common Babbler</i>	<i>Turdoidescaudatus</i>	IV	LC
20.	<i>Jungle Babbler</i>	<i>Turdoidesstriatus</i>	IV	LC
21.	<i>House Sparrow</i>	<i>Passer domesticus</i>	IV	LC
22.	<i>Red-vented Bulbul</i>	<i>Pycnonotuscafer</i>	IV	LC
23.	<i>Himalayan Bulbul</i>	<i>Pycnonotusleucogenys</i>	IV	LC
24.	<i>Alexandrine Parakeet</i>	<i>Psittaculaeupatria</i>	IV	LC
25.	<i>Spotted Dove</i>	<i>Streptopeliachinensis</i>	IV	LC
26.	<i>Red-wattled Lapwing</i>	<i>Vanellusindicus</i>	IV	LC
27.	<i>Red junglefowl</i>	<i>Gallus gallus</i>	IV	LC
28.	<i>Asian barred owlet</i>	<i>Glaucidiumcuculoides</i>	IV	LC
29.	<i>Rusty Tail Flycatcher</i>	<i>Ficedularuficauda</i>	IV	LC
30.	<i>Laughing Thrush</i>	<i>Pterorhinusalbogularis</i>	IV	LC
BUTTERFLY SPECIES				
2	<i>Threering plain</i>	<i>Ypthimalycuslycus</i>	II	---
3	<i>Keeled Apollo</i>	<i>Parnassiusjacquemontii</i>	II	---
4	<i>Great Blackvein</i>	<i>Aporianabellica</i>	IV	---
Note: LC: Least Concern, NA: Not Assessed, DD: Data deficient, 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. Nearest protected area Binsar WLS is at a distance of more than 17 km. Two species scheduled under Schedule I of WPA, 1972 are reported in the Buffer Zone, Asiatic black bear and Indian Leopard.

3.12SOCIO-ECONOMIC REPORT

INTRODUCTION

In this part of the EIA report an attempt has been made to assess the Socio-Economic impact of the proposed Soapstone mining project. It is a new project under Category-“B1”. As per EIA Notification dated 14th September, 2006 and its amended thereof. The soapstone will be extracted by Open cast manual cum semi mechanized method.

SOCIO-ECONOMIC IMPACT ASSESSMENT

Socio-Economic Impact Assessment (SEIA) refers to the systematic analysis of various social and economic characteristics of the human beings living in the geographical / study area around the proposed project location. SEIA is carried out separately but concurrently

with Environment Impact Assessment (EIA) study. The SEIA focuses on the likely effects of the project on social and economic well-being of the community. The impact(s) may be direct or indirect, positive or negative. In this Chapter of the EIA Report an attempt has been made to assess the composite Socio-Economic Impact of the project.

STEPS TAKEN TO PREPARE THE SEIA REPORT

Various steps taken to prepare the SEIA report were as follows

- Literature review
- Identification of habitations in the study area with the help of Google earth
- Visit to project site
- Collection of secondary data
- Planning and designing of the field survey for collection of primary data
- Formulation of Data collection tools (Schedule/Questionnaire)
- Field testing of Schedule/Questionnaire through a pilot survey
- Briefing of field staff
- Conduct of field work in sample villages and households
- Scrutiny of filled-in-schedules
- Data processing and tabulation
- Data analysis and preparation of report

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 $n = \sqrt{\{(1.96 * \sigma) / \Delta\}^2}$; 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.

STUDY AREA

The proposed Soapstone mining project is located in near mine site & Bageshwar district. The entire study area is spread over in district Bageshwar. As many as 203 villages are located in the study area and there is no urban area. The Sub- district wise distribution of villages in the Study Area is given in the table below:

Table 3.17: Sub-district wise distribution of villages in the Study Area

Sr. No	Name of the Sub-district	Number of villages
State Uttarakhand, District Bageshwar		
1	Bageshwar	82
2	Garud	5
3	Kanda	76
4	Kapkot	40
Total		203

Table 3.18: Distribution of Habitations (villages) based on number of Households

Sr. No.	Range of Households	Number of villages
01	< 50	200
02	50-100	218
03	100-200	212
04	200-300	196
05	300 -500	214
06	>500	269
Total		1309

The land use pattern of the study area is given in the table and figure below:

Table 3.19: Land use pattern of the Study Area

SI. No	Description	Area (ha)	Area in %
1	Agriculture land	3438.67	10.41
2	Open land	289.41	0.88
3	River	234.18	0.71

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4	Settlements	59.89	0.18
5	Forest	28926.53	87.60
6	Vegetation	74.16	0.22
Total		33022.84	100.00

I. BASELINE DATA

Baseline data refers to basic information collected before a project / scheme is implemented. It is used later to provide a comparison for assessing impact of the project. Any attempt to collect base line data while undertaking impact assessment study is faced with recall errors. The present report is provided with following base line data for the study area as a whole.

Table 3.20: Demographic Particulars of the Study Area of Soapstone Mining Project at Bageshwar, Uttarakhand

Sr. No.	Description	Number	Percentage to Respective totals
1	Gender wise total Population of the Study area	55259	100
	Male	26563	48.1
	Female	28696	51.9
	Sex Ratio (No. of females per 1000 males)	1080	
2	Gender wise total Population (0-6 age group)	7428	100
	Male	3914	52.7
	Female	3514	47.3
	SexRatioof0-6agegrouppopulation(No. of females per 1000males)	898	
3	NumberofHouseholdsandhousehold size for the studyarea	1262	1
	Average House Hold size for the study area as a whole	4	
	Highest Household size in the study area	9	
	Lowest Household size in the study area	3	
4	Total Population of Schedule Caste Community in the study area	15571	100
	Male	7799	50.1
	Female	7772	49.9
	Sex Ratio (No. of females per 1000 males)	997	
	Total Population of Schedule Tribe Community	776	100

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, **Village:** Khuldaudi,
Tehsil & District: Bageshwar, **State:** Uttarakhand

CHAPTER 3

BASELINE ENVIRONMENT STATUS

5	Male	366	47.2
	Female	410	52.8
	Sex Ratio (No. of females per 1000 males)	1120	
6	Total population of General Community (including OBC)	38912	100
	Male	18398	47.3
	Female	20514	52.7
	Sex Ratio of General Community population (including OBC) (No. of females per 1000 males)	1115	
7	Total Literates in the study area	38277	100
	Male	20914	54.6
	Female	17363	45.4
	Over all literacy rate in the study area	80.0	
	Male	92.3	
	Female	69.0	
	Gender gap in literacy rate	23.4	
8	Total Workers in the study area	27741	100
	Male	12991	46.8
	Female	14750	53.2
	Overall Gender Gap in work participation rate	6.4	
	Overall Dependency Rate of Non-workers over workers	99.2	
9	Total Main Workers in the study area	18651	100
	Male	8736	46.8
	Female	9915	53.2
	Over all gender gap in work participation rate of main workers	6.4	
10	Total Marginal Workers in the study area	9090	100
	Male	4255	46.8
	Female	4835	53.2
	Overall gender gap in work participation rate of Marginal workers	6.4	
11	Total Household Industrial Workers in the Study Area	658	100
	Male	344	52.3
	Female	314	47.7

**BASELINE ENVIRONMENT
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12	Total Agricultural Workers in the study Area	22257	100
	Male	8776	39.4
	Female	13481	60.6
13	Total Cultivators in the Study Area	19822	100
	Male	7389	37.3
	Female	12433	62.7
14	Total Agricultural Labour in the Study Area	2435	100
	Male	1387	57.0
	Female	1048	43.0
15	Total 'Other Workers' in the Study Area	4826	100
	Male	3871	80.2
	Female	955	19.8

Various amenities available in the study area are given in the table below:

Table 3.21: Amenities available in the Study Area

SI. No	Amenities	Type
1	Educational Institutions	Primary School
		Middle school
		Secondary School
		Senior Secondary School
		Other School
		Adult Literacy Center
		College
2	Health facilities	Allopathic Hospital
SI. No	Amenities	Type
		Ayurvedic Hospital
		Allopathic Dispensary
		Ayurvedic Dispensary
		Maternity Child Welfare Centre
		Maternity Home
		Child welfare Centre
		Health Centre
		Primary Health Centre
		Primary Health Sub Centre
		Registered Medical Practicenors
		Community Health Workers
3	Drinking Water	Canal

		Hand pump
		Tank
		River
		Spring
		Tap
		Lake
		Other sources of drinking water
4	Electricity	Power for domestic uses Only
		Power for Domestic and Agricultural uses
		Power for Domestic, Agricultural and other uses
		Power for All uses
5	Approach Road	Only Paved Roads
		Only Mud Roads
		Only Foot Road (Pagdandi)
		Paved and Foot Road
		Paved, Mud and Foot Road (Pagdandi)
		Mud and Foot Road (Pagdandi)
6	Banks & Credit Societies	Commercial bank
		Co-operative Bank
		Agriculture Credit Society
SI. No	Amenities	Type
7	Communication Facilities	Bus Services
8	Post and Telephone	Number of Post Offices
		Landline Phones

SOCIO-ECONOMIC IMPACT ASSESSMENT

Impact on Population Composition

No impact is envisaged on the population composition of the study area as there will be no in-migration or out-migration of villagers. Those who will be engaged in Soapstone mining will be recruited locally.

Impact on Employment

For extraction of Soapstone the project proponent has ensured that only local people will be recruited for the operation of the upcoming mining project. The exact number of people to be recruited will depend upon quantity of the minerals to be extracted over a period of time. In the initial period the number of such people will be less but gradually it will go up when the

production will increase in a phased manner. The project proponent has planned to recruit 47 local people for the operation of the upcoming mine. Of these, 43 will be recruited on piecemeal basis and the remaining four will be on regular basis. Besides providing direct employment there will be indirect employment in service sector. Though marginally, the dependency rate in the study area will decline by one percent with the commencement of the above soapstone mine. This is a positive impact of the project.

Increased Supply of Soapstone

Soapstone Powder is an important industrial mineral. The soapstone powder should be milky white, free from impurities and soapy feel. It is widely used as basic material in Cosmetic and Paper industry. It is an important raw material in the manufacture of talc in the cosmetic industry. It is also used in rubber, paper plastic and other allied industries. There is always a good demand for soapstone for industrial uses. With the commencement of the proposed mining project, the supply of soapstone powder in the domestic market will increase by about 25784 tonnes per annum. This is a direct and positive impact of the upcoming mining project.

Impact on Approach Roads

Movement of trucks and other vehicles to and from the quarry site is expected to increase substantially, when the operation of the mine will commence. The existing roads connecting the quarry with the national and state highways are mud roads and they are narrow. There will be mud slide and traffic bottle neck if these roads are not widened and their conditions are not improved by making them paved roads. Hence, there is a wide scope for road development in the area. This is a positive impact of the upcoming mining project.

Impact on Law & Order

Since the workers will attend to their duties from their residence and return to their homes after the day's work is over there will be no law & order problem as such. On the other hand, if the workers are migrants and live in shanties close to the mining area it may create law & order problem and ethnic issues. To meet any untoward incident one police post may be set up close to the project area.

Impact on Vulnerable Groups of People

No impact is envisaged on vulnerable groups of people that include hospital patients, children, pregnant women and elderly persons. There will be no re-habilitation and re-settlement issues that may adversely affect the people living adjoining the mine lease area. The social welfare activities to be taken up by the mine owner will definitely make positive impact on the living conditions of people including those who fall under vulnerable groups.

Income to Government

The proposed soapstone mining will bring income for the state government in the form of royalty, dead rent and taxes. This is a positive impact of the project.

Impact on Health

Extraction of soapstone may pose serious health risks if it is not handled carefully. It can affect the body adversely if it is inhaled or if it comes in contact with eyes or skin. Exposure to soapstone may damage the lungs. Shortness of breath, cough, enlargement of the ends of the fingers and heart failure may occur due to continuous exposure to soapstone dust. There are reports of cancer cases among the workers engaged in mining of soapstone. Hence, preventive measures should be taken to protect oneself from the exposure of soapstone, while working in a soapstone mine. This is a negative impact of soapstone mining. The project proponent will undertake the following preventive measures, in order to protect the workers from the exposure of soapstone:

1) Consult to Physician

A physician will be consulted if anyone develops any sign or symptom caused due to exposure to soapstone.

2) Regular medical surveillances

Regular medical surveillances of the workers will be made. In case anyone get adversely affected due to soapstone mining the miner will be medically examined and provided medical assistances regularly. They will also be medically checked annually.

3) Provision of First Aid at mining site

Extraction of soap stones, from the mining site may pose serious health risks due to dust. To meet any emergency during extraction of the minerals from the mining site and subsequent loading in the transport vehicles, provision for First Aid will be made by the project proponent. Before the affected person is removed to a doctor or health institution for necessary medical aid, the miner will be provided with First Aid.

4) Tie up with the nearest PHC for medical help

At present there are no adequate health facilities available in the mining village. To meet the medical needs of the mine workers, tie-ups with nearest hospital or Primary Health Center (PHC) will be made. Few beds will exclusively be reserved for the mine workers in the above health institutions. This will ensure timely medical aid to the affected persons.

5) Supply of Masks and Gloves

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

6) Health Camps

Health Camps will be organized at regular intervals preferably in every quarter. Further, free medical facilities will be made available to the workers and their family members.

7) Administration of Anti-venom injections

Provision of Anti-venom therapy will be made available at the nearest health institution. Anti-venom injections will be administered to the mine workers in case of snake, spider and insect bites, while working in the mines.

8) Special telephone number

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

9) Special Group Insurance Scheme

All the mine workers will be covered under a Group Insurance Scheme of LIC or any other Insurance company.

CONCLUSION

The implementation of the soapstone mining project will generate both direct and indirect employment. It will also promote legally valid mining in the area and bring income to the state exchequer. It is expected that intending entrepreneurs will venture to set up soapstone based industrial units in the near future making the area a mixed society, dependent on industry, trade and business. At present agriculture is the main occupation of the people as eighty percent of the total working population depends on it. With the implementation of the proposed mining project the occupational pattern of the people in the area may change making more people engaged

in industrial and business activities rather in agriculture. Thus there will be a gradual shifting of population from agricultural sector to mining and industry. Due to industrialization of the area, employment opportunities will further increase.

The study area is still lacking in infrastructure. It is expected that the same will improve to a great extent due to proposed mining project and associated industrial and business activities. It is therefore suggested that the commencement of the mining operation at may be taken up on priority basis as employment opportunists are intended for the local aspirants.

CHAPTER-4

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 Details of the Investigated Environmental Impacts

This Chapter provides a brief overview of the potential impacts on various environmental components due to the proposed opencast mining activities. The opencast mining operations in general cause environmental degradation and if adequate control measures are not taken to prevent/mitigate the adverse environmental impacts, these operations may cause irreversible damage to the eco- system. The environmental parameters most commonly affected by mining activities are:

- Topography and drainage;
- Air quality including Climate
- Noise levels
- Water resources and quality;
- Land use Pattern
- Soil quality
- Flora and Fauna
- Socio-Economic conditions
- Occupational Health

Various environmental impacts, which have been identified due to the mining activities, are discussed in the following sections and mitigation measures are suggested.

4.2 Impact on Drainage

The surrounding area characterized by steep slopes, narrow ridges & forms the mountainous topography. The rainy water flows through the slopes & meet the seasonal drainages. All the seasonal drainages meet & ultimately influence in to river which is the main catchment zone within the buffer area. Garland drains will be all along the proposed pits will be made for proper drainage. Thus, there will be no impact on drainage pattern of the area

4.3 WATER ENVIRONMENT

(a) Impact on Water Resources & Surface Water Resources:

The topography of the area will not be largely changed in view of the proposed concurrent reclamation. No surface water body exists and passes through the lease area. During the mining activity period, there is a possibility of mixing of freshly disturbed material with the rain water. To take care of such events, retaining walls have been provided along the backfilled pits and

along the soil and inter-burden dumps. Before the commencement of rain all the mining pits shall be backfilled so that rain water does not accumulate in the mining pits. Rain water will be channelized along the slopes it shall not carry suspension to natural streams.

Groundwater Resources: The water table in hills is usually very deep and does not have any relevance with mining activities. However, concurrent restoration to original topography will not disturb the percolating water.

The Pre-monsoon Depth to Water (DTW) ranges from 9.06 to 60.75 m bgl whereas the Post- monsoon DTW ranges from 1.02 to 55.90 m bgl.

Table-4.1 Site Elevation and Working Depth Details

Particulars	Details
Elevation	1430.20mRL – 1238.10mRL
Ground Water Table	9.06 to 60.75m bgl
Ultimate working depth	In pit I 18m (from 1302mRL to 1284mRL) in pit II, 12m (From 1326mRL to 1314mRL).

(b) Impact on Water Quality

Mining activities cause adverse impacts due to mine drainage, siltation due to storm water and contaminated water from workshops and domestic sewage water. Various components have been identified for study of impact of the mine operations.

(c) Impact on Surface Water Quality

As there no perennial and seasonal *nalla* or water body within the leasehold area, therefore no change will be observed due to mining operation.

Due to mining activities it is anticipated that over burden and mineral fines flowing with water may cause siltation and affect the flow of drainage courses. Mining activity and degradation of land and subsequent flow of water is likely to disturb the drainage course. The quality of water flowing in these drainages will also be polluted. Therefore to safeguard the existing drainages in the area following precautions are proposed:-

- The mining pits will be properly benched; and waste dumps will be properly terraced with retaining walls at the toe so that there is no land slide during the rains.
- Premature backfilling shall be carried out before the commencement of monsoon & all the quantities of interburden & soil shall be filled back in the mining pit, leveled & it shall be used for agricultural purpose
- The benches of mining pits, terraces of waste dumps will have grass plantation during the

- rains and if possible local cultivators will be allowed to grow vegetables and other seasonal crops so that it will also reduce the land degradation and will provide additional income to the local people. Cultivated land reduces the soil erosion and this aspect will be utilized for reducing the soil erosion and also the effect of siltation on drainages.
- The over burden and mineral is non-toxic and not going to have any effect on quality of water flowing in these drainages.
- Check dams will also be constructed so that speed of water flowing during rains does not increase abruptly to cause land slide and degradation of land and these check dams will also works for settlement of the silts before the clean water flows out of the lease area.
- Regular monitoring of quality of water and surface water flow in these drainages are proposed to take care of adverse impact due to mining.

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

No adverse impact was noticed. Backfilling will be done before the onset of monsoon.

(d) Impact on Ground Water Quality

The proposed bottom level of working pit will not affect the water table. Extraction of water for mining operation is not anticipated. Therefore project will not affect the ground hydrogeology and water depth. The source of water will be under the govt. scheme Swajal Dhara Yojna.

(e) Wastewater Generation, Treatment & Disposal

The total water consumption in the proposed Soapstone Mine is about 6.61 KLD. The water is used in the following purposes.

- For dust suppression
- For domestic consumption
- For greenbelt development

It is proposed to obtain water for drinking and plantation from spring under the scheme of Swajal Dhara (Govt. of India).

There will be no waste water generation from Mining activities. However, a small amount of domestic wastewater generation will happen as a result of water used by humans. The domestic and service building effluents will be disposed through eco-friendly mobile toilet.

There will no settlement near the site as the workers will be hired from nearby villages so no significant liquid effluent will be generated.

(f) Surface Water

There is a possibility of mixing of freshly disturbed material with the rain water. To take care of such happenings, retaining walls have been provided along the backfilled pits and along

the soil and interburden dumps.

Monitoring of water will be carried out periodically. Water analysis will be carried out seasonally.

(g) Ground Water Pollution

Regular monitoring of water levels and quality in the existing open wells and bore wells in the vicinity will be carried out. If found necessary, additional observation wells will be sunk for monitoring the water levels and quality around the mine representing both upstream and downstream conditions. No springs are reported within the site, therefore chances of surface runoff mixing with ground water is negligible.

Mostly local labors are employed for mining operation, thus small value of waste water from domestic source are anticipated. The waste water generated from toilets at site will be routed to septic tanks.

4.4 IMPACT ON LANDUSE

Land use Pattern in Core Zone

The proposed opencast mine will result in change of land use pattern of the ML area. The land degradation is expected during mining activities like excavation, overburden dumping, soil extraction etc. Land requirement for the project has been assessed considering functional needs.

The potential adverse impact of opencast mining is the change in land use pattern. So reclamation of mined out land will be given due importance as a step for land resource management.

4.5 IMPACT ON SOIL

The quantum of soil removed during the mining will be very less. Soil will lose its compactness. Present, End of the 25 years & Conceptual land use pattern land use pattern is given in mine plan attached as annexure III.

4.6 IMPACT ON AIR QUALITY

Proposed Soapstone mine where PM 10 will be the main pollutants generated in mining activities. The emissions of Sulphur dioxide (SO₂), Oxides of Nitrogen (NO_x) contributed by diesel operated equipment and vehicles movement were considered marginal as branded make and vehicles with PUC certificate will be operated only. Fugitive dust and particulates are major pollutants which will occur in the mining activities. Fugitive emissions will be settled by 70-80% by use of multiple water sprinklers. Prediction of impacts on air environment will be made with proposed production and net increase in PM 10 emissions at the proposed site and at the 10

km radius of study area due to mining activities.

Air pollution sources in the operating mine was classified into two categories

- Impact due to wind erosion & road maintenance
- Loading and unloading of mineral and OB,IB
- Transportation on the mule and haul road

Water tankers with spraying arrangement of sprinklers with high efficiency will be used for regular water sprinkling on the mule and haul roads to ensure effective dust suppression. The trucks and tippers are well maintained so that exhaust smoke does not contribute abnormal values of noxious gases and un-burnthydrocarbons.

(a) Emissions Details

Road maintenance due to mining activities, loading - unloading and transportation of ores and overburden, interburden will be the main polluting sources in the proposed mining activities releasing Particulate Matter (PM₁₀) affecting Ambient Air Quality of the area. Transportation of the ore by tucks on the haul road was calculated by the area source which was combination of line sources with each truck loaded with ore transported over the haul road of the mining area.

4.7 PROPOSED MITIGATION MEASURES FOR DUST SUPPRESSION

Soapstone is a talcose rock mineral composed of hydrous magnesium silicate: $3 \text{MgO} \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O}$. The specific gravity is around 1. Therefore emissions due to mineral handling during mining operation are not much and restricted to the lease area only. Air pollution is caused mainly due to dust generation added with gaseous emission from transportation activities along with mining operation like evacuation, loading, haulage etc. Proper mitigation measures will be practiced during mining activities to control air pollution load below the prescribed limits. The same are as follows:

Control of Fugitive Emissions

- Use of Personal Protection Equipments (PPE) like dust masks, ear plugs etc. by the mine workers.
- No Blasting will be done.
- Regular water sprinkling on haul roads & loading points will be carried out.
- Development of green belt/plantation around the lease boundary, roads, dumps etc.
- Ambient Air Quality Monitoring will be conducted on regularly basis to assess the quality of ambient air.

Prevention and control of Gaseous Pollution

- In mining activities, the sources of gaseous emissions would be through truck movements
- Proper maintenance of vehicles improves combustion process & makes reduction in

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the pollution. Good maintenance and monitoring of fuel and oil will not allow significant addition in the gaseous emission.

- All the vehicles used will have PUC certificate.
- Taxi mode of vehicles carrying mined out material while loading and unloading will not be allowed.
- Vehicles carrying mineral will be covered with tarpaulin sheet. This will prevent dust emission.

The sources of pollutants from mining activities are given in **Table-4.3**

Table-4.3 Sources of Pollutants

Sr. No.	Source	Type of Pollutant
1	Transport of Overburden or soil for dumping/ backfill	SPM
2	Dumping	SPM
3	Loading of ore	SPM
4	Transportation of ore	SPM, NO _x

4.8 IMPACT ON NOISE ENVIRONMENT

Noise Environment

As mining will be done by machine, noise will only be generated due evacuation, 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 impact of noise on the villages is negligible as the villages are far located from the mine workings. Since there is no involvement of machinery, the impact of noise levels will be minimal.

(a) Noise Abatement and Control

In this mine the noise level will be up to tolerable limit (70 dB (A)) and the noise level can be reduced by:

- Proper maintenance, oiling and greasing of transport vehicles at regular intervals will be done to reduce the generation of noise.
- Adequate silencers will be provided in all the diesel engines.
- Plantation along the sides of approach roads, around office building and mine area will be done to minimize the propagation of noise.
- Personal Protective Equipments (PPE) like earmuffs/earplugs will be provided to all operators and employees working near mining machineries or at higher noise zone.

- Periodical noise level monitoring will be done.

Frequency levels and associated mental and physical response of humans are given in Table-4.4.

Table-4.4: Noise Exposure Levels & Its Effects

Noise Levels	Exposure Time	Effects
85	Continuous	Safe
85-90	Continuous	Annoyance and irritation
90-100	Short term	Temporary shift in hearing threshold, generally with complete recovery
Above 100	Continuous	Permanent loss of hearing
	Short term	Permanent hearing loss can be avoided
100-110	Several years	Permanent deafness
110-120	Few months	Permanent deafness
120	Short term	Extreme discomfort
140	Short term	Discomfort with actual pain
150 and above	Single exposure	Mechanical damage to the ear

4.9 GREENBELT AND PLANTATION

Proposed Plantation at the Mine Site

The main aim of plantation in the mined out areas is to stabilize the land to protect it from rain wash off and wind erosion. The plantation scheme broadly covers the following areas:

Greenbelt around peripheral portions of the ML and Plantation will be raised along the boundaries of the mining lease by planting the native species around ML area, backfilled and reclaimed area, around water body, etc. in consultation with the local DFO/Agriculture department. Around 2500 plants will be planted in the 5 year of mining period.

Greenbelt Development in ML area

The entire plantation will be done on the periphery of the reclaimed area. Precautionary measures will be taken for care of the forestation made by regular watering in the plantation area, to protect from grazing animals and proper manuring.

Trees to be planted: Peach (Khumani), Pears (Nashpati), Apricot (Aaru), Faliyat, Surai etc.

Shrubs: Kilmora, Hisalu, etc.

Further trees will be also selected from the plants recommended for afforestation is as per Guidelines for Developing Greenbelts, CPCB, and March2000.

Table-4.6: Species Suggested for Plantation

Sl.No.	Species	Family	Habit
1.	<i>Alternantheraparonychioides</i>	Amaranthaceae	Herb
2.	<i>Alternantherapungens</i>	Amaranthaceae	Herb
3.	<i>Amaranthusspinosus</i>	Amaranthaceae	Herb
4.	<i>Colocasiaesculenta</i>	Araceae	Herb
5.	<i>Ageratum conyzoides</i>	Asteraceae	Herb
6.	<i>Grangeamaderaspatana</i>	Asteraceae	Herb
7.	<i>Partheniumhysterophorus</i>	Asteraceae	Herb
8.	<i>Cassia tora</i>	Fabaceae	Herb
9.	<i>Cannabis sativa</i>	Cannabaceae	Herb
10.	<i>Chenopodium album</i>	Chenopodiaceae	Herb
11.	<i>Argemone Mexicana</i>	Papaveraceae	Herb
12.	<i>Brachiaria ramose</i>	Poaceae	Herb
13.	<i>Cynodondactylon</i>	Poaceae	Herb
14.	<i>Eleusineindica</i>	Poaceae	Herb
15.	<i>Eragrostistenella</i>	Poaceae	Herb
16.	<i>Saccharumspontaneum</i>	Poaceae	Herb
17.	<i>Physalis minima</i>	Solanaceae	Herb
18.	<i>Calotropisprocera</i>	Asclepiadaceae	Shrub
19.	<i>Cassia occidentalis</i>	Fabaceae	Shrub
20.	<i>Croton bonplandianum</i>	Euphorbiaceae	Shrub
21.	<i>Abutilon indicum</i>	Malvaceae	Shrub
22.	<i>Bougainvillea spectabilis</i>	Nyctaginaceae	Shrub
23.	<i>Ziziphusmauritiana</i>	Rhamnaceae	Shrub
24.	<i>Daturainnoxia</i>	Solanaceae	Shrub
25.	<i>Solanumvirginianum</i>	Solanaceae	Shrub
26.	<i>Lantana camara</i>	Verbenaceae	Shrub
27.	<i>Berberis vulgaris</i>	Berberidaceae	Shrub
28.	<i>Mangiferaindica</i>	Anacardiaceae	Tree
29.	<i>Ficusracemosa</i>	Moraceae	Tree
30.	<i>Cassia fistula</i>	Fabaceae	Tree
31.	<i>Ricinuscommunis</i>	Euphorbiaceae	Tree
32.	<i>Albizialebeck</i>	Fabaceae	Tree

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33.	<i>Bauhinia acuminata</i>	Fabaceae	Tree
34.	<i>Buteamonosperma</i>	Fabaceae	Tree
35.	<i>Bombaxceiba</i>	Malvaceae	Tree
36.	<i>Azadirachta indica</i>	Meliaceae	Tree
37.	<i>Quercusleucotricophora</i>	Lauraceae	Tree
38.	<i>Meliaazedarach</i>	Meliaceae	Tree
39.	<i>Luecenaleucocephala</i>	Fabaceae	Tree
40.	<i>Bauhinia variegata</i>	Fabaceae	Tree
41.	<i>Terminaliabellerica</i>	Combretaceae	Tree
42.	<i>Terminaliachebula</i>	Combretaceae	Tree
43.	<i>Morus alba</i>	Moraceae	Tree
44.	<i>Delonixregia</i>	Fabaceae	Tree
45.	<i>Pinusroxburgii</i>	Pinaceae	Tree
46.	<i>Celtisaustralis</i>	Cannabaceae	Tree
47.	<i>Grewiaoptiva</i>	Tiliaceae	Tree
48.	<i>Holopteleaintegrifolia</i>	Ulmaceae	Tree

4.10 BIOLOGICAL ENVIRONMENT

The baseline flora and fauna has been depicted in Chapter-3. There is no National Parks, Sanctuary, Breeding, roosting places or ecologically sensitive areas within the 10 km periphery of the mine lease area. However, most of the area surrounding to project site are covered with forest land.

No loss of forest resource is envisaged due to the project. No medicinal plants exist in the area.

Impact 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. Save the flora/fauna around the project area, is one of the basic objective of present project. For this, mine owner agency will plant a good roadside plantation along both side of the mine road.

4.11 SOCIO – ECONOMIC ENVIRONMENT

The mine area does not cover any habitation. Hence the mining activity does not involve any displacement of human settlement. The mining operation will not disturb/ relocate any village or need resettlement. Thus no adverse impact is anticipated.

The impact of mining activity in the area is positive on the socio-economic environment of the region. Proposed project will provide employment to local population and preference will be given to the local people whenever there is requirement of man power.

PROBABLE IMPACT ASSESSMENT

Impact on population composition

The impact of the proposed mining project on population composition will be marginal as there will be no major immigration of people from distant areas. Only few skilled and managerial staff will be recruited from outside and the rest will be recruited locally. The PP will ensure that all the unskilled workers deployed for mining activities are local recruits. Further, no mining operation will be carried till it is assured that local people has been recruited and deployed for mining operation.

Impact on employment generation

The proposed mining project is expected to provide Direct and Indirect employment opportunities to local people of different skills and trades. It is a positive impact that needs to be encouraged. It has been estimated that 47 workers of various categories will be employed directly. 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. Further, the project will provide indirect employment to people who will be involved in segregation of extracted mining materials, petty business and service oriented industries.

Impact on consumption pattern

The field survey has revealed that people in the study generally poverty ridden. Increased household income may slightly change and enhance the consumption pattern of few who are burdened with poverty.

Impact on road development

Movement of trucks and other vehicles to and fro the quarry is expected to increase, when mining will start. There is mule road connectivity from the quarry to existing road. The existing roads connecting the quarry with the state highways are mostly narrow mud roads. There will be mud slide and traffic bottle neck if these roads are not widened and their conditions are not improved by making them paved roads. Hence, there is ample scope for road development in and around the mining areas. It is suggested that concerned department in the Government of the state to undertake widening and strengthening of existing roads connecting the mining sites on priority basis. There should also be budgetary support for road development in and around the mining areas.

Impact on law & Order

As local people will be employed to run the quarry, no law & order problem is envisaged. It is expected that the workers will attend to their duties from their residence and return to their homes after the day's work is over. There would have been law & order problem if the workers were migrants and lived in shanties closed to the mining area.

4.12 OCCUPATIONAL HAZARDS AND SAFETY

Occupational safety and health is very closely related to productivity and good employer-employee relationship. The factors of occupational health in soapstone Mining project are mainly dust and land degradation. Safety of employees during operation and maintenance etc. shall be as per Mines rules and regulations.

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

- Provision of rest shelters for mine workers with amenities like drinking water etc.
- All safety measures like use of safety appliances, such as dust masks, helmets, shoes, safety awareness programs, awards, posters, slogans related to safety etc.
- Safety belts will be provided to workers on working on top benches.
- Training of employees for use of safety appliances and first aid in vocational training center.
- Regular maintenance and testing of all equipment as per manufacturers' guidelines.
- Periodical Medical Examination (PME) of all workers by a medical Officer
- First Aid facility is provided at the mine site.
- The mine area will be properly fenced to avoid any inadvertent entry in the mining pit.
- Warning boards and working hours will be displayed at conspicuous places.

4.13 PUBLIC HEALTH IMPLICATIONS

With the mitigation measures in relation to air pollution, water pollution, soil contamination and noise pollution proposed to be adopted at the mine along with green belt plantation along the periphery of Mining Lease boundary, it is expected that there will be no impact of mining on the population in the impact zone. However, the following measures shall be adopted:

Health check of all villagers in the immediate vicinity of the mine shall be carried out periodically. Surface water management shall be adopted to ensure that run-off from the mining area does not adversely affect natural water streams or other water bodies.

All water bodies e.g. wells and surface water sources in the vicinity of the mine, shall be

periodically tested for any pollution related to mining operations and remedial action taken, if warranted. Operators of all transport vehicles shall be instructed not to honk unnecessarily and not over speed while passing through villages or near schools.

4.14 CORPORATE SOCIAL RESPONSIBILITY

Corporate Social Responsibility (CSR) refers to responsibility of a company to ensure positive impact on environment, consumers, employees, communities, stakeholders and all other members of public sphere. The CSR activities are increasingly being taken up by the project proponents not only as fulfilling of mandatory provisions but also for the formation and or enhancement of brand image. Besides the above, CSR is seen more as a responsibility towards society rather than a business promotion activity. It is the need of the day for expansion of occupational welfare. The activities to be undertaken for the local people under CSR have already been identified. It is expected that this will improve the socio-economic status of the local people and at the same time the popularity of the mining project will enhance. It is proposed to spend five percent of the total cost of the project for the benefits of the local community under CSR activities.. It is proposed to spend the above amount during the first five years of the commissioning of the mining project. Based on ‘Community Needs Survey’ conducted in the study area by the Consultant appointed by the company the following activities are proposed to be taken up for the benefits of the local community.

Table 4.7: Funds allocation of for the various activities proposed to be taken up under CER programme

S. No.	Activity	Cost per Unit (Rs)	Quantity	Total (Rs.)
1	Installation of Solar street light in vill -Khuldaudi	15,000	10	1,50,000
2.	Construction of Toilets for Women in vill -Khuldaudi	80,000	0	1,60,000
3.	Distribute Stationary nearby School	11065	-	11065
	Total Proposed CER Cost			3,21,065

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

CHAPTER-5

ANALYSIS OF ALTERNATIVE TECHNOLOGY AND SITE

5.1 Site Alternatives under Consideration

The Soapstone 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.

The Opencast Mechanized method will be adopted because of the following reasons: The opencast mining operations ensure higher mineral conservation.

The method used for mining is efficient for Soapstone mining, so no alternative mining method is proposed. The Soapstone will be excavated with the help of crow bar & spade and stacked separately. Sorting & sizing of mineral will be carried out manually. Soapstone is a soft material; therefore no drilling & blasting shall be required. No further beneficiation shall be undertaken during first five years. Different grade of Soapstone will be filled into 50 kg plastic bags & transported the road side by mules. From road side the Soapstone bags will be loaded into trucks manually & transport to destination.

CHAPTER-6

ENVIRONMENTAL MONITORING PROGRAMME

6.1 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.

6.2 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.

6.3 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 will 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.

6.4 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 liaison activities or even assessment of complaints. The environmental monitoring will be conducted in the mine operations as follows:

- Air quality;
- Water and waste water quality;
- Noise levels;
- Soil Quality; and

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ENVIRONMENTAL MONITORING PROGRAMME

- Greenbelt Development

The details of post project monitoring is presented in **Table 6.2**

6.5 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	Test Procedure
	Network	Frequency	Method	
A. Air Environment				
Pollutants	5 locations in the project impact area (Minimum 2 Locations in upwind side, 3 sites in Downwind side / impact zone and 1 in core zone)	Once in a season.	Gravimetric method	-
PM2.5, PM10			Gravimetric method	-
SO2			EPA Modified West & Geake method	Absorption inPotassium Tetra Chloromercurate followed by Colorimetric estimation using P- Rosaniline hydrochloride and Formaldehyde (IS: 5182 Part - II).
NO2			Arsenite modified Jacob Hochheiser	Absorption indil. NaOH and then estimated colorimetrically with sulphanilamide and N (I-Nephthyle) Ethylene diamineDihydrochlori deand HydrogenPeroxide (CPCB Method).
B. Water Environment				
pH, Turbidity,	Set of grab	Diurnal and	As per IS	Samples for water

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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	samples during pre and post- monsoon for ground and surface Water in the vicinity.	Season wise	10500	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 per CPCB 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,				

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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 with Govt. Agencies

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

The complete mining operation will be carried out under the management control and direction of a qualified mine manager. Moreover, mining staff will be sent to refresher courses from time to time to keep them alert.

In order to take care of above hazard/disasters, the following control measures will be adopted:

- All safety precautions and provisions of Mine Act 1951, Metalliferous Mines Regulations 1961 and Mines Rules, 1955 will be strictly followed during all mining operations;
- Entry of unauthorized persons will be prohibited;
- Firefighting and first-aid provisions in the mines office complex and mining area;
- Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use;
- Training programmes for all the employees working in hazardous premises; Under Mines rules all employees of mines shall have to undergo the training at a regular interval;
- Working of mine, as per approved plans and regularly updating the mine plans;
- Regular maintenance and testing of all mining equipment as per manufacturer's guidelines;
- Suppression of dust on the haulage roads and loading & unloading points;
- Increasing the awareness of safety and disaster through competitions, posters and other similar drives.

Blasting

No drilling & blasting is proposed as mineral is very soft in nature.

Overburden & Interburden

The overburden and interburden dumps may cause landslides. High overburden dumps created at the quarry edge may cause sliding of the overburden and interburden dump or may cause failure of the pit slope due to excessive loading, thereby causing loss of life and property. Siltation of surface water may also cause run-off from overburden and interburden dumps.

Machinery

Machinery is involved, entire operation will be mechanized, and accident during transport by

trucks is often attributable to mechanical failures and human errors.

Water Logging

Water logging in the mine site can be avoided by adopting following measures:

- Due care will be taken to provide retaining/toe wall around the pits.
- Proper drainage will be maintained to eliminate inundation of working pits during rains from run-off water.
- There is no danger of flood or inundation as the ground level.
- Mining operations are not carried below the ground water table; therefore, there will be no disturbance to ground water quality due to mining activity.

Natural resource conservation

- A green belt will be developed so that minimum soil erosion takes place.
- The excavated soil will be refilled in order to minimize the impact on environment.
- In any case the natural habitat of the existing flora and fauna will not be disturbed.
- Use of traditional knowledge in all aspects of conservation.
- Water conservation techniques will be employed.
- Time to time analysis of the soil, water resources etc will be done in order to analyze the negative impacts of mining activities on the environment.
- To prepare management plans for village landscapes. Villages to be seen as landscapes of diverse elements such as forests, scrub, grassland, streams/river, ponds etc.

Earthquake Management Plan

It will be open cast mechanized mine. Excavator shall be deployed for the removal of overburden & interburden. The overburden/interburden will be dumped separately into the dump yard secured with toe walls & later on all quantities shall be used in backfilling in the mined out pits. Mining shall be carried out in two pits viz. pit I & II. The width of benches shall be kept 8m; height of benches shall be kept 6m with face slope 68°. The soapstone will be extracted manually with the help of crow bar, chisels, pickaxe, hammers, spade etc as well as with deployment of excavator. Soapstone is soft mineral therefore no drilling & blasting shall be required. No further beneficiation will be required except breaking & sorting. The different grade of soapstone will be filled into 50 kg plastic bags & transported up to road side yard manually. From road side the soapstone bags will be loaded into trucks through manually and transported to nearest market.

Flood Management Plan

- This is a soapstone mining project and the site is not close by to a water body so water bodies in the area will not be disturbed.

Natural resource conservation

- A green belt will be developed so that minimum soil erosion takes place.
- The excavated soil will be spread over the backfilled mined out area in order to minimize the impact on environment.
- In any case the natural habitats of the existing flora and fauna will not be disturbed.
- Use of traditional knowledge in all aspects of conservation shall be utilized.
- Water conservation techniques will be employed.
- Time to time analysis of the soil, water resources etc will be done in order to analyze the negative impacts of mining activities on the environment.
- To prepare management plans for village landscapes, villages to be seen as landscapes of diverse elements such as forests, scrub, grassland, streams/river, ponds etc. The dynamics of the village as an ecosystem to be assessed, corridors to be devised between major natural landscape elements, so as to facilitate movement of species.

Safety Measures

➤ Safety Measures at the proposed Open Cast Mining Project

It will be opencast mechanized mine. An excavator shall be deployed for the removal of overburden. Mining shall be carried out in two pits viz. pit I & pit II. The height & width of benches shall be kept 6.0m & 8.0m with face slope 68°. The waste to be generated shall be dumped towards slope side of working pits & dumping shall be carried out in single terrace.

➤ Measures Suggested to Avoid Accidents due to Blasting

- No drilling & blasting is proposed as mineral is very soft in nature.

➤ Measures to Prevent the Danger of Overburden

- To prevent the failure of overburden slopes, especially during the rainy season, proper garland drain & bund are constructed around the dump.

➤ Measures to Prevent Accidents due to Trucks and Tippers

- All transportation within the main working area should be carried out under the direct supervision and control of the management.
- The vehicles must be maintained in good repairs and checked thoroughly at least once a week by a competent person authorized for this purpose by the management;
- Broad signs should be provided at each and every turning point specially for the guidance of the drivers at night;
- To avoid dangers while reversing the trackless vehicles, especially at the embankment and tripping points, all areas for reversing of lorries should, as far as possible, be made man free, and there should be a light and sound device to indicate reversing of trucks;

-
- A statutory provision of the fence, constant education, training etc. will go a long way in reducing the incidence of such accidents.

7.2 Disaster Management Plan

Objectives of Disaster Management Plan

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation and restoration of production. For effective implementation of the Disaster Management Plan, it should be widely circulated and personnel training should be given. The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

- Effect the rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Secure the safe rehabilitation of affected area;

In effect, it is to optimize operational efficiency to rescue rehabilitation and render medical help and to restore normalcy.

Fire Fighting Facilities

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

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.

CHAPTER 8

ENVIRONMENT MANAGEMENT PLAN

The environmental management plan consists of the set of mitigation, management, monitoring and institutional measures to be taken during the implementation and operation of the project, to eliminate adverse environmental impacts or reduce them to acceptable levels. The present environmental management plan addresses the components of environment, which are likely to be affected by the different operations in a mine area.

The aims of EMP are:

- Overall conservation of environment.
- Minimization of waste generation and pollution.
- Judicious use of natural resources and water.
- Safety, welfare and good health of the work force and population.
- Ensure effective operation of all control measures.
- Vigilance against probable disasters and accidents.
- Monitoring of cumulative and long time impacts.
- Ensure effective operation of all control measures.

8.1 Air Quality Management

Talc is a hydrous magnesium silicate. In trade, talc often includes: (i) the mineral talc in the form of flakes and fibres; (ii) steatite, the massive compact cryptocrystalline variety of high-grade talc; and (iii) soapstone, the massive talcose rock containing variable talc (usually 50%), soft and soapy to feel. Commercial talc may contain other minerals like quartz, calcite, dolomite, magnesite, serpentine, chlorite, tremolite and anthophyllite as impurities. The properties that give talc a wide variety of uses and markets are its extreme softness and smoothness, good lustre and sheen, high slip and lubricating property, low moisture content, ability to absorb oil and grease, chemical inertness, high fusion point, low electrical and heat conductivity, high dielectric strength, good retention for filler purposes, whiteness, good hiding power as pigment and high specific heat.

Control of Fugitive Emissions: Use of Personal Protection Equipments (PPE) like dust masks, ear plugs etc. by the mine workers.

- Regular water sprinkling on haul roads & loading points will be carried out.
- Development of green belt/plantation around the lease boundary, roads, dumps etc.
- Ambient Air Quality Monitoring will be conducted on regularly basis to assess the quality of ambient air.

Prevention and control of Gaseous Pollution

Proper maintenance of machines improves combustion process & makes reduction in the pollution. Good maintenance and monitoring of fuel and oil will not allow significant addition in the gaseous emission.

8.2 Noise Pollution Control

Noise Abatement and Control

- Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce the generation of noise.
- Adequate silencers will be provided in all the diesel engines.
- Plantation along the sides of approach roads and mine area will be done to minimize the propagation of noise.
- Personal Protective Equipments (PPE) like earmuffs/earplugs will be provided to all operators and employees working near mining machineries or at higher noise zone.
- Periodical noise level monitoring will be done.

8.3 Water Quality Management

Water for drinking and operations is required to be 7.84 KLD. It is proposed to obtain water for drinking and plantation from spring under the scheme of Swajal Dhara (Govt. of India).

8.4 Waste Management

Nature of waste: Top Soil

Selection of Dumping Site:

All the quantities of soil & interburden material to be generated will be used in the purpose of reclamation. The soil and interburden is stacked separately. The interburden will be filled back on the pit and later on soil will be spread over the interburden material to restore the maximum original topography of the area. Therefore soil stack and interburden material have not been proposed to be dumped separately.

8.5 Biological Management 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 beauty of the core and the buffer zone. To achieve this, it is planned to increase plantation activities. The basic objectives of plantation are as follows:-

- Improvement of Soil quality
- Quick vegetative cover to check soil erosion
- Improvement in mining site stability
- Conservation of biological diversity
- As dust receptor which likely to produce during mining

8.6 Greenbelt 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 belts have been planned with emphasis on creating biodiversity; enhance natural surroundings and mitigating pollution. The greenbelt development plan aims to overall improvement in the environmental conditions of the region. The plan with a five-fold objective addresses issues such as providing sink for air pollutants likely to emit from the project enhancing the forest cover for increasing the biodiversity of the

region; providing aesthetic value to the project area enhancing the ecological equilibrium of the area; and to a large proportion in combating soil erosion.

- Afforestation on degraded forest area, forest protection / conservation will be carried out every year by the mineowner.
- This helps in regeneration & establishment of pioneer plant species saving expose land & landcutting
- It will improve the aesthetic beauty of the area.

Plantation will be raised at a spacing of 7.5m along the boundaries of the mining lease by planting the native species around ML area, backfilled and reclaimed area, around water body, roads etc. in consultation with the local DFO/Agriculture department.

The following characteristics should be taken into consideration while selecting plant species for green belt development and tree plantation.

- They should be fast growing and tall trees.
- They should be perennial and evergreen.
- They should have thick canopy cover.
- Plantation should be done in appropriate alternate rows around the proposed site to prevent lateral pollution dispersion.
- The trees should maintain regional ecological balance and conform to soil and hydrological conditions. Indigenous species should be preferred

Year	Outside lease area over Van Panchayat land		Total no. of sapling
	Area (ha.)	No. of saplings	
I st	0.50	800	800
II nd	0.50	800	800
III rd	0.50	800	800
IV th	0.50	800	800
V th	0.50	800	800
Total	0.5	4000	4000

The suggestive measures under EMP are given in Table below

Table 8.3: Key suggestive measures under EMP

Impact Predicted	Suggestive measure
Disturbance of free movement/living of wild fauna	<ul style="list-style-type: none"> Awareness camps will be conducted for labours to make them aware about sensitivity/importance of forestlife No tract or new road for movement of labours or vehicles be laid in reserve forest area, this will prevent forest fragmentation, encroachment and human – animal encounter Care will be taken that noise produced during vehicles movement for carrying materials are within the permissible noise level. Higher noise level in the forest area will lead to restless and failure in detection of calls of mates and young ones Care will be taken that no hunting of animals carried out by labours If wild animals are noticed crossing the core zone, it will not be disturbed at all Labours will not be allowed to discard food, plastic etc., which can attract animals near the core site Only low polluting vehicle will be allowed for carrying ore materials. All vehicles allowed in the project site area will have to provide pollution under control certificate at the end of three months No honk will be allowed in the forest area, noise level will be within permissible limit (silent zone-50dB during day time) as per noise pollution (regulation and control), rules, 2000, CPCB norms
Harvesting of forest flora	<ul style="list-style-type: none"> No tree cutting, chopping, lumbering, uprooting of shrubs and herbs should be allowed No piling of ore material should in the reserve forest area Collections of economically important plants will be fully restricted

8.7 Occupational Hazards and Safety

Occupational safety and health is very closely related to productivity and good employer-employee relationship. The factors of occupational health in the proposed soapstone mine are mainly dust and land degradation. Safety of employees during operation and maintenance etc. shall be as per Mines rules and regulations.

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

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

8.8 Environmental Policy

The Owner believes that responsible environmental stewardship comprises diligent application of well-established natural resource management, controls and practices for the protection, reclamation of the mined out land, preservation of biodiversity and proper disposal of waste following the best environmental practices during the process of mining of soapstone.

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

Operate in accordance with prescribed industry standards while complying with all applicable

environmental, health and safety laws and regulations.

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

Budget

It is necessary to include the environmental cost as a part of the budgetary cost component. The project authorities propose to undertake the following environmental works to achieve the environmental quality as desired. The budget for environmental protection has been formulated and given in Table.

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CHAPTER 8

ENVIRONMENT
MANAGEMENT PLAN

S. No.	Description	Unit	Total (Rs.)
A. Project Operation Cost			
1.	Manpower Cost: Mine Engineer (Full time) - 01 Geologist (Full time) -01 Skilled workers -02 Un skilled: Laborers charge -26	(Total Man power 30) Assuming 240days Rs. 25,000/ month= 3,00,000 Rs. 35,000/ month= 4,20,000 Rs. 500/ day= 1,20,000 x 2=2,40,000 Rs.370 / day= 88,800x26=23,08,800	32,68,800
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 30)= 90,000 Doctor's visit: 10,000/ month (8 working months) =80,000 Medicines (Assuming 500/worker) 500 x 30 = 15,000 (Mine operation Month: 8) = 120,000	2,90,000
3.	Equipment's/Tools/Machineries	240 days Assuming Rs.5000/day	12,00,000
4.	Drinking and Sanitary Facilities	Rs. 2000/day for drinking/domestic (240 days) Rs. 30,000/ Bio-toilets x 2	5,40,000
	Total Project Operation Cost (A)		Rs. 52,98,800 (52.988 Lakhs)

B. Break-up of Expenditure on Environment Protection & Environment Management			
5.	Haulage Road Repair & Maintenance <ul style="list-style-type: none"> Filling, Leveling and widening of the road up to width of 6m and length of 200 m. Setting & Fixing of Cut Stone on the leveled road. 	Annual 200 m (L) x 6 m (W)	1,00,000
6.	Water Sprinkling on Haulage Road for Dust Suppression	Assuming Rs.1000/day for 240 days of working Tanker Cost: Rs. 1000/Tanker Tanker Capacity: 5000 liter, No. of Tankers required: 1	2,40,000
7.	Plantation along the road side & post plantation care	Plantation@100/sapling (2000 sapling/Year) Post plantation care @500/day (For 2000 Saplings Annually.i.e.365 days). <i>Note: Annual cost will increase with increase in no. of sapling.</i>	3,82,500
8.	Environmental Monitoring & Compliances.	<ul style="list-style-type: none"> ➤ 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. 11,22,500 (11.225 Lakhs)
	Total Project Cost (A+B)		Rs. 52.988 + 11.225 = (64.213 Lakhs)

8.9 CER Project Details

It is proposed to provide financial assistance of **Rs. 3.21 lac** for the development of social infrastructure of the area. Following measure will be taken to improve the Social infrastructure of the study area:

- Health Camps & medical care facilities for rural population shall be promoted.
- Distribution of Books and Notebooks among meritorious girl child belonging to Scheduled Caste and Scheduled Tribes population.
- Up gradation of toilets of government school in nearby villages.
- Repair and Painting of School Building in the project village assisting social forestry programme.

Conclusion

As discussed, it is safe to say that the project is not likely to cause any significant impact on the ecology of the area, as adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of Soapstone Mine.

CHAPTER – 9

PROJECT BENEFITS

9.1 Improvement in the Physical Infrastructure

The impact on the civic amenities will be substantial after the commencement of mining activities. The basic requirement of the community needs will be strengthened by extending health care, educational facilities developed in the township to the community, providing drinking water to the villages, building/strengthening of existing roads in the area. The proponent will initiate the above amenities either by providing or by improving the facilities in the area, which will help in uplifting the living standards of local communities. 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.

9.2 Improvement in the Social Infrastructure

- 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.
- There will be significant change in the socio-economic scenario of the area.
- The proposed project will enhance the prospects of employment. Recruitment for the unskilled and semiskilled workers for the proposed project will be from the nearby villages.
- The development of the basic amenities viz. roads, transportation, electricity, drinking water, proper sanitation, educational institutions, medical facilities, entertainment, etc. will be developed as far as possible.
- Overall the proposed project will change living standards of the people and improve the socio-economic conditions of the area.

9.3 Employment Potential

- Future production planning does not indicate some change from present, in the employment.

The number of unskilled labour may increase depending on the quantum of

Overburden removal and mineral excavation. The lessee has employed miners for raising ores & removal of overburden, quarry cleaning & road repairing. The details of employment are given in mine plan.

The employment of local people in primary and secondary sectors of project will upgrade the prosperity of the region. These will in-turn improves the socio-economic conditions of the area. The total manpower required for the proposed mining project under various categories is 30 persons and persons will be mainly sourced from local community in and around mining project and few technical persons will be employed during operational phase from local and also from outside area. In addition to the above, contractual labour and indirect employment opportunities will also be getting benefited after installation of mining project.

9.4 Policy and Action Plan on Social Responsibility

A detailed Community Social Responsibility plan has been prepared and the details of the report are given below.

CER Project Details

Soapstone mine has proposed to provide financial assistance of Rs. 3.21 lac for the development of social infrastructure of the area.

Following measure will be taken to improve the Social infrastructure of the study area:

- Health Camps & medical care facilities for rural population shall be promoted.
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PROJECT BENEFITS

Conclusion

As discussed, it is safe to say that the project is not likely to cause any significant adverse impact on the ecology of the area, as adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of the soapstone mine.

CHAPTER 10

SUMMARY & CONCLUSION

10.1 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, Uttarakhand, under EIA Notification of the MoEF dated 19-8-2006, and its subsequent amendments and EIA Guidance Manual for Mining of Minerals of MoEF, Govt. of India, for seeking environmental clearance for mining of soapstone in the applied mining lease area measuring 3.834 Ha. The proposed project falls under Category “B1” as per NGT order dated 13.09.2018 & OM dated 12th December 2018 by MOEF & CC which states that all 5-25 Ha projects falling under B-2 category will be considered as B1 & will be appraised by SEAC/SEIAA.

10.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

The proposed project is for soapstone mining which covers an area of 3.834 Ha. near Village: Khuldaudi, Tehsil & District: Bageshwar, State: Uttarakhand, Uttarakhand. LOI has been granted

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CHAPTER 10

SUMMARY & CONCLUSION

in favor of Smt Nirmala Devi for 50 yrs

The applications for prior Environmental Clearance (Form-1, PFR) for the proposed project was submitted online vide Proposal no. **SIA/UK/MIN/68750/2021** on **26th Oct, 2021** was considered by the SEAC (Uttarakhand) in its meeting dated **8th Nov, 2021** for determination of the Terms of Reference (ToR) for preparation of the Environmental Impact Assessment (EIA) report. The Committee has issued Terms of Reference (ToR) for preparation of the EIA report and Environmental Management Plan vide letter No. **259/SEAC dated 11.11.2021** attached as Annexure- I

Soapstone finds its uses in all aspects of life and commercial business. Soapstone has wide applications across various industries. Some uses for soapstone or talc are paper, textile, cosmetics, paint, ceramics, detergents, animal feed, insecticide, plastics and various drying powder. Soapstone, also known as Talc or Talcum Powder, is a mineral that is naturally found in nature. The chemical name for Talc or Talcum Powder is hydrated magnesium silicate. The region Uttarakhand accounts for 29% of India's soapstone production. The Details of Production is depicted in Tables No. 10.1.

YEAR	Quantities of soapstone (tonnes)	Quantities of Waste (Cum)	Stripping ratio Tonnes/Cum
	Pit-I	Pit-I	
Ist	8008	13845	0.58:1
IInd	8499	7249	1.17:1
IIIrd	9015	6701	1.35:1
IVth	9589	9052	1.06:1
Vth	10721	9405	1.14:1
Total	45832	46252	0.99:1

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

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LOCATION MAP

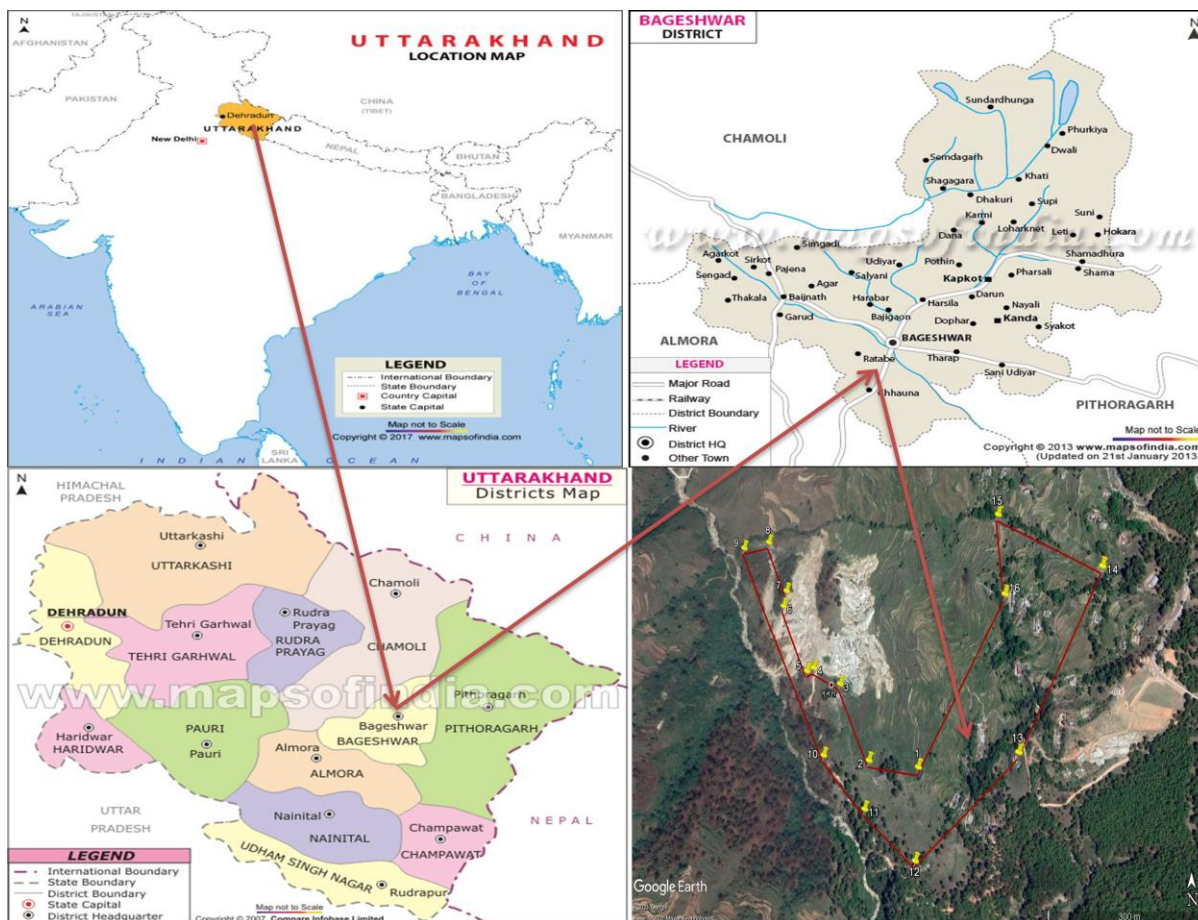


Figure: 10.1- Project Location

Table No.10.2:- Details of the Project

S. No.	Parameters	Description
1.	Name of the Project	Khuldaudi Soapstone Mining project
2.	Location of the Project	Area: 3.834 Ha, Village: Khuldaudi,

Project: Khuldaudi Soapstone Mining project
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		Tehsil & District: Bageshwar, State: Uttarakhand		
3.	Project Proponent	Smt Nirmala Devi		
4.	Lease period validity	50years/specific year will be calculated w.e.f grant of lease deed.		
5.	Lease Details	It is fresh grant case of mining lease. State Govt. has given its consent to grant mining lease for a period of 50 years.		
6.	Location of the Project			
	Village	Khuldaudi,		
	Tehsil	Bageshwar		
	District	Bageshwar		
	State	Uttarakhand		
7.	Total Lease Area	3.834 Ha		
8.	Category of the Project	“B1”		
9.	Capacity of the Project	8008 TPA upto 10721 TPA (1st to 5th Year) Maximum Production: 10721 TPA (end of 5 th Year)		
10.	Topography	The highest level of lease hold is 1430.20mRL towards eastern side & while lowest level is 1238.10mRL towards north west.		
11.	Lease Area Coordinate		Pillar No	E
			N	
		1.	29°52'22.33"N	79°47'59.78"E
		2.	29°52'22.43"N	79°48'3.51"E
		3.	29°52'21.31"N	79°48'3.06"E
		4.	29°52'18.31"N	79°48'6.27"E
		5.	29°52'16.57"N	79°48'6.59"E
		6.	29°52'17.42"N	79°48'4.72"E
		7.	29°52'15.74"N	79°48'4.70"E
		8.	29°52'13.18"N	79°48'8.19"E
		9.	29°52'13.95"N	79°48'9.56"E
		10.	29°52'13.39"N	79°48'10.65"E
		11.	79°48'10.78"E	79°48'10.78"E

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		12.	29°52'12.17"N	79°48'7.61"E
		13.	29°52'9.72"N	79°48'7.36"E
		14.	29°52'10.76"N	79°48'2.81"E
		15.	29°52'9.80"N	79°48'3.50"E
		16.	29°52'9.51"N	79°48'3.17"E
		17.	29°52'9.80"N	79°48'0.90"E
		18.	29°52'12.02"N	79°48'0.22"E
		19.	29°52'12.18"N	79°47'58.45"E
		20.	29°52'13.80"N	79°47'59.40"E
		21.	29°52'12.92"N	79°48'2.24"E
		22.	29°52'11.42"N	79°48'2.48"E
		23.	29°52'10.95"N	79°48'6.09"E
		24.	29°52'13.33"N	79°48'6.66"E
		25.	29°52'15.60"N	79°48'3.68"E
		26.	29°52'18.53"N	79°48'3.70"E
		27.	29°52'18.62"N	79°48'3.25"E
		28.	79°48'2.90"E	79°48'2.90"E
		29.	29°52'19.05"N	79°48'0.05"E
12.	Land Type	Agriculture land, waste land, State Govt. Land & Public Utility Land		
13.	Method of Mining	Opencast, Mechanized Method		
14.	Operational days/ Year	240 Days		
15.	Total Water Requirement	7.85 KLD of water will be used for the project site (Drinking use, Sprinkling & Plantation)		
16.	Source of Water	Potable tankers		
17.	Man power requirement	30 persons		
18.	Nearest railway Station/ Airport along with distance in Kms	Kathgodam, 71.22 Km, SW Airport: Naini Saini Airport, Pithoragarh, 46.48 km, SE		
19.	Nearest Town, City, District Head Quarters along with distance in Kms	Nearest Town/District: Bageshwar, 8.0 km, W		
20.	Ecological sensitive areas (Wild life Sanctuaries, National Parks, Biosphere Reserves, etc.)	Not Available		

Project: Khuldaudi Soapstone Mining project
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21.	Historical Places	None
22.	Financial & Social benefit	This Project will provide employment to local people directly and indirectly, which will improve their socio- economic status.
23.	Proposed Project Cost	Rs. 64.213 Lakhs
24.	Proposed CER Cost	Rs. 3.21 Lakhs
25.	EMP Expenditure	Rs. 11.22 Lakhs



Figure: 10.2 – 500 M Map

10.3 STATUS OF REGULATORY CLEARANCES OF THE PROJECT

There is no National Park, Wildlife Sanctuary & National Monument, within core zone or 10 km radius of the ML area.

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

MINE DEVELOPMENT AND PRODUCTION

The mining will be done mechanized way in open cast method in quite a systematic manner by forming 6m high benches. However, there may be minor variation in the width and- height which the lessee will keep on mending. The top soil and interburden to be scrapped with the help of JCB machine, dozer, shovels, pickaxe, spade & crowbar and will be stacked separately in dump yard located near the working pit. The developmental working will be done by construction of road/track to different working benches, removal of top soil and interburden. The soil will be filled into the bags, loaded on mules and unload into stockyard.

Method of Mining

It will be opencast mechanized mine. An excavator shall be deployed for the removal of overburden. Mining shall be carried out in two pits viz pit I & pit II. The height & width of benches shall be kept 6.0m & 8.0m with face slope 68°. The waste to be generated shall be dumped towards slope side of working pits & dumping shall be carried out in single terrace.

No further beneficiation will be required except breaking & sorting. The different grade of soapstone will be filled into 50 kg plastic bags & transported the too road side yard manually. From road side the soapstone bags will be loaded into trucks through manually and transported to market.

10.4 IMPACT ON LAND USE & RECLAMATION OF MINED OUT AREAS

Opencast mining activities may alter the landscape of the lease area and also cause some disturbance to the surface features of the surrounding areas. Mining will be done after leaving 7.5 m safety barrier. Plantation will be developed in consultation with district administration/ local authority, wherever feasible.

Proposal for reclamation of land affected by mining activities:

The mining will commence from the higher levels and will advance towards lower levels. Intermittent backfilling will commence from the higher levels and subsequently advance towards the lower elevation so that terraced agriculture fields would undertake in such a manner that original land use will be restored i.e. before the onset of monsoon will be handed over to cultivators for cultivation. The final backfilling will be started once the ultimate benches are formed and pit reaches the optimum economic depth. All recovery of the mineral will be of the saleable grade.

Plantation will be raised in 7.5m barrier zone along the boundaries of the mining lease area by planting the native species around ML area, backfilled and reclaimed area, around water body, roads etc. in consultation with the local DFO/Agriculture department.

10.5 LAND USE PATTERN

Presently (pre-mining), the land covered under the mine lease area is non-forest land.

Forest Land	Area (ha)	Non Forest Land	Area (ha)
Forest (specify) Area (ha)	Nil	(i) waste land,	Nil
		(ii) grazing land,	Nil
		(iii) Agriculture land, Category 1(d)	3.147
		(iv) State Govt. Land	0.687
		(v) Public Utility Land	-
Total	Nil		3.834

10.6 BASELINE ENVIRONMENTAL STATUS

Three soil samples were collected in and around the mine lease area to assess the present soil quality of the region. Physical characteristics of soil were characterized through specific parameters viz bulk density, porosity, water holding capacity, pH, electrical conductivity and texture. Soil pH plays an important role in the availability of nutrients. Soil microbial activity as well as solubility of metal ions is also dependent on pH. In the study area, variations in the pH of the soil were found to be slightly basic (7.15 to 7.48). Electrical conductivity (EC) is a measure of the soluble salts and ionic activity in the soil. In the collected soil samples the conductivity ranged from 264-298 μ mhos/cm.

The soils with low bulk density have favorable physical condition where as those with high bulk density exhibit poor physical conditions for agriculture crops.

Based on the results, it is evident that the soils are not contaminated by any polluting sources.

Meteorology

Meteorological data at the site was monitored during 1st Oct 2021 to 31st Dec 2021 representing post- monsoon season.

Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) has been carried out at five locations during pre-monsoon season from 1st Oct 2021 to 31st Dec 2021. The minimum and maximum level of PM₁₀ recorded within the study area was in the range of 63.21 μ g/m³ to 87.26 μ g/m³ with the 98th percentile 86.16 μ g/m³. The minimum and maximum level of PM_{2.5} recorded within the study area was in the range of 23.38 μ g/m³ to 38.53 μ g/m³ with the 98th percentile 38.51 μ g/m³. The minimum and maximum concentration of SO₂ recorded within the study area was 5.4 /m³ to 9.6 μ g/m³ with the 98th percentile 9.65 μ g/m³. The minimum and maximum level of NO₂ recorded within the study area was in the range of was 14.3 μ g/m³ to 21.7 μ g/m³ with the 98th percentile 21.33 μ g/m³. The results thus obtained indicate that the concentrations of PM₁₀, PM_{2.5}, SO₂ and NO₂ in the Ambient Air are well within the National Ambient Air Quality (NAAQ) standards for Industrial, Residential, Rural and other areas.

Water Quality

The water quality in the impact zone was assessed through physico-chemical and Microbiological analysis of ground water samples. The results have been compared with the drinking water quality standards specified in IS: 10500. It was observed that all the physico-chemical parameters and heavy metals from ground water samples are below stipulated limits for drinking water standards.

□ The pH limit fixed for drinking water samples as per IS-10500 Standards is 6.5 to 8.5 beyond this range the water will affect the mucus membrane or water supply system. During the study period, the pH was varying for ground waters from 7.23 to 7.32 and the surface waters are 7.64 to 7.72. The pH values for all the samples collected in the study area during study period were found to be within the limits.

□ The desirable limit for total dissolved solids as per IS-10500 Standards is 500 mg/l whereas the permissible limits in absence of alternate source is 2000 mg/l, beyond this palatability decreases and may cause gastro intestinal irritation. In ground water samples collected from the study area, the total dissolved solids are varying from 263 mg/l to 275 mg/l. The TDS of the samples were above the desirable limit but within the permissible limit of 2000 mg/l.

□ The desirable limit for chlorides is 250 mg/l as per IS-10500 Standards whereas, permissible limit of the same is 1000 mg/l beyond this limit taste, corrosion and palatability are affected. The chloride level in the surface water samples collected in the study area were ranging from 13 mg/l to a maximum of 19 mg/l, in ground water samples 19 mg/l to 23 mg/l. The chloride samples are within the desirable limits.

□ The desirable limit as per IS-10500 Standards for hardness is 200 mg/l whereas the permissible limit for the same is 600 mg/l beyond this limit encrustation in water supply structure and adverse effects on domestic use will be observed. In the ground water samples collected from the study area, the hardness is varying from 172.8 mg/l to 182 mg/l.

□ Fluoride is the other important parameter, which has the desirable limit of 1 mg/l and permissible limit of 1.5 mg/l. however the optimum content of fluoride in the drinking water is 0.6 to 1.5 mg/l.

If fluoride content is less than 0.6 mg/l it causes dental carries, above 1.5 mg/l causes flurosis. In the ground water samples of study area the fluoride value were in the range of 0.2 mg/l to 0.6 mg/l. In surface water 0.37 mg/l to 0.44 mg/l.

Overall all the samples collected from the study area were found to be fit for consumption, Most of ground water samples are well within the permissible limits, as per IS-10500. Most of the heavy metals in all samples are below detectable limits.

Noise Levels

The noise level monitoring results of 1st Oct 2021 to 31st Dec 2021 are presented in Table 3.5. The ambient noise level in study area during the day time varies from 45.87 to 40.23 dB(A) during day time and 41.27 to 36.15 dB(A) during night which is within the specified limits of CPCB.

Ecological Environment

There are no wildlife sanctuaries and National Parks within the study area of 10-km radius.

10.7 ANTICIPATED ENVIRONMENTAL IMPACTS

Impact on Air Quality

Soapstone mine where PM10 and PM2.5 will be the main pollutants generated in mining activities. The emissions of Sulphur dioxide (SO₂), Nitrogen Oxide (NO₂) contributed by diesel operated equipment and vehicles movement were considered marginal as branded make and vehicles with PUC certificate will be operated only. Fugitive dust and particulates are major pollutants occurred in the mining activities. Fugitive emissions will be settled by 70- 80% by use of multiple water sprinklers. Prediction of impacts on air environment will be made with proposed production and net increase in PM10 and PM2.5 emissions at the proposed site and at the 10 km radius of study area due to mining activities.

Air pollution sources in the operating mine was classified into two categories

- i. Loading and unloading of mineral and OB, IB

ii. Transportation on the haul road

Impact on Water Resources Surface Water Resources

The topography of the area will not be largely changed in view of the proposed concurrent reclamation. During the mining activity period, there is a possibility of mixing of freshly disturbed material with the rain water. To take care of such happenings, retaining walls have been provided along the backfilled pits and along the soil and interburden dumps.

Groundwater Resources

The water table in hills is usually very deep and does not have any relevance with mining activities. However, concurrent restoration to original topography will not be disturbing the percolating water.

Impact on Water Quality

The impact on water quality will be confined to increased suspended solids during rain. The dumps will be secured with toe walls and rainy water will not carry significant suspended material.

Impact on Noise Levels and Ground Vibrations

With the mining operations, due to the deployment of machinery, operation for mine development, excavation and transportation of soapstone, it is imperative that noise levels would increase. It is also observed that these incremental noise levels will not significantly affect the existing ambient noise levels.

Impact on Soil

The environmental impacts of the mining activities on topsoil are based on the quantity of removal of topsoil and its dumping. In the present project as it is proposed to temporarily store the topsoil and use it for plantation schemes, no impact of dozing of topsoil is envisaged.

The soil erosion from overburden and interburden dumps is not envisaged in the present project, as sufficient measures as detailed in the EMP would be undertaken.

Impact on Flora and Fauna

There is no forest area in the core zone area of the lease. As the mining activity is restricted to core zone, no significant impact on the flora of the buffer zone due to the proposed mining of Soapstone is anticipated.

The incremental dust generations due to the mining operations, at the boundary of the mine lease are insignificant and it is also expected that with the adoption of mitigatory measures as suggested in EMP, the impact due to operation of the mine will be minimal on the terrestrial ecosystem and also on the adjacent forest area.

The impact on the fauna of the buffer zone due to the mining activity will be marginal. The proposed progressive plantation over a period of time will reduce the impact, if any, on the fauna.

Impact on Land Use Pattern

The proposed opencast mine will result in change the land use pattern of the ML area. The land degradation is expected during mining activities like excavation, overburden dumping, soil extraction etc. Land requirement for the project has been assessed considering functional needs.

Impact on Socio - Economic Aspects

The mine area does not cover any habitation. Hence the mining activity does not involve any displacement of human settlement. No public buildings, places, monuments etc exist within the lease area or in the vicinity. The mining operation will not disturb/ relocate any village or need resettlement. Thus no adverse impact is anticipated.

The impact of mining activity in the area is positive on the socio-economic environment of the region. The proposed Soapstone Mine will be providing employment to local population and it will be give preference to the local people whenever there is requirement of man power

10.8 ENVIRONMENTALMANAGEMENTPLAN

The summary of environmental mitigation measures are given in below table

Table10.3: Proposed Environmental Mitigation Measures

Impact Predicted	Suggestive measure
Disturbance of free movement/living of wild fauna	<ul style="list-style-type: none"> • Awareness camps will be conducted for labours to make them aware about sensitivity/importance of forest life • No tract or new road for movement of labours or vehicles be laid in reserve forest area, this will prevent forest fragmentation, encroachment and human – animal encounter • Care will be taken that noise produced during vehicles movement for carrying materials are within the permissible noise level. Higher noise level in the forest area will lead to restless and failure in detection of calls of mates and young ones • Care will be taken that no hunting of animals carried out by labours • If wild animals are noticed crossing the core zone, it will not be disturbed at all • Labours will not be allowed to discards food, plastic etc., which can attract animals near the core site • Only low polluting vehicle will be allowed for carrying ore materials. All vehicles allowed in the project site area will have to provide pollution under control certificate at the end of three months • No honk will be allowed in the forest area, noise level will be within permissible limit (silent zone-50dB during day time)as per noise pollution (regulation and control),rules, 2000, CPCB norms

Harvesting of forest flora	<ul style="list-style-type: none"> No tree cutting, chopping, lumbering, uprooting of shrubs and herbs should be allowed No pilling of ore material should in the reserve forest area Collections of economically important plants will be fully restricted
----------------------------	--

10.9 ANALYSIS OF ALTERNATIVES

The Soapstone 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.

The mine is operated by opencast mechanized method of mining. No other alternative technologies can be used because of the hard nature of the ore. Proposed mine is using eco-friendly measures to minimize the impact of mining on the surrounding environment.

10.10 ENVIRONMENTAL MONITORING PROGRAM

Attributes	Sampling		Measurement	Test Procedure
	Network	Frequency	Method	
A. Air Environment				
Pollutants PM _{2.5} , PM ₁₀	5 locations in the project impact area (Minimum 2 Locations in upwind side, 3 sites in Downwind side / impact zone and 1 in core zone)	Once in a season.	Gravimetric method	-
			Gravimetric method	-
EPA Modified West & Geake method			Absorption inPotassium Tetra Chloromercurate followed by Colorimetric estimation using P- Rosaniline hydrochloride and Formaldehyde (IS: 5182 Part - II).	
NO ₂			Arsenite modified Jacob Hochheiser	Absorption indil. NaOH and then estimated colorimetrically with

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				sulphanilamide and N (I-Nepthyle) Ethylene diamineDihydrochlori deandHydrogenPeroxi de (CPCB Method).
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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.
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C. Noise

Noise levels at Day & night time - Leq dB (A)	Mine Boundary , High noise generating areas within	Quarterly / Half yearly	As per CPCB norms	As per CPCB norms
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	the lease			
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 with Govt. Agencies

10.11 COST ESTIMATES

The details of the cost to for the Environmental Management plan for 5 years, the budget for Corporate Environmental Responsibility (CER) and year wise allocation of funds for the various activities proposed to be taken up under CER programme has been given in below **Table No – 10.4**

CER plan is given below:

- Total Cost of the Project = Rs.64.213Lakhs

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- Yearly CER cost for the project, i.e. 5% of the total project cost Rs. (3.21 Lakhs)

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 – 10.4 Budget allotted for CER

S. No.	Activity	Cost per Unit (Rs)	Quantity	Total (Rs.)
1.	Installation of Solar street light in vill -Khuldaudi	15,000	10	1,50,000
2.	Construction of Toilets for Women in vill -Khuldaudi	80,000	0	1,60,000
3.	Distribute Stationary nearby School	11065	-	11065
	Total Proposed CER Cost			3,21,065

Table- 10.5 Budget allotted for project operation cost & Environmental Management Programme

S. No.	Description	Unit	Total (Rs.)
A. Project Operation Cost			
1.	Manpower Cost:	(Total Man power 30) Assuming	32,68,800
	Mine Engineer (Full time) - 01	240days	
	Geologist (Full time) -01	Rs. 25,000/ month= 3,00,000	
	Skilled workers -02	Rs. 35,000/ month= 4,20,000	
	Un skilled: Laborers charge -26	Rs. 500/ day= 1,20,000 x 2=2,40,000	
		Rs.370 / day= 88,800x26=23,08,800	

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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 30)= 90,000 <i>Doctor's visit:</i> 10,000/ month (8 working months) =80,000 <i>Medicines</i> (Assuming 500/worker) 500 x 30 = 15,000 (Mine operation Month: 8) = 120,000	2,90,000
3.	Equipment's/Tools/Machineries	240 days Assuming Rs.5000/day	12,00,000
4.	Drinking and Sanitary Facilities	➤ Rs. 2000/day for drinking/domestic (240 days) ➤ Rs. 30,000/ Bio-toilets x 2	5,40,000
Total Project Operation Cost (A)			Rs. 52,98,800
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 6m and length of 200 m. • Setting & Fixing of Cut Stone on the leveled road.	Annual 200 m (L) x 6 m (W)	1,00,000
6.	Water Sprinkling on Haulage Road for Dust Suppression	Assuming Rs.1000/day for 240 days of working Tanker Cost: Rs. 1000/Tanker Tanker Capacity: 5000 liter, No. of Tankers required: 1	2,40,000
7.	Plantation along the road side & post plantation care	Plantation@100/sapling (2000 sapling/Year) Post plantation care @500/day (For 2000 Saplings Annually.i.e.365 days). <i>Note: Annual cost will increase with increase in no. of sapling.</i>	3,82,500

8.	Environmental Monitoring & Compliances.	<p>➤ Half Yearly Monitoring of Environmental Parameters viz. Air, water, Noise & Soil.</p> <p>➤ Half Yearly Submission of Compliances.</p>	4,00,000
	Total Environment Protection & Management Cost (B)		Rs. 11,22,500 (11.225 Lakhs)
	Total Project Cost (A+B)		Rs. 52.988 + 11.225 = (64.213 Lakhs)

10.12 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.

10.13 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 submitted to the Uttarakhand Environment Protection & Pollution Control Board (UEPPCB) for public hearing.

10.14 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.

10.14CONCLUSIONS

- 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.

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

CHAPTER-11
DISCLOSURE OF
CONSULTANTS ENGAGED

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DISCLOSURE OF CONSULTANTS ENGAGED

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: + 91 9958486431 + 91 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

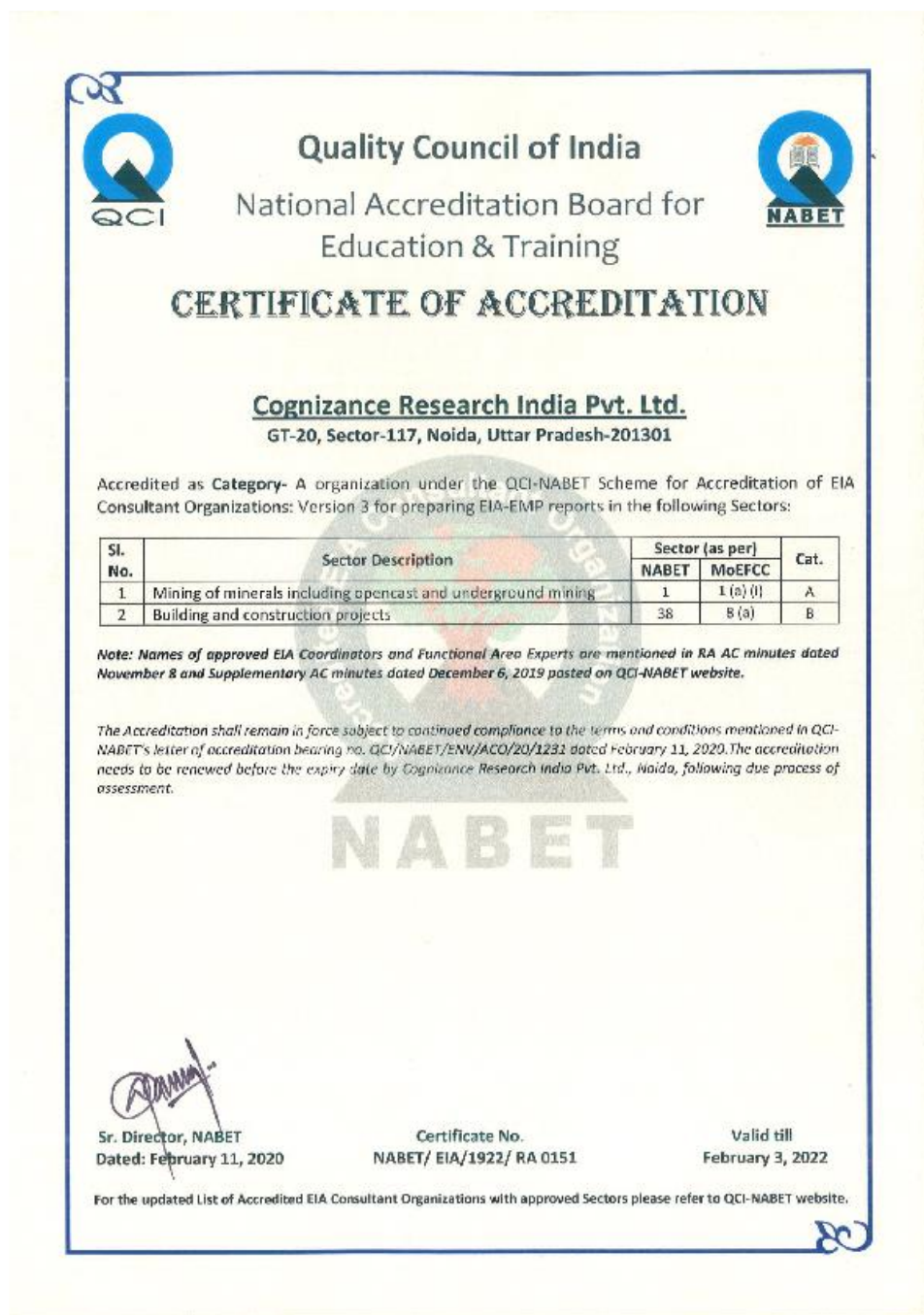
Accreditation Certificate of the Consultant Engaged:



Cognizance Research India Pvt Ltd
NABET-QCI Accredited Consultant

Project: Khuldaudi Soapstone Mining project
Proponent: Smt Nirmala Devi
Area: 3.834 Ha, Village: Khuldaudi,
Tehsil & District: Bageshwar, State: Uttarakhand

CHAPTER-11 DISCLOSURE OF CONSULTANTS ENGAGED



कार्यालय राज्य स्तर पर्यावरण समाघात निर्धारण प्राधिकरण (SEIAA) व

राज्य विशेषज्ञ अंकन समिति (SEAC), उत्तराखण्ड।

653, इन्दिरा नगर कालोनी, सीमाद्वार रोड, देहरादून-248006 ।

पत्र संख्या-259/SEAC

दिनांक- 11 नवम्बर, 2021

To,

Smt. Nirmala Devi W/o Shri Narendra Singh,
R/o- Village - Shishakani, Tehsil & Distt- Bageshwar.

Sub- Regarding Environmental Clearance for Proposed Extraction of Soapstone at Village- Khuldaudi,
Tehsil & District- Bageshwar. (Area- 3.834 Ha.).

Dear Sir/Madam,

Kindly take reference of your submitted vide proposal no SIA/UK/MIN/68750/2021 on dated 26th October, 2021 regarding above proposal. The SEAC in its meeting dated 8th November, 2021 examined the proposal submitted by you. After through discussion and deliberation, it has been conveyed that SEAC desires Rapid EIA report of this proposal after due public consultation conducted by Uttarakhand Environment Protection and Pollution Control Board. The terms of reference (TOR) for the EIA report is being out lined below:-

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

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee. The above reports should also match with the latest District Survey Report (DSR) notification no- 2827 dated 25th July, 2018. **Data obtained from this DSR should be incorporated in the EIA Report for Impact Identification, Interpretation, Prediction, Carrying Capacity and Mitigation.**
- 4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
- 5) Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
- 6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
- 7) It should be clearly stated whether the proponent Company has a well laid down Environment. Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.
- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
- 9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
- 10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features

- should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
 - 12) A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
 - 13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
 - 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
 - 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
 - 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
 - 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
 - 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled- I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
 - 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.
 - 20) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements; and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.
 - 21) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.
 - 22) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
 - 23) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
 - 24) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

- 25) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
- 26) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
- 27) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
- 28) Details of any stream, seasonal or otherwise, passing through the lease area and modification/diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
- 29) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
- 30) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
- 31) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
- 32) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 33) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 34) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
- 35) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- 36) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
- 37) Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
- 38) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
- 39) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 40) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 41) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
- 42) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 43) **Besides the above, the below mentioned general points are also to be followed:-**
 - a) Executive Summary of the EIA/EMP Report
 - b) All documents to be properly referenced with index and continuous page numbering.
 - c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
 - d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
 - e) Where the documents provided are in a language other than English, an English translation should be provided.

- f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
- g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
- h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
- i) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
- j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

Note: 1) The study area shall comprise of radial distance of 10 KM from the project site and the study period is three months. The impact on each of the above parameter as a result of mining shall be assessed through appropriate modeling and prediction methods considering base line data.

2) District Survey Report should be submitted as per the latest notification no- 2827 dated- 25-7-2018

Hence you are kindly requested to kindly submit EIA report for further necessary action.

(Rajiv Dhiman)
Member Secretary,
SEAC, Uttarakhand

Copy to:- Member Secretary, Gaura Devi Paryavaran Bhavan Environment Protection and Pollution Control Board, IT, Park Dehradun for necessary action.

(Rajiv Dhiman)
Member Secretary,
SEAC, Uttarakhand