

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT
AND
DRAFT ENVIRONMENTAL MANAGEMENT PLAN
FOR**

**PROPOSED MINING OF SOAPSTONE
AT**

**Village-Khatigaon & Rangdev, Tehsil & District- Bageshwar
Uttarakhand**

AREA: 8.529 HA, PROPOSED CAPACITY: 40682 TPA (MAXIMUM)

PROJECT PROPONENT

**Shri Deewan Singh Papola
Village Papoli, Post Kafli,
Tehsil & District Bageshwar,
Uttarakhand**

PREPARED BY

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February, 2023

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CHAPTER 1: INTRODUCTION

1.1 PURPOSE OF THE EIA REPORT

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

Draft Environmental Impact Assessment report has been prepared to comply with the proposed Terms of Reference (ToR), under EIA notification of the MoEF&CC dated 14th September, 2006 and amended thereof, for seeking environmental clearance for mining of soapstone in the applied mining lease area.

1.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

The proposed lease of Khatigaon & Rangdev Soapstone Mine having 8.529 ha area and is situated near Village-Khatigaon & Rangdev, Tehsil & District- Bageshwar in the Uttarakhand State.

The Lease has been granted in favor of Shri Deewan Singh Papola.

The proponent has applied for environmental clearance for mining lease in the name of Soapstone Mining Project over an area of 8.529 ha at Village-Khatigaon & Rangdev, Tehsil & District- Bageshwar in the Uttarakhand State.

1.3 BRIEF DESCRIPTION OF PROJECT

1.3.1 NATURE

The proposed mining will be done semi-mechanized way in open cast method in quite a systematic manner and the mining shall be carried out in two pits. The height of the benches will be kept of 3m and width more than 4m initially to facilitate separation of soapstone and remove the mineral and interburden and soil by mules. All the benches will be connected by mule track, so that mule can reach to the working faces the slope of the benches will be kept 70° but for exploitation of mineral benches will be steepened and width will be reduced and average slope of the faces will be kept 65 - 70°.

1.3.2 SIZE

The mine lease area is 8.529 ha private agricultural land on hill terrain and the project is contemplated to extract the mineral (Soapstone) by manual open pit/cast method of mining without blasting.

1.3.3 LOCATION

The proposed lease of Soapstone Mine is situated at Village-Khatigaon & Rangdev, Tehsil & District- Bageshwar in the Uttarakhand State. The location and Salient feature of mining Lease area has been shown in Table 1.1. The location map of the mine lease area has been shown in Figure 1.1.

Table 1.1: Location and Salient feature of Mining Lease Area

Sr. No.	Particular	Details
A.	Nature of the Project	Proposed Khatigaon & Rangdev Soapstone Mine
B.	Size of the Project	
1.	ML Area	8.529ha (private agricultural Land).
2.	Proposed Production Capacity	Total Recoverable Quantity of Soapstone:
		40682 Tonnes/ Annum (Maximum)
		(As per approved Mining Scheme)
3.	Lease Period of Mine	Lease was granted for a period of 20 Years.
C.	Method of Mining	
1.	Method	Semi Mechanized Open-Cast Mining
2.	Blasting / Drilling	Not proposed
D.	Project Location	Location Map is given in Figure.1& 2
1.	Village	Khatigaon & Rangdev
2.	Tehsil	Bageshwar
3.	District	Bageshwar
4.	State	Uttarakhand
5.	Topo Sheet No.	53O/13
6.	Lease Area Coordinates	Latitude 29°53'11.58"N to 29°53'39.77"N and Longitude 79°56'47.70"E to 79°56'32.05"E
E.	Cost Details	
1.	Project Cost	Rs.30.0 Lac
F.	Water Demand	
1.	Requirement	5 KLD
2.	Source of water	Water requirement for drinking, plantation and dust suppression shall be met from nearby villages, during the operational phase of the mine. Total water requirement shall be 5 KLD.

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G.	Man Power Requirement	98
H.	Environmental Setting	
1.	Nearest Village	Khatigaon & Rangdev
2.	Nearest Town	Bageshwar, 40.0 Km. (by road)
3.	Nearest National / State Highway	Dopahar Banlekh Road, 0.38km (Aerial)
4.	Nearest Railway Station	Kathgodam, 78.27 Km (Aerial)
5.	Nearest Airport	Pantnagar, 111.28 Km (Aerial)
6.	Ecological Sensitive Areas (National Park, Wild Life Sanctuaries, Biosphere Reserve etc.) within 10 km radius	None
7.	Reserved / Protected Forest within 10 km radius	Khatigaon RF, 1 Km (Aerial)
8.	Water bodies within 10 km radius of the mine site.	Seasonal Gadhera 0.5 km (Aerial)
9.	Archaeological Important Place	None
10.	Seismic Zone	V

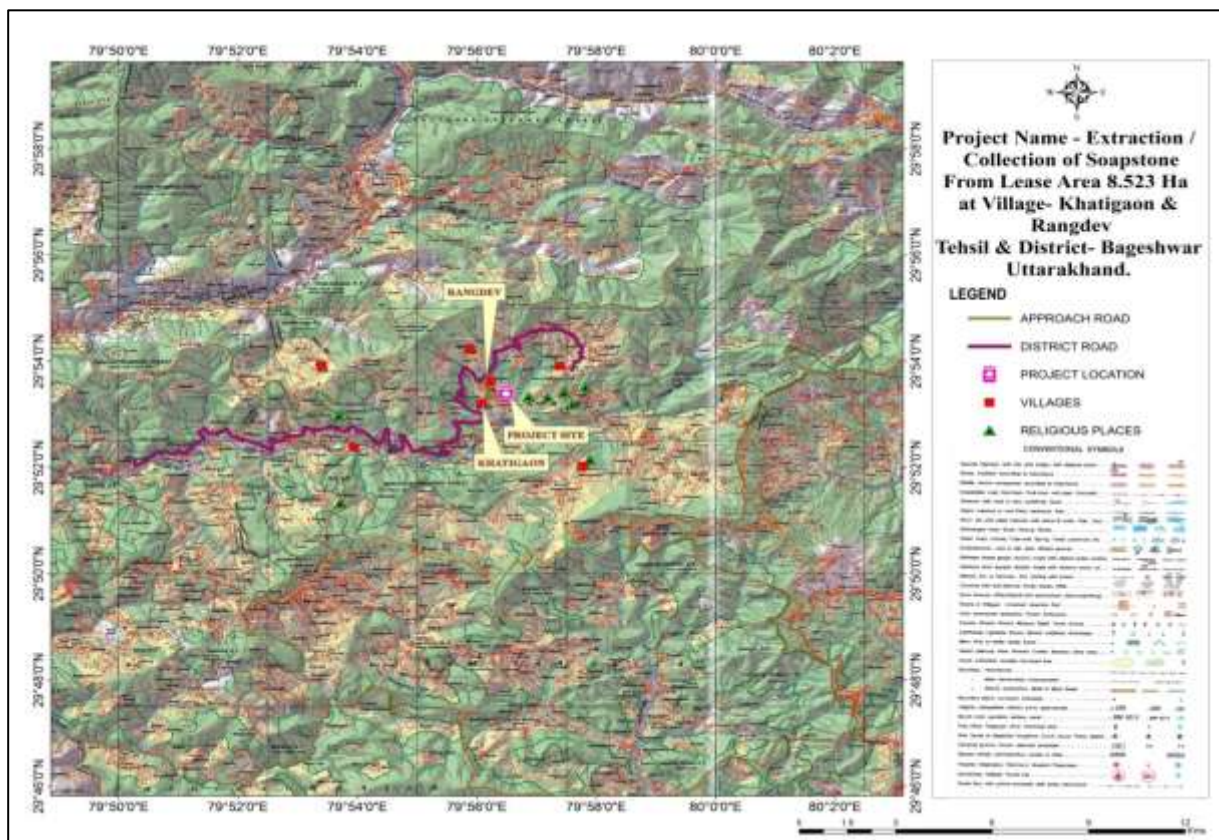


Figure 1.1: Location Map of the mine lease area

1.4 PROJECT'S IMPORTANCE TO THE COUNTRY AND THE REGION

Soapstone finds its use in many of the industries that include detergent & Paper industries etc. The natural available material in the quarry site has been found suitable from techno economic consideration. The mining project shall provide direct employment to about 98 persons. Additional jobs are created by way of transportation.

No subgrade mineral is produced from the mine. The soapstone is being dressed manually and transport to Haldwani. The final material will be utilized paper & cosmetic industries.

1.5 SCOPE OF THE STUDY

The SEAC in its meeting dated 17th January, 2023 examined the proposal. After through discussion and deliberation, it has been conveyed by SEAC that draft EIA/EMP report shall be prepared as per approved ToR and after public consultation through Uttarakhand Environment Protection and Pollution Control Board, the final EIA/EMP report shall be submitted after incorporating Public Hearing details to SEIAA, Uttarakhand for Environmental Clearance.

1.6 POINT WISE COMPLIANCE

The present draft EIA/EMP report of the proposed project is prepared as per proposed TOR and in compliance with the ToR No. 21/SEIAA dated 27 January 2023 by State Level Expert Appraisal Committee, Dehradun. The copy of the ToR has been attached as **Annexure I**. The point wise compliance of ToR has been shown in **Table 1.2**.

Table 1.2: Point Wise Compliance for TOR

Sr No.	ToR Points	Reference of Compliance
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.	The proposed soapstone mine is a new mine. Therefore the year wise production data since 1994 is not applicable.
2.	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	The copy of LOI is 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, carrying capacity and mitigation.	Complied.
4.	All corner coordinates of the mine lease area,	The study area map has been

	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).	shown in Figure 1.1 of Chapter 1.
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	The land use map of the proposed project has been shown in Figure 3.7 of 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 details have been have been described in Section 4.3 of Chapter 4.
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 'infringement/deviation/violation to bring into focus any 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.	Yes the details have been shown in Figure 6.1 of Chapter 6.
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.	Complied.
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.	Complied.
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.	The land use map of the proposed project has been shown in Figure 3.7 of Chapter 3.
11.	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area,	Provided in EIA/EMP Report.

	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.	<p>No forest land is involved in the proposed soapstone mine.</p> <p>The letter from the forest department is in process.</p>
13.	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	No forest land is involved in the proposed soapstone mine
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.	Not Applicable
15.	The Vegetation in the RF/PF areas in the study, 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.	No wildlife Sanctuary/National Park is situated within 10 km radius from the proposed soapstone mine.
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.	No wildlife Sanctuary/National Park is situated within 10 km radius from the proposed soapstone mine.
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	The detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] has been described in section 3.11 of Chapter 3.

	fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	
19.	Proximity to Areas declared as 'Critically Polluted' or the Project areas 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.	Not Applicable
20.	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	Not Applicable
21.	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their 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.	Not Required.
22.	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring	The details of Ambient Air Quality have been described in section 3.5 of Chapter 3.

		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.	
23.		Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	The Air quality modeling has been described in section 4.4 of Chapter 4.
24.		The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	The details of Water requirement for the Project have been described in section 2.9 of Chapter 2.
25.		Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Not required.
26.		Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	Not Applicable.
27.		Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	The details have been described in section 4.2 of Chapter 4.
28.		Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	Not Required.
29.		Details of any stream, seasonal or otherwise, passing through the lease area and modification/diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	No streams, seasonal nallahs or river is passing through the proposed the soapstone mine.
30.		Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	The details have been described in table 4.1 of Chapter 4
31.		A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating	The Greenbelt Development Plan has been described in

	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.	<p>section 9.9 of Chapter 9.</p> <p>The Greenbelt and Plantation have been described in section 4.7 of Chapter 4.</p>
32.	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	The impact on Traffic has been mentioned in section 4.13 of chapter 4.
33.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	The temporary rest shelters and mobile toilets will be provided to the mine workers.
34.	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	The details have been described in section 4.1 of Chapter 4.
35.	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	The details have been described in section 4.10 of Chapter 4.
36.	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	Complied and Provided in EIA/EMP report
37.	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	The details have been described in section 4.9 of Chapter 4.
38.	Detailed environmental management plan (EMP) to	The detailed Environmental

	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.	Management Plan (EMP) has been described in Chapter 9.
39.	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	This is the draft report and is being submitted for conduction of public hearing.
40.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No court case is pending in any court against the proposed project.
41.	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	The budget of Environmental Management Plan has been presented in Table 9.3 of Chapter 9. The budget of CSR has been presented in Table 4.13 of Chapter 4. The budget of CER has been presented in Table 9.4 of Chapter 9.
42.	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	The detailed Disaster management Plan has been described in section 7.3 of Chapter 7.
43.	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	The detailed project benefits have been described in Chapter 8.
44.	General Points	
(a)	Executive Summary of the EIA/EMP Report	Complied
(b)	All documents to be properly referenced with index and continuous page numbering.	Complied
(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.	Complied
(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.	Complied
(e)	Where the documents provided are in a language other than English, an English translation should be provided.	Complied
(f)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Complied
(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-	Complied

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

CHAPTER 2: PROJECT DESCRIPTION

2.1 TYPE OF PROJECT

The project is proposed for the excavation of soapstone from the Hill slope (Agricultural land). It is an opencast mining project where the entire activity will be done in a semi-mechanized way.

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 pulverize /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 micronizing 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 tones 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

The proposed lease of Soapstone Mine is situated at Village- Khatigaon & Rangdev, Tehsil & District- Bageshwar, Uttarakhand. The lease co-ordinates and connectivity details are listed below:

Latitude	29°53'11.58"N to 29°53'39.77"N
Longitude	79°56'47.70"E to 79°56'32.05"E

The lease is well connected to metaled road Dopahar Banlekh Road which is at a distance of approx. 0.38 km from the mine lease area.

The index map of the project site has been shown in **Figure 2.1**.

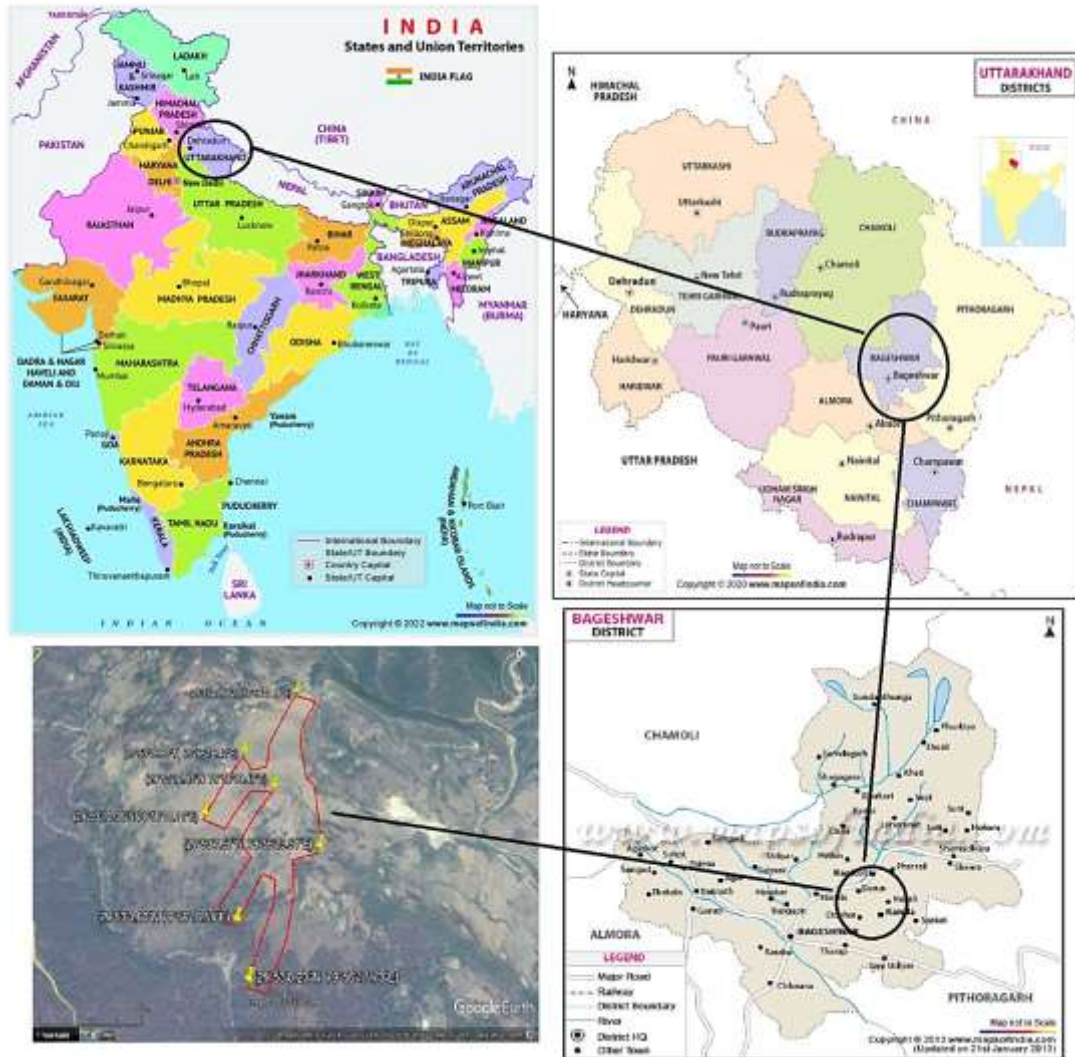


Figure 2.1: Index map of the project site

2.3.1 Lease Hold Area

The lease hold area of 8.529 ha lies on the hill slope. The LOI vide letter no. 316 (1)/VII-1/16/62-Kha/2012 dated 28.11.2016 was issued for mine lease period of 20 years. The copy of Letter of Intent (LOI) has been attached as **Annexure II**.

2.3.2 Details of the Lease Hold Area

Forest	Area (ha)	Non Forest Land	Area(ha)
Forest (specify)	None	1. Waste. land	Nil
		2. Grazing land	Nil
		3. Agriculture land	8.529
		4. Others (public land use)	Nil
Total	Nil	Total	8.529

2.4 TOPOGRAPHY & GEOLOGY

Topography

Bageshwar district comprises two broad physiographic divisions from north to south viz. Central Himalayan Zone (north of the Main Central Thrust) and Lesser Himalayan Zone (south of the Main Central Thrust). The area shows an extremely rugged topography characterized by precipitous hills and deep gorges with sharp variation of high magnitude in surface relief. The general slope is towards south. In the northern parts the elevation of the land surface ranges from about 3000 m to 6861 m above mean sea level whereas in the valleys of southern part, the altitude is as low as 795 m. The soils of Bageshwar district can be broadly classified into two types, viz. Soils of Lesser Himalaya and Soils of Greater or Central Himalaya. Majority of the area is covered by the first type. The soils in this area are exposed in massive mountainous tracts and tangled mass of series of ridges divided from each other by deep, narrow valleys. The soils of Lesser Himalaya are further subdivided into a) Soils of Summits and Ridge tops, b) Soils of Side Slopes, c) Soils of Glacio-Fluvial Valleys, d) Soils of Fluvial Valleys and e) Soils of Cliffs. The soils of Greater Himalaya have been broadly classified under a) Soils of Summits, Ridge Tops and Mountain Glaciers, b) Soils of Side Slopes, c) Soils of Upper Glacio-Fluvial Valleys and d) Soils of Cliffs.

The general slope of the area is towards West direction, which is sloping toward NW to SW and NE to SE from 20° to 25°. The topography of the area is rough and rugged. The area by and large has a gentle slope. Terraced paddy farming is carried out by the villagers on the slopes. The highest altitude recorded with in the project area is 1400 mRL toward North of the area and lowest altitude recorded is 1271 mRL toward South of the area.

Geology

District Bageshwar is mainly represented by the rocks of Lesser Himalaya and Central Himalaya. The geological set up is very complex due to the repeated tectonic disturbances caused by different orogenic cycles. Valdiya (1980) carried out extensive geological and structural mapping in the area. The salient features of geology are depicted in the geological map of Bageshwar district. The map is based on Geological Survey of India, 2002.

The rock units exposed in various parts of Bageshwar district comprise current-bedded quartzite with associated volcanics, mica-talc schist, limestone, conglomerate, slate, quartzite, granodiorite, augen gneiss, migmatite and granite gneiss. Many areas in the northern part of the district are yet to be mapped by conventional field methods due to inaccessibility and permanent snow cover. However, a group of regionally metamorphosed rocks known as the Central Crystallines are exposed in this area. The Central Crystallines of the Central Himalayan Zone occur as thrust sheets over the metasedimentary and sedimentary rocks of Lesser Himalayan Zone in varied tectonic settings. Major rock types of Central Crystallines are migmatites, psammitic and mica gneiss, calc gneiss, quartzite, marble, mica schist and amphibolite. Granites of different ages ranging from Paleoproterozoic to Mesozoic-Tertiary intrude the Central Crystallines. Major parts of Bageshwar district falls under the geotectonic zone known as the Lesser Himalaya. Rock types in the Lesser Himalayan Zone include sedimentaries, metasedimentaries and plutonic igneous rocks. The various rock units have suffered multiple phases of deformation and metamorphism in major parts of the district.

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:

Berinag Quartzite

Gangolihat Dolomite:

Dolomite and dolomite limestone with algal structures. Magnesite with minor talc/talcose; phyllite and dolomite intercalations.

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 colour of soil exists in the whole area. The average thickness of soil varies from 0.50 m.

Soap stone intermixed with dolomite and magnesite:

The soapstone mineral in Kumaon Himalaya is an alteration a products magnesium bearing minerals, Soapstone occurs as pocket type massive and sometimes confined to the upper part of the magnesium bearing zones. The mineral body occurs in irregular shape & size. The foliation plane of soapstone trending 85°N to 88°N , amount of dip varies 30° to 33° and dip direction varies from 50°N to 80°N .

The area was explored with the help of seven exploratory pits viz E1, to E7. During prospecting period the pits were exposed up to depth of 3.5m to 9m and soapstone persists in depth. Soapstone bearing with low grade magnesite was seen in the pit. The pit was dug at different levels in the agricultural field & soapstone encountered in the pits which is further persists in depth as observed during prospecting period. The soapstone occurring in the area is weakly foliated, fine grained off white in colour with its characteristic soapy feel.

Source: Approved Mining plan

2.5 CLIMATE

The climate in Bageshwar district is temperate to sub-humid. The northern part of the 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 subtropical and sub-humid climate except for the northern part where a cold temperate climate prevails.

2.5.1 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) whereas the minimum temperature recorded was 4°C (January).

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).

2.5.2 Rainfall

Most of the rainfall, about 75% of the annual value, occurs during monsoon months of June to September. July is the rainiest month followed by August. In September, depressions from Bay of Bengal occasionally reach Uttarakhand and affect the weather of Bageshwar district also. This 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 normal rainfall data of Kausani Rain Gauge Station for the period 1997-2002 shows that the annual rainfall ranges from 1051 to 1705 mm and the Annual Average Rainfall is 1331.4 mm. The monthly rainfall data from the rain gauge station also reveals that the maximum rainfall (460.4 mm) was received in July 2001 whereas the minimum rainfall (355.8 mm) was observed in June.

2.6 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. Pungar Nadi, Khir Ganga Nadi, Bhadrapati Nadi, Revti Ganga, Kanal Gad, Lahor Nadi, 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 shown in **Figure 2.2**.

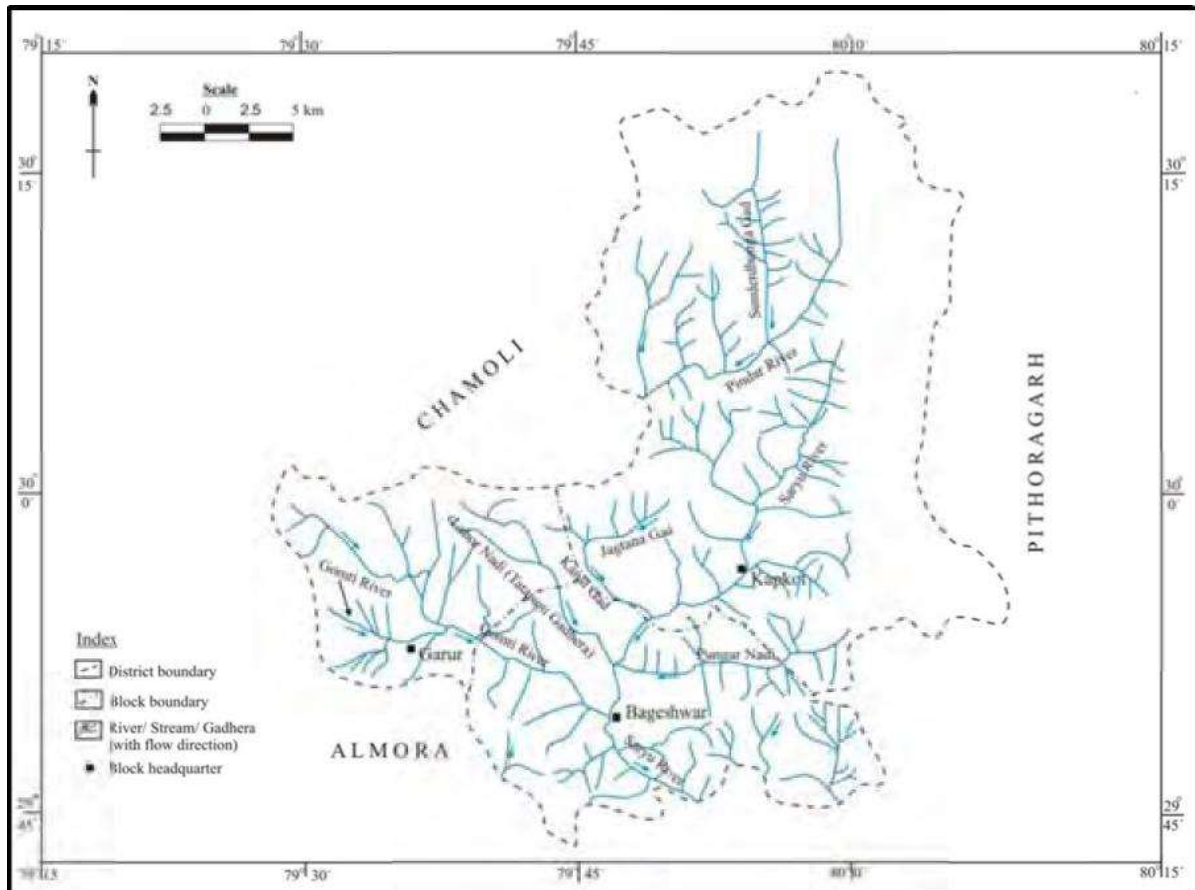


Figure 2.2: Surface Drainage Map

2.7 PROPOSED METHOD OF MINING

The mining will be open cast semi mechanized mine. The overburden & interburden shall be removed deployment of an excavator & its deployment shall be on hire basis as & when required. The soapstone shall be extracted with deployment of a excavator as well as manually with the help of crow bar, chiesels, pickaxe, hammers, spade and different grade of soapstone will be stacked separately near the mining faces. Soapstone is soft mineral; therefore no drilling & blasting shall be required. The soapstone shall be dressed manually & stacked separately. No further beneficiation shall be undertaken during first five years. The 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 through manually and transported to Haldwani.

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

Mining shall be carried out in two pits viz pit-I & pit-II.

- Average thickness of soil has been considered as 0.50m.
- It shall be stacked separately.
- An excavator shall be deployed for the removal of overburden & interburden & its deployment shall be 3-4 days in a week.
- Bench height will be kept 3.0 m width of benches shall be kept 3.0m with face slope 70° to 75°.

2.8 RESERVE (AVAILABLE QUANTUM) AND PRODUCTION (EXTRACTABLE QUANTUM)

Economic Axis (EI):

- (i) Due to mining surrounding area & past exploration within area, it has been revealed that the mineral is good grade & having no problem in selling in the market. Mineral shall be transported manually as well as mules up to road side & loaded in to truck. NOC from individual land owners have been obtained. On this basis economic viability of the deposit has been established & mineral is economically viable. Hence economic axis under UNFC for the deposit is E=1.
- (ii) Specific end use grade of reserve established. The reserves of soapstone with applied area are cosmetic, paper & detergent grade.
- (iii) Specific knowledge of own forest & other land use data is available. The applied area is totally agricultural land & after mining it shall be backfilled, leveled it & put use for agriculture.

Feasibility axis: As this is small opencast semi-mechanized mine. The feasibility study carried out for this area and is considered to be pre-feasibility status. Hence pre-feasibility axis under UNFC for the deposit is F=I.

Geology: Due to past exploration within area, local geology, mineralogy & geometry of soapstone deposit has been established. The identification of ore body carried out & only soapstone was formed to be occurred within applied area.

Geological Axis:

(G-I) Actual exploration in vicinity of applied area has been established by way of mining pits. Therefore geological axis has been considered under G 1.

- (i) Geological Survey: Mapping in the scale of 1:1000 will triangulation point & bench marks carried out & shown in surface geological plan. Extensive pitting in surrounding area has been done & nature of deposition of soapstone has been established.
 - (ii) Linking of map with topo grid carried & latitude & longitude of corner pillar token,
 - (iii) Assessment of lithology carried out based on the exposures in the pit of soapstone, structure & surface mineralization studied & mapped.
2. Geo chemical survey: Detailed sampling of pit.
 3. Geophysical survey: Geophysical survey was carried out on the basis of exposure & outcrops. Based on the exploration & exposure in the pit, the mineralization zone delineated,
 4. Technological: Extensive pitting at the time of prospecting period was carried out within the applied area. The deposit is regular with low dip. Surface & subsurface lithology & co-relation of mineralization zones carried out by pitting & sampling carried out from pit faces.

Parameters for Estimation:

1. The cross section area of each section line has been calculated for each category of reserves. The cross sectional area is multiplied by the strike influence to get the

volume. The volume is multiplied by the bulk density to get the tonnage in each section line.

2. Bulk density of soapstone has been assumed 2.6 III view of our past experience in and around the area.
3. Bulk density of interburden (Magnesite) has been assumed 2.5 in view of our past experience in the area.
4. Recovery of interburden (Magnesite) has been taken as 70% of the total excavation as per the past experience with in the area & on the basis of prospecting carried out within applied area.

Category	Quantity in tonnes
A. Total Mineral Reserve	
Proved mineral reserve 111	0.478656
Probable mineral reserve 122	0.101242
B. Total Remaining Resources	
Feasibility mineral resources 211	0.027127
Prefeasibility mineral resources 222	0.035233
Measures mineral resource 331	Nil
Indicated mineral resource 332	Nil
Inferred mineral resource 333	0.107256
Reconnaissance mineral resource 334	Nil
Total Reserves + Resources A+ B	249382

At all the times it is necessary that top soil will not be allowed to mix with waste rock. Separate stacking will be done, it will also be done separately so that precious top soil is not properly conserved and utilized at all he stages of stacking and backfilling.

Since the land chosen for disposal of waste is mineralized land and also cultivated land therefore, the land will be ultimately vacated and utilized for mineral excavation and also for cultivation.

The quantities of overburden, interburden & ROM to be generated in each year of lease period are as below:

Year	Pit-I			Pit-II		
	Top Soil (cum)	Interburden (cum)	Soapstone (Tonnes)	Top Soil (cum)	Interburden (cum)	Soapstone (Tonnes)
I	249	2995	15124	180	1260	22768
II	282	2827	17150	200	1539	26487
III	330	3305	20049	218	2007	32225
IV	366	3663	22222	233	14141	36363
V	419	4185	25389	312	15293	40682
Total	1646	16975	99934	1143	34240	158525

Source: Approved mine plan

Man Power Requirement:

Owing to the topography of the area, which is a rough terrain, Soap Stone mining activity is needed as the primary source of income for the locals. The mine will provide employment to about 61 workers. It will provide employment to the people residing in vicinity and also indirectly by the development of supporting infrastructure and allied activities. The manpower requirement for the proposed project is shown in **Table 2.5** along with the breakup, who will be utilized for excavation & loading of minerals into trucks.

1. Mines manager full time: 1 no.
2. Geologist full time: 1 no.
3. Skilled workers: 2 nos.
4. Unskilled workers: 94 nos.

Solid Waste Generation & its Disposal

The top soil will be removed with the help of JCB machine, dozer, shovels, pickaxe, spade & crowbar and stacked separately. The soil intermixed with fragments and interburden rejects are low grade magnesite. Part of these rejects will be utilized in construction and maintenance of retaining walls, parapet walls, check dams and other construction works.

The quantity of top soil, interburden to be generated in each year is shown in **Table 2.1**.

Table 2.1: Details of Top soil and Interburden

Year	Pit-I		Pit-II	
	Top Soil (cum)	Interburden (cum)	Top Soil (cum)	Interburden (cum)
I	249	2995	180	1260
II	282	2827	200	1539
III	330	3305	218	2007
IV	366	3663	233	14141
V	419	4185	312	15293
Total	1646	16975	1143	34240

Storage and preservation of top soil:

The soil will be removed with the help of JCB machine, dozer, shovels, pickaxe, spade & crowbar and loaded manually to stack on the dump yard. Stacking will commence higher level to lower level. The spread of stacks will be undertaken through mechanically and manually both & average dump height kept 1.5m.

Restriction on mining:

- As per the Uttarakhand mining policy no mining operation shall be carried out within 100 m of railway line & bridge.
- The mining will not intercept the ground water table.
- The contractors will abide by Uttarakhand Minor Mineral Concession Rules, 2001 and guidelines contained in the River/Stream Bed Mining Policy and Land forms studies were taken into consideration.

- The contractors will abide at the time of mining with the term and condition as laid down under Mines Act, 1952 and Mines & Minerals (Regulation and Development) Act, 1957, Forest (Conservation) Act, 1980 and the stipulations of the EIA/EMP.
- The contractor will abide by provision of Mines Act, 1952, Interstate Migrant Work Man Act, the contractor with the satisfaction of competent authority will provide drinking water, rest shelter, first aid box, welfare facilities as Central and State Govt. labor laws.

2.9 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 break up for water requirement is shown in **Figure 2.3**.

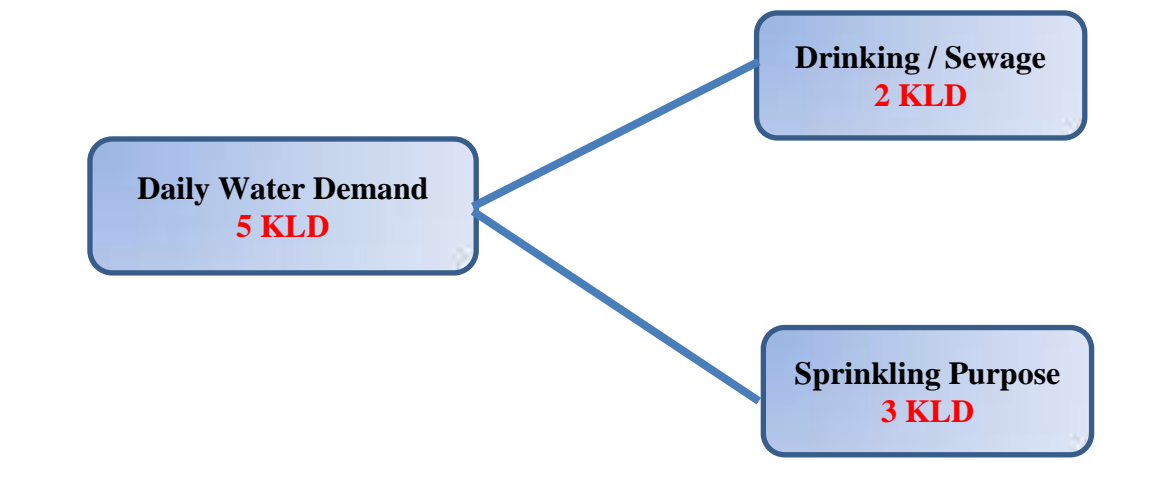


Figure 2.3: Details of water requirement

Temporary Rest Shelter:

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

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

2.10 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

2.11 OTHER MINE LEASE PRESENT WITHIN THE STUDY AREA

The other soapstone mine sites which are present within 500 m from the proposed mine and in the study area (10 km) has been presented in **Table 2.2**. The mine lease sites present in the core zone (500 m) and the study area marked in Google earth has been shown in **figure 2.4**.

Table 2.2: Details of other soapstone mines present in the study area (10 km radius) from the proposed soapstone mine

Sr. No.	Mine No. Marked on Google Earth Map	Details Of Mine	Area (ha)
1.	M1	Shri Umaid Singh Kalakoti, Village Ganwa Sirmoli, T. Kanda, District Bageshwar (M. Kalakoti Mines and Minerals)	4.79 ha
2.	M2	Shri Harish Chandra Bhatt, Bakheta Soapstone Mines, T.Kanda, District Bageshwar (O Jagannath Minerals)	9.50ha
3.	M3	Prem Singh Dhami, Dhapti Soapstone Mine, Village Dhapti, Tehsil Kanda, Bageshwar. (M/s Mahesh Joshi)	4.843 ha
4.	M4	M/s Mangal Singh Dhami, Village Dhapti Tehsil Kanda, District Bageshwar (M/s Jai Dhaulnag Enterprises)	4.27 ha
5.	M5	Shri Mahesh Chandra Pant, Village Ganuvasirmoli, Tehsil Kanda, District Bageshwar. (Main Sirmoli Mines)	4.588 ha
6.	M6	Shri Ganga Prasad Pandey, Village Batoli	1.95 acer

		Tehsil Kanda, District Bageshwar.	
7.	M7	Mr. Fate Singh Parihar, Tehsil Kanda, District Bageshwar. (M. Fate Singh Parihar)	4.491 ha
8.	M8	Shri Ram Bharat Mines, Village Dhapoli, Tehsil Kanda, District Bageshwar.	30.07 acer
9.	M9	Shri Govind Singh Ratla, Village Pali Chak Ditoli, Tehsil Kanda District	4.620 ha
10.	M10	Shri Kuldeep Singh bish Village tachi district bhgeswar	4.812 ha
11.	M11	Shree mati nandita Tiwari Tharv Mines	23 ha
12.	M12	Rahul vershaney Dhapoli Mines	30.07 acer
13.	M13	Sher singh Dhapola dhapola shera Mines	3.60 acer
14.	M14	Girsh petshali kandey kanyal Mines	5.40 acer
15.	M15	Ravi sharma H.B Corporation	5.86 ha
16.	M16	Harsh kumar mehra Musyoli Mines	4.294 ha
17.	M17	Ramash singh manjhela Jharkot Mines	4.056 ha
18.	M18	Bhopal singh kanwal Musyoli chak Joshi gaon	17.97 ha

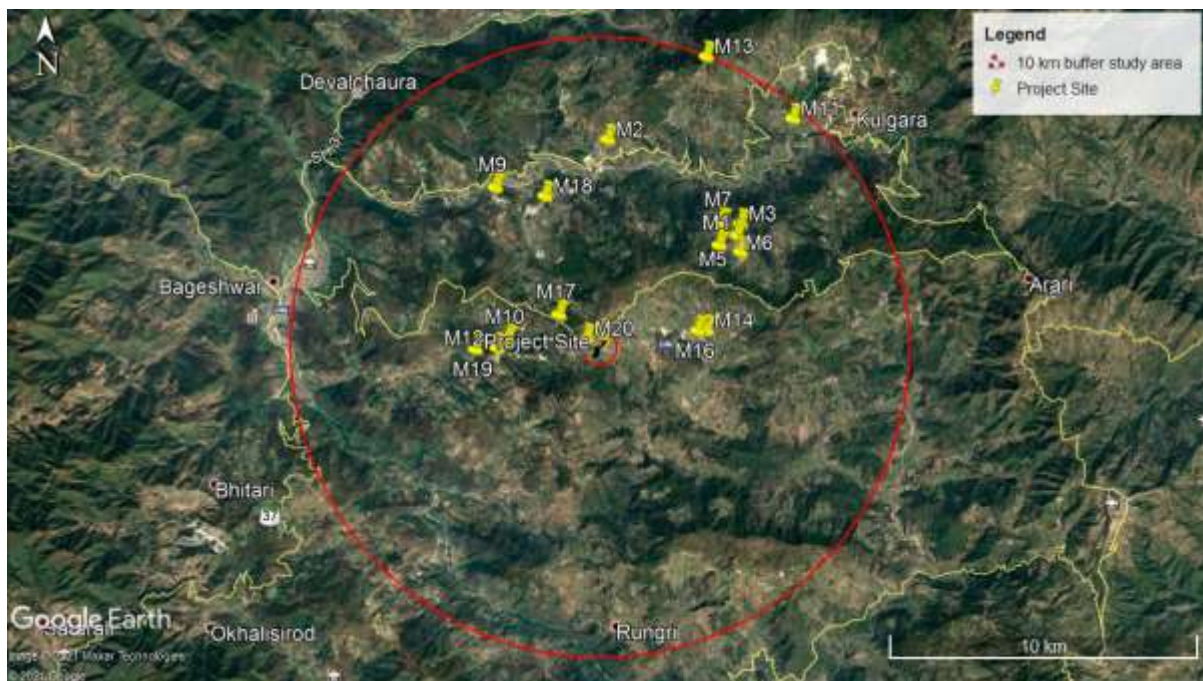


Figure 2.4: Other Mine sites present in the core and study area from the proposed project marked in Google earth

CHAPTER 3: DESCRIPTION OF THE ENVIRONMENT

3.1 PREAMBLE

Baseline environmental studies were conducted to monitor micro-meteorology, Ambient Air Quality, Ground and Surface water quality, Noise Levels, present land use pattern, soil quality, biological environment, socio-economic status, health status etc. within a study area of 10 Km radius around the project site. To establish the existing physical, natural, socio-economic and cultural environment condition of the study area, data has been collected through primary sources (consultation with the key persons) in addition to information gathered from various secondary sources.

All project relevant secondary data has been collected on regional environmental and social features from various reports pertaining to Government Agencies / Institutions and through literature reviews. Relevant data has been compiled from the census data of 2011, for obtaining details regarding the demographic and socio-economic features in the study area.

The main aim of the impact assessment study depends mainly on two factors. One of the estimation of impact from proposed project on the environment and second one is the assessment of the environmental condition. Both are key factors to arrive at the post project scenario. The estimated impact due to the mine lease area can be superimposed over the existing conditions to arrive at the post project scenario. The scope of the baseline studies includes detailed characterization of following environmental components, which are most likely to be influenced by the setting up of a mine lease area.

- Metrological conditions
- Ambient Air Quality
- Noise levels
- Water Quality (Surface and Ground water)
- Soil Quality
- Socio economic status

3.2 STUDY AREA AND PERIOD

The base-line data has been collected at the project site and 10 km buffer zone for prominent environmental attributes like Ambient Air Quality, Ambient Noise Level, Water quality and Soil profile. Primary and Secondary data has also been collected for other environmental attributes for the preparation of EIA/EMP report. The baseline study for the project was conducted during October 2022 to December 2022 (winter season). The baseline data monitoring procedures conforms to the requirement of EIA Notification, 2006 (as amended on 14.09.2006). The monitoring and analysis was done through Noida Testing Laboratory which is NABL and MoEF&CC accredited.

Study area map comprising direct impact area is shown in **Figure 3.1**

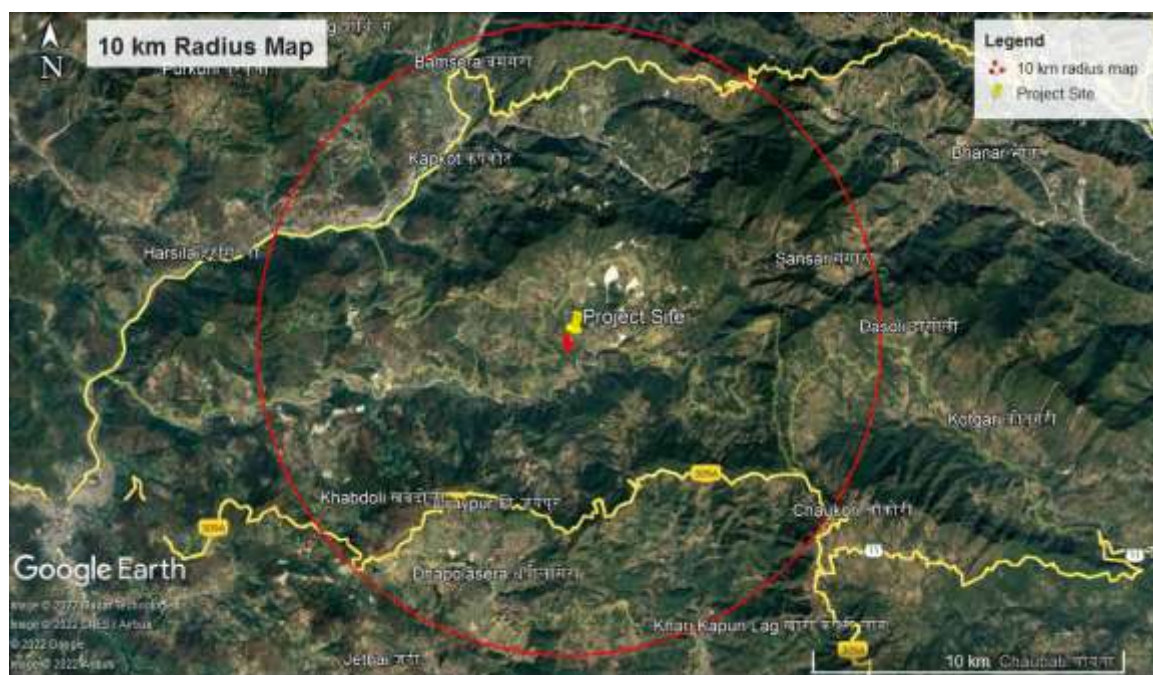


Figure 3.1: Study Area Map (10 km radius)

3.3 METHODOLOGY / APPROACH

3.3.1 Methodology of EIA

Environmental Impact Assessment study has been conducted within an area of 10 km radius around the ML area. The various steps involved in the study for this project are divided into three following phases.

- Identification of significant environmental parameters and assessing the baseline status within the study area and assessment of pollutants envisaged due to proposed activities and the polluting activities in the study area on various environmental parameters.
- Evaluation of impacts after superimposing the predicted pollution load over the baseline condition.
- Prepare Environmental Management Plan for mitigation of impacts on environment arising out of the proposed activity.

3.3.2 Approach

Environmental monitoring in order to establish the baseline environmental status of the study area for Ambient air, Water, Soil, Land use, ecology, etc.

- Collection of site specific meteorological data at the mine site.
- Carrying out a detailed biological study for the Core and Buffer Zone.
- Literature review that includes identification of relevant data and articles from various publications, various government agencies and other sources for socio-economy, meteorology, land use, ecology, etc.

- Identify various existing pollution loads due to mining and domestic activities in the buffer zone.
- Evaluate the predicted impacts on the various environmental attributes in the study area by using scientifically developed and widely accepted Environmental Impact Assessment (EIA) Methodologies.
- Preparation of an Environmental Management Plan (EMP) outlining the measures for improving the environmental quality.

Accordingly, field studies were carried out during the study period (October 2022 to December 2022) to establish the existing baseline conditions.

3.4 METEOROLOGICAL CONDITIONS

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

A meteorological station was set up at the proposed mine premises. Meteorological data was generated during the winter period.

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

- Wind speed
- Wind Direction
- Air Temperature
- Rainfall

3.4.1 Climate of the project district

The average temperature for the year in Bageshwar is 20.4 °C (68.8 °F). The warmest month, on average, is June with an average temperature of 27.3 °C (81.2 °F). The highest temperature ever recorded was 38 °C, recorded on 5 June 2017. The coolest month on average is January, with an average temperature of 11 °C (51.8 °F). The average amount of precipitation for the year in Bageshwar is 48.1" (1221.7 mm). The month with the most precipitation on average is July with 13.0" (330.2 mm) of precipitation. The month with the least precipitation on average is November with an average of 0.2" (5.1 mm). There is an average of 63.6 days of precipitation, with the most precipitation occurring in August with 15.3 days and the least precipitation occurring in November with 0.8 days.

3.4.2 Wind speed/Direction

Generally, light to moderate winds prevail throughout the year with speed ranging from 1 to 19 kmph. Winds were light and moderate particularly during the morning hours, while during the afternoon hours the winds were stronger. The wind rose diagram developed during the study

period is shown in **Figure 3.2** reveals that pre-dominant wind direction occurs mostly blowing from west direction in project site and the average wind speed is 0.6m/s.

Table 3.1(a) shows the Meteorological Data Parameters at the project site whereas **Table 3.1 (b)** shows the Meteorological Data Parameters of Mukteshwar district (Nearest IMD from the proposed project) for the months of October 2022 to December 2022.

Table-3.1 (a): Meteorological Data Parameters at Project site for the months of October 2022 to December 2022

Date	Temperature, deg C			Humidity, %			Pressure, hPa			Wind Speed, km/Hr	Predominant Wind Direction	Rainfall mm
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Avg		
October	5.6	27.6	18.4	52	69	58	776.2	778.4	777.0	2.1	W	14.2
November	3.8	26.9	17.2	45	61	58	775.7	777.3	776.4	1.5	W	20
December	1.9	25.6	15.4	52	60	57	774.2	775.1	774.6	1.9	NE	44.2

Source: Weather station

Table-3.1 (b): Meteorological Data Parameters at Mukteshwar district (Nearest IMD from the proposed project) for the months of October 2022 to December 2022

Date	Temperature, deg C			Humidity, %			Pressure, hPa			Wind Speed, km/Hr	Predominant Wind Direction From	Rainfall mm
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Avg		
October	3.5	24.6	16.2	54	68	59	776.4	778.5	777.2	2.0	W	11.2
November	1.5	19.8	14.8	45	61	56	775.8	777.0	776.1	1.7	W	16.8
December	-1.3	19.2	14.3	46	62	58	775.9	777.2	776.4	1.8	W	22

Source: IMD

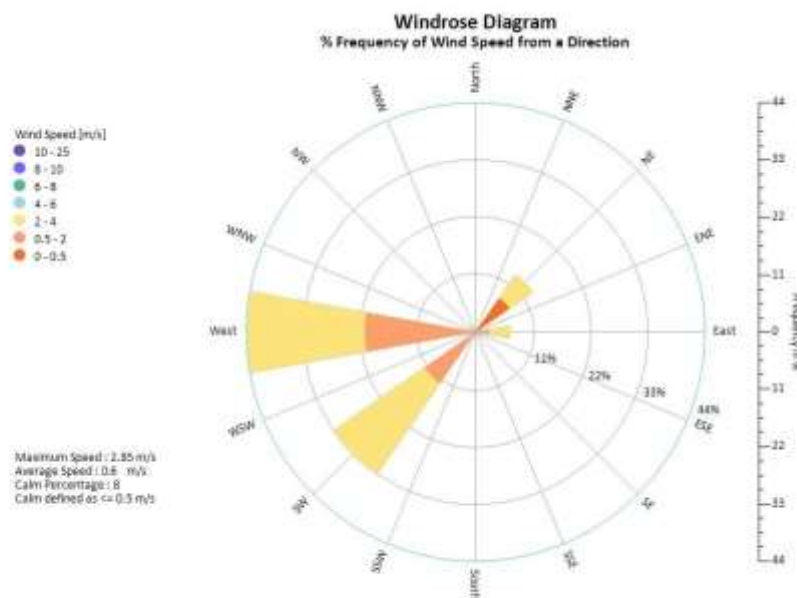


Figure 3.2: Wind-rose of the project site (October 2022 to December 2022)

3.5 AIR ENVIRONMENT

3.5.1 Ambient Air Quality

The Ambient Air Quality was monitored in the impact area as per MoEF&CC guidelines and as per approved ToR by SEAC, Uttarakhand. The study area represents mostly rural environment. The prime objective of the baseline air quality study was to assess the ambient air quality of the mining lease area.

3.5.2 Methodology Adopted for the Study

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

- Meteorological parameters covering upwind, downwind and cross wind direction
- Topography of the study area
- Representative of regional background air quality for obtaining baseline status
- Representative of likely impact areas.

Ambient Air Quality Monitoring (AAQM) stations were set up at 5 locations, one in core zone and the other four in the study area of 10 km with due consideration to the above mentioned points. AAQM locations were selected in downwind and upwind direction of the proposed mining lease area covering core and buffer zones. The details of the monitoring stations are given in **Figure 3.3** and shown in **Table-3.2**.

Ambient air quality monitoring was carried out twice a week with a frequency of 24 hours for 12 weeks during the study period. The common air pollutant namely Particulate Matter-10 (PM₁₀), Particulate Matter-2.5 (PM_{2.5}), Sulphur-dioxide (SO₂) and Nitrogen dioxide (NO₂) has been measured through a planned field monitoring. The baseline values of the air pollutants of concern are presented in **Tables 3.3 (a) to Tables 3.3 (d)** below statistical parameters like minimum, maximum, average and 98th percentiles have been computed from the observed field data for all sampling stations. These are compared with the standards prescribed by National Ambient Air Quality Standards 2009.

Table 3.2: Location of Ambient Air Quality Monitoring Stations

S. No.	Location Name	Direction	Distance from the project site (in km)
AAQ1	Project site	--	--
AAQ2	Kulgara	E	2.50
AAQ3	Riguriya	W	2.40
AAQ4	Deo Toli	SE	5.0
AAQ5	Papoli	N	3.0

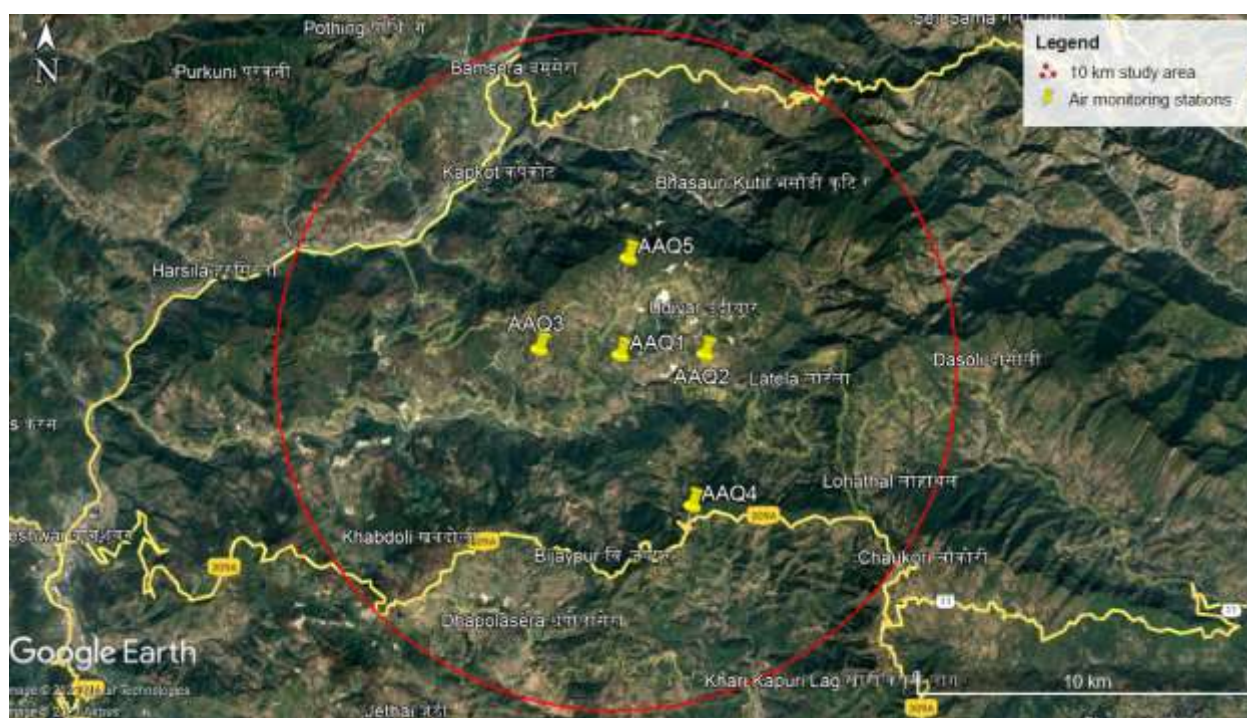


Figure 3.3 Ambient Air Quality Monitoring Locations

Table-3.3 (a): Ambient Air Quality in Project Site

S.No	Date	PM2.5, µg/m3	PM10, µg/m3	SO ₂ µg/m3	NO _x µg/m3
		Gravimetric	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	01.10.22	25.4	45.2	5.3	10.9
2	03.10.22	24.3	48.8	5.0	11.7
3	9.10.22	27.2	44.1	5.5	9.8

4	11.10.22	28.5	53.5	5.4	8.6
5	15.10.22	20.5	54.7	5.6	10.3
6	17.10.22	18.8	47.6	5.4	9.6
7	25.10.22	16.2	49.5	5.2	9.2
8	29.10.22	15.7	50.6	5.3	10.5
9	02.11.22	18.6	51.2	5.0	11.5
10	04.11.22	21.5	53.6	5.4	12.8
11	9.11.22	22.2	54.0	5.5	13.2
12	11.11.22	24.6	45.2	5.3	13.3
13	15.11.22	25.8	47.8	5.2	10.8
14	17.11.22	28.0	44.5	5.6	9.9
15	25.11.22	23.2	50.2	5.4	10.6
16	29.11.22	24.4	51.6	5.2	10.2
17	01.12.22	19.6	54.0	5.3	9.4
18	03.12.22	20.3	50.2	5.0	9.9
19	9.12.22	21.6	52.5	5.4	8.6
20	11.12.22	25.4	48.6	5.5	7.6
21	15.12.22	27.7	49.4	5.3	5.5
22	17.12.22	26.8	45.8	5.2	6.8
23	25.12.22	24.4	53.2	5.1	9.2
24	29.12.22	21.2	50.5	4.9	8.4
Minimum		15.7	44.1	4.9	5.5
Maximum		28.5	54.7	5.6	13.3
Average		23.2	50.1	5.4	10.2
98 Percentile		28.1	54.0	5.4	12.9
NAAQS, For 24 hourly monitoring (except CO for One hour)		60	100	80	80

Table-3.3 (b): Ambient Air Quality in Kulgara

S.No	Date	PM2.5, µg/m3	PM10, µg/m3	SO ₂ µg/m3	NO _x µg/m3
		Gravimetric	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	01.10.22	25.7	44.8	5.3	16.5
2	03.10.22	26.3	47.6	5.4	13.3
3	9.10.22	24.0	49.8	6.0	14.2
4	11.10.22	26.6	45.5	5.4	15.5
5	15.10.22	25.5	50.2	5.0	14.3
6	17.10.22	20.4	53.4	5.7	13.2
7	25.10.22	19.8	43.2	5.0	14.8
8	29.10.22	24.6	50.6	5.2	12.6
9	02.11.22	25.5	52.5	5.5	15.8
10	04.11.22	27.1	48.2	5.6	16.8

11	9.11.22	26.4	47.5	5.2	6.6
12	11.11.22	27.2	49.2	5.8	7.0
13	15.11.22	25.8	50.2	5.9	8.8
14	17.11.22	24.2	47.8	5.5	14.2
15	25.11.22	23.7	46.2	5.4	15.5
16	29.11.22	25.3	44.5	5.6	14.3
17	01.12.22	23.4	50.5	5.7	14.2
18	03.12.22	22.2	51.2	5.3	15.5
19	9.12.22	19.8	45.4	5.4	14.3
20	11.12.22	19.6	46.7	5.5	13.2
21	15.12.22	21.6	50.5	5.2	14.8
22	17.12.22	22.8	51.5	5.5	12.6
23	25.12.22	24.5	49.0	5.4	15.8
24	29.12.22	26.7	48.2	5.7	16.0
Minimum		19.6	43.2	5.0	6.6
Maximum		27.2	53.4	6.0	16.8
Average		24.2	48.7	5.6	13.9
98 Percentile		26.8	52.9	5.7	16.5
NAAQS, For 24 hourly monitoring (except CO for One hour)		60	100	80	80

Table-3.3 (c): Ambient Air Quality in Riguriya

S.No	Date	PM2.5,µg/m3	PM10,µg/m3	SO ₂ µg/m3	NO _x , µg/m3
		Gravimetric	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	01.10.22	22.7	45.6	5.4	11.9
2	03.10.22	21.4	50.5	5.6	12.0
3	9.10.22	20.3	52.4	5.3	13.4
4	11.10.22	22.7	43.2	5.6	9.9
5	15.10.22	23.3	50.6	5.5	10.2
6	17.10.22	21.8	52.5	5.0	11.2
7	25.10.22	19.8	36.1	5.2	12.6
8	29.10.22	20.6	47.5	5.6	10.6
9	02.11.22	13.2	49.2	5.5	9.8
10	04.11.22	12.2	50.2	5.2	11.6
11	9.11.22	21.5	47.8	5.3	10.2
12	11.11.22	22.5	46.2	5.5	9.8
13	15.11.22	23.0	44.5	5.4	10.2
14	17.11.22	20.8	50.5	5.6	11.6
15	25.11.22	17.6	51.2	5.2	12.4
16	29.11.22	16.8	50.6	5.7	13.2
17	01.12.22	17.0	52.5	5.2	10.8
18	03.12.22	16.5	48.2	5.0	9.6
19	9.12.22	19.0	47.5	5.5	7.3

Proposed Soapstone Mine (Area 8.529 ha) at Village- Khatigaon & Rangdev, Tehsil & District-Bageshwar, Uttarakhand by Shri Deewan Singh Papola	<u>Draft EIA/EMP</u>
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20	11.12.22	18.2	49.2	5.4	10.8
21	15.12.22	20.6	50.2	5.2	11.3
22	17.12.22	21.5	47.8	5.5	12.5
23	25.12.22	22.3	46.2	5.6	10.4
24	29.12.22	23.0	44.5	5.0	9.6
Minimum		12.2	36.1	5.0	7.3
Maximum		23.3	52.5	5.7	13.2
Average		20.2	48.3	5.5	10.8
98 Percentile		23.1	52.3	5.6	13.0
NAAQS, For 24 hourly monitoring (except CO for One hour)		60	100	80	80

Table-3.4 (d): Ambient Air Quality in Deo Toli

S.No	Date	PM2.5,µg/m3	PM10,µg/m3	SO ₂ µg/m3	NO _x , µg/m3
		Gravimetric	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	01.10.22	20.4	40.2	5.1	10.7
2	03.10.22	19.6	44.2	5.3	9.4
3	9.10.22	18.4	35.6	5.0	11.7
4	11.10.22	16.4	37.9	5.2	13.4
5	15.10.22	15.2	39.0	5.0	14.0
6	17.10.22	14.6	40.8	5.2	14.3
7	25.10.22	14.4	45.2	5.3	11.6
8	29.10.22	15.8	44.6	5.2	12.5
9	02.11.22	16.2	42.3	5.1	12.0
10	04.11.22	21.3	37.8	5.2	9.8
11	9.11.22	20.6	40.2	5.3	11.2
12	11.11.22	19.8	41.6	5.0	12.6
13	15.11.22	18.2	43.2	5.3	14.0
14	17.11.22	21.0	45.2	5.2	13.8
15	25.11.22	17.6	44.8	5.4	11.8
16	29.11.22	15.5	41.6	5.0	12.5
17	01.12.22	16.8	40.2	5.2	13.6
18	03.12.22	17.2	34.2	5.1	12.2
19	9.12.22	18.5	36.8	5.4	10.2
20	11.12.22	20.2	44.2	5.3	9.8
21	15.12.22	21.0	45.0	5.2	10.2
22	17.12.22	21.3	39.7	5.1	11.5
23	25.12.22	19.7	36.4	5.0	10.8
24	29.12.22	17.2	40.7	5.2	9.6
Minimum		14.4	34.2	5.0	9.2
Maximum		21.3	45.2	5.4	14.3

Average	18.1	40.8	5.2	11.9
98 Percentile	21.0	44.8	5.2	13.9
NAAQS, For 24 hourly monitoring (except CO for One hour)	60	100	80	80

Table-3.5 (e): Ambient Air Quality in the Papoli

S.No	Date	PM2.5, µg/m3	PM10, µg/m3	SO ₂ µg/m3	NO _x µg/m3
		Gravimetric	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	01.10.22	23.7	50.5	5.6	18.3
2	03.10.22	22.4	51.9	5.3	17.5
3	9.10.22	20.9	52.4	5.2	16.3
4	11.10.22	24.1	42.3	5.2	18.4
5	15.10.22	23.5	44.7	5.3	19.7
6	17.10.22	22.5	45.4	5.6	17.4
7	25.10.22	21.5	47.2	5.8	16.5
8	29.10.22	18.8	50.8	6.0	9.8
9	02.11.22	15.5	51.6	5.5	8.6
10	04.11.22	21.4	49.2	5.2	6.1
11	9.11.22	20.8	48.6	5.4	10.8
12	11.11.22	24.0	47.5	5.7	9.7
13	15.11.22	23.5	41.0	5.6	11.2
14	17.11.22	22.4	43.6	5.2	12.6
15	25.11.22	21.2	44.5	5.0	13.5
16	29.11.22	20.6	46.8	5.5	14.6
17	01.12.22	21.2	50.2	5.6	13.2
18	03.12.22	22.4	51.7	5.8	15.5
19	9.12.22	20.6	52.3	5.2	16.8
20	11.12.22	21.6	45.7	5.7	17.2
21	15.12.22	22.8	47.8	6.0	12.6
22	17.12.22	20.6	50.2	5.3	13.0
23	25.12.22	22.4	49.6	5.7	14.2
24	29.12.22	21.5	48.2	5.5	15.6
Minimum		15.5	41.0	5.0	6.1
Maximum		24.0	52.3	6.0	19.2
Average		21.5	48.4	5.6	14.3
98 Percentile		23.8	52.0	5.8	18.8
NAAQS, For 24 hourly monitoring (except CO for One hour)		60	100	80	80

3.5.3 Baseline Scenario

a) Suspended Particulate Matter (PM₁₀)

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

- Emission due to vehicular movement
- Dust generation from mining operations

The minimum and maximum level of PM₁₀ recorded within the study area was in the range of 34.2 µg/m³ to 54.7 µg/m³.

The 24 hourly average values of PM₁₀ were compared with the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations recorded in the study area are within the applicable limits i.e., 100 µg/m³ for PM₁₀ in Industrial, Residential, Rural and other areas.

b) Particulate Matter (PM_{2.5})

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

- Emission due to vehicular movement
- Dust generation from mining operations

The minimum and maximum level of PM_{2.5} recorded within the study area was in the range of 12.2 µg/m³ to 28.5 µg/m³.

The 24 hourly average values of PM_{2.5} were compared with the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations recorded in the study area are within the applicable limits i.e., 60 µg/m³ for PM_{2.5} in Industrial, Residential, Rural and other areas.

c) Sulphur Dioxide (SO₂)

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

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

Sulphur dioxide in atmosphere is significant because of its toxicity; Sulphur dioxide is capable of producing illness and lung injury. Further it can combine with water in the air to form toxic acid aerosols that can corrode metal surfaces, fabrics and the leaves of plants. Sulphur dioxide is an

irritant to the eyes and respiratory system. Excessive exposure to Sulphur dioxide causes bronchial asthma and other breathing related diseases as it affects the lungs.

The minimum and maximum concentration of SO₂ recorded within the study area was 4.9 to 6.0 µg/m³.

The 24 hourly average values of SO₂ were compared with the National Ambient Air Quality Standards (NAAQS) and it was found that all sampling stations recorded values are below the applicable limits 80 µg/m³ for Industrial, Residential, Rural and other areas.

d) Nitrogen Dioxide (NO₂)

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

- Emissions from field burning of coal.
- Emissions from vehicular movements in the study area.

Oxides of Nitrogen in the presence of sunlight will undergo reactions with a number of organic compounds to produce all the effects associated with photochemical smog. The minimum and maximum level of NO₂ recorded within the study area was in the range of was 5.5 µg/m³ to 19.2 µg/m³.

The 24 hourly average values of NO₂ were compared with the National Ambient Air Quality Standards (NAAQS) and it was found that all sampling stations recorded values are below the applicable limits 80 µg/m³ for Industrial, Residential, Rural and other areas.

3.6 NOISE ENVIRONMENT

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 proposed site.

3.6.1 Source of Noise

The main sources of noise in the study area are domestic activities, industrial activities and vehicular traffic. The main occupation of the villagers in the study area is agriculture and business.

3.6.2 Noise Level in the Study Area

The baseline noise levels have been monitored at 5 locations, one in core zone and four within the study zone twice a week during winter period, using a sound level meter and noise level measurement locations were identified for assessment of existing noise level status, keeping in view the land use pattern, industrial area, Silence Zone, residential areas in villages etc., if

available within 10 km radius of the study area. The day levels have been monitored during 6.00 AM to 10.00 PM and night noise levels, during 10.00 PM to 6.00 AM. The noise monitoring stations are shown in **Figure 3.4** and represented in **Table 3.4**. The results are presented in **Table 3.5 (a) Table 3.5**.

Table 3.4: Noise Level Monitoring Stations in the Study Area

S. No.	Location Name	Direction	Distance from the project site (in km)
NQ1	Project site	--	--
NQ2	Kulgara	E	2.50
NQ3	Riguriya	W	2.40
NQ4	Deo Toli	SE	5.0
NQ5	Papoli	N	3.0

Table 3.5: Leq Noise Level in the Study Area (during day and Night) (Dec 2022)

Location Code	Noise levels dB(A), Day (Leq)	Noise levels dB(A) Night, (Leq)	Noise Limits in dB(A), Leq Day Time	Noise Limits in dB(A), Leq Night Time	Area
NQ1	52.8	41.2	75	70	Industrial Zone
NQ2	51.3	39.8	65	55	Commercial
NQ3	50.8	38.4	55	45	Residential Zone
NQ4	46.5	37.6	55	45	Residential Zone
NQ5	51.7	40.1	55	45	Residential Zone

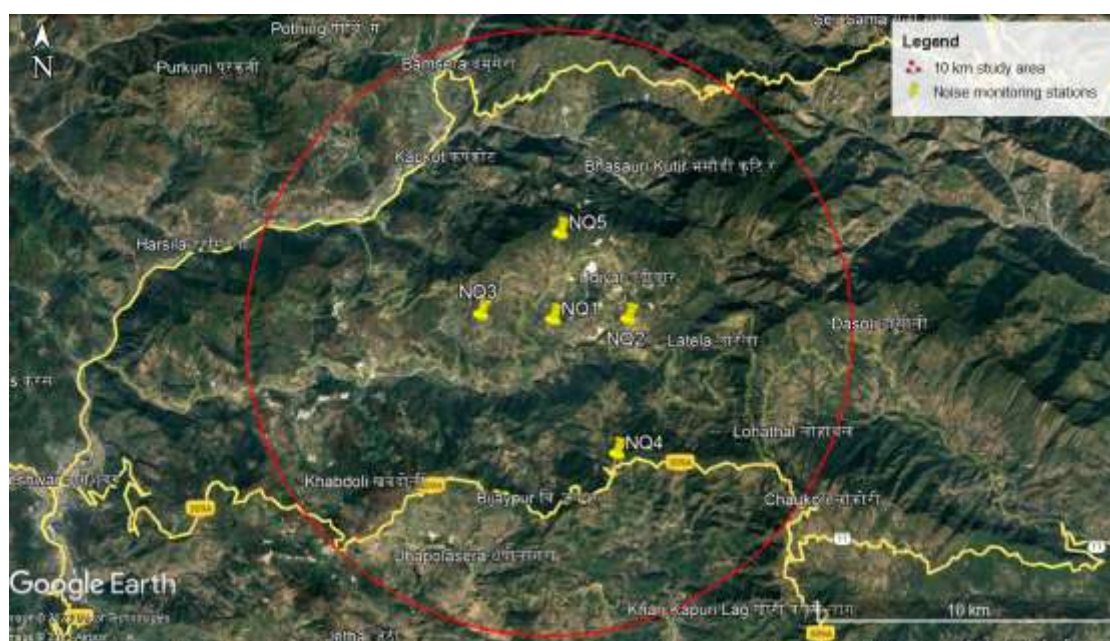


Figure 3.4: Ambient Noise Level Monitoring Locations

3.6.3 Ambient Noise Standards

Ministry of Environment, Forest and Climate Change (MoEF&CC) has notified the noise standards vide gazette notification dated February 14, 2000 for different zones under the Environment Protection Act (1986). These standards are given in **Table-3.6**

Table 3.6: Ambient Quality Standards in respect of Noise

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

Note:

1. Daytime is from 6.00am to 10.00 pm and Nighttime 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

3.6.4 Baseline Scenario

The values of noise observed in some of the areas are primarily owing to vehicular traffic and other anthropogenic activities. Assessment of average logarithm night time Leq (Ln) varies from 37.6 to 41.2 dB (A) and the average logarithm daytime Leq (Ld) varies from 46.5 to 52.8 dB (A) within the study area.

The status of noise quality within the 10 km zone of the study area is, therefore, within the MoEF&CC standards.

3.7 WATER ENVIRONMENT

3.7.1 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 dust suppression, drinking and green belt watering purpose.

The water quality within the study area was monitored during the study period. The water samples were collected once in month. The water sampling locations marked within the study are presented in **Table 3.7** and the result of the monitoring and analysis are presented in the **Table 3.8** and **Figure 3.5** shows the Water Quality Monitoring Locations marked within the Study Area.

Table 3.7: Location of Water Sampling Sites

S. No.	Location Name	Direction	Distance from the project site (in km)
GW1	Project site	--	--
GW2	Kulgara	E	2.50
GW3	Riguriya	W	2.40
GW4	Deo Toli	SE	5.0
GW5	Papoli	N	3.0
SW1	Stream near Karoli	SW	2.50
SW2	Saryu River	NW	7.0

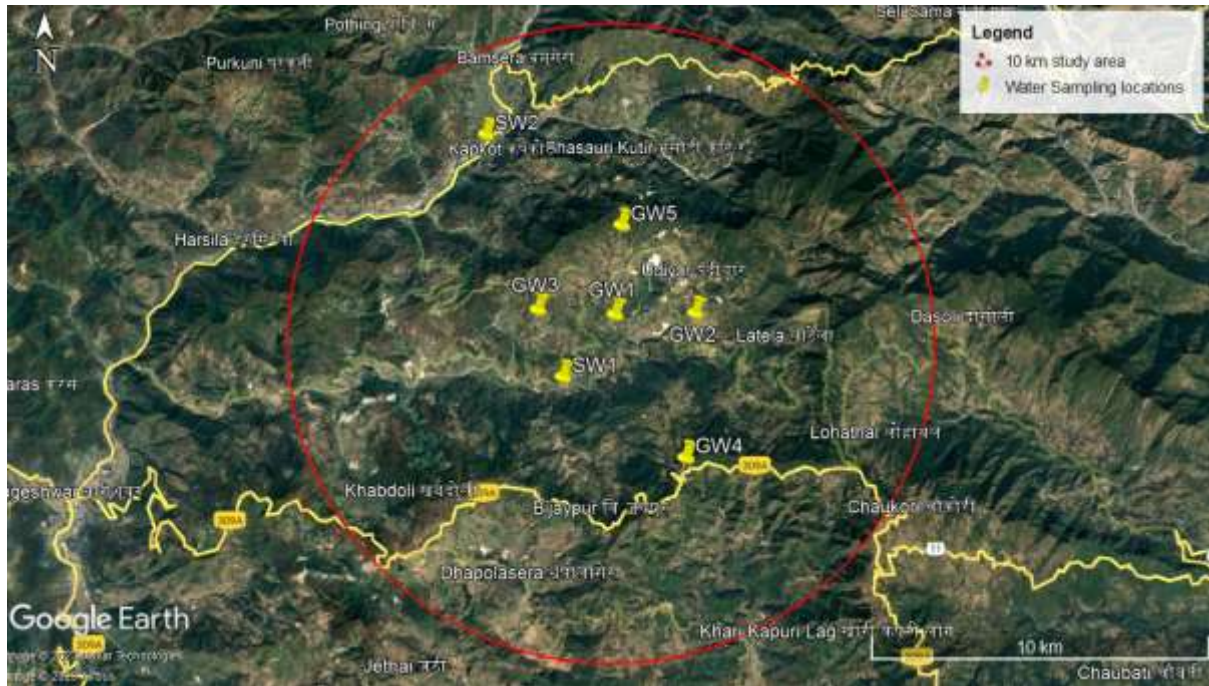


Figure 3.5: Location Map of Ground Water Sampling Sites

Table 3.8 (a): Water Quality during the month of November 2022

S.No	Parameter	Unit	Limit (IS-10500:2012)		GW1	GW2	GW3	GW4	GW5	SW1	SW2
			Desirable	Permissible	Project Site	Kulgara	Riguriya	Deo Toli	Papoli	Stream near Karoli	Saryu
1	Temperature (°C)	(°C)	-	-	15	16	15	15	16	15	15
2	pH	-	6.5-8.5	No Relaxation	7.81	7.52	7.31	7.49	7.28	7.20	7.48
3	Electrical Conductivity	Micromhos/cm	-	-	755.15	762.22	412.34	425.20	395.84	408.10	410.27
4	TDS	mg/l	500	2000	413.32	395.20	205.15	210.27	198.5	196.50	202.10
5	TSS	Mg/l	-	-	BDL	BDL	0.41	BDL	BDL	BDL	BDL
6	Dissolved Oxygen	mg/l			4.7	3.5	5.5	4.0	3.8	4.3	4.5
7	Alkalinity as (CaCO ₃)	mg/l	200	600	389.20	386.10	216.15	208.13	205.20	200.10	221.27
8	Total Hardness (as CaCO ₃)	mg/l	200	600	288.4	245.50	182.40	205.30	195.24	178.51	184.20
9	BOD (at 27°C 3-Days)	mg/l	-	-	BDL	BDL	BDL	BDL	BDL	4.8	5.6
10	COD	mg/l	-	-	BDL	BDL	BDL	BDL	BDL	12.9	13.7
11	Nitrate (as NO ₃)	mg/l	45	No Relaxation	0.24	0.12	0.66	0.12	0.24	0.22	0.33
12	Chloride (as Cl)	mg/l	250	1000	28.2	47.6	12.3	19.9	18.8	22.3	17.8
13	Phosphates	mg/l	-	-	0.03	0.05	0.03	0.06	0.08	0.07	0.08
14	Sulphate (as SO ₄)	mg/l	200	400	58.5	62.4	42.2	38.5	40.4	41.0	39.3
15	Sodium (as Na)	mg/l	-	-	42.6	62.7	42.4	40.1	38.6	43.4	51.9
16	Potassium (as	mg/l	-	-	2.4	3.9	2.6	3.0	2.4	2.1	3.5

	K)										
17	Calcium (as CaCO ₃)	mg/l	75	200	56.7	52.2	55.5	48.6	47.2	51.6	50.4
18	Magnesium (as CaCO ₃)	mg/l	30	100	225	40.8	32.9	38.5	32.1	42.6	37.5
19	Silica	mg/l	-	-	33.2	28.6	32.5	30.5	37.5	25.6	27.8
20	Oil & Grease	mg/l	-	-	<1.0	<1.00	<1.00	<1.00	<1.01	<1.02	<1.03
21	Residual Sodium Carbonate	mg/l	-	-	116	86	72	78	65	80	62
22	Lead (as Pb)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
23	Arsenic (as As)	mg/l	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
24	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
25	Cadmium (as Cd)	mg/l	0.003	No Relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
26	Chromium (as Cr ⁶⁺)	mg/l	0.05	No Relaxation	<0.001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Total Chromium (as Cr ⁶⁺)	mg/l	0.05	No Relaxation	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
28	Copper (as Cu)	mg/l	0.05	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
29	Zinc (as Zn)	mg/l	5	15	0.18	0.19	0.003	0.12	0.16	0.14	0.17
30	Iron (as Fe)	mg/l	0.3	1	0.88	0.77	0.04	0.77	0.68	0.69	0.58
Bacteriological Parameter											
1	Total Coliform	MPN/100ml	Absent	-	Absent	Absent	Absent	Absent	Absent	110	124
2	<u>E.coli</u>	<u>E.coli</u> /100ml	Absent	-	Absent	Absent	Absent	Absent	Absent	30	38

3.7.2 Sampling Frequency and Sampling Techniques

Parameters for analysis of water quality were selected based on the utility of the particular source of water as per MoEF&CC guidance. Hence quality of ground water was compared with IS: 10500: 2012 for drinking purposes. Surface water quality was monitored for parameters as per Methods of Monitoring & Analysis published by CPCB and it was rated according to the CPCB Water Quality Criteria against A, B, C, D & E class of water. Water samples were collected as Grab water sample from sampling location. The samples were analyzed as per standard procedure / method given in IS: 3025 (Revised Part) and standard method for examination of water and wastewater Ed.21st, published jointly APHA, AWWA and WPCF.

The surface water quality is compared with CPCB water quality criteria mentioned in **Table 3.9** below:

Table 3.9: Water Quality Criteria as per Central Pollution Control Board

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

3.7.3 Result & Conclusion:

- 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 water from 7.28 to 7.81 and the surface water are 7.2 to 7.45. 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 in ground water are varying from 198.5 mg/l to 413.32 mg/l whereas in surface water varying from 196.5 mg/l to 202.1 mg/l. The TDS of the samples were within the desirable limit of 500 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 ground water samples collected in the study area were ranging from 12.3 mg/l to a maximum of 47.6 mg/l, in surface water samples 12.3 mg/l to 47.6 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 182.4 mg/l to 288.4 mg/l, in surface water samples 178.51 mg/l to 184.2 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.

Comparing the values of pH, DO, BOD and total coliforms with 'Use based classification of surface waters' published by Central Pollution Control Board; it can be seen that all the analyzed surface waters can be compared with class 'B' and can be used as Outdoor bathing (Organized).

3.8 SOIL CHARACTERISTICS

The composite soil samples were collected from site and the study area and were analyzed for characterization. The locations of the monitoring sites are depicted in **Figure 3.6** and given in **Table 3.10**. Showing Soil Sample Collection Points marked within the Study Area.

3.8.1 Methodology

The soil samples were collected in the month of **December 2022**. Soil samples were collected from five locations. The samples were filled in polythene bags, labeled in the field with number and site name and sent to laboratory for analysis. The test results are given in **Table-3.11**.

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

Table 3.10: Soil Sample Collection Points

S. No.	Location Name	Direction	Distance from the project site (in km)
SQ1	Project site	--	--
SQ2	Kulgara	E	2.50
SQ3	Riguriya	W	2.40
SQ4	Deo Toli	SE	5.0
SQ5	Papoli	N	3.0

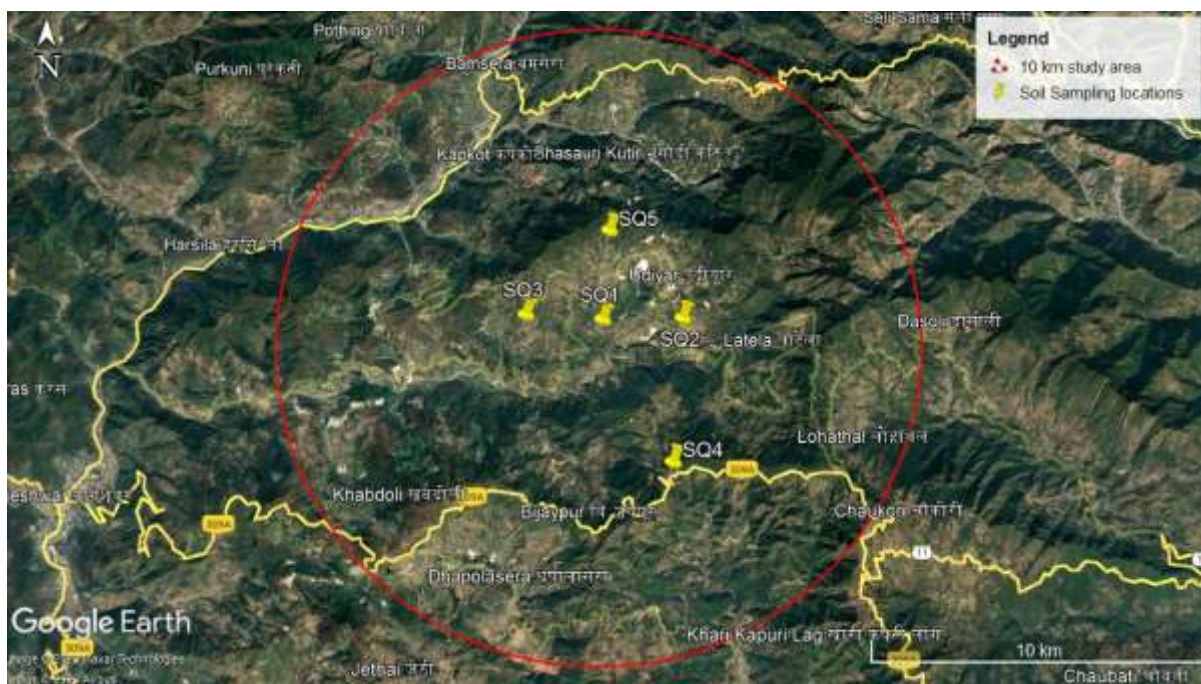


Figure 3.6: Location Map of Soil Sampling Sites

Table 3.11: Physiochemical Properties of Soil (November 2022)

S.No	Parameter	Test Method	Unit	SQ-1	SQ-2	SQ-3	SQ-4	SQ-5
1	pH(1:5 suspension)	IS:2720(Par t-26)		7.71	7.60	7.58	7.82	7.91
2	Electrical Conductivity at 25°C (1:5suspension.)	IS:2720(Par t-21)	µmhos/cm	341.52	252.60	221.5	284	224
3	Calcium (as Ca)	STP/SOIL	mg/kg	481.6	411.2	401.6	392.5	388.5

4	Magnesium(as Mg)	STP/SOIL	mg/kg	28.5	32.6	35.7	38.2	39.4
5	Organic Matter	IS:2720(Part-22)	% by mass	0.43	0.66	0.37	0.22	0.28
6	Potassium(as K)	STP/SOIL	mg/kg	91.3	87.5	93.6	84.5	89.8
7	Water holding Capacity	STP/SOIL	% by mass	25.9	19.5	28.7	25.6	24.6
8	Porosity	STP/SOIL	Mq/100/g m	40.20	37.82	37.6	34.4	34.5
9	Texture	STP/SOIL	-	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam
10	Sand	STP/SOIL	% by mass	57.6	55.4	60	65.6	60
11	Clay	STP/SOIL	% by mass	22.8	26.6	24.1	18	20
12	Silt	STP/SOIL	% by mass	19.6	18	15.9	16.4	20
13	Sodium	STP/SOIL	mg/100g	190.0	206.5	180.7	201.5	190.9
14	Sodium Absorption Ratio	STP/SOIL	%By mass	1.35	1.10	1.38	1.15	1.19
15	Nitrogen	STP/SOIL	mg/100g	0.07	0.02	0.09	0.07	0.05
16	Phosphorus	STP/SOIL	mg/kg	0.9	0.40	0.61	0.85	0.81
17	Bulk Density	STP/SOIL	grm/cc	1.2	1.3	1.58	1.2	1.0
18	Infiltration Rate	STP/SOIL	mm/hr	12	14	10	09	11
19	Moisture	STP/SOIL	%	15.7	17.9	22.1	18.5	17.8
20	Sulphates	STP/SOIL	mg/1000g	55.3	63.6	47.8	49.5	55.8
21	Available Sulphur(as S)	STP/SOIL	mg/kg	22.3	25.4	28.5	25.78	24.0
22	Available Manganese (as Mn)	STP/SOIL	mg/100g	2.12	1.92	1.58	1.12	1.88
23	Available Iron (as Fe)	STP/SOIL	mg/kg	45.6	38.9	36.18	40.6	45.2
24	Sodium as Na	STP/SOIL	mg/kg	56.6	60.2	70.8	79.5	68.6

3.8.2 Results of Analysis of the Soil

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 7.58 to 7.91. 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 221.5 – 341.52 µmhos/cm.

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 toposheet is shown in **Figure-3.7**.

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-3.12**.

Table 3.12: Land use of the study area

Sr. No.	Particulars	Percentage
1	Settlements	4
2	Water bodies	2.77
3	Barren land	3.45
4	Crop land	12.98
5	forest area	76.8
	Total	100.00

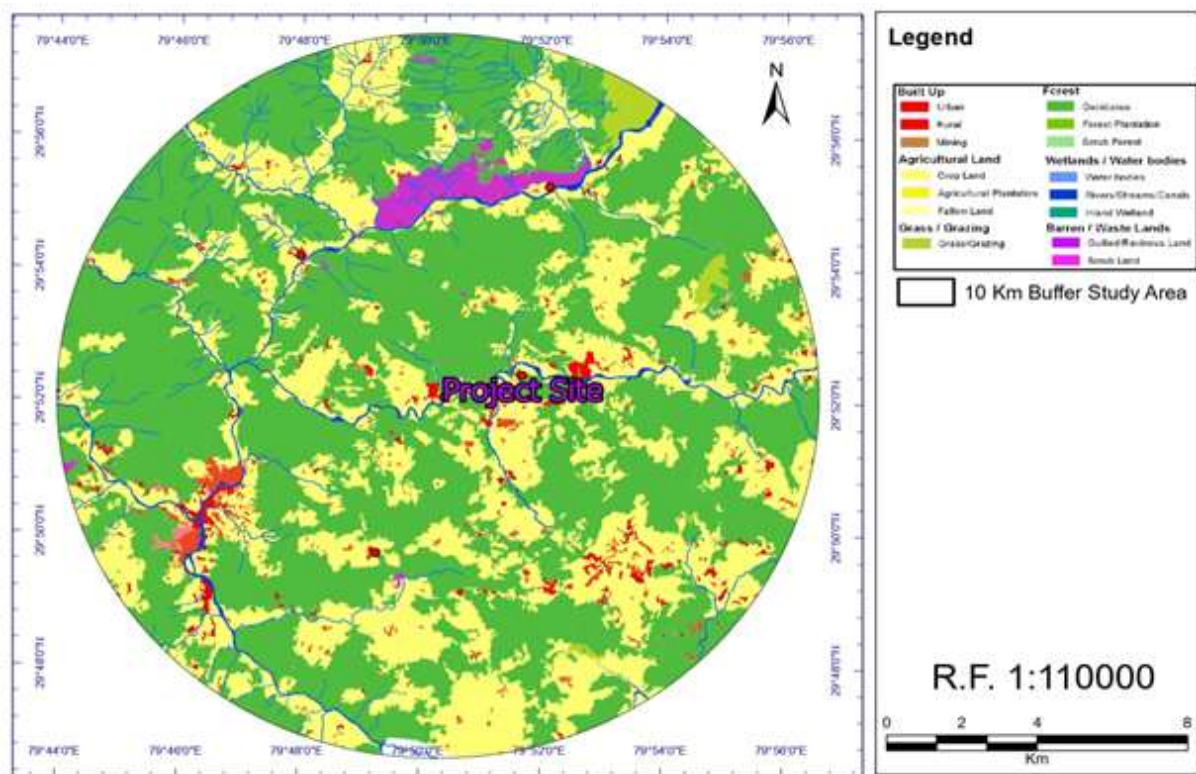


Figure 3.7 Land use delineation of 10 km radius area

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-3.13 (i)** and shown in traffic density map as **Figure 3.8**.

Table 3.13 (i): Existing Traffic Scenario & LOS

Road	V (PCU/day)	C (PCU/day)	Existing V/C Ratio	LOS
Dopahar Banlekh Road	200	600	0.3	B

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

During Mine operation

Total Capacity of mine : 40,682 TPA
 No. of working days : 240 days
 Total Capacity of mine/day : $40682 / 240 = 169$ tonnes/day
 Truck Capacity : 20 tonnes
 No. of trucks deployed per day : $169 / 20 = 8$ trucks per day
 No. of trucks deployed/day to & fro : $8 * 2 = 16$ trucks
 Increase in PCU/day : 36

The addition to traffic by the proposed project during its operation is given table below:

Table 3.13 (ii): Additional Traffic Scenario & LOS due to proposed project

Road	V	C	Modified V/C Ratio	LOS
Dopahar Banlekh Road	236	600	0.39	B

From the above analysis it can be seen that the V/C ratio is likely to be changed to 0.39 on Dopahar Banlekh Road with LOS remains "B" which is "Very Good" as per the classification. So the additional load on the carrying capacity of the concerned roads is not likely to have much significant adverse effect.



Figure 3.8: 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 in to 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 contribute in improvement of essential environmental attributes like air, water, soil, etc.

Before starting any Environmental Impact Assessment study, it is necessary to identify the baseline of relevant environmental parameters which are likely to be affected as a result of operation of the proposed project. A similar approach has been adopted for conducting the study on Biological Environment for this Project. Both terrestrial and aquatic ecosystems have been studied to understand the biological environment.

3.11.1 Methodology for the study

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

Field study period: The ecological survey has been conducted for one season. All data were collected in winter season. The map showing the details of reserve forest within 10 km radius has been shown in **Figure 3.9**. The details are given as below:

Table 3.14: Mode of data collection & parameters considered during the survey

Aspect	Data	Mode of data collection	Parameters monitored
Terrestrial Ecology	Primary data collection	By conducting field survey	Floral and Faunal diversity

	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.
Aquatic Ecology	Primary data collection	By conducting field survey	Floral and Faunal diversity
	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.

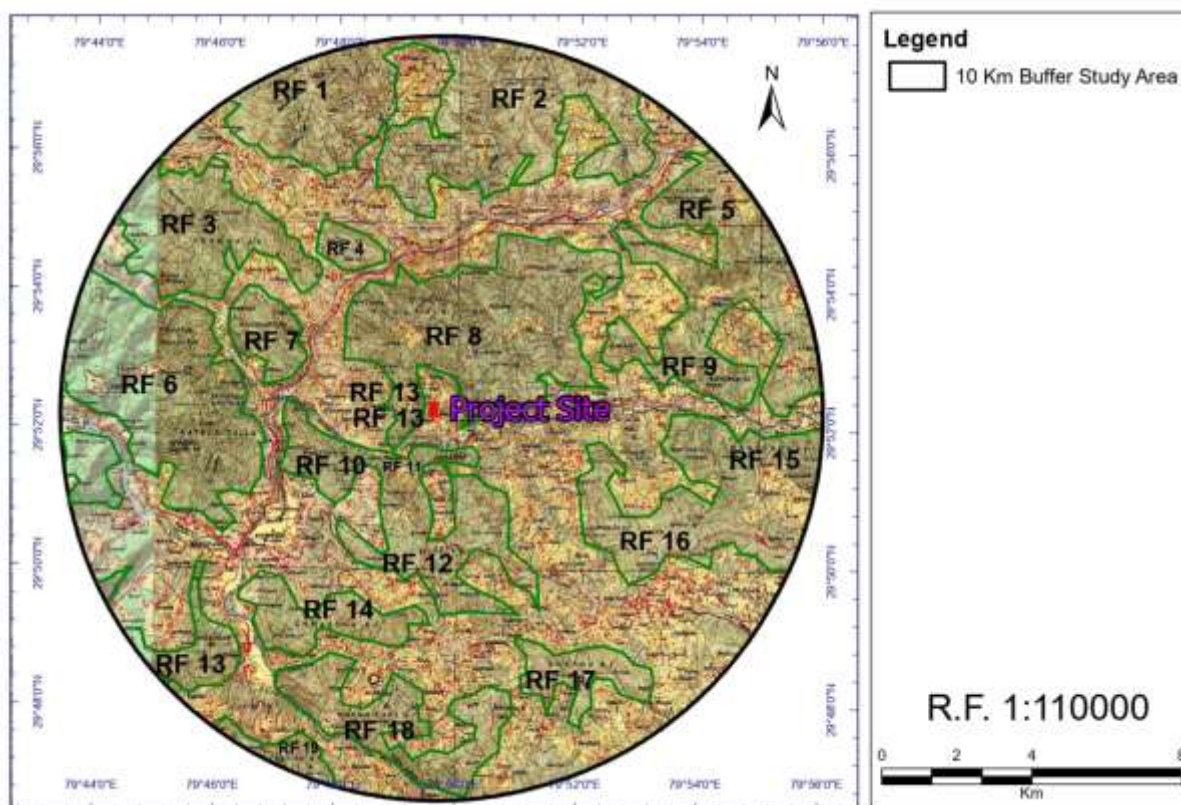


Figure 3.9: Details of reserve forest within 10 km radius

3.11.2 Physical Environment of the study area:

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 and northwest and Pithoragarh district in the east. The geographical area of the district is 1687.8 km² (Census, 2001).

3.11.2.1 Drainage:

Drainage of the area is mainly controlled by Saryu, Gomti and Pindar Rivers and their tributaries (locally called Nadi, Gad or Gadhera) viz. Pungar Nadi, Khir Ganga Nadi, Bhadrapati Nadi, Revti

Ganga, Kanal Gad, Lahor Nadi, 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.

3.11.2.2 Climate:

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).

3.11.2.3 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 valleys of Gomti and Saryu Rivers. Rice, wheat, mandua, barley, maize and sawan are the principal crops grown in the district. Garur valley has the maximum cultivated area. Due to high production of rice, the area is known as "Rice Bowl of Kumaun".

3.11.3 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 vegetation in the north. Uttarakhand covers an area of 53, 483 sq km which is 1.63 % of the geographical area of the country as mentioned in the India State of Forest Report 2017 and 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 area under moderately dense forest and 5567 km² area under open forest. Out of 2246 km² total area of Bageshwar district, 194 km² area is under very dense forest, 883 km² fall under moderately dense forest and 304 km² area is open forest (61.49% area of district encompasses forest cover).

As per Champion and Seth (1968), the project site included following types of forests.

- Very dense forest
- Moderate dense forest
- Open forest
- Scrub

Winter	:	October 2022 to December 2022
Survey sites	:	Around the project site in 10 km radius
Core zone	:	At the project site (100m)
Buffer zone	:	Around the project site in 10 km radius.

3.11.4 Taxonomic Diversity: Floristic of Terrestrial Ecosystem

The magnificent Himalaya is well recognized for its bio-physical diversity and socio-cultural Heritage, unique physical and ethnic diversity, traditional systems and an ample quantity of Indigenous knowledge. It forms one of the Global Biodiversity Hotspots-the Himalayan Biodiversity Hotspot.

Table 3.15: Tree species recorded in the study area during study period

S. No.	Botanical Name	Family	Local Name / English	Availability
1.	<i>Phoenix humilis</i>	Arecaceae	Khajoor	Occasional
2.	<i>Acacia catechu</i>	Mimosaceae	Khair	Occasional
3.	<i>Prunus armenica</i>	Rosaceae	Chulu	Common
4.	<i>Adina cordifolia</i>	Rubiaceae	Haldu	Common
5.	<i>Terminalia chebula</i>	Combretaceae	Harad	Common
6.	<i>Bombax ceiba</i>	Bombacaceae	Semal	Common
7.	<i>Ficus religiosa</i>	Moraceae	Pipal	Common
8.	<i>Syzygium cumuni</i>	Myrtaceae	Jamun	Common
9.	<i>Populus ciliata</i>	Salicaceae	Pahadi Pipal	Common
10.	<i>Pyrus pyr ifolia</i>	Rosaceae	Nashpati	Common
11.	<i>Erythrina suberosa</i>	Fabaceae	Dhak	Common
12.	<i>Cedrus deodara</i>	Pinaceae	Devdar	Common
13.	<i>Ficus nemoralis</i>	Moraceae	Dudhla	Common
14.	<i>Shorea robusta</i>	Dipterocarpaceae	Saal	Common
15.	<i>Dalbergia Sissoo</i>	Fabaceae	Shisham	Common
16.	<i>Litsea chinensis</i>	Lauraceae	Lauraceae	Common
17.	<i>Pyrus pashia</i>	Rosaceae	Mehal	Common
18.	<i>Ficus glomerata</i>	Moraceae	Gular	Common
19.	<i>Lagerstroemia indica</i>	Lythraceae	Gulbahar	Common
20.	<i>Quercus semecarpifolia</i>	Fabaceae	Khairu	Rare
21.	<i>Quercus leucotrichophora</i>	Fabaceae	Banj	Common
22.	<i>Sapindus mukurossi</i>	Sapinadaceae	Reetha	Common
23.	<i>Cassia fistula</i>	Caesalpiniaceae	Amaltash	Common
24.	<i>Mangifera indica</i>	Anarcardiaceae	Aam	Common
25.	<i>Embllica officinalis</i>	Euphorbiaceae	Amla	Common
26.	<i>Castanopsis tribuloides</i>	Fagaceae	Katauni	Common
27.	<i>Machilus duthiei</i>	Lauraceae	Kaula	Rare
28.	<i>Salix wallichiana</i>	Salicaceae	Bains	Occasional
29.	<i>Dendrocalamaus strictus</i>	Poaceae	Bans	Common
30.	<i>Aegle marmelos</i>	Rutaceae	Bel	Common
31.	<i>Betula utilis</i>	Betulaceae	Bhuj	Occasional
32.	<i>Grewia optiva</i>	Tiliaceae	Bhimal	Common
33.	<i>Salix babylonica</i>	Salicaceae	Salicaceae	Common

Source: Field survey & Bageshwar forest department.

Table 3.16: Tree, shrub & herb species recorded in the study area during study period

S. No	Botanical Name	Family	Local Name / English	Local Availability
1.	<i>Lespedeza eriocarpa</i>	Fabaceae	Khunju	Common
2.	<i>Schefflera venulosa</i>	Araliaceae	Khadsemal	Common

3.	<i>Viburnum erubescens</i>	Caprifoliaceae	Gani	Common
4.	<i>Viburnum mullaha</i>	Caprifoliaceae	Ricchoi	Occasional
5.	<i>Viburnum nervosum</i>	Caprifoliaceae	Gadbiya	Occasional
6.	<i>Carissa opaca</i>	Apocynaceae	Karaunda	Occasional
7.	<i>Rubus niveus</i>	Rosaceae	Kala Hinsalu	Occasional
8.	<i>Dioscorea deltoidea</i>	Dioscoreaceae	Taroi	Occasional
9.	<i>Murraya exotica</i>	Rutaceae	Kamini	Common
10.	<i>Berberis asiatica</i>	Berberidaceae	Kilmoda	Common
11.	<i>Lantana camara</i>	Verbenaceae	Kuri	Common
12.	<i>Nyctanthes arbor-tristis</i>	Oleaceae	Harsingar	Common
13.	<i>Artemisia vulgaris</i>	Asteraceae	Kurinja	Common
14.	<i>Plectranthes rugosus</i>	Lamiaceae	Kurkha	Common
15.	<i>Smilex aspera</i>	Liliaceae	Kukurdada	Common
16.	<i>Skimmia anquetilia</i>	Rutaceae	Kedarpati	Occasional
17.	<i>Rubus biflorus</i>	Rosaceae	Achhai	Common
18.	<i>Asparagus racemosus</i>	Liliaceae	Satavar	Common
19.	<i>Viburnum cotinifolium</i>	Caprifoliaceae	Ghinna	Common
20.	<i>Randia tetrasperma</i>	Rutaceae	Ghighari	Common
21.	<i>Rhus continus</i>	Anacardiaceae	Tung	Common
22.	<i>Cassia tora</i>	Caesalpiniaceae	Chakunda	Common
23.	<i>Pleurospermum densiflorum</i>	Apiaceae	Gugal	Rare
24.	<i>Mimosa pudica</i>	Mimosaceae	Chuimui	Common
25.	<i>Strobilanthes wallichii</i>	Acanthaceae	Jaanu	Common
26.	<i>Rubus duthieanus</i>	Rosaceae	Jogi	Common
27.	<i>Phoenix acaulis</i>	Arecaceae	Thakal	Rare
28.	<i>Taraxacum officinale</i>	Asteraceae	Dudhiya	Common
29.	<i>Datura stramonium</i>	Solanaceae	Dhatura	Common
30.	<i>Mentha sylvestris</i>	Lamiaceae	Pudina	Common
31.	<i>Adhatoda vasica</i>	Acanthaceae	Basinga	Common
32.	<i>Centella asiatica</i>	Apiaceae	Brahmi	Common
33.	<i>Salix elegans</i>	Salicaceae	Kadvi	Common
34.	<i>Zizyphus mauritiana</i>	Rhamnaceae	Ber	Common
35.	<i>Cannabis sativa</i>	Cannabinaceae	Bhang	Common
36.	<i>Ficus scandes</i>	Moraceae	Chachri	Common
37.	<i>Lawsonia inermis</i>	Lythraceae	Mehndi	Common
38.	<i>Euphorbia royleana</i>	Euphorbiaceae	Suru	Common

Source: Field survey & Bageshwar forest department.

Table 3.17: Climber species recorded in the study area study period

S. No	Botanical Name	Family	Local Name / English	Local Availability
1.	<i>Rubus paniculatus</i>	Rosaceae	Kathula	Common
2.	<i>Milletia auriculata</i>	Fabaceae	Gauj	Occasional
3.	<i>Clematis montana</i>	Ranunculaceae	Kenia	Common
4.	<i>Tinospora cordifolia</i>	Menispermaceae	Giloy	Rare
5.	<i>Cryptolepis buechanani</i>	Asclepiadaceae	Dudhibel	Common
6.	<i>Holboellia angustifolia</i>	Berberidaceae	Jangali sharifa	Occasional

Source: Field survey & Bageshwar forest department

Table 3.18: Parasite species (angiosperm) recorded in the study area during study period

S. No.	Botanical Name	Family	Local / English Name	Local Availability
1.	<i>Cuscuta reflexa</i>	Cuscutaceae	Amarbel	Common
2.	<i>Taxillus vestitus</i>	Loranthaceae	Pand	Common
3.	<i>Viscum nepalense</i>	Loranthaceae	Budu	Common
4.	<i>Dendrophthoe falcata</i>	Loranthaceae	Banda	Common

Source: Field survey & Bageshwar forest department.

Table 3.19: Bamboo species recorded in the study area during study period

S. No.	Botanical Name	Family	Local / English Name	Local availability
1.	<i>Arundinaria alcate</i>	Poaceae	Gol Ringal	Common
2.	<i>Dendrocalamus hamiltonii</i>	Poaceae	Kako Bans	Common
3.	<i>Dendrocalamus somdevii</i>	Poaceae	Bans	Common
4.	<i>Dendrocalamus strictus</i>	Poaceae	Bans	Common

Source: Field survey & Bageshwar forest department.

Table 3.20: Grass species recorded in the study area during study period

S. No.	Botanical Name	Family	Local/ English Name	Local availability
1.	<i>Saccharum munja</i>	Poaceae	Munj	Common
2.	<i>Eragrostis curvula</i>	Poaceae	Love grass	Common
3.	<i>Setaria sphacelata</i>	Poaceae	Setaria grass	Common
4.	<i>Dactylis glomerata</i>	Poaceae	Auchard grass	Common
5.	<i>Saccharum spontaneum</i>	Poaceae	Kans	Common
6.	<i>Crysopogon gryllus</i>	Poaceae	Kush	Common
7.	<i>Cynodon dactylon</i>	Poaceae	Dub	Common
8.	<i>Sorghum halepense</i>	Poaceae	Bajra	Common
9.	<i>Cymbopogon maritini</i>	Poaceae	Babla	Common
10.	<i>Themeda anathera</i>	Poaceae	Piriya	Common

Source: Field survey & Bageshwar forest department.

Table 3.21: Non- flowering plant species in the study area during study period

S. No.	Botanical Name	Family	Local / English name	Local availability
Fern				
1.	<i>Angiopteris evecta</i>	Angiopteridaceae		Common
2.	<i>Osmunda hilsenbergii</i>	Osmundaceae		Rare
3.	<i>Drynaria propinqua</i>	Polypodiaceae		Common
4.	<i>Microsorium membranaceum</i>	Polypodiaceae		Common
5.	<i>Phymatopteris oxyloba</i>	Polypodiaceae		Common
6.	<i>Lygodium japonicum</i>	Lygodiaceae		Common
7.	<i>Pteris biaurita</i>	Pteridaceae		Common
8.	<i>Pteris vittata</i>	Pteridaceae		Common
9.	<i>Adiantum philippenese</i>	Adiantaceae		Common
10.	<i>Vittaria flexuosa</i>	Pteridaceae		Common
11.	<i>Sphenomeris chinesis</i>	Lindsaceae		Common

12.	<i>Christella parasitica</i>	Thelypteridaceae		Common
13.	<i>Tectaria coadunata</i>	Tectariaceae		Common
Bryophyte				
14.	<i>Anthoceros sp.</i>	Anthoceroceae		Common
15.	<i>Funaria hygrometrica</i>	Funariaceae		Occasional
16.	<i>Riccia sp.</i>	Ricciaceae		Common
Algae				
17.	<i>Spirogyra sp.</i>	Zygnemataceae		Occasional
18.	<i>Chara sp.</i>	Characeae		Occasional
19.	<i>Nostoc sp.</i>	Nostocaceae		Common

Source: Field survey & Bageshwar forest department.

During winter season, a total of 113 species were recorded inhabiting land. The floral angiosperm diversity (94 species) was dominated by tree species (32); the other species recorded are shrub, herb (42), climber (06), parasitic angiosperm (04) and grass (10) species. The graph showing the Taxonomic diversity of terrestrial flora in the project area during study period has been shown in **Figure 3.10**.

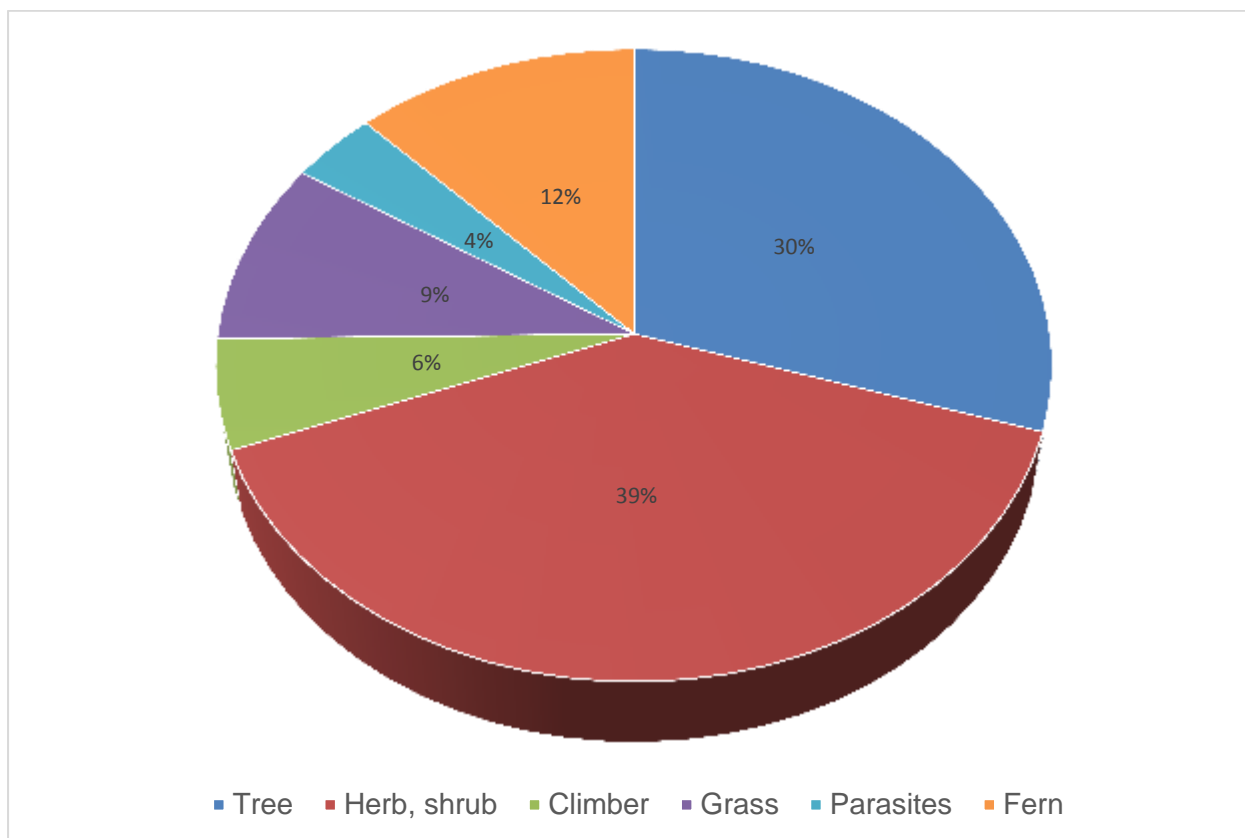


Figure 3.10: Taxonomic diversity of terrestrial flora in the project area during study period

3.11.5 Economically Important Species

The terrestrial peculiarities make the Himalayan region a very diverse system subtending a wide range of flora types. The biodiversity of this region is severely vulnerable by natural and anthropogenic disturbances. During the field survey, numbers of plant species which are medicinally and economically importance in the area were recorded. These plants are used by

local people for various purpose and also used as food and other devotions. A total of 19 Species of sparingly significant plants were recorded in the project area.

Table 3.22: Economically & medicinally important plant species recorded in the project area

S. No.	Botanical Name	Family	Local / English Name	Life form
1.	<i>Asparagus adscendens</i>	Liliaceae	Shatavar	Herb
2.	<i>Quercus leucotrichophora</i>	Fagaceae	Banj	Tree
3.	<i>Juglans regia</i>	Juglandaceae	Akhrot	Tree
4.	<i>Ficus religiosa</i>	Moraceae	Pipal	Tree
5.	<i>Ficus palmata</i>	Moraceae	Bedu	Tree
6.	<i>Ricinus communis</i>	Euphorbiaceae	Arandi	Shrub
7.	<i>Jatropha curcas</i>	Euphorbiaceae	Safed Arand	Shrub
8.	<i>Litsea umbrosa</i>	Lauraceae	Chirar	Tree
9.	<i>Symplocos crataegoides</i>	Symplocaceae	Lodh	Tree
10.	<i>Rhododendron arboreum</i>	Ericaceae	Burans	Tree
11.	<i>Prunus cerasoides</i>	Rosaceae	Padam	Tree
12.	<i>Bauhinia variegata</i>	Caesalpinaceae	Kanchnar	Tree
13.	<i>Bombax ceiba</i>	Bombacaceae	Semal	Tree
14.	<i>Cedrus deodara</i>	Pinaceae	Deodar	Tree
15.	<i>Hedychium spicatum</i>	Zingiberaceae	Haldi	Herb
16.	<i>Malaxis acuminata</i>	Orchidaceae	Jivak	Herb
17.	<i>Myrica esculenta</i>	Myricaceae	Kaphal	Tree

Source: Field survey & Bageshwar forest department.

3.11.6 Fauna Diversity: Terrestrial Ecosystem

The list of fauna according are based on primary survey and multiples sources of data together with the operating plans of Bageshwar forest divisions, printed articles in scientific journals, publications of multiple sources of data like the Zoological Survey of India. During field surveys resulted in to updated information of the 48 species belonging to both vertebrate as well as invertebrate animal diversity. The faunal species recorded in the project area include; butterfly 06 species, avifauna 24 species and vertebrates 18 species. The percentage contribution of different species is dominated by birds and mammal. Two Schedule – 1 species have also been recorded in the study area.

The graph showing the Taxonomic diversity of terrestrial fauna in the project area during October 2022 to December 2022 has been shown in **Figure 3.11**.

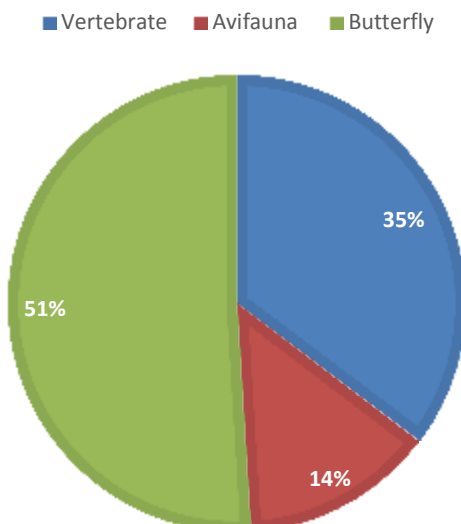


Figure 3.11: Taxonomic diversity of terrestrial fauna in the project area during study period

Table 3.23: Vertebrate's species recorded in the study area during study period

S. No.	Scientific Name	Common Name	Local Availability	WPA, 1972	IUCN category
1.	<i>Presbytis entellus</i>	Common Langur	Common	II	NA
2.	<i>Macaca mulata</i>	Rhesus Macaque	Common	II	NA
3.	<i>Sus scrofa cristatus</i>	Indian wild Boar	Frequently	III	NA
4.	<i>Felis chaus</i>	Jungle cat	Frequently	II	LC
5.	<i>Herpestes edwardsi</i>	Common mongoose	Common	II	LC
6.	<i>Vulpes bengalensis</i>	Indian fox	Common	II	LC
7.	<i>Vulpes vulpes</i>	Red fox	Common	II	NA
8.	<i>Hyaena hyaena</i>	Striped hyena	Occasional	III	NT
9.	<i>Lutra lutra</i>	Common otter	Rare	II	NT
10.	<i>Rousettus leschenaultia</i>	Fulvous fruit bat	Common	-	NA
11.	<i>Petaurista petaurista</i>	Red flying squirrel	Common	II	LC
12.	<i>Lepus nigricollis nigricollis</i>	Indian hare	Common	IV	NA
13.	<i>Axis axis</i>	Spotted deer	Frequently	III	NA
14.	<i>Cervus unicolor</i>	Sambhar	Common	III	VU
15.	<i>Muntiacus muntjak</i>	Barking deer	Common	III	NA
16.	<i>Panthera pardus</i>	Leopard	Rare	I	NT
17.	<i>Ursus thibetanus</i>	Asiatic Black Bear	Rare	I	VU
18.	<i>Canis aureus</i>	Jackal	Common	II	LC

Source: Field survey & Bageshwar forest department.

Note: NA- Not assessed yet for IUCN category, LC- Least Concern, NT- Near threatened, VU- Vulnerable.

Table: 3.24: Avifauna (Bird) species recorded in the project area during study period

S. No.	Scientific Name	Common name	Local availability
1.	<i>Motacilla alba</i>	White wagtail	Frequent
2.	<i>Certhia himalayana</i>	Bar-tailed creeper	Common
3.	<i>Garrulax albogularis</i>	White throated laghing thrush	Common
4.	<i>Neophron percnopterus</i>	Egyptian vulture	Common
5.	<i>Gyps himalayensis</i>	Himalayan griffon	Frequently
6.	<i>Falco tinnunculus</i>	Common kestrel	Common
7.	<i>Francolinus francolinus</i>	Black francolinus	Common
8.	<i>Gallus gallus</i>	Red jungle fowl	Frequently
9.	<i>Vanellus indicus</i>	Red wattled lapwing	Rare
10.	<i>Columbia livia</i>	Rock pigeon	Frequently
11.	<i>Psittacula cyanocephala</i>	Plum headed parakeet	Common
12.	<i>Psittacula himalayana</i>	Stay- headed parakeet	Frequently
13.	<i>Eudynamys scolopacea</i>	Asian Koel	Common
14.	<i>Heiropococcyx sparveroides</i>	Large Hawk Cuckoo	Common
15.	<i>Heiropococcyx varius</i>	Common Hawk Cuck	Common
16.	<i>Glaucidium radiatum</i>	Jungle Owlet	Common
17.	<i>Glaucidium brodiei</i>	Collared Owlet	Common
18.	<i>Coracias benghalensis</i>	Indian roller	Common
19.	<i>Dendrocopos auriceps</i>	Brown-fronted woodpecker	Common
20.	<i>Acridotheres fuscus</i>	Jungle myna	Common
21.	<i>Acridotheres tristis</i>	Common myna	Common
22.	<i>Corvus splendens</i>	House crow	Common
23.	<i>Corvus macrorhynchos</i>	Large-billed crow	Common
24.	<i>Sitta castanea</i>	Chestnut-bellied Nut hatch	Common
25.	<i>Pycnonotus cafer</i>	Red vented bulbul	Common
26.	<i>Dinopium benghalense</i>	Black rumped flameback	Frequently

Sources: Field survey & Bageshwar forest department.

Table 3.25: Butterfly species recorded in the project area during study period

S. No.	Scientific Name	Local availability	IUCN Status
1.	<i>Pieris brassicae</i>	Common	NA
2.	<i>Pieris caniaidia</i>	Frequently	NA
3.	<i>Gonepteryx rhamni</i>	Common	NA
4.	<i>Colias fieldi</i>	Common	NA
5.	<i>Colias erate</i>	Common	NA
6.	<i>Lampides</i> sp.	Common	NA
7.	<i>Dilipa morgiana</i>	Frequently	NA

Source: Field survey & Bageshwar forest department.

3.12 SOCIO-ECONOMIC ENVIRONMENT

Socio-Economic status of the population is an indicator for the development of the region. Any development project of any magnitude will have a bearing on the living conditions and on the economic base of population in particular and the region as a whole. Similarly, the proposed activities will have its share of socio-economic influence in the study area. The section delineates the overall appraisal of society relevant attributes. The baseline data collection of project on socioeconomic aspects in the study area has been done through the analysis of secondary data

(Census 2011) available for the study area of 10 km radius around the project site. The information in the context was gathered on the following socio-economic parameters viz.

- Demographic profile
- Education levels
- Occupational Profile
- Cropping Pattern
- Other Socio-Economic Parameters.

3.12.1 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.

3.12.1.1 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 and topo sheet
- 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
- Scrutiny of filled-in-schedules
- Data processing and tabulation
- Data analysis and preparation of report.

3.12.1.2 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.

3.12.1.3 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.

3.12.1.4 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) Facilitation of sustainability of positive impact by recommending community development initiatives in the study area.
- g) Suggestion of mitigation measures in case of adverse impact.

3.12.2 Methodology

For composite Socio-Economic Impact Assessment of projects, the consultant 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. 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.

3.12.2.1 Census 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).

3.12.3 Bageshwar District (Project District)

Bageshwar is a town and a municipal board in Bageshwar district in the state of Uttarakhand, India. It is located at a distance of 470 km from the National Capital New Delhi and 332 km from the State Capital Dehradun. Bageshwar is known for its scenic beauty, Glaciers, Rivers and Temples. It is also the administrative headquarters of Bageshwar district. Situated on the confluence of Sarju and Gomati rivers, Bageshwar is surrounded by the mountains of Bhileshwar and Nileseshwar to its east and west and by the Suraj Kund in the north and Agni Kund in the south. Bageshwar was a major trade mart between Tibet and Kumaun, and was frequented by the Bhotia traders, who bartered Tibetan wares, wool, salt and Borax in exchange for Carpets and other local produces in Bageshwar.

3.12.4 Population Profile

The description of the project district is presented in **Table 3.26**. According to the 2011 census of India, Bageshwar has a population of 2, 59,898.

Table 3.26: Demographic details of Project District and Tehsil

S.No.	District/Tehsil	Households	Population					Sex ratio
			Total	Male	%	Female	%	
1.	Bageshwar	57,941	2,59,898	1,24,326	47.84	1,35,572	52.16	1090

Source: Census of India, 2011

3.12.5 Caste Wise Distribution of Population

Table 3.27 provides detailed information about the SC, ST population in Bageshwar district as well as on the Project area. The total SC population in Bageshwar district is 72,061 which is 27.72% of the total population, while ST population is 1982, which is 0.76% of the total population.

Table 3.27: Caste wise distribution of population

Sl. No.	District/Project Area	Schedule Caste (SC)		Schedule Tribes (ST)	
		Total	% of SC	Total	% of ST
1	Bageshwar	72,061	27.72	1,982	0.76

Source: Census of India, 2011

3.12.6 Literacy Rate

District Bageshwar: The literate population in Bageshwar district is 1,79,483, out of which male & female are 97,546 and 81,937 respectively. The male literates represent 54.35% while female represent 45.65% of the total population.

The details of literacy rate and literate people in Bageshwar tehsil and district are provided in **Table 3.28**.

Table 3.28: Literacy Rate of Project District and Project Area

S. No	District/Project Area	Number of Literate			Literacy Rate %	
		Total	Male	Female	Male	Female
1	Bageshwar	1,79,483	97,546	81,937	54.35	45.65

Source: Census of India, 2011

3.12.7 Ethnographic Profile of Project State and Project District

The various Scheduled Castes and the Scheduled Tribes in Project district area are Agariya, Dom, Dhobi, Dhangar and Bhotiya, Jaunsari, Tharu etc.

The list containing the names of the Scheduled Castes and the Scheduled Tribes applicable for the Census of India 2011 in the Project State are given below **Table 3.29 (a & b)**:

Table 3.29 (a): List of Schedule Caste in the Project District

S.NO	Name of SC	S.NO	Name of SC
1.	Agariya	34.	Patari
2.	Badhik	35.	Saharya
3.	Badi	36.	Dhangar
4.	Baheliya	37.	Dhanuk
5.	Baiga	38.	Dharkar
6.	Baiswar	39.	Dhobi
7.	Bajaniya	40.	Dom
8.	Bajgi	41.	Domar
9.	Balahar	42.	Dusadh
10.	Balai	43.	Gharami
11.	Balmiki	44.	Ghasiya
12.	Bangali	45.	Gond
13.	Banmanus	46.	Gual
14.	Bansphor	47.	Habura
15.	Barwar	48.	Hari
16.	Basor	49.	Hela
17.	Bawariya	50.	Kalabaz
18.	Beldar	51.	Kanjar
19.	Beriya	52.	Kapariya
20.	Bhantu	53.	Karwal
21.	Bhuiya	54.	Khairaha
22.	Bhuyiar	55.	Kharwar (excluding banbasi)
23.	Boria	56.	Khatik
24.	Chamar, Dhusia, Jhusia, Jatawa	57.	Khorot
25.	Chero	58.	Kol
26.	Dabgar	59.	Kori
27.	Majhwar	60.	Korwa
28.	Mazhabi	61.	Lalbegi
29.	Musahar	62.	Sanaurhiya
30.	Nat	63.	Sansiya
31.	Pankha	64.	Shilpkar
32.	Parahiya	65.	Turaiha
33.	Pasi, Tarmali		

Source: Census of India, 2011

Table 3.29 (b): List of Schedule Tribe in the Project District

S.NO	Name of ST
1.	Bhotia
2.	Buksa
3.	Jaunsari
4.	Raji
5.	Tharu

Source: Census of India, 2011

3.12.8 Religion and Culture

Bageshwar is Hindu majority city with approximately 99.1% of district population following Hinduism as their religion. Muslim is second most popular religion in district with approximately 0.6 % following it. In Bageshwar district, Christianity is followed by 0.2 %. **Table 3.30** shows the Religious wise distribution of Population of Bageshwar District.

Table 3.30: Religion wise distribution of Population of Bageshwar District

Description	Total	Percentage
Hindu	257509	99.1
Muslims	1440	0.6
Christian	397	0.2
Sikh	46	0.0
Buddhist	102	0.0
Jain	7	0.0
Others	16	0.0
Not Stated	381	0.2

Source: Census of India, 2011

3.12.9 Economic Structure

The economy of the district is predominantly based on agriculture, as maximum per cent of the population resides in rural areas and their main occupation is agriculture. Kharif and Rabi are the two principal harvests grown in the district.

The **Table 3.31** given below describes two sections of workers main and marginal with a third category which is non-worker; the total number of workers at district level is 1,23,638 which is 47.57 percent of total population out of which main workers are 63.16 percent and marginal workers have a share of 36.84 percent while rest nearly 52.43 percent workers are non-workers.

Table 3.31: Main Workers, Marginal Workers and Non-workers of Project District and Project Area

Sl. No.	District/ Project Area	Total workers	Total worker %	Main workers	Main workers %	Marginal workers	Marginal workers %	Non-workers	Non-workers %
1.	Bageshwar	1,23,638	47.57	78,085	63.16	45,553	36.84	1,36,260	52.43

Source: Census of India, 2011

3.13 SOCIO-ECONOMIC IMPACT ASSESSMENT

3.13.1 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.

3.13.2 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 mine. 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 locals for the operation of the upcoming mine. 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.

3.13.3 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 at project village, the supply of soapstone powder in the domestic market will be increased. This is a direct and positive impact of the upcoming mining project.

3.13.4 Impact on Approach Roads

Movement of trucks and other vehicles to and fro 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. The proposed mining will lead to 36 nos of PCUs in the approach road; hence there shall be negligible impact on the approach road due to the proposed mining.

3.13.5 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 closed 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.

3.13.6 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 resettlement 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.

3.13.7 Income to Government

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

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.

3.14 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 may be taken up on priority basis as employment opportunists are intended for the local aspirant.

CHAPTER 4: ANTICIPATED ENVIRONMENTAL IMPACTS & 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 and ground vibrations;
- Water resources and quality;
- Land use Pattern;
- Soil quality;
- Flora and Fauna;
- Socio-Economic conditions; and
- Occupational Health.

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

4.1.1 Impact on Drainage

Water table in this area is very deep ranging from 75 to 90m. No water problem is envisaged in the working pits since the rain water will be coursed through the garland drain to be provided on the upper side of the mine lease area and drainage on the benches provided on the hillside by slight slopping the benches. The only source of the water shall be the rainwater which shall flow along the natural slopes. The lesse have provided check dams to course the water and control the flow of the material into the nala. The check dams have been proposed to restrict material from going to Nala to check further water pollution. There are no water bodies within the lease area. However there are seasonal tributaries or stream inside the leasehold areas; however, rain water flows down to southern slopes towards the valley causing no problem to the habitat. Thus there is no impact on drainage pattern of the area.

4.2 WATER ENVIRONMENT

4.2.1 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 disturb the percolating water. The details of the site elevation and working depth are shown in **Table 4.1**.

Table-4.1 Site Elevation and Working Depth Details

Particulars	Details
Elevation	1647 mRL – 1695 mRL
Ground Water Table	1250 mRL
Ultimate working depth	12m

4.2.2 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.

➤ Impact on Surface Water Quality

The impact on water quality will be confined to increased suspended solids during rain. Retaining walls be constructed on both side where mining is done to prevent flow of water in the mining pots during rains.

The district is drained by first and second order streams which control flow of Saryu River flowing in southern side of the lease area. The seasonal water flows from upper reaches down the slope and has curbed courses through erosion process over long geological period. The area is drained by first order seasonal drainage flows from N to S and meet the Saryu River, which is main catchment of the area flowing towards W.

The interburden to be generated will be temporary on nature & used for the purpose of backfilling each year before commencement of monsoon so that rain water will not accumulated in the mined out pit. It is however water sprinkling on the foot track shall be carried out during summer month to suppress the dust. Retaining wall shall be proposed along the slope of dump for its stabilization. The course of drainage shall not be disturbed due to mining & allied activities.

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 toe walls along the existing interburden dumps. Analysis results of surface water samples collected from rivers in the buffer zone indicate that the pH, total dissolved solids (TDS) are well below the prescribed limits.

No adverse impact was noticed. The mine water from sump will be used for water sprinkling and plantation purpose posing positive impact in buffer zone.

➤ **Impact on Ground Water Quality**

Mine working will not go beyond 1647 m RL & depth of pit during next five years shall be 3-8m & water table will not be intersected by mining operations.

4.2.3 Wastewater Generation, Treatment & Disposal

The total water consumption in the Proposed Soapstone Mine shall be about 5.0 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 operations from water sources under Gram Panchayat. There will no settlement near the site as the workers will be hired from nearby villages so no significant liquid effluent will be generated.

4.2.3.1 Measures for Minimizing Adverse Impacts

The interburden and top soil will be used in backfilling. Further no significant impact on water quality is anticipated as material exposed will be low grade magnesite & is very feebly react with water that too when water becomes acidic. Even of reaction takes place it gives arise to increased temporary hardness of water. Water is being supplied from the spring. No hydrological studies have been carried out in the area.

➤ **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.

➤ **Ground Water Pollution**

- The domestic sewage from the canteen and toilets will be routed to septic tanks.
- 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.

4.3 IMPACT ON LAND USE

➤ **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.

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

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.

The Existing land use pattern is agricultural land. The Existing, Proposed at the end of 5 year and at the end of life of mine land use pattern indicating the area already degraded due to quarrying/pitting dumping, roads, processing plants, workshop, township etc. in a tabular form is shown in **Table 4.2**.

Table 4.2: Land use pattern

Sr.No	Particulars	Present	Proposed at the end of 5 year (Ha)	At the end of life of mine (Ha)
1.	Mining pits	0.24	2.02	7.65
2.	Interburden dumps	Nil	0.308	Nil
3.	Soil stack	0.10	0.034	Nil
4.	Foot track/PWD road	0.014	0.038	Nil
5.	Workshop	-	Nil	Nil
6.	Retaining wall	-	0.048	0.124
7.	Balance undisturbed agricultural land	8.175	6.081	0.755
8.	Total	8.523	8.529	8.523

Source: Mine plan

The impact on land form or physiography will be land use on the hilly terrain will undergo radical changes due to the open cast mining. During the next five years mining, 2.02 ha land will be degraded due to mining & allied activities.

Note: All the quantities of top soil & interburden material to be generated by the end of plan/conceptual period shall be used for the purpose of reclamation over the mined unit land. Therefore no proposal for separate stacking of top soil and interburden dump has been proposed.

Solid waste generation and management

Disposal of Waste:

The top soil will be removed with the help of JCB machine, dozer, shovels, pickaxe, spade & crowbar and stacked separately. The soil intermixed with fragments and interburden rejects are low grade magnesite. Part of these rejects will be utilized in construction and maintenance of retaining walls, parapet walls, check dams and other construction works.

The quantity of top soil, Interburden & mineral to be generated in each year is shown in **Table 4.4:**

Table 4.4: Details of Top soil, Interburden and Mineral generated

Year	Pit-I			Pit-II		
	Top Soil (cum)	Interburden (cum)	Soapstone (Tonnes)	Top Soil (cum)	Interburden (cum)	Soapstone (Tonnes)
I	249	2995	15124	180	1260	22768
II	282	2827	17150	200	1539	26487
III	330	3305	20049	218	2007	32225
IV	366	3663	22222	233	14141	36363
V	419	4185	25389	312	15293	40682
Total	1646	16975	99934	1143	34240	158525

Mitigation measures

- Access roads from public roads will be aligned in such a way that it would cause least damage.
- The banks cut for ramp will also be restored at the closing of mine during monsoon.
- Vegetation development is proposed along the lease area as restoration work.
- Plantation is proposed along the road sides, civic amenities in consultation with local/ govt. authorities. While selecting the plant species, preference will be given for planting native species of the area.

Storage and preservation of top soil:

The soil will be removed with the help of JCB machine, dozer, shovels, pickaxe, spade & crowbar and loaded manually to stack on the dump yard. Stacking will commence from higher level to lower level. The spread of stacks will be undertaken through mechanically and manually both & average dump height kept 1.5m.

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. The quantum of development and mineral to overburden soil and interburden in the pit is shown in **Table 4.5.**

Table 4.5: Quantum of development and mineral to overburden soil and waste rock in the pit

Year	Pit-I		Pit-II	
	Top Soil (cum)	Interburden (cum)	Top Soil (cum)	Interburden (cum)
I	249	2995	180	1260
II	282	2827	200	1539
III	330	3305	218	2007
IV	366	3663	233	14141
V	419	4185	312	15293
Total	1646	16975	1143	34240

4.4 IMPACT ON AIR ENVIRONMENT

4.4.1 Change in Ambient air and GLC

The air pollution impact of excavation in ordinary earth and boulders and rock is directly dependent upon construction methodology, annual rate of excavation, mode of transport within the construction site, mode of screening and method of crushing. The air pollution sources at the proposed project site can be broadly classified into three categories, viz. area source, line source and instantaneous point source.

Excavation by various activities in project area is construed as an area source which includes excavation pit(s) and activities happening in the excavation area like digging, dozing, hauling and loading/unloading. The dust emission from these areas will be fugitive in nature. The excavator operations, loading/unloading operations will also cause dust emission though it will be confined to the area of operation of the machinery. The gaseous emission from their operation shall be minimal and limited within the project.

Transportation of excavated material from the project site to dumping sites area categorized as line source. Since the dumper movement on haul road will be within the project area, no adverse impact shall be felt in the settlement area.

4.4.1.1 Dust Dispersion Modeling for Excavation Operation

In the present study, United States Environmental Protection Agency (USEPA-42 series) approved mathematical equations have been used to predict concentrations for different operations in project including the material transportation. To predict the particulate emissions, Envitrans AERMOD Cloud. (Air Dispersion Modeling Software) an interface based on ISCST3 – was used to predict changes in air quality i.e., maximum ground level concentration (GLC's) of Particulate Matter. Short term model options were opted for uniform emissions rates. The concentration of other gaseous pollutants i.e. SO₂ and NO_x was found to be much lower than the threshold limit (80 µg/m³), the air modeling was restricted to determination of PM₁₀ and PM_{2.5} in the present case. The emission factors adopted for various project operations are mentioned below:

Emission Factor for Excavation and Material Loading/unloading

For excavation and material handling the emission factor for PM₁₀ has been adopted as per USEPA – 42 series.

For Dozing Operation:

$$EF_{PM_{10}} \text{ (kg/hr)} = 0.34 \times s_{1.5(\%)} / M_{1.4(\%)}$$

Where,

EFPM₁₀ (kg/hr) = emission factor in kg/hr

S = silt contents in percentage by weight

M = moisture content in percentage by weight

For Material Loading/unloading:

EFPM₁₀ (kg/hr) = 0.34 [0.119 / M^{0.9}]

Where,

EFPM₁₀ (kg/hr) = emission factor in kg/ton

M = moisture content in percentage by weight.

Emission Factor for Material Haulage within Project:

The emission rate is dependent on several factors which include soil properties, climatic conditions, vehicular traffic, wind forces and machinery operation. The Empirical equation for calculation of emission rate is as under.

$E = k \cdot (1.7)^s \cdot (S/48) \cdot (W/2.7)^{0.7} \cdot (w/4)^{0.5} \cdot (365-p/365) \text{ g/VKT}$

Where,

E=Emission Rate

K = Particle size multiplier

s=Silt Content of the Road surface material

S= Mean Vehicle Speed (km/hr)

W=Mean Vehicle Weight (tons)

w=Mean number of wheels

p= Number of days with at least 0.254mm of precipitation per year

Note: The emission factor for PM_{2.5} has been considered 60% of PM₁₀.

The Isopleths developed are shown in **Figure 4.1 (a)** and **Figure 4.1 (b)** for PM₁₀ and PM_{2.5} **respectively**. The maximum GLC due to excavation, loading & unloading activities for PM₁₀ and PM_{2.5} was found to be 7.1 and 4.2 µg/m³ respectively and has been shown in **Table 4.6**.

Table 4.6: Maximum Concentration at receptors

Location	Pollutants	N-Cord.	E-Cord.	GLC (µg/m ³)
Project site	PM ₁₀	29°53'11.31"N	79°56'20.55"E	7.1
Project site	PM _{2.5}	29°53'11.31"N	79°56'20.55"E	4.2

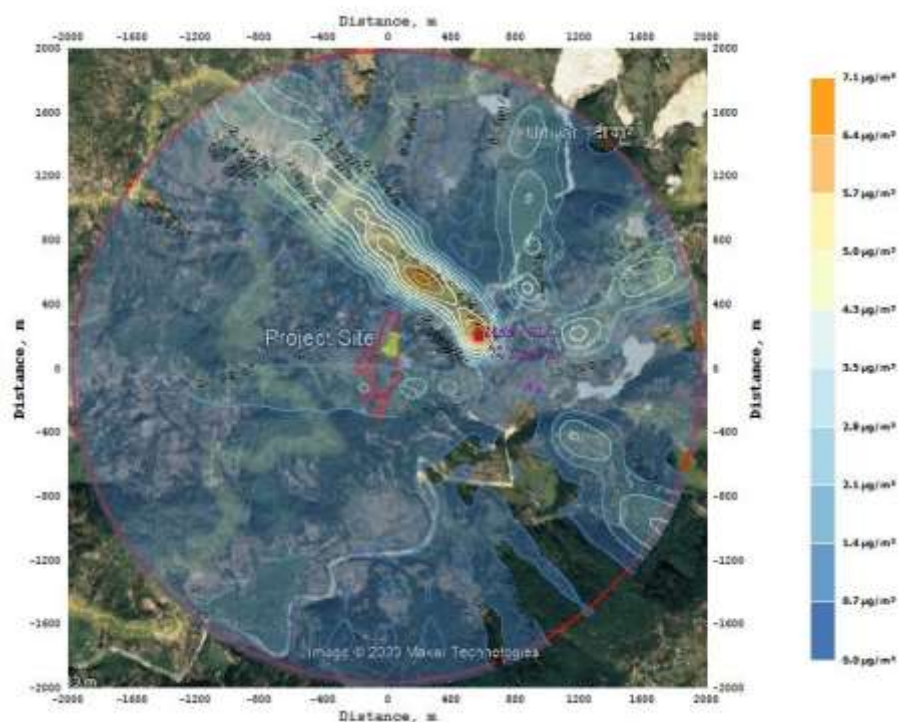


Figure 4.1 (a): Isopleth of Maximum Predicted 24 hourly Ground – Level Concentrations for PM₁₀

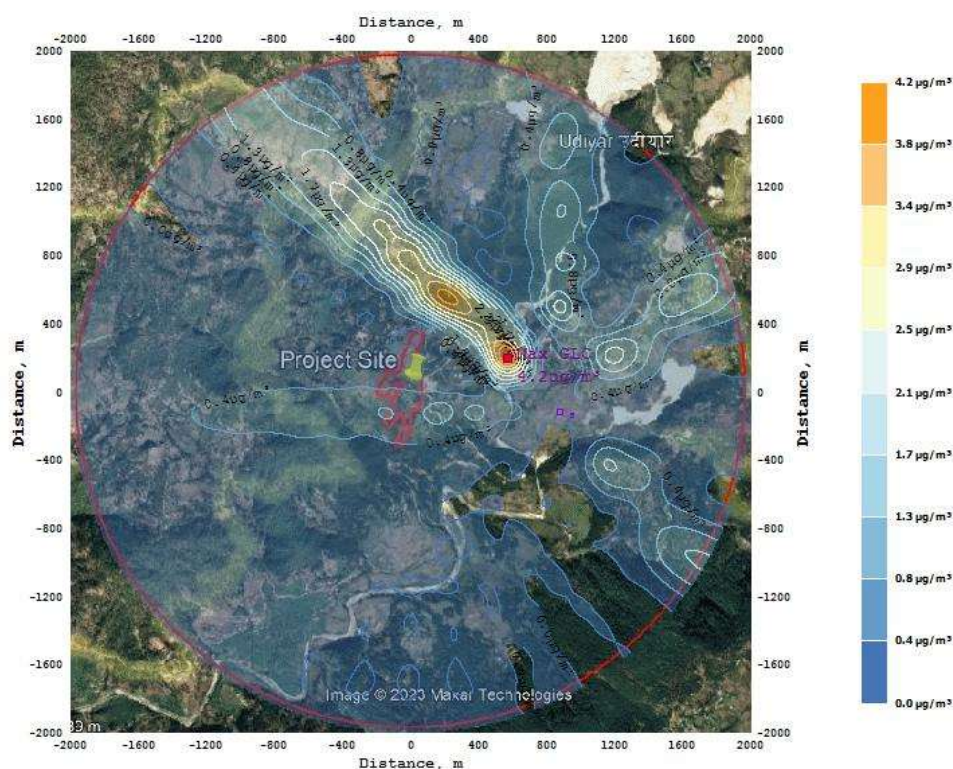


Figure 4.1 (b): Isopleth of Maximum Predicted 24 hourly Ground – Level Concentrations for PM_{2.5}

4.4.1.2 Resultant Impact

The resultant impact due to construction activities (excavation and crushing) on the ambient air quality for PM₁₀ and PM_{2.5} at monitoring station project site respectively is presented in **Table 4.7** which shows that, the resultant concentration level is within the NAAQS.

Table 4.7: Resultant levels due to excavation

Station Name	Pollutants	Sampling Station	Max. Conc. (µg/m ³)	Predicted GLC (µg/m ³)	Resultant concentration (µg/m ³)	NAAQS (µg/m ³)
Project site	PM ₁₀	AAQ 1	54.7	7.1	61.8	100
Project site	PM _{2.5}	AAQ 1	28.5	4.2	32.7	60

4.5 PROPOSED MITIGATION MEASURES FOR DUST SUPPRESSION

Soapstone is a talcose rock mineral composed of hydrous magnesium silicate: 3 MgO-4SiO₂-H₂O. 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 Equipment's (PPE) like dust masks, ear plugs etc. by the mine workers.
- Ambient Air Quality Monitoring will be conducted on regularly basis to assess the quality of ambient air.
- Rock breaker will be used for breaking over size boulders in order to reduce dust and noise generation, which otherwise would be generated due to secondary blasting.
- Regular water sprinkling on haul roads & loading points will be carried out.
- Development of green belt/plantation around the lease boundary, roads, dumps etc.

Prevention and control of Gaseous Pollution

- Open cast manual method will be adopted in this case and there is no provision for blasting. The main source of gaseous emissions would be transportation.
- Approx 169 tonnes of soapstone will be produced per day and the transportation will be done with covered materials to prevent any spillage and also prevent fugitive dust emission due to wind.
- Any gaseous emission transportation will be negligible and not impact the ambient quality.
- Exhaust emission will be monitored of the trucks and to be kept below the permissible limit.

- 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.

The sources of pollutants from mining activities are given in **Table-4.8**.

Table 4.8: Sources of Pollutants

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

4.6 NOISE ENVIRONMENT

4.6.1 Noise Impact on Working Environment

As mining will be done by manual cum semi-mechanized means, 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 major machinery, the impact of noise levels will be minimal.

4.6.2 Prediction of Noise Impact on Noise level

A noise propagation modeling study has been conducted to find out the impact from the noise generated because of the estimated total traffic flow during operation phase as well as the significance of these impacts. The noise modeling has been done taking into account the additional flow of traffic due to the proposed project. Dhvani PRO is a computer program developed to undertake construction, industrial and traffic noise propagation studies for noise assessment.

4.6.2.1 Outcome of the Noise level Modeling:

The outcome of the noise modeling is as follows:

- The predicted noise levels during both day and night time are within the prescribed limit and there will be no significant impact on noise due to the proposed project.

4.6.3 Noise Abatement and Control

In this mine the noise level will be upto tolerable limit (90 dbA) 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 Equipment (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-4.9**.

Table 4.9: Noise Exposure Levels & Its Effects

Noise Levels dB (A)	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

Source: Hand Book of EIA, Rao & Wooten

4.7 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 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. The density of the trees proposed for 5 years will be 8700 plants.

Greenbelt Development in ML area

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

Number of Saplings to be Planted and Budgetary Estimate of the Green Cover

The breakup of the proposed afforestation programme with reclamation in progressive manner for entire life of mine is given in **Table 4.10**.

Table 4.10: Year-wise Afforestation Schedule

Year	No. of Plants as per mine plan
I	40
II	40
III	40
IV	40
V	40
Total	200*

*Besides these 8500 nos. of more samplings will be done all along the periphery of the mine lease area/in the nearby van panchayat land. Total no. of trees shall be planted in the first two years and in the next three years its maintenance will take place. Local native species like Peach (Khubani), Pears (Nashpati), Apricot (Aaru), Plumk, Mehal, Kaphal, Chilmora etc. shall be planted.

The plants recommended for afforestation are as per Guidelines for Developing Greenbelts, CPCB, March 2000 and listed in **Table 4.11**.

Table 4.11: Suitable Plant Species for Green Belt Plantation

Sl.No.	Species	Family	Habit
1.	<i>Alternanthera paronychioides</i>	Amaranthaceae	Herb
2.	<i>Alternanthera pungens</i>	Amaranthaceae	Herb
3.	<i>Grangea maderaspatana</i>	Asteraceae	Herb
4.	<i>Cassia tora</i>	Fabaceae	Herb
5.	<i>Brachiaria ramosa</i>	Poaceae	Herb
6.	<i>Cynodon dactylon</i>	Poaceae	Herb
7.	<i>Eleusine indica</i>	Poaceae	Herb
8.	<i>Eragrostis tenella</i>	Poaceae	Herb
9.	<i>Saccharum spontaneum</i>	Poaceae	Herb
10.	<i>Physalis minima</i>	Solanaceae	Herb
11.	<i>Calotropis procera</i>	Asclepiadaceae	Shrub
12.	<i>Cassia occidentalis</i>	Fabaceae	Shrub
13.	<i>Croton bonplandianum</i>	Euphorbiaceae	Shrub
14.	<i>Abutilon indicum</i>	Malvaceae	Shrub
15.	<i>Ziziphus mauritiana</i>	Rhamnaceae	Shrub
16.	<i>Datura innoxia</i>	Solanaceae	Shrub
17.	<i>Solanum virginianum</i>	Solanaceae	Shrub
18.	<i>Berberis vulgaris</i>	Berberidaceae	Shrub
19.	<i>Mangifera indica</i>	Anacardiaceae	Tree
20.	<i>Ficus racemosa</i>	Moraceae	Tree
21.	<i>Cassia fistula</i>	Fabaceae	Tree
22.	<i>Ricinus communis</i>	Euphorbiaceae	Tree
23.	<i>Albizia lebbeck</i>	Fabaceae	Tree
24.	<i>Bauhinia acuminata</i>	Fabaceae	Tree
25.	<i>Butea monosperma</i>	Fabaceae	Tree
26.	<i>Dalbergia sissoo</i>	Fabaceae	Tree
27.	<i>Bombax ceiba</i>	Malvaceae	Tree
28.	<i>Azadirachta indica</i>	Meliaceae	Tree

29.	<i>Quercus leucotricophora</i>	Lauraceae	Tree
30.	<i>Melia azedarach</i>	Meliaceae	Tree
31.	<i>Luecena leucocephala</i>	Fabaceae	Tree
32.	<i>Bauhinia variegata</i>	Fabaceae	Tree
33.	<i>Terminalia bellerica</i>	Combretaceae	Tree
34.	<i>Terminalia chebula</i>	Combretaceae	Tree
35.	<i>Morus alba</i>	Moraceae	Tree
36.	<i>Delonix regia</i>	Fabaceae	Tree
37.	<i>Pinus roxburgii</i>	Pinaceae	Tree
38.	<i>Celtis australis</i>	Cannabaceae	Tree

4.8 BIOLOGICAL ENVIRONMENT

The baseline flora and fauna has been depicted in Section-3.11 of 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. There no wildlife corridors in 10-km radius area.

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

4.8.1 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 planted a good roadside plantation along both side of the mine road.

The mitigative measures proposed are:

- Prior to mining, short awareness program will be conducted for labors to make them aware for way of working.
- No tree cutting, chopping, lumbering, uprooting of shrubs and herbs will be allowed.
- No track or new road for movement of labors or vehicles be laid in adjoining area, this will prevent fragmentation, encroachment and human – animal encounter.

4.9 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. 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.

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. Similarly, there is no scope for emigration of people and there will be no displacement of people due to land acquisition. The Project Proponent 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 98 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 Health

Soapstone mining damages water supply as also a health hazard. Scarring of the lungs are the most frequently reported impacts of contact with polluted water and breathing problem due to Soapstone dust particles. There is a risk of death like lung cancer due chronic exposure and also a pleura disease due to inhale of Soapstone dust. These negative impacts of Soapstone mining needs to be viewed seriously.

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.

4.10 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.
- 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.

4.11 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. In case any person or a group of persons is found to be suffering from any ailment, directly related to bauxite mining, their medical treatment will be carried out free of cost.

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 while passing through villages or near schools.

4.12 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. The total cost of the project is around Rs. 30 Lacs and the amount earmarked for CSR activities has been worked out to Rs. 4 Lacs per year. 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. The year wise allocation of funds for the various activities proposed to be taken up under CSR programme has been shown in **Table 4.12**.

The list of activities proposed to be taken up is indicated below:

- a) Health Camps
- b) Drinking Water Facilities
- c) Maintenance of foot track
- d) Donation for Temple Construction
- e) Donation for cultural activities in the surrounding areas
- f) Plantation of trees.

Table 4.12: Year wise allocation of funds for the various activities proposed to be taken up under CSR programme

S. No.	Activities	Allocation of Fund (Rs.)
1	Health Camps	1,00,000
2	Drinking Water Facilities	50,000
3	Maintenance of foot track	1,00,000
4	Donation for Temple Construction	50,000
5	Donation for cultural activities in the surrounding areas	1,00,000
Total		4,00,000

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 CSR programme.

4.13 IMPACT ON TRAFFIC

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 below.

Existing Traffic Scenario & LOS

Road	V (PCU/day)	C (PCU/day)	Existing V/C Ratio	LOS
Dopahar Banlekh Road	200	600	0.3	B

V= Volume in PCU's/day

&

C= Capacity in PCU's/ day

During Mine operation

Total Capacity of mine	: 40,682 TPA
No. of working days	: 240 days
Total Capacity of mine/day	: $40,682 / 240 = 169$ tonnes/day
Truck Capacity	: 20 tonnes
No. of trucks deployed per day	: $169/20 = 8$ trucks per day
No. of trucks deployed/day to & fro	: $8*2=16$ trucks
Increase in PCU/day	: 36

The addition to traffic by the proposed project during its operation is given table below

Additional Traffic Scenario & LOS due to proposed project

Road	V	C	Modified V/C Ratio	LOS
Dopahar Banlekh Road	236	600	0.39	B

From the above analysis it can be seen that the V/C ratio is likely to be changed to 0.39 on Dopahar Banlekh Road with LOS remains "B" which is "Very Good" as per the classification. So the additional load on the carrying capacity of the concerned roads is not likely to have much significant adverse effect.

CHAPTER 5: ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

5.1 SITE ALTERNATIVES UNDER CONSIDERATION

The Soapstone has been identified based on the result of geological investigations and exploration carried out during prospective mining.

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

5.2 ANALYSIS OF ALTERNATIVE TECHNOLOGY

5.2.1 Choice of Method of Mining

Factors in the choice of an actual mining method for a given deposit are deposit characteristics, percentage recovery, requirement of health and safety and environmental concerns, production, scheduling scope of mechanization and automation, workforce requirements wage rates, 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 open cast mining method will be adopted because of the following reasons:

- The open cast mining operations ensure higher mineral conservation.
- The method used for mining is efficient for Soapstone mining, so no alternative mining method is proposed.

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-VI 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 upgradation	Stage-wise implementation	Immediate & Progressive

6.2.1 Administrative Aspects & Environmental Monitoring Program

Regular monitoring of environmental parameters is of immense importance to assess the status of environment during project operation. With the knowledge of baseline conditions, the monitoring programme will serve as an indicator for any deterioration in environmental conditions due to operation of the project, to enable taking up suitable mitigatory steps in time to safeguard the environment. Monitoring is as important as that of control of pollution since the efficiency of control measures can only be determined by monitoring.

Usually, as in the case of the study, an Impact Assessment study is carried over short period of time and the data cannot bring out all variations induced by the natural or human activities. Therefore, regular monitoring programme of the environmental parameters is essential to take into account the changes in the environmental quality.

6.2.2 Institutional Arrangements for Environment Protection and Conservation

The mine will be supervised and controlled by an independent Mines Manager supported by adequate team of technically and statutorily qualified personnel apart from the operating staff of skilled, semi-skilled, unskilled and other categories.

The organizational structure for Environment Cell for mining operations is shown in **Figure-6.1**. 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, Liasoning 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.



Figure-6.1 Organization Structure for Environment Management

6.3 ENVIRONMENT MONITORING PROGRAMME

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

The environmental monitoring will be conducted in the mine operations as follows:

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

The details of post project monitoring are presented in **Table 6.2**.

6.4 REPORTING SCHEDULES

Post project monitoring will be carried out as per conditions stipulated in environmental clearance letter issued by MoEF&CC, 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. In the buffer zone, slight impact may be observed and that too is occasional, table below showing the details of Post Project Monitoring programme.

Table-6.2 Post Project Monitoring Programme

Attributes	Sampling		Measurement Method	Test Procedure
	Network	Frequency		
A. Air Environment				
Meteorological • Wind direction • Relative humidity • Rainfall	Minimum 1 site in the project impact area	Regularly in one season by Weather Monitoring Station	Mechanical/automatic weather station	-
Pollutants PM10, PM2.5	5 locations in the project impact area (Minimum 2 locations in upwind side, 2 sites in downwind side / impact zone and 1 in core zone)	Once in a season.	Gravimetric method	-
SO2			Gravimetric method	-
			EPA Modified West & Geake method	Absorption in Potassium Tetra Chloro-mercurate followed by Colorimetric estimation using P-Rosaniline hydrochloride and Formaldehyde (IS: 5182 Part - II).
NO2			Arsenite modified Jacob & Hochheiser	Absorption in dil. NaOH and then estimated colorimetrically with sulphanilamide and N (I Nepthyle) Ethylene diamine Dihydrochloride and Hydrogen Peroxide (CPCB Method).
B. Water Environment				

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pH, Turbidity, Colour, Odour, Taste, TDS, Total Hardness, Calcium hardness, Magnesium hardness, Chloride, Fluoride, Sulphate, Nitrates, Alkalinity, Iron, Copper, Manganese, Mercury, Cadmium, Selenium,	Set of grab Samples during pre and post-monsoon for ground and surface Water in the vicinity.	Diurnal and Season wise	As per IS 10500:2012	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
Arsenic, Cyanide, Lead, Zinc, Chromium, Aluminum, Boron, Phenolic Compounds				.
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, Nitrogen, Available Phosphorus, Potassium, Calcium, Magnesium, Sodium, Electrical Conductivity, Organic Matter, Chloride	5 locations in the project impact area	Yearly/half yearly	As per USDA Method	As per USDA Method
E. Socioeconomic				
• Demographic structure	Socio-economic survey is based on proportionate,	Minimum for two phases of the project	Primary data collection through Questionnaire	Secondary data from census records, statistical hand books, topo sheets, health

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<ul style="list-style-type: none"> • Infrastructure resource base • Economic resource base • Health status: Morbidity pattern • Cultural and Aesthetic attributes • Education 	sampling method			Records and relevant official records available with Govt. agencies
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CHAPTER 7: ADDITIONAL STUDIES

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

7.2 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. However, following natural/industrial hazards may occur during normal operation.

- Accident due to explosives;
- Accident due to mining equipment; and

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 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.

7.2.1 Blasting

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

7.2.2 Overburden & Interburden

The overburden (soil) 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.

7.2.3 Machinery

Most of the accidents during transport by trucks, excavators and dozers and other heavy vehicles are often attributable to mechanical failures and human errors.

7.2.4 Water Logging

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

- Due care will be taken to provide retaining 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 habitats 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.

7.2.5 Earthquake Management Plan

Following measures will be undertaken:

- The project site is mainly a plain area. There will be no drilling and blasting during mining.
- The ultimate pit wall will be kept to 45° and the slope angle of the inner benches will not be greater than 60° to 65° and bench height would be 9m.
- Slope will be stabilized with the help of *Chrysopogon zizanioides* grass to stabilize the slope

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.

7.2.6 Safety Measures

Safety Measures at the proposed Open Cast Mining Project

- The opencast mines have been planned for working with shovel tipper system which requires proper benching not only for slope stability but also for movement of tippers and other machinery. The inclination of the quarry sides at the final stage i.e. at the dip most point will not exceed 45° to the horizontal. (This angle is measured between the line joining the toe of the bottom most bench to the crest of the top most bench and the horizontal line);
- The gradient of the haul road inside the pit, access trench and on the dumps will not be steeper than 1 in 16;
- The slope of the sides of the OB and IB dump to the horizontal will not exceed 37° , and the height of the OB and IB dumps has been restricted to a max of 12 m;
- The quarries will be protected by garland drains around the periphery for storm water drainage;
- A minimum safe distance of 50m will be kept between the surface edge of the quarry and the nearest public building, roads etc.

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

7.3 DISASTER MANAGEMENT PLAN

7.3.1 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; and

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: PROJECT BENEFITS

8.1 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.

8.2 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.

In addition to above, due to increase in purchasing power of local habitants:

- 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.

8.3 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 & 98 Workers for removal of overburden, quarry cleaning & road repairing. The details of employment are given in Chapter-2.

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 98 persons and persons will be mainly sourced from local as well as other 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.

8.4 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.

8.4.1 CSR Project Details

Soapstone mine has proposed to provide financial assistance of Rs. 4.00 lakhs every year 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. (Rs. 1,00,000).
- Drinking Water Facilities. (Rs. 50,000).
- Maintenance of foot track (Rs. 1,00,000).
- Donation for Temple Construction. (Rs. 50,000).
- Donation for cultural activities in the surrounding areas (Rs. 1,00,000).

8.4.2 CER Project Details

In addition to the CSR, the provision of Rs.1.00 lakh every year has been proposed for the Corporate Environmental Responsibility (CER).

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

- Sanitation facilities. (Rs. 25,000).
- Skill Development for villagers. (Rs. 20,000).
- Awareness to local farmers to increase yield of crop and fodder (Rs. 15,000).
- Plantation in the community areas/schools and on van panchayat land of nearby villages. (Rs. 40,000).

CHAPTER 9: ENVIRONMENT MANAGEMENT PLAN

9.1 INTRODUCTION

An EMP is prepared including all the administrative aspects of ensuring that mitigative measures are effectively monitored, after approval of the EIA. In consonance with the EIA notification dated 14th September 2006, vide section 1 (a) related to Public Hearing, the draft EIA/EMP report will be submitted to the Uttarakhand Environment Protection & Pollution Control Board (UEPPCB) for public hearing. The approved Environment Management Plan will be implemented throughout the life of the project and half-yearly monitoring report showing the compliance status of conditions stipulated in Environmental Clearance letter will be submitted to MoEF&CC in every six months. An Environmental monitoring programme has been prepared for the proposed project for periodical assessment of effectiveness of implementation of Environment Management Planned to take corrective measures in case of any degradation in the surrounding environment.

To mitigate the adverse impact which will be caused due to the mining operation and overall scientific development of local habitat, environmental management plan (EMP) has been formulated and integrated with the mine planning. The details of the anticipated impacts and mitigative measures have been discussed in Chapter 4 of this report, based on the results of present environmental conditions and environmental impact assessment. The EMP has therefore been made considering implementation and monitoring of environmental protection measures during and after mining operations.

The aims of Environment Management Plan are:

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

9.2 IMPLEMENTATION OF EMP

As the major environment attributes will continue to be around the project area alone, implementation of the proposed control measures and monitoring thereof will be undertaken on a regional basis. The project proponent will ensure the implementation of the measures within the mine area and carryout efficient monitoring.

In order to implement the measures suggested for mitigating the adverse impacts on the environment, it is suggested to monitor the environmental parameters regularly.

9.3 ENVIRONMENTAL MONITORING

For assessing the prevailing quality of air, water, noise, soil etc., regular monitoring of parameters are necessary. The data assessed will be helpful in predicting the impact and planning suitable measures to improve/protect the environment. In the study area, the lessee will carry out monitoring studies for ambient air quality, fugitive dust, water quality, noise levels and soil quality as per the standard procedures and schedules. The monitoring system will include:

- Monitoring stations in the buffer zone remain the same as selected in this study for Air, water, Soil, Noise etc.,
- Implementation of the planned mitigating measures.
- Monitoring the programme of implementation.

The Environmental parameters will be monitored & samples will be analyzed as per the stipulations of Indian Bureau of Mines & Uttarakhand Pollution Control Board and as per MoEF&CC Guidelines. The above monitoring proposals shall be adhered to and the results shall be intimated to the appropriate authorities for their perusal and records.

9.4 ORGANIZATIONAL SETUP FOR ENVIRONMENT MONITORING

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

- a) Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.
- b) Collection of soil samples at strategic locations once in every year and analysis thereof with regard to deleterious constituents, if any.
- c) Measurement of water level fluctuations in the nearby surface resources and bore wells.
- d) Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done in every quarter of the year.
- e) Monitoring Ground Vibrations: Ground vibrations studies or monitoring is not required as there is no proposal of drilling/blasting for scooping operations.

9.4.1 Environment Management Cell

No cell is proposed to form; the plan will be implemented through outsourcing suitable and accredited consultants and experts.

Environmental Monitoring will be directly coordinated by the Supervisor/Owner.

Competent outsourced certified organization/lab personnel will conduct the monitoring operations. A full-fledged laboratory is not essential; part of the work will be given to competent consultants to undertake these jobs.

Regular semi-skilled manpower will be required for supervision, assistance in reclamation works followed by trained unskilled laborers to carry out other necessary operations.

9.4.1.1 Functions of the Cell

- Implementation of the mitigation measures.
- Maintain Records of the operation.
- Monitoring the programme of implementation.
- To estimate the efficiency of measures taken.
- To bring out any other unforeseen effect on environment not covered under the report.
- Inspection and regular maintenance of mining equipment and transport vehicles.

9.5 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 luster 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.

9.5.1 Control of Fugitive Emissions

- Use of Personal Protection Equipment (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.

9.5.2 Prevention and control of Gaseous Pollution

Open cast manual method will be adopted in this case and there is no provision for blasting. The main source of gaseous emissions would be transportation.

Only 169 tonnes of soapstone will be produced per day and the transportation will be done with covered materials to prevent any spillage and also prevent fugitive dust emission due to wind. Any gaseous emission transportation will be negligible and not impact the ambient quality. Exhaust emission will be monitored of the trucks and to be kept below the permissible limit.

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.

9.6 NOISE POLLUTION CONTROL

9.6.1 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 Equipment's (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.

9.7 WATER QUALITY MANAGEMENT

Water for drinking and operations is required to be 5.0 KLD. The water shall be extracted from the nearby surface water resources or natural springs.

Measures for Minimizing Adverse Impacts

Seasonal drainage exists near to the project site. The mining is being carried out in hilly region. The problem of ground water pumping will not arise. Rain water will not accumulate in the mining pit & it will be channelized along the slopes. The mining work will usually be confined within gullet driven from north-south & a ledge of about one meter height will be kept on the outer edge so that in discrete water flow will be avoided. The interburden and top soil will be used in backfilling. Further no significant impact on water quality is anticipated as material exposed will be low grade magnesite & is very feebly react with water that too when water becomes acidic. Even of reaction takes place it gives arise to increased temporary hardness of water. Water is being supplied from the spring. No hydrological studies have been carried out in the area.

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.

Ground Water Pollution

The domestic sewage from the canteen and toilets will be routed to septic tanks. 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.

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. The Existing land use pattern is agricultural land.

The impact on land form or physiography will be land use on the hilly terrain will undergo radical changes due to the open cast mining. During the next five years mining, 2.02 ha land will be degraded due to mining & allied activities.

All the quantities of top soil & interburden material to be generated by the end of plan/conceptual period shall be used for the purpose of reclamation over the mined unit land. Therefore no proposal for separate stacking of top soil and interburden dump has been proposed.

9.8 WASTE MANAGEMENT

Solid waste generation and management Disposal of Waste:

The top soil will be removed with the help of JCB machine, dozer, shovels, pickaxe, spade & crowbar and stacked separately. The soil intermixed with fragments and interburden rejects are low grade magnesite. Part of these rejects will be utilized in construction and maintenance of retaining walls, parapet walls, check dams and other construction works.

Mitigation measures

Access roads from public roads will be aligned in such a way that it would cause least damage.

The banks cut for ramp will also be restored at the closing of mine during monsoon. Vegetation development is proposed along the lease area as restoration work.

Plantation is proposed along the road sides, civic amenities in consultation with local/ govt. authorities. While selecting the plant species, preference will be given for planting native species of the area.

Storage and preservation of top soil:

The soil will be removed with the help of JCB machine, dozer, shovels, pickaxe, spade & crowbar and loaded manually to stack on the dump yard. Stacking will commence from the higher levels and will advance towards lower levels. The spread of stacks will be undertaken through mechanically and manually both & average dump height kept 1.5m.

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.

9.9 GREENBELT AND PLANTATION

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 year wise plantation of trees has been shown in **Table 9.1**.

Table 9.1: Year wise afforestation scheduled

Year	No. of Plants as per mine plan
First year	40
Second year	40
Third year	40
Fourth year	40
Fifth year	40
Total	200*

*Besides these 8500 nos. of more samplings will be done all along the periphery of the mine lease area/in the nearby van panchayat land. Total no. of trees shall be planted in the first two years and in the next three years its maintenance will take place. Local native species like Peach (Khubani), Pears (Nashpati), Apricot (Aaru), Plumk, Mehal, Kaphal, Chilmora etc. shall be planted.

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.

9.10 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.

9.10.1 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 emitted 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 mine owner.
- This activity will promote the emergence of the primary succession species; hence it will be a silvicultural operation, extremely important for maintaining ecology and environmental health of the area.
- This helps in regeneration & establishment of pioneer plant species saving expose land & land cutting.

These plantations will be carried out around mining zone, van panchayat land and both sides of the mine road. About twice the area recommended for mining will be used for afforestation/greenbelt as per the “Forest (Conservation) Amendment Rule, 2004”.

The scheme of plantation around the project site is given as follows:

Afforestation will be put under a protective regulatory framework to ensure that it is not degraded or disturbed. No ecologically disruptive activity will be allowed in this zone.

The suggestive measures under EMP are given in **Table 9.2**.

Table 9.2: 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 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 ore materials are within the permissible noise level. Higher noise level in the forest

	<p>area will lead to restless and failure in detection of calls of mates and young ones.</p> <ul style="list-style-type: none"> • 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.

9.11 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 proposed 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.
- 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.

9.12 ENVIRONMENTAL POLICY

The Owner of proposed Soapstone Mine 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.
- Maintain a high degree of emergency preparedness.

9.13 BUDGET ALLOCATION FOR EMP IMPLEMENTATION

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 EMP implementation has been shown in **Table 9.3**.

Table 9.3: Budget for Environmental Management Plan

S. No.	Measures	Cost (In Rs.)
1.	Water Sprinkling for dust suppression	50,000
2.	Environmental Monitoring : (i) Ambient Air Quality Monitoring (ii) Ambient Noise Monitoring (iii) Water Quality Sampling & Analysis (iv) Soil Quality Sampling & Analysis	1,00,000
3.	Plantation of 8700 trees along with their maintenance for green belt	8,70,000
4.	Cost for Retaining wall/Toe wall	74,700
Total		10,94,700

9.14 CORPORATE ENVIRONMENTAL RESPONSIBILITY (CER)

The cost towards Corporate Environmental Responsibility (CER) has been shown in **Table 9.4**.

Table 9.4: Budget for Corporate Environmental Responsibility (CER) (per year)

S. No.	Measures	Cost (In Rs.) (per year)
1.	Sanitation facilities	25,000
2.	Skill Development for villagers	20,000
3.	Awareness to local farmers to increase yield of crop and fodder	15,000
4.	Plantation in the community areas/schools and on van panchayat land of nearby villages	40,000
Total		1,00,000

9.15 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 the proposed Soapstone Mine.

CHAPTER 10: SUMMARY AND CONCLUSIONS

10.0 INTRODUCTION

10.1 PURPOSE OF THE REPORT

The proposed soapstone mine extends over an area of 8.529 ha [40,682 TPA (maximum) of Soapstone] in Village-Khatigaon & Rangdev, Tehsil & District- Bageshwar Uttarakhand. The proposal for TOR was considered in its meeting dated 17th January 2023 and since the project is greater than 5 ha and it comes under category B1 therefore comprehensive EIA report shall be prepared. The draft Environmental Impact Assessment report has been prepared to comply with the standard Terms of Reference (ToR), under EIA notification of the MoEF&CC dated 14th September, 2006 and amended thereof, for seeking environmental clearance for mining of soapstone in the applied mining lease area.

10.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

10.2.1 Identification of Project

The proposed lease of Khatigaon & Rangdev Soapstone Mine having 8.529 ha area and is situated near Village-Khatigaon & Rangdev, Tehsil & District- Bageshwar in the Uttarakhand State.

The Lease has been granted in favor of Shri Diwan Singh Papola.

The proponent has applied for environmental clearance for mining lease in the name of Soapstone Mining Project over an area of 8.529 ha at Village-Khatigaon & Rangdev, Tehsil & District- Bageshwar in the Uttarakhand State.

10.2.2 Project Proponent

Proposed mine will be executed by a private company. The proposed Soapstone Mine extends over an area of 8.529 ha in Village-Khatigaon & Rangdev, Tehsil & District- Bageshwar Uttarakhand. The LOI of proposed Soapstone Mine was granted in favor of Shri Deewan Singh Papola for period of 20 years by the Govt. of Uttarakhand. The proposed rate of production is 40682 TPA (maximum) of soapstone. The estimated project cost is Rs 30.0 lakhs. The expected life of mine is 20 years.

Address of the applicant

Shri Deewan Singh Papola
(Village Papoli, Post Kafli, Tehsil & District Bageshwar, Uttarakhand)

10.3 BRIEF DESCRIPTION OF PROJECT

10.3.1 Nature of the Project

The proposed Soapstone Mine, project will adopt opencast manual cum semi mechanized method. The mine is executed over a lease area of about 8.529 ha, for the production of 40682 TPA of soapstone.

Therefore as per the EIA Notification dated 15th January, 2016 and 1st July, 2016, the project comes under “B1” Category since the area is greater than 5 ha.

10.3.2 Size of the Project

The proposed Soapstone mining project extends over an area of 8.529 ha with the target maximum production capacity of mine is about 40682 TPA (maximum) of Soapstone.

10.3.3 Anticipated Life of Project and Cost of the Project

The projected life of the mine is 20 years. The cost of the project is about Rs. 30 lakhs.

10.3.4 Location of the Project

The proposed Soapstone Mine lease comes under Village-Khatigaon & Rangdev, Tehsil & District- Bageshwar Uttarakhand. Geo-graphically the ML area extends from latitude 29°53'11.58"N to 29°53'39.77"N and longitude 79°56'47.70"E to 79°56'32.05"E. The area falls in Survey of India topo sheet No. 53 O/13.

10.4 PROJECT DESCRIPTION

10.4.1 Salient Features of Mine Lease

The salient features of mine lease are given in **Table 10.1** below:

Table 10.1: Salient Features of mine lease area

Sr. No.	Particular	Details
A.	Nature of the Project	Proposed Khatigaon & Rangdev Soapstone Mine
B.	Size of the Project	
1.	ML Area	8.529ha (private agricultural Land).
2.	Proposed Production Capacity	Total Recoverable Quantity of Soapstone: 40682 Tonnes/ Annum (Maximum) (As per approved Mining Scheme)
3.	Lease Period of Mine	Lease was granted for a period of 20 Years.
C.	Method of Mining	
1.	Method	Semi Mechanized Open-Cast Mining
2.	Blasting / Drilling	Not proposed
D.	Project Location	Location Map is given in Figure.1& 2
1.	Village	Khatigaon & Rangdev
2.	Tehsil	Bageshwar
3.	District	Bageshwar
4.	State	Uttarakhand
5.	Topo Sheet No.	53O/13

6.	Lease Area Coordinates	Latitude 29°53'11.58"N to 29°53'39.77"N and Longitude 79°56'47.70"E to 79°56'32.05"E
E.	Cost Details	
1.	Project Cost	Rs.30.0 Lac
F.	Water Demand	
1.	Requirement	5 KLD
2.	Source of water	Water requirement for drinking, plantation and dust suppression shall be met from near by villages, during the operational phase of the mine. Total water requirement shall be 5 KLD.
G.	Man Power Requirement	98
H.	Environmental Setting	
1.	Nearest Village	Khatigaon & Rangdev
2.	Nearest Town	Bageshwar, 40.0 Km. (by road)
3.	Nearest National / State Highway	Dopahar Banlekh Road,0.38km(Aerial)
4.	Nearest Railway Station	Kathgodam, 78.27 Km(Aerial)
5.	Nearest Airport	Pantnagar, 111.28 Km(Aerial))
6.	Ecological Sensitive Areas (National Park, Wild Life Sanctuaries, Biosphere Reserve etc.) within 10 km radius	None
7.	Reserved / Protected Forest within 10 km radius	Khatigaon RF, 1 Km (Aerial)
8.	Water bodies within 10 km radius of the mine site.	Seasonal Gadhera0.5 km (Aerial)
9.	Archaeological Important Place	None
10.	Seismic Zone	V

10.4.2 Mine Development and Production

The mining shall be carried out in two pits and will be done open semi cast semi mechanized way. The mining benches will be formed along the contours, the height of the benches will be kept of 3m and width more than 4m initially to facilitate separation of soapstone and remove the mineral and interburden and soil by mules. The mule track of 3-4m width with a gradient of 1 in 3 to 1 in 4 will be made. The mineral will be transported by mules to the road point. So that the mineral can be loaded on to the trucks for further transportation to Haldwani. All the benches will be connected by mule track, so that mule can reach to the working faces the slope of the benches will be kept 70° but for exploitation of mineral benches will be steepened and width will be reduced and average slope of the faces will be kept 65 - 70°.

Year wise Production details are given in **Table 10.2** below.

Table 10.2: Year wise Production of Soapstone Mine

Years	Soapstone (Pit I) (Tonnes)	Soapstone (Pit II) (Tonnes)
1st	15124	22768
2nd	17150	26487
3rd	20049	32225
4th	22222	36363
5th	25389	40682
Total	99934	158525

The quantity of soil, waste rock from pit to be generated during next five years is given in **Table 10.3** below:

Table 10.3: Quantity of Top Soil and waste rock to be generated

Year	Pit-I		Pit-II	
	Top Soil (cum)	Interburden (cum)	Top Soil (cum)	Interburden (cum)
I	249	2995	180	1260
II	282	2827	200	1539
III	330	3305	218	2007
IV	366	3663	233	14141
V	419	4185	312	15293
Total	1646	16975	1143	34240

10.4.3 Method of Mining

The mining shall be carried out in two pits and will be done open semi cast semi mechanized way. The mining benches will be formed along the contours, the height of the benches will be kept of 3m and width more than 4m initially to facilitate separation of soapstone and remove the mineral and interburden and soil by mules. The mule track of 3-4m width with a gradient of 1 in 3 to 1 in 4 will be made. The mineral will be transported by mules to the road point. So that the mineral can be loaded on to the trucks for further transportation to Haldwani. All the benches will be connected by mule track, so that mule can reach to the working faces the slope of the benches will be kept 70° but for exploitation of mineral benches will be steepened and width will be reduced and average slope of the faces will be kept 65 - 70°.

10.5 IMPACT ON LAND USE, RECLAMATION OF MINED OUT AREAS AND AFFORESTATION PROGRAMME

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.

The Existing land use pattern is agricultural land. The impact on land form or physiography will be land use on the hilly terrain will undergo radical changes due to the open cast mining. During the next five years mining, 2.02 ha land will be degraded due to mining & allied activities.

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. The details of the year wise plantation have been shown in **Table 10.4**.

Table 10.4: Year wise Afforestation scheduled

Year	No. of Plants as per mine plan
First year	40
Second year	40
Third year	40
Fourth year	40
Fifth year	40
Total	200*

*Besides these 8500 nos. of more samplings will be done all along the periphery of the mine lease area/in the nearby van panchayat land. Total no. of trees shall be planted in the first two years and in the next three years its maintenance will take place. Local native species like Peach (Khubani), Pears (Nashpati), Apricot (Aaru), Plumk, Mehal, Kaphal, Chilmora etc. shall be planted.

10.6 LAND USE PATTERN

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

10.7 BASELINE ENVIRONMENTAL STATUS

10.7.1 Soil Quality

Five soil samples were collected in and around the mine lease area to assess the present soil quality of the region. In the study area, variations in the pH of the soil were found to be slightly basic 7.58 to 7.91. 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 221.5 – 341.52 µmhos/cm.

10.7.2 Meteorology

Meteorological data at the site was monitored during October 2022 to December 2022 representing winter season.

10.7.3 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) has been carried out at five locations during winter season from October 2022 to December 2022.

The minimum and maximum level of PM₁₀ recorded within the study area was in the range of 34.2 µg/m³ to 54.7 µg/m³. The minimum and maximum level of PM_{2.5} recorded within the study area was in the range of 12.2 µg/m³ to 28.5 µg/m³. The minimum and maximum concentration of SO₂ recorded within the study area was 4.9 to 6.0 µg/m³. The minimum and maximum level of NO₂ recorded within the study area was in the range of was 5.5 µg/m³ to 19.2 µg/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.

10.7.4 Water Quality

To assess the physical and chemical properties of water in the region, ground water samples from 5 locations and surface water samples from 2 locations were collected from various water sources around the mine lease area.

- During the study period, the pH was varying for ground water from 7.28 to 7.81 and the surface water are 7.2 to 7.45. The pH values for all the samples collected in the study area during study period were found to be within the limits.
- In ground water samples collected from the study area, the total dissolved solids in ground water are varying from 198.5 mg/l to 413.32 mg/l whereas in surface water varying from 196.5 mg/l to 202.1 mg/l. The TDS of the samples were within the desirable limit of 500 mg/l.
- The chloride level in the ground water samples collected in the study area were ranging from 12.3 mg/l to a maximum of 47.6 mg/l, in surface water samples 12.3 mg/l to 47.6 mg/l. The chloride samples are within the desirable limits.
- In the ground water samples collected from the study area, the hardness is varying from 182.4 mg/l to 288.4 mg/l, in surface water samples 178.51 mg/l to 184.2 mg/l.

The results indicate water is generally in conformity with the drinking water standards (IS: 10500) and surface water is in conformity with IS-2296 standards.

10.7.5 Noise Levels

Ambient noise levels were measured at Five locations around the proposed mine site. Assessment of average logarithm night time Leq (Ln) varies from 37.6 to 41.2 dB (A) and the average logarithm daytime Leq (Ld) varies from 46.5 to 52.8 dB (A) within the study area.

10.7.6 Ecological Environment

Based on the field studies and review of published literature, it is observed that there are two Schedule-I species present in the study area of the mine lease area i.e. Indian Leopard and Asiatic Black Bear. There are no wildlife sanctuaries and National Parks within the study area of 10-km radius.

10.7.7 Social Environment

According to the 2011 census of India, Bageshwar has a population of 2,59,898. The total SC population in Bageshwar district is 72,061 which is 27.72% of the total population, while ST population is 1982, which is 0.76% of the total population. The literate population in Bageshwar district is 1,79,483, out of which male & female are 97,546 and 81,937 respectively. The male literates represent 54.35% while female represent 45.65% of the total population.

10.8 ANTICIPATED ENVIRONMENTAL IMPACTS

10.8.1 Impact on Air Quality

Soapstone mine where PM₁₀ and PM_{2.5} 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 PM_{2.5} 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

10.8.2 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.

10.8.3 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.

10.8.4 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 and men, it is imperative that noise

levels would increase. Assessment of average logarithm night time Leq (Ln) varies from 37.6 to 41.2 dB (A) and the average logarithm daytime Leq (Ld) varies from 46.5 to 52.8 dB (A) within the study area. It is also observed that these incremental noise levels will not significantly affect the existing ambient noise levels.

10.8.5 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.

10.8.6 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.

It is proposed to include *Alternanthera paronychioides*, *Cassia tora* and *Holoptelea integrifolia* in the plantation program as they serve as sinks for gaseous emissions. Extensive plantation comprising of pollutant resistant trees will be undertaken, which will serve not only as pollution sink but also as a noise barrier.

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.

10.8.7 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.

10.8.8 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.

10.9 ENVIRONMENTAL MANAGEMENT PLAN

The summary of environmental mitigation measures are given in **Table-10.5**.

Table-10.5: 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 ore 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.

10.10 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 cum semi-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.

10.11 COST ESTIMATES

The details of the cost to for the Environmental Management plan for 5 years, the budget for Corporate Environmental Responsibility (CER) (per year) and year wise allocation of funds for the various activities proposed to be taken up under CSR programme has been given in **Table 10.6**, **Table 10.7** and **Table 10.8** respectively.

Table-10.6: Budget for Environmental Management Plan

S. No.	Measures	Cost (In Rs.)
1.	Water Sprinkling for dust suppression	50,000
2.	Environmental Monitoring : (i) Ambient Air Quality Monitoring (ii) Ambient Noise Monitoring (iii) Water Quality Sampling & Analysis (iv) Soil Quality Sampling & Analysis	1,00,000
3.	Plantation of 8700 trees along with their maintenance for green belt	8,70,000
4.	Cost for Retaining wall/Toe wall	74,700
Total		10,94,700

Table 10.7: Budget for Corporate Environmental Responsibility (CER) (per year)

S. No.	Measures	Cost (In Rs.) (per year)
1.	Sanitation facilities	25,000
2.	Skill Development for villagers	20,000
3.	Awareness to local farmers to increase yield of crop and fodder	15,000
4.	Plantation in the community areas/schools and on van panchayat land of nearby villages	40,000
Total		1,00,000

Table 10.8: Year wise allocation of funds for the various activities proposed to be taken up under CSR programme

S. No.	Activities	Allocation of Fund (Rs.)
1	Health Camps	1,00,000
2	Drinking Water Facilities	50,000
3	Maintenance of foot track	1,00,000

4	Donation for Temple Construction	50,000
5	Donation for cultural activities in the surrounding areas	1,00,000
Total		4,00,000

10.12 ADDITIONAL STUDIES

10.12.1 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.

10.12.2 Disaster Management Plan

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

10.13 PUBLIC CONSULTATION

10.13.1 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 will be 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.

10.15 CONCLUSIONS

- The mining operations will meet the compliance requirements of MoEF&CC;
- Community impacts will be beneficial, as the project will generate significant economic benefits for the region;
- 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.

Chapter 11: DISCLOSURE OF CONSULTANT ENGAGED

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

Basic Information about the Consultant Engaged is as follows stated below:

Name of the Consultant	Cognizance Research India Private Ltd.
Address	Suite- B 02, Block-H-61, Sector-63, Noida, U.P
Credentials	Accredited by QCI/NABET

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

Sr. No.	Name	EC/FAE	Details
1.	Mr. Vijay Sharma	EC	EIA Coordinator (Mining of minerals opencast)
2.	Mr. Nimish Singhvi	FAE	AP, SHW & Geology
3.	Mr. Bhavesh Kumar	FAE	SE
4.	Mr. Rahul Kumar	FAE	AQ
5.	Mr. Prakash Mal Jain		NV
6.	Mr. Ankur Sharma	FAE	WP
7.	Ms. Pooja	FAE	EB
8.	Mr. Prakash Mal Jain	FAE	RH
9.	Dr. P Radhakrishna Moorthy	FAE	HG
10.	Mr. Abhishek kumar	FAE	LU

Consultant Contact Details:

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Annexure I
Copy of Approved TOR

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प्राधिकरण, उत्तराखण्ड, "गौरादेवी पर्यावरण
भवन, तृतीय तल, 46-बी, आई.टी.
पार्क, सहस्त्रधारा रोड, देहरादून"
(पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय,
भारत सरकार, नई दिल्ली द्वारा गठित)
दूरभाष: 0135-2976159
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State Level Environment Impact
Assessment Authority, "Gauradevi
Paryavaran Bhawan, Third Floor, 46-B
I.T. Park, Sahasradhara Road,
Dehradun"
(Constituted by Ministry of
Environment, Forests and Climate
Change Government of India.)
Phone No-0135-2976159
Email- seiaa.seac.uk@gmail.com

Letter No. 2 /SEIAA

Dated- 27 January, 2023

To,

Shri Deewan Singh Papola S/o Shri Trilok Singh Papola,
Village - Papoli, Post - Kafli, Tehsil & District - Bageshwar.

Sub- Regarding Environmental Clearance for Proposed Extraction of Soapstone at Village - Khatigaon & Rangdev, Tehsil & District - Bageshwar. (Area- 8.529 Ha.).

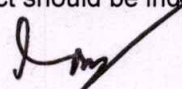
Kindly take reference of your submitted vide proposal no SIA/UK/MIN/73878/2022 on dated 20th March, 2022 regarding above proposal. The SEAC in its 1st meeting held on dated 17th January, 2023 examined the proposal. The SEIAA in its 1st meeting held on dated 24th January, 2023 after thorough discussion and deliberation conveyed that SEIAA desires EIA report of this proposal after due public consultation conducted by Uttarakhand 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 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.

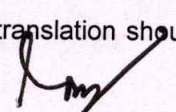
- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
- 12) A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement 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) Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- 21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.
- 22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM₁₀, particularly for free silica, should be given.
- 23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
- 24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.



- 25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
- 26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
- 27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
- 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
- 29) Details of any stream, seasonal or otherwise, passing through the lease area and modification/diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
- 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
- 31) 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.
- 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
- 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
- 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- 37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
- 38) Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
- 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
- 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
- 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.

44) 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.

Additional ToR

- ❖ All pages of technical documents/EIA/EMP should be signed by the consultant and project proponent both.
- ❖ The lease area, its address and production per annum should match with as mentioned in DSR and LOI. In case there is any difference classification/amendment letter from competent authorities shall be submitted.
- ❖ Plan for using the mine void for productive use in consultation with local administration and gram panchayat.
- ❖ In case project proponent intends to temporarily mine out materials outside the mine lease area than NOC from competent authority for doing so should be submitted and details of such area and associated environmental impacts should be included in EIA EMP report this should be clearly mentioned during public hearing.
- ❖ Road network to be used by the project should be clearly shown on survey of India top sheet in 1:20,000 scale. In case road network involves forest road, permission should be obtained from forest department and a copy of the same should be submitted at the time of appraisal of EIA-EMP report.
- ❖ Project proponent should submit action plan for carrying out plantation at least 1000 plants/ha of lease area. In this case PP, should prepare a plan duly approved either by Forest department of Horticulture department for planting either on government land or community land within periphery of 5 Kms from the boundary of lease area along with provision for maintenance for 5 years. Survival of plants below Uttarakhand Forest Departments survival rate will be treated as violation of EC condition.
- ❖ In view of the agricultural land proposed under the mining lease area, the project proponent needs to submit the cost benefit analysis composing the current agricultural production and annual turnover vis-à-vis the mineral cost and beneficiaries.
- ❖ One season monitoring data of Ambient Air, Ground Water, Surface Water, Noise and Soil with geo tagged photographs shall be submitted with final EIA report.

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 modelling and prediction methods considering base line data.

2) District Survey Report should be submitted as per the latest notification issued by MoEF&CC.

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

(S.P. Subudhi)
Secretary,
SEIAA, Uttarakhand

Copy to:- Member Secretary, Uttarakhand Pollution Control Board, Gaura Devi Paryavaran Bhavan, 46-B, IT Park, Sahastradhara Road, Dehradun for necessary action.

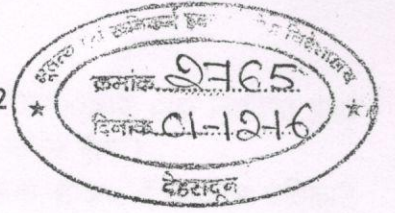
(S.P. Subudhi)
Secretary,
SEIAA, Uttarakhand

Annexure II

Copy of Letter of Intent

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उत्तराखण्ड शासन
औद्योगिक विकास अनुभाग-1
संख्या: 1316/VII-1/16/62ख/2012
देहरादून : दिनांक: 28 नवम्बर, 2016



कार्यालय ज्ञाप

जनपद व तहसील बागेश्वर के ग्राम खातीगांव, रंगदेव के क्षेत्रान्तर्गत सोपस्टोन के खनन पट्टा चाहने हेतु आवेदक श्री दीवान सिंह पपोला पुत्र श्री त्रिलोक सिंह पपोला, निवासी ग्राम काफली, तहसील व जनपद बागेश्वर के आवेदन पत्र दिनांक 22.4.1999 के क्रम में शासन के कार्यालय ज्ञाप संख्या-500/VII-1/62-ख/2012 दिनांक 22 फरवरी, 2014 द्वारा आवेदक के पक्ष में ग्राम खातीगांव/रंगदेव, तहसील व जनपद बागेश्वर में 10.867 है० क्षेत्रफल में खनिज सोपस्टोन का 20 वर्ष की अवधि हेतु खनन पट्टे की स्वीकृति हेतु कतिपय शर्तों/प्रतिबन्धों के अधीन आशय पत्र स्वीकृत किया गया। उक्त स्वीकृत आशय पत्र के अनुसार आवेदक को आशय पत्र में इंगित शर्तों की अनुपालना 06 माह के भीतर पूर्ण की जानी थी। निदेशक, भूतत्व एवं खनिकर्म इकाई, उद्योग निदेशालय उत्तराखण्ड, देहरादून द्वारा अपने पत्र संख्या-870/मु0ख0/66/बागे0/खनन/2010-11 दिनांक 4 अगस्त, 2016 द्वारा आवेदक के पक्ष में निर्गत आशय पत्र की शर्तों की अनुपालना में हुए 24 वर्ष का विलम्ब का मर्षण किये जाने तथा संशोधित आशय पत्र निर्गत किये जाने का प्रस्ताव शासन को उपलब्ध कराया गया है।

2. निदेशक, भूतत्व एवं खनिकर्म इकाई, उत्तराखण्ड द्वारा उपलब्ध कराये गये प्रस्ताव के क्रम में शासन के उक्त कार्यालय ज्ञाप दिनांक 22.2.2014 द्वारा जारी आशय पत्र में उल्लिखित औपचारिकताओं को पूर्ण किये जाने में हुए विलम्ब का मर्षण करते हुए आवेदक के पक्ष में ग्राम खातीगांव/रंगदेव, तहसील व जनपद बागेश्वर में 10.867 है० क्षेत्रफल के स्थान पर सीमांकित क्षेत्र 8.529 है० में खनिज सोपस्टोन का 20 वर्ष की अवधि हेतु खनन पट्टा स्वीकृति हेतु उक्त आशय पत्र में उल्लिखित शर्तों को निम्नानुसार संशोधित कर इस कार्यालय ज्ञाप निर्गत होने की तिथि से छः माह के भीतर निम्नलिखित औपचारिकतायें पूर्ण किये जाने हेतु आवेदक के पक्ष में स्वीकृत आशय पत्र को निम्नवत् संशोधित किया जाता है :-

1. आवेदक द्वारा उत्तराखण्ड गौण खनिज नीति, 2015 यथासंशोधित के नियमों/प्रतिबन्धों पर लिखित सहमति पत्र।
2. उत्तराखण्ड गौण खनिज नीति, 2015 यथासंशोधित दिनांक 7.10.215 के प्रस्तर-3(दो)(1) के अनुसार खनन योजना/उत्तरोत्तर खान बन्द करने की योजना का अनुमोदन निदेशक, भूतत्व एवं खनिकर्म इकाई, उत्तराखण्ड द्वारा किया जायेगा।
3. उत्तराखण्ड गौण खनिज नीति, 2015 यथासंशोधित के प्रस्तर-3(आठ) के अनुसार आवेदक को प्रतिभूति धनराशि ₹ 10,000/- निदेशक, भूतत्व एवं खनिकर्म के पक्ष में बन्धक करना होगा।
4. आवेदक द्वारा उत्तराखण्ड गौण खनिज नीति, 2015 के प्रस्तर-3(ग्यारह) के अकनुसार बैंक गारन्टी ₹ 2.00 लाख खनन योजना, खनन स्कीम एवं उत्तरोत्तर खान बन्दी योजना लागू किये जाने के संबंध में प्रस्तुत करनी होगी।
5. उत्तराखण्ड गौण खनिज नीति, 2015 के प्रस्तर-7 के अनुसार पट्टाधारक को खनन पट्टे में पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय भारत सरकार की अधिसूचना का0आ0 2601 (अ) दिनांक 07 अक्टूबर 2014 के क्रम में जारी शासनादेश संख्या-1621/VII-1/ 212-ख/2014 दिनांक 17 दिसम्बर 2014 के अनुसार पर्यावरणीय अनुमति प्राप्त किया जाना आवश्यक होगा।
6. उक्त क्षेत्रान्तर्गत सार्वजनिक उपयोग की भूमि सड़क श्रेणी 1(क) 0.006 है०, रौली श्रेणी 10(1) 0.149 है०, रास्ता श्रेणी 10(2) 0.041 है० कुल 0.196 है० में खनन कार्य निषिद्ध होगा।

7. आवेदक को खनन एवं राजकीय बकाया न होने के संबंध में जिलाधिकारी द्वारा निर्धारित प्रपत्र में अद्यतन अदेयता प्रमाण-पत्र तथा चरित्र प्रमाण-पत्र प्रस्तुत करना होगा।
8. आवेदक को आयकर/आयकर विवरणी जमा करा दिये जाने के सम्बन्ध में आयकर अधिकारी का अद्यतन प्रमाण-पत्र प्रस्तुत करना होगा। यदि आयकर देय नहीं हो तो इस आशय का शपथ-पत्र प्रस्तुत करना होगा।
9. आवेदक द्वारा सक्षम अधिकारी द्वारा प्रदत्त निवास प्रमाण-पत्र प्रस्तुत करना होगा।

विनय शंकर पाण्डेय
अपर सचिव

संख्या: 13/6 (1)/VII-1/16/62-ख/2012 तददिनांकित।

प्रतिलिपि निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित :-

1. जिलाधिकारी, बागेश्वर।
2. निदेशक, भूतत्व एवं खनिकर्म इकाई, उद्योग निदेशालय, उत्तराखण्ड, देहरादून को उनके पत्र संख्या-870/मुख०/66/बागे०/खनन/भू०खनि०ई०/2010-11 दिनांक 4 अगस्त, 2016 के क्रम में सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।
3. श्री दीवान सिंह पंपोला पुत्र श्री त्रिलोक सिंह पंपोला, निवासी ग्राम काफली, तहसील व जनपद बागेश्वर।
4. गार्ड फाईल।

आज्ञा से,
(राजेन्द्र सिंह पतियाल)
उप सचिव

Annexure III

Copy of Approved Mining Plan

मु० ख०/ भा० प्ला०-22/वागे०/१२० खा० ई०/2016-17

MINING PLAN

CATEGORY- OFM

WITH

PROGRESSIVE MINE CLOSURE PLAN

((Submitted under Rule 34 (4) of Uttrakhand Minor Mineral Rules 2001))

VILLAGE- KHATIGAON & RANGDEV, DISTRICT- BAGESHWAR

STATE UTTARAKHAND

FOREST LAND: NIL, AGRICULTURAL LAND 8.529 HA.

(AREA: 8.529 ha)

(सुनील पवार)

उपनिदेशक (खनन)
भूतत्व एवं खनिकर्म
उत्तराखण्ड देहरादून



APPLICANT

APPROVED

अनुमोदित

SHRI DEEWAN SINGH PAPOLA

VILLAGE-PAPOLI, POST-KAFLI,

TEH. & DISTT-BAGESHWAR, UTTARAKHAND

CELL NO. 91941131757

भूतत्व एवं खनिकर्म इकाई
उद्योग निदेशालय, उत्तराखण्ड
(मुख्य खनिज अनुभाग)

देहरादून

शर्तों के अधिन अनुमोदित

पत्रांक 2200

दिनांक 04 मार्च 2017

PREPARED BY

PANKAJ PANDE

REGISTRATION NO.RQP/DDN/086/95A

VALID UPTO-14.02.2021

(विनय शंकर पाण्डेय)

निदेशक

भूतत्व एवं खनिकर्म इकाई
उद्योग निदेशालय उत्तरा
देहरादून

२१
(सुनील चंदर)
CONTENT

उप निदेशक खनन
भू-तत्त्व एवं खनिकर्म इकाई
उद्योग निदेशालय उत्तराखण्ड, देहरादून



CHAPTER NO.

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INTRODUCTION

(सुनील पंतार)

श्री देवान सिंह का खनिज
उद्योग विदेशांतर उत्तराखण्ड, देहरादून



State Government has given its consent to grant the lease over an area of 10.867 ha for soapstone to Shri Deewan Singh Papola in the village- Khatigaon-Rangdev, Tehsil & District- Bageshwar. Vide letter of intent No.- 500/VII-1/62-ख/2012 Dated 22 February 2014. Copy of LOI enclosed as **Annexure No.-1.**

At the time of demarcation the area has enclosed & only 8.529 ha area was found suitable for mining. Copy of demarcation report is enclosed (**Annexure no 2**).

Detail of other leases held by Shri Deewan Singh Papola is given below-

Village	Tehsil	District/State	Area (ha)	Mineral
Odiyar	Kanda	Bageshwar, Uttarakhand	2.14	Soapstone

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(सुनील पंचार)

उप निदेशक खनन

भूतत्व एवं खनिकर्म इकाई

उद्योग निदेशालय, उत्तराखण्ड, देहरादून



1.0 General

a)	Name of applicant /lessee	:	Shri Deewan Singh Papola
	Address	:	Village-Papoli, Post-Kafli, Tehsil & Distt- Bageshwar, Uttarakhand
	District	:	Bageshwar
	State	:	Uttarakhand
	Pin code	:	-
	Phone	:	Not available
	Fax	:	Not available
	Mobile No.	:	91941131757
	Email id	:	N.A.
b)	Status of applicant/lessee	:	
	Private Individual	:	Private Individual
	Co-operative Association	:	N.A.
	Private Company	:	N.A.
	Public limited Company	:	N.A.
	Public Sector Undertaking	:	N.A.
	Joint Sector Undertaking	:	N.A.
	Other (Please specify)	:	N.A.
c)	Mineral(s) which is / are included in the prospecting license (For Fresh grant)	:	Soapstone
d)	Mineral(s) which is / are included in the letter of Intent / lease deed	:	Soapstone.
e)	Mineral(s) which is the applicant /lessee intends to mine	:	Soapstone
f)	Name of Recognized Person for Scheme of Mining/Mining Plan	:	Pankaj Pande
	Address	:	M/s Sahaj Sahyog Consultants (P) Ltd., B-1/21, Sec.-B, Aliganj, Lucknow
	Phone	:	0522-4011565
	Fax	:	0522-2338617
	Email	:	sahajsahyog990@gmail.com
	Mobile No.	:	91+9415102339
	Registration No.	:	RQP/DDN/086/95/A
	Date of Grant/Renewal	:	17.04.1997/ Renewed 10 years from 14.02.2011
	Valid upto	:	14.02.2021. Copy of RQP certificate is enclosed as Annexure no. 3.
	Tin No	:	Tin No. is 05000244756, Copy of Tin No is enclosed. Annexure no. 4.


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2.0 I) LIST OF ANNEXURE

LIST OF ANNEXURES

S. No.	TITLE	Annexure No.
1	Copy of LOI	1
2	Copy of Demarcation letter	2
3	Copy of RQP Certificate	3
4	Copy of Tin No	4
5	Copy of ID Proof	5
6	Copy of Khasra Plan	6
7	Copy of Khasra Details	7
8	Copy of NOC from respective land owners	8

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II) LIST OF PLATES

LIST OF PLATES (नील पंवार)

S.No.	NAME OF PLATES	Plate No.	Scale
1.0	Location Plan	1	Not in scale
2.0	Key Plan	2	1:50,000
3.0	Surface/ Geological Plan	3	1:1000
4.0	Geological Section	4	1:1000
5.0	Pit Position at the end of 1 st Year (Pit-I & II)	5	1:1000
6.0	Pit Position at the end of 2 nd Year (Pit-I & II)	6	1:1000
7.0	Pit Position at the end of 3 rd Year (Pit-I & II)	7	1:1000
8.0	Pit Position at the end of 4 th Year (Pit-I & II)	8	1:1000
9.0	Pit Position at the end of 5 th Year (Pit-I & II)	9	1:1000
10.0	Reclamation Plan	10	1:1000
11.0	Financial Area Assurance Plan	11	1:1000

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3.0 LOCATION AND ACCESSIBILITY

a) Lease Details (Existing Mine)

Name of mine : Khatigaon & Rangdeo Soapstone Area

Lat/long of any boundary point : The area lies between latitude 29 deg. 53 minutes 08 seconds and 29 deg. 54 minutes 06 seconds and longitude 79 deg. 56 minutes 14 seconds and 79 deg. 57 minutes 18 seconds in Survey of India toposheet no. 53⁰/13. The Key Plan is enclosed as **Plate No. 2.**

Date of grant of lease : It is a fresh grant case of mining lease & Lease is proposed to be granted for 20 years.

Period/Expiry Date : Expiry date will be effected from date of execution of lease deed.

Name of Applica : Mr. Deewan Singh Papola

Postal Address : Village-Papoli, Post-Kafli, Teh. & Distt-Bageshwar, Uttarakhand. Copy of ID proof is enclosed as **Annexure No. 5.**

Telephone : Nil

fax : Nil

email id :

Mobile No. : +91941131757

b) Details of applied /lease area with location map (fresh area /mine)

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,	8.529
		(iv) others (specify) Public Utility Land (lkoZtfud Hkwfe ¹ / ₂)	Nil
Total	Nil		8.529

Total applied area : **8.529 Ha.** Copy of khasra Map & khasra details enclosed as **Annexure No.6 & Annexure No.-7.**

District & State : Bageshwar, Uttarakhand

Taluka : Bageshwar

Village : Khatigaon & Rangdev

Whether the area falls under Coastal Regulation Zone(CRZ)?if yes, details thereof : Not applicable

Existence of public road/railway line, if any nearby and approximate distance : The applied area falls in village in Khatigaon & Rangdeo & it is about 40kms from Bageshwar via Bageshwar-Reema-Pachar PWD road. The area can also be approached from Bageshwar via Kothmunia-Dharamghar. From Dharamghar the is about 34kms & it is approach PWD metalled road. The Location Plan is shown in **Plate No.1.**

Toposheet No. with latitude & : The area lies between latitude 29 deg. 53 minutes 08

longitude of all corner boundary point/pillar

seconds and 29 deg. 54 minutes 06 seconds and longitude 79 deg. 56 minutes 14 seconds and 79 deg. 57 minutes 18 seconds in Survey of India toposheet no. 53 0/13. The Key Plan is enclosed as **Plate No. 2.**

Each corner pillars have been surveyed by G.P.S. & their readings are shown in **Plate No. 3 & 4** also given in **Table No. 1.**

- c) **Attach a general location map showing area and access routes. It is preferred that the area be marked on a Survey of India topographical map or a cadastral map or forest map as the case may be. However, if none of these are available, the area may be shown on an administrative map.**

The applied area falls in village in Khatigaon & Rangdeo & it is about 40kms from Bageshwar via Bageshwar-Reema-Pachar PWD road. The area can also be approached from Bageshwar via Kothmunia-Dharamghar. From Dharamghar the is about 34kms & it is approach PWD metalled road. The Location Plan is shown in **Plate No.1** and Key Plan showing 5 buffer zone is shown in **Plate No. 2.**

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(सुनील पंवार)

GPS READINGS निदेशक खनन

Pillar No	N	E
1	N-29°-53'-11.58"	E-79°-56'-47.70"
2	N-29°-53'-12.18"	E-79°-56'-53.63"
3	N-29°-53'-12.50"	E-79°-56'-42.87"
4	N-29°-53'-12.81"	E-79°-56'-41.80"
5	N-29°-53'-20.90"	E-79°-56'-40.23"
6	N-29°-53'-19.21"	E-79°-56'-42.48"
7	N-29°-53'-21.51"	E-79°-56'-18.30"
8	N-29°-53'-22.28"	E-79°-56'-19.42"
9	N-29°-53'-23.37"	E-79°-56'-19.07"
10	N-29°-53'-23.40"	E-79°-56'-20.12"
11	N-29°-53'-25.05"	E-79°-56'-20.91"
12	N-29°-53'-25.12"	E-79°-56'-17.65"
13	N-29°-53'-26.54"	E-79°-56'-21.28"
14	N-29°-53'-30.46"	E-79°-56'-21.80"
15	N-29°-53'-32.48"	E-79°-56'-22.73"
16	N-29°-53'-32.52"	E-79°-56'-23.18"
17	N-29°-53'-33.35"	E-79°-56'-24.93"
18	N-29°-53'-34.15"	E-79°-56'-25.29"
19	N-29°-53'-34.15"	E-79°-56'-26.27"
20	N-29°-53'-35.14"	E-79°-56'-25.04"
21	N-29°-53'-34.24"	E-79°-56'-24.51"
22	N-29°-53'-33.42"	E-79°-56'-23.42"
23	N-29°-53'-34.12"	E-79°-56'-26.10"
24	N-29°-53'-34.48"	E-79°-56'-25.56"
25	N-29°-53'-33.46"	E-79°-56'-27.05"
26	N-29°-53'-35.42"	E-79°-56'-26.86"
27	N-29°-53'-34.21"	E-79°-56'-24.62"
28	N-29°-53'-33.77"	E-79°-56'-28.00"
29	N-29°-53'-36.62"	E-79°-56'-27.06"
30	N-29°-53'-32.53"	E-79°-56'-27.18"
31	N-29°-53'-31.24"	E-79°-56'-27.27"
32	N-29°-53'-31.12"	E-79°-56'-28.59"
33	N-29°-53'-33.53"	E-79°-56'-27.60"
34	N-29°-53'-33.15"	E-79°-56'-21.67"
35	N-29°-53'-34.79"	E-79°-56'-21.04"
36	N-29°-53'-36.15"	E-79°-56'-23.39"
37	N-29°-53'-37.79"	E-79°-56'-25.14"
38	N-29°-53'-38.92"	E-79°-56'-29.43"
39	N-29°-53'-38.86"	E-79°-56'-29.76"
40	N-29°-53'-38.08"	E-79°-56'-30.98"
41	N-29°-53'-38.47"	E-79°-56'-31.01"
42	N-29°-53'-39.77"	E-79°-56'-32.05"
43	N-29°-53'-38.25"	E-79°-56'-33.51"
44	N-29°-53'-37.18"	E-79°-56'-34.15"
53	N-29°-53'-37.95"	E-79°-56'-35.83"
46	N-29°-53'-36.83"	E-79°-56'-36.85"
47	N-29°-53'-35.75"	E-79°-56'-37.18"
48	N-29°-53'-35.10"	E-79°-56'-38.81"
49	N-29°-53'-35.99"	E-79°-56'-39.08"
50	N-29°-53'-34.53"	E-79°-56'-40.84"
51	N-29°-53'-33.48"	E-79°-56'-40.48"



52	N-29°-53'-33.46"	E-79°-56'-39.06"
53	N-29°-53'-35.39"	E-79°-56'-38.10"
54	N-29°-53'-35.36"	E-79°-56'-35.78"
53	N-29°-53'-35.40"	E-79°-56'-39.86"
56	N-29°-53'-31.25"	E-79°-56'-38.61"



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4.0 DETAILS OF APPROVED MINING PLAN / SCHEME OF MINING (if any)

4.1 Date and reference of earlier approved MP/SOM: (सुनील पंवार)

It is a fresh grant case of mining lease & Mining plan is yet to be approved.

4.2 Details of last modifications if any (for the previous approved period) of approved MP/SOM, indicating date of approval, reason for modification:

It is fresh grant case of mining lease & First mining plan is being submitted for approved.

4.3 Give review of earlier approved proposal (if any) in respect of exploration, excavation, reclamation etc.

It is fresh grant case of mining lease therefore it is not applicable in this present case.

4.4 Give status of compliance of violations pointed out by IBM/District Magistrate/Dept. Geology and Mining office or other specified person appointed by Government or Director Geology & Mining.

Mining operation yet to be commenced therefore it is not applicable.

4.5 Indicate and give details of any suspension /closure/ prohibitory order issued by any Government agency under any rule or Court of law:

No mining activities are in progress therefore any suspension/closure/prohibitory order issued by any Government agency.

4.6 In case the MP/SOM is submitted for approval of modification, specify reason and justification for modification under these rules:

No modified MP/SOM has been submitted for approval.

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5.0 GEOLOGY AND RESERVES:

5.1 **Physiography:** The aspects to be looked into are topography of terrain, drainage pattern, vegetation, climate, and rainfall data of the area applied/mining lease area.

Topography: The applied area comprises of terraced agricultural fields showing undulating topography. The area comprises of a ridge trending NE-SW having a sinuous shape. The ridge within the applied area has adjoining south-Eastern and Northern to North-Eastern slopes. The higher levels are found towards the western side of the area near boundary pillars C-D whereas the lowest horizons within the area are found towards the north eastern side. The highest & lowest levels found in the area are of RL 1703m. and RL 1636m. Respectively. The slope in the area varies from moderate to gentle. The Physiography of the area is shown in **Plate No. 3**.

Climatic Condition

Climatically the area falls in temperate zones with pleasant summer and extremely cold in winters. The area receives moderate snowfalls during winters between December to February. The maximum temperature goes upto 40°C while the average minimum temperature goes above upto 2°C to 3°C the months of January & February.

Relative Humidity

The relative humidity shows rise from June to February with highest values in the month of January and decreases it reaches lowest during April and May.

On the basis of past experience reveals that the maximum average humidity in the month of January is about 96.33% while the minimum average humidity is about 31.43% during month of April.

Rainfall:

The area receives 70% on an average rainfall in between June end to mid September. Average rainfall from June to September comes about 1000mm. The maximum rainfall was received 1140mm. during the month of July & August while the minimum rainfall was recorded will during the months of January & February & it varies 8mm to 15mm.

5.2 **Geology:** Surface Geological map with contour interval maximum of 10 meter on a scale of 1:2000/1:1000 may be examined for features detailed below:

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:

Berinag Quartzite

Unconformity

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Gangolihat Dolomite

Dolomite and dolomitic limestone with algal structures.
Magnesite with minor talc/talcosite phyllite 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.

(I) **Disposition of all lithological units with clear nomenclature and their descriptions.**

Local Geology:

The area only shows part of carbonates of Gangolihat Dolomite sequence. The local stratigraphy shows that the mineralized zone lies between upper & lower carbonates as below:

Upper Carbonates: Magnesite sporadic dolomite

Middle Talcose phyllite: Talc in pockets

Lower Carbonates: Dolomite & Dolomite Limestone

As per UNFC, the deposit is lenticular of all dimensions including bodies occurring en-echelon fashion.

Alluvial Cover:

A thin layer of brownish colour of soil exists in the whole area. The average thickness of soil is 0.50m.

Soapstone bearing with Magnesite:

The soapstone mineral in Kumaon Himalaya is an alteration products magnesium bearing minerals, Soapstone occurs as pocket type massive and sometimes confined to the upper part of the magnesium bearing zones. The mineral body occurs in irregular shape & size. The foliation plane of soapstone trending 320° N to 325° N, amount of dip varies 30° to 35° and dip direction varies 50° N. to 55° N.

The area was explored with the help of seven trial pits viz E1, to E7. During prospecting period the pits were exposed up to depth of 3.5m to 9m and soapstone persists in depth. Soapstone bearing with low grade magnesite was seen in the pit. The pit was dug at different levels in the agricultural field & soapstone encountered in the pits which is further persists in depth as observed during prospecting period. The soapstone occurring in this area is weakly foliated, fine grained off white in colour with its characteristic soapy feel.

The Geological Plan is shown in **Plate No.4**

(II) **Contacts of lithounits/rock types traced or inferred.**

The lease area is terrace agriculture land with soil cover. No contacts of lithounits/rock types are observed on ground level.

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(III) Attitudes like strike and dip available in adequate numbers.

Due to the past exploration, eleven exploratory pits were dug in different levels & occurrence of soapstone established in each pits. The foliation plane of soapstone trending 850°N to 880°N, amount of dip varies 300 to 330 and dip direction varies 50°N to 80°N.

(IV) Structural features such as joints, folds, faults and their attitudes.

No structural features such a joints, folds, faults etc. observed within lease area.

(V) Delineation of mineralized/ore zones with definite demarcation of observed and inferred.

During prospecting, eleven trial pits were dug within lease area & depth of pit varies 4m to 9.0m. 50.0m horizontal extension from exploratory pits & depth 6.0m from surface has been taken as G-2 Category. The remaining area beyond 122 limit & upto lease boundary has been considered as Inferred Mineral Resources.

5.3 Details of prospecting/exploration already carried out:

No exploration was carried out in past by MECL. In past area was explored with the help of seven trial pits & soapstone was encountered in all the pits.

The details of exploration already undertaken within the area are given below:

Exploratory	Length (M)	Width (M)	Depth (M)	Thickness	Lithology	Status	Location
E1	10	8	3.5	0-0.50 0.50-3.5	Soil Cover Soapstone bearing with low grade magnesite	Backfilled	In between the local coordinates N 1658 to N 1666 & E 1150 to E 1160
E2	20	15	7.5	0-0.50 0.50-7.5	Soil Cover Soapstone bearing with low grade magnesite	Backfilled	In between the local coordinates N 1688 to N 1708 & E 1215 to E 1230
E3	25	20	9.0	0-0.50 0.50-9.0	Soil Cover Soapstone bearing with low grade magnesite	Backfilled	In between the local coordinates N 1560 to N 1585 & E 1174 to E 1194
E4	38	20	9.0	0-0.50 0.50-9.0	Soil Cover Soapstone bearing with low grade magnesite	Backfilled	In between the local coordinates N 1320 to N 1340 & E 1150 to E 1188
E5	20	10	6.0	0-0.50 0.50-6.0	Soil Cover Soapstone bearing with low grade magnesite	Backfilled	In between the local coordinates N 1262 to N 1272 & E 1138 to E 1158
E6	15	8	4.5	0-0.50 0.50-4.5	Soil Cover Soapstone bearing with low grade magnesite	Backfilled	In between the local coordinates N 1260 to N 1268 & E 1075 to E 1090
E7	25	15	8.0	0-0.50 0.50-8.0	Soil Cover Soapstone bearing with low grade magnesite	Backfilled	In between the local coordinates N 1090 to N 1115 & E 1150 to E 1165



5.4 Exploration proposed to be carried out (in case adequate total reserves is not established for the tenure of lease)

During next five years, the unexplored area, shall be explored with seven trial pits having dimension 5m x 5m x 5m & three auger drill holes to ascertain the continuity & grade of soapstone. The year wise exploration programme is given below:

Year	No. of trial pits	Location		Expenses incurred (in Rs.)
1 st	PT1	In between the local coordinates N 1795 to N 1800 & E 1178 to E 1183		1800
	PT2	In between the local coordinates N 1730 to N 1735 & E 1173 to E 1178		
2 nd	PT3	In between the local coordinates N 1512 to N 1517 & E 1145 to E 1150		2400
	PT4	In between the local coordinates N 1165 to N 1170 & E 1238 to E 1243		
3 rd	PT5	In between the local coordinates N 1125 to N 1130 & E 1087 to E 1092		3600
	PT6	In between the local coordinates N 1025 to N 1030 & E 1180 to E 1185		
	PT7	In between the local coordinates N 1010 to N 1015 & E 1118 to E 1123		
4 th	Augar drill hole	Depth & Angle	Location	
	ADH-1	20m, vertical	At the intersection of local coordinates N 1545 to E 1165	4200
5 th	ADH-2	20m, vertical	At the intersection of local coordinates N 1290 to E1120	9000
	ADH-3	20m, vertical	At the intersection of local coordinates N 1130 to E 1145	

5.5 Reserve/Resource Estimation:

The reserves & resources as per UNFC is given below-

Economic Axis (E1):

- Due to mining in surrounding area, the mineral is good grade & having no problem in selling in the market. Mineral shall be transported manually up to road side & loaded in to truck. NOC from individual land owners have been obtained. On this basis economic viability of the deposit has been established & mineral is economically viable. Hence economic axis under UNFC for the deposit is **E=1**.
- General exploration laterally as well as in depth by way of pilling.
- Prospecting report has been prepared under rule 16 of MCR 1960
- Specific end use grade of reserve established. The reserves of soapstone with in applied area is cosmetic, paper & ceramic grade.
- Specific knowledge of own forest & other land use data is available. The applied lease area is totally agricultural land & after mining it shall be backfilled, levelled it & put use for agriculture.

Feasibility axis (Pre-feasibility study carried out): As this is small semimechanised mine. The pre feasibility study carried out for this area and is considered to be pre feasibility status. Hence pre feasibility axis under UNFC for the deposit is **F=2**.

1. **Geology:** Local geology, mineralogy & geometry of soapstone deposit within applied area established during prospecting operations. The identification of ore body carried out & only soapstone was formed occur within applied area.
2. **Mining:** The mine will be worked out by semi-mechanized. The preproduction & development plan prepared & appended. The estimation of manpower has been carried out.
3. **Environment:** Base line data on environment & land use data etc. has been generated.
4. **Processing:** No processing is proposed.
5. **Infrastructure:** Infrastructure & services- site services such as rest shatter, first aid room, drinking water facilities etc. will be provided in compliance of mine Act- 1952 & Mines rules 1955. Construction activities is proposed to be commenced vary soon.
6. **Costing:** Capital cost & operating cost has been evaluated based on comparable mining operations as appended in prefeasibility.
7. **Marketing:** The soapstone of the area is proposed the supply to ceramic, paper & cosmetic industries.
8. **Economic viability:** The mineral is economic viable.
9. **Other factors:** Statutory provisions relating to land has been complied while layout, mining & taxation etc. during course of mining.

Geological Axis:

General exploration has been carried out by way of pitting in scattered manner & shallow in depth. Therefore geological axis has been considered under G-2.

- (i) Geological Survey: Mapping in the scale of 1:1000 will triangulation point & bench marks carried out & shown in surface geological plan. Extensive pitting has been done & nature of deposition of soapstone has been shown on geological plan & section.
- ii) Linking of map with cadastral map carried out & latitude & longitude of corner pillar taken.
- iii) Assessment of lithology carried out based on the exposures in the pit of soapstone, structure & surface mineralization studied & mapped during prospecting period.
2. Geo chemical survey: Detailed sampling of pit.
3. Geophysical survey: Geophysical survey was carried was carried out on the basis of exposure & outcrops. Based on the exploration & exposure in the pit, the mineralization zone delineated.
4. Technological: Pitting carried out through the applied area in scattered manner & in shallow in depth. The depth of pit varies 3.5m to 9m. The deposit is regular with low dip. Surface & subsurface lithology & co-relation of mineralization zones carried out by above questioned

pling & sampling carried out of pit faces. 50m influence of pit has been taken for G-2 category,

- G-2
1. Mapping on the scale of 1:1000 on G2 probable category has been marked.
 2. Geo chemical survey: Sampling from out crops carried out.

All the quantities of soapstone up to 50m horizontal extension from exploratory pit & depth 6m have been considered under 122. Further 3m depth from 122 has been considered as 333 categories.

5.6 Parameters for Estimation:

1. The cross section area of each section line has been calculated for each category of reserves. The cross sectional area is multiplied by the strike influence to get the volume. The volume is multiplied by the bulk density to get the tonnage in each section line.
2. Bulk density of soapstone has been assumed 2.6 in view of our past experience in and around the area.
3. Bulk density of interburden (Magnesite) has been assumed as 2.5 in view of our past experience in the areas.
4. The incidence of Soapstone has been taken as 30% of the total excavation as per past experience in the areas.
5. Recovery of interburden (Magnesite) has been taken as 70% of the total excavation as per the past experience with in the area.
6. Due to past exploration with in the area & mining activities in surrounding areas, it has been revealed that incidence of soapstone in different pits varies 20% to 40%, therefore on an average incidence of soapstone has been considered 30% of total excavation which is on lower side.

Probable mineral reserve (121):

All the quantities of soapstone occurring 6m. Vertically below the surface & 50m lateral extent from the exploratory pits has been considered as probable mineral reserves (122).

Pre feasibility Mineral Resources (222): Reserves blocked in barrier ultimate pit limit under probable mineral reserves has been considered as 222.

Inferred mineral Resource (333)

All quantities of soapstone occurring 3m below the probable zone has been considered as inferred mineral resource (333).

The details calculation of reserve & resources in given in **Table No. 2.**

Mineral Reserves/Resources:

General Exploration has been carried out with help seven exploratory pits. 50m horizontal extension from exploratory pits & upto depth of 6m from surface has been considered as probable mineral reserves.

	UNFC Code	Quantity in million tons	Grade
A. Total Mineral Reserve			
Proved Mineral Reserve	111	0.478656	Nil
Probable mineral Reserve	122	0.101242	Cosmetic paper
B. Total Remaining Resources			
Feasibility mineral Resource	211	0.027127	Nil
Prefeasibility mineral resource	222	0.035233	Cosmetic Paper
Measured mineral resource	331	Nil	Nil
Indicated mineral resource	332	Nil	Nil
Inferred mineral resource	333	0.107256	Cosmetic paper
Reconnaissance mineral resource	334	Nil	Nil
Total Reserves + Resources		0.749514	

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(सुजीत पंडे)

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उद्योग निदेशक, देहरादून

Table No. 2

GEOLOGICAL RESERVES

Proved Mineral Reserves (111)				
section Line	Area (m2)	Strike Influence	Volume	Insitu Reserves in MT
1-1'	342	65	22230	40459
2-2'	444	81	35964	65454
3-3'	1062	142	150804	274463
4-4'	450	120	54000	98280
Total			262998	478656
Probable Mineral Reserves (122)				
section Line	Area (m2)	Strike Influence	Volume	Insitu Reserves in MT
1-1'	138	65	8970	16325
2-2'	210	81	17010	30958
3-3'	44	142	6248	11371
4-4'	195	120	23400	42588
Total			55628	101242

Feasible Mineral Resources (211)				
section Line	Area (m2)	Strike Influence	Volume	Insitu Reserves in MT
1-1'	28	65	1820	3312
2-2'	35	81	2835	5160
3-3'	35	142	4970	9045
4-4'	44	120	5280	9610
Total			14905	27127
Prefeasibility Mineral Resources (222)				
section Line	Area (m2)	Strike Influence	Volume	Insitu Reserves in MT
1-1'	39	65	2535	4614
2-2'	48	81	3888	7076
3-3'	48	142	6816	12405
4-4'	51	120	6120	11138
Total			19359	35233

Inferred Mineral Resources (333)				
section Line	Area (m2) 333	Strike Influence	Volume (333)	Insitu Reserves in MT
1-1'	72	65	4680	8518
2-2'	126	81	10206	18575
3-3'	153	142	21726	39541
4-4'	186	120	22320	40622
Total			58932	107256

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6.0 MINING

6.1 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 opencast semimechanised mine. The overburden & interburden shall be removed deployment of an excavator & its deployment shall be on hire basis as & when required.

The soapstone shall be extracted with deployment of a excavator as well as manually with the help of crow bar, chiesels, pickaxe, hammers, spade and different grade of soapstone will be stacked separately near the mining faces. Soapstone is soft mineral; therefore no drilling & blasting shall be required. The soapstone shall be dressed manually & stacked separately. No further beneficiation shall be undertaken during first five years. The 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 through manually and transported to Haldwani.

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

Mining shall be carried out in two pits viz pit-I & pit-II.

It will be open cast semi-mechanized. Average thickness of soil has been considered as 0.50m & it shall be stacked separately.

An excavator shall be deployed for the removal of overburden & interburden & its deployment shall be 3-4 days in a week.

Bench height will be kept 3.0m width of benches shall be kept 3.0m with face slope 70° to 75° .

Development work will be construction of foot track to different working benches and removal of the top soil. Seasonal nalla & habitation are far away from proposed mining pits. However 60m long wire crated wall having width & height 3.0m & 3.0m shall be provide along the nalla in pit I for the protection of nalla by mining activities & siltation of waste dump. Mining shall be carried out by an excavator on hire basis with conventional hand tools without adoption of drilling & blasting & habitation is far away from the proposed mining area, therefore there shall be no adverse impact on habitation due to mining activities.

(iii) **Last five Year production Target & achievement:**

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

(iv) **Proposed five year production target:**

The year wise quantities of soapstone, soil interburden to be generated from different pits is as below-



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Pit I:

Year	Soil (Cum)	exploitation of soapstone (Tonnes)	Mineral Reject (cum)	Subgrade (tonnes)	Interburden (Cum)
I st	249	15124	-	-	2995
II nd	282	17150	-	-	2827
III rd	330	20049	-	-	3305
IV th	366	22222	-	-	3663
V th	419	25389	-	-	4185
Total	1646	99934	-	-	16975

Pit II:

Year	Soil (Cum)	Exploitation of soapstone (Tonnes)	Mineral reject (toonnes)	Subgrade (tonnes)	Interburden (Cum)
I st	180	7644	-	-	1260
II nd	200	9337	-	-	1539
III rd	218	12176	-	-	2007
IV th	233	14141	-	-	14141
V th	312	15293	-	-	15293
Total	1143	58591			34240

The total yearwise quantities of soapstone exploited from Pit-I & Pit-II are tabulated below:

Year	Total exploitation of soapstone (Tonnes)		
	Pit-I	Pit-II	Total
I st	15124	7644	22768
II nd	17150	9337	26487
III rd	20049	12176	32225
IV th	22222	14141	36363
V th	25389	15293	40682
Total	99934	58591	158525

The year wise production schedule of soapstone generation of soil & interburden from different benches in different pit is as below:

1st Year:

Pit I

Bench level (mRL)	Face length (m)	Face advancement (m)	Volume (cum)	ROM Soapstone (Tonnes)	Interburden (cum)	Soil (cum)
1695-1692	30	3	270	491	81	8
1692-1689	34	20	2040	3713	1114	61
1689-1686	50	40	6000	10920	1800	180
Total				15124	2995	249

Pit II

Bench level (mRL)	Face length (m)	Face advancement (m)	Volume (cum)	ROM Soapstone (Tonnes)	Interburden (cum)	Soil (cum)
1656-1659	20	20	1200	2184	360	78

1653-1656	22	25	1650	3003	495	64
1650-1653	20	15	900	1638	270	38
1647-1650	15	10	450	819	135	0
Total				7644	1260	180

2nd Year:

Pit I

Bench level (mRL)	Face length (m)	Face advancement (m)	Volume (cum)	ROM Soapstone (Tonnes)	Interburden (cum)	Soil (cum)
1683-1686	43	43	5547	10096	1664	166
1680-1683	34	34	3876	7054	1163	116
Total				17150	2827	282

Pit II

Bench level (mRL)	Face length (m)	Face advancement (m)	Volume (cum)	ROM Soapstone (Tonnes)	Interburden (cum)	Soil (cum)
1659-1662	25	28	2100	3822	630	98
1656-1659	20	25	1500	2730	450	64
1653-1656	18	20	1080	1966	324	38
1650-1653	15	10	450	819	135	0
Total				9337	1539	200

3rd Year:

Pit I

Bench level (mRL)	Face length (m)	Face advancement (m)	Volume (cum)	ROM Soapstone (Tonnes)	Interburden (cum)	Soil (cum)
1677-1680	68	54	11016	20049	3305	330
Total				20049	3305	330

Pit II

Bench level (mRL)	Face length (m)	Face advancement (m)	Volume (cum)	ROM Soapstone (Tonnes)	Interburden (cum)	Soil (cum)
1665-1668	40	25	3000	5460	900	116
1662-1665	36	20	2160	3931	648	78
1659-1662	24	15	1080	1966	324	24
1656-1659	15	10	450	819	135	0
Total				12176	2007	218

4th Year:

Pit I

Bench level (mRL)	Face length (m)	Face advancement (m)	Volume (cum)	ROM Soapstone (Tonnes)	Interburden (cum)	Soil (cum)
1674-1677	74	55	12210	22222	3663	366
Total				22222	3663	366

Pit II

Bench level (mRL)	Face length (m)	Face advancement (m)	Volume (cum)	ROM Soapstone (Tonnes)	Interburden (cum)	Soil (cum)

1668-1671	30	28	2070	3767	621	62
1665-1668	50	18	2700	4914	810	81
1662-1665	40	16	1920	3494	576	58
1659-1662	30	12	1080	1966	324	32
Total				14141	2331	233

5th Year:**Pit I**

Bench level (mRL)	Face length (m)	Face advancement (m)	Volume (cum)	ROM Soapstone (Tonnes)	Interburden (cum)	Soil (cum)
1674-1677	60	50	9000	16380	2700	270
1671-1674	55	30	4950	9009	1485	149
Total				25389	4185	419

Pit II

Bench level (mRL)	Face length (m)	Face advancement (m)	Volume (cum)	ROM Soapstone (Tonnes)	Interburden (cum)	Soil (cum)
1677-1680	40	16	1920	3494	576	58
1674-1677	38	17	1938	3527	581	58
1671-1674	40	20	2400	4368	720	72
1668-1671	55	13	4145	3904	1244	124
Total				15293	3121	312

6.2 Plan & Sections:

The individual year wise Development Plan & Section showing pit layout, dumps, top soil stack etc. is shown in Plate No. 6 to 10.

6.3 Drilling & Blasting:

Soapstone is soft minerals, its hardness has been considered as 1 on moh's hardness scale which can be mined easily therefore, there is no need of drilling and blasting for soapstone mining.

6.4 Mine Drainage:**a) Minimum and maximum depth of water table based on observations from nearby wells and water bodies**

One perennial spring exists outside the applied area in village- khatigaon which is about 900m away towards north east direction of proposed mining area and level of perennial spring is 1638m. Practically there is no fluctuation in water table throughout the year. One seasonal nalla exists west flank of the area & flows from north-east to south-west direction.

b) Indicate maximum and minimum depth of Workings.

The proposed bottom level of working pit is expected up to 1641mRL in pit-I and 1671mRL in pit-II (End of 5th year) & water table will not be intersected by mining operations as spring about 900m away from the proposed working area. Seasonal drainage exists within the applied. Proposed mining area is far away from existing drainage, therefore chances to encounter the water within the working pit shall be nil during first five years.

- c) **Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged**

Mine working will not go beyond 1641mRL in pit-I and 1671mRL in pit-II & depth of pit during first five years shall be 9m, thus there is no chance to encounter the water table.

- d) **Describe regional and local drainage pattern. Also indicate annual rain fall, catchments area, and likely quantity of rain water to flow through the lease area, arrangement for arresting solid wash off etc.**

Number of seasonal drainage exists with in the area & its surroundings & flow from north-west, west to east direction & confluence to other drainages & flows from south-west to north-east direction. The area receives 70% on an average rain fall in between June & to mid September. Average rain fall from June to September comes out 1000mm. The rain water with in applied area drain down through the slopes & meet the natural drainage. Retaining wall along the waste dumps and check dams across the drainage shall be provided for the arresting of solid waste.

6.5 Disposal of Waste:

The top soil having average thickness 0.50m lies all over the applied area. The top soil will be scrapped manually, stacked separately In pit I top soil & interburden shall be stacked for first two years & from third year onwards all the quantities shall be used in backfilling. In pit II, topsoil & interburden shall be dumped for first year & from second year all quantities shall be used in backfilling. The low grade magnesite boulders are high silica percentage and hence the same is treated as interburden and will be dumped separately. No mineral reject will be produced during next five years.

The quantity of soil and interburden material to be generated during first five years is given below:

Year	Pit I		Pit II	
	Top Soil (cum)	Interburden (cum)	Top Soil (cum)	Interburden (cum)
I	249	2995	180	1260
II	282	2827	200	1539
III	330	3305	218	2007
IV	366	3663	233	14141
V	419	4185	312	15293
Total	1646	16975	1143	34240

6.6 Storage and preservation of top soil:

The top soil material will be dumped towards slope side of working pits. In pit-I top soil dump during first two years shall be dumped towards slope of working pits. Dumping shall be carried out in single terrace & slope of dump shall be kept 37°. From third year onwards all the quantities shall be used in backfilling therefore no proposal has been envisaged for separate dumping of top soil. 30m long toe wall having width & height 1m shall be made at the base of dump for its stabilization. In pit-II top soil stack during first year shall be dumped towards slope of working pits. Dumping shall be carried out in single terrace & slope of dump shall be kept 37°. From second year onwards all the quantities shall be used in backfilling therefore no proposal has been envisaged for separate dumping of top soil. 30m long toe wall having width & height 1m shall be made at the base of stack in pit-I and pit-II for its stabilization.

The Quantities of soil to be generated to as below:

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Year	Pit I	Pit II
	Top Soil (cum)	Top Soil (cum)
I	249	180
II	282	200
III	330	218
IV	366	233
V	419	312
Total	1646	1143



6.7: Proposal for reclamation of land affected by mining activities:

The mining has been proposed in such a way that land will be reclaimed concurrently from third year onward in pit I & second year onwards in Pit II. The reclaimed land will be used in agriculture purpose. By the end of 5th year about 89208 cum space will be backfilled to restore the original topography of the area and ultimately be used for agricultural purpose. The average depression with respect to original topography after backfilling will be 2.0 m.

The quantities of interburden & soil to be generated the area backfilled, quantities of interburden & soil to be filled back and balance quantity of interburden & soil during next five years is given below:

Pit I:

Year	Quantities of soil + interburden to be generated & dumped	Space available for backfilling (Cum)	Dimension of backfilled pit (m)			Quantities of soil+ interburden to be used in backfilling (Cum)	Balance quantities to be dumped (Cum)
			L	W	D		
I st	1782	0	0	0	0	Nil	1782
II nd	5849	0	0	0	0	Nil	5849
III rd	6206	10260	45	38	10	6206	0
IV th	7577	7800	50	26	8	7577	0
V th	8063	8208	36	38	8	8063	0
Total	29477	26268				21846	7631

Pit II:

Year	Quantities of soil + interburden to be generated & dumped	Space available for backfilling (Cum)	Dimension of backfilled pit			Quantities of soil+ interburden to be used in backfilling (Cum)	Balance quantities to be dumped (Cum)
			L	W	D		
I st	8122	0	0	0	0	0	8122
II nd	9262	11400	50	38	6	9262	0
III rd	10880	18240	76	40	6	10880	0
IV th	14285	17100	95	30	6	14285	0
V th	14460	16200	90	30	6	14460	0
Total	57009	62940				48887	8122

The average depression during third year with respect to original topography shall be 2.0m. The area backfilled during first five year is shown in Plate Nos. 6 to 10.

6.8 Measures for Dust Suppression:

The existing kachha foot track shall be converted into cemented foot track. Apart from this water sprinkling on haul roads shall be undertaken during dry spell of months to suppress dust. The soil

and interburden to be generated a temporarily in nature and all quantities shall be used in premature backfilling before commencement of monsoon as direction by district administration. After over the monsoon the backfilled material shall be rehandled by means of an excavator and dump over existing dump yard secure with toe walls.

6.9 Measures to minimize vibration due to blasting and check noise pollution:

As proposed method of mining is opencast semimechanized without adoption of drilling and blasting. Therefore impact on this aspect is negligible.

6.10 Tailing Dam:

No tailing dam is proposed in the soapstone mine.

6.11 Guidelines for scrutiny with respect to mineral beneficiation:

Except dressing & breaking no beneficiation of mineral processing is required for soapstone mining. The soil coating within soapstone shall be dressed with brush and stacked separately. If any kind of impurities observed within soapstone dumps it shall be broken with hammer, dress manually & stack separately.

6.12 How many time penalty imposed upon lessee against illegal mining:

It is a fresh grant case of mining lease & mining operations ye to be commenced. Therefore it is not applicable in the present case.

6.13 Employment Potential/Mine Management Plan:

The details of personnel to be employed are given below:

Managerial Staff:

- | | |
|------------------------------|----------|
| 1. Mines Manager (Full Time) | = 1 no. |
| 2. Geologist (Full Time) | = 1 no. |
| 3. Skilled workers | = 2 nos. |
| 4. Unskilled workers | = 94 |

The production envisaged is 40682 tonnes which shall be achieved during fifth years which implies that 169 tonnes of production per day considering 240 working days in a calendar year.

Due to past mining experience with in applied area, the OMS varies from 1.5 tonnes to 2.0 tonnes. Considering average OMS 1.8 tonnes, which implies that 94 workers shall be employed to achieve the required production.

6.14 Environment Management Plan:

The Existing land use pattern is agricultural land. The applied area has a mild slope towards north east direction. The seasonal nalla exists vicinity of the area flows from south west to north east direction & meets the local gadheras.

The Existing land use pattern indicating the area already degraded due to quarrying/pitting dumping, roads, processing plants, workshop, township etc in a tabular form is as below:

Name of land use	Benap land (forest land) (ha)	Agricultural Land (ha)	Scrub Land (ha)	Other (ha)	Total (ha)
Pits and quarries	-	0.24	-	-	0.24
Waste Dump	-	Nil	-	-	Nil
Backfilled pit	-	0.10	-	-	0.10
Habitation	-	Nil	-	-	Nil
Foot track/PWD road	-	0.014	-	-	0.014
Drainage	-	-	-	-	-
Remaining undisturbed area	-	8.175	-	-	8.175

Total

8.523

Water regime, quality of air, ambient noise level, flora, climatic conditions

Water Regime:

One seasonal drainage exists towards north flank of the area & flows from north-west to south-east direction & confluence to other drainages & flow from north to south direction. The surrounding area is characterized by steep slopes, narrow ridges & forms the mountainous topography & rain water flows through the slope & meet the drainages & finally meets the Pungar river. The water catchment of buffer zone is divided into one water locally called as Pungar river which is the main catchment of the area.

Flora:

The area is basically agricultural. It is therefore deficient in trees. 10-15 fruits tree are existing with an village Khatigaon & Rangdeo which is south west of the area. The mining activities will be concentrated on cultivated fields. The mining will be performed manually without drilling and blasting, flora shall not be disturbed.

Shrubs: Ghingarua with a few Jhitalu, Kilmora and Hisalu etc. occurs in the depressions.

Grasses: Kumaria, Doob, Shishoona, Gria and Bhawaria.

Fauna: No particular type of fauna finds except snakes, Jackals, wild cat, wildhen etc. are found in and around the area.

Quality of air, ambient noise level and water:

Through no air samples were collected to ascertain the air quality of the region.. On the basis of past experience with in the area the SPM content will be lower than permissible limit. Similarly ambient noise is practically nil accepting the natural background noise level of nature, as even the nearest habitation is about 150 m. away from the working zone.

The water for drinking purpose comes from springs or nuala. Water quality of nala will not deteriorate as mine working is proposed to be restricted in one pit only. The backfilling and retaining wall at the edge of the reclaim pits will also remote the chances of fine particles to be mix with the nala water.

Climatic Condition:

i) Temperature:

Climatically the area falls in temperate zones with pleasant summer and extremely cold in winters. The area receives moderate snowfalls during winters between December to February. The maximum temperature goes upto 40°C while the average minimum temperature goes above upto 20°C to 30°C the months of January & February.

ii) Relative Humidity:

On the basis of past experience reveals that the maximum average humidity in the month of January is about 96.33% while the minimum average humidity is about 31.43% during month of April.

iii) Rainfall:

The area receives 70% on an average rainfall in between June end to mid September. Average rainfall from June to September comes about 1000mm. The maximum rainfall was received 1140mm. during the month of July & August while the minimum rainfall was recorded will during the months of January & February & it varies 8mm to 15mm.

Human settlements:

The nearest human settlement is village Bhardwari, Gol, Pokhari which is about 150m away towards the south west side from the applied area.

Human settlements are distributed on fringes of buffer zone. The percentage of population of male is higher than females. The population within 5km buffer zone of females is percent while population of male is percent.

public buildings, places of worship and monuments

No public building, places of workshop & any kind of Historical monuments exists within the applied area.

However near habitation is village Bhardwari which is about 50m away towards south west side of the area.

- Indicate any sanctuary is located in the vicinity of leasehold

The applied area does not fall under notified area under water (Prevention & control of Pollution), Act 1974. Further there is not any National park/ Sanctuary with in 10km radius of applied area.

Impact Assessment: Attach an Environmental Impact Assessment Statement describing the impact of mining and beneficiation on environment on the following:

i) Land area indicating the area likely to be degraded due to quarrying, dumping, roads, workshop, processing plant, tailing pond/dam, township etc.

The impact on land form or physiography will be land use on the hilly terrain will undergo radical changes due to the open cast mining.

During the next five years mining, 2.02ha land will be degraded due to mining & allied activities. The breakup of the land to be affected during the five years and end of conceptual period of due to mining operation is given below:

Activities	End of 5 years	Area occupied (Ha)
	(ha.)	End of conceptual period
Mining Pits	2.02	7.65
Interburden dumps	0.308	Nil
Soil stack	0.034	Nil
Foot track/ PWD road	0.038	Nil
Workshop	Nil	Nil
Retaining wall	0.048	0.124
Balance undisturbed agricultural land	6.081	0.755

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Total	8.529	8.529
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Note: All the quantities of top soil & interburden material to be generated by the end of conceptual period shall be used for the purpose of reclamation over the mined unit land. Therefore no proposal for separate stack of top soil and interburden material has been proposed.

ii) Air quality:

It is proposed that mining shall be carried out opencast semi-mechanized. Mineral shall be filled into 50 kg plastic bags & manually transported to road side. No air quality shall be deteriorated due to mining activities.

iii) Water quality:

The impact on water quality will be confined to increased suspended solids during rain. The perennial drainage flows in the surrounding of applied area. The dumps to be generated will be temporary in nature & used for the purpose of backfilling by the end of third year onwards in pit I & second year onwards in pit II. The dumps will be secured with toe walls and rainy water will not carry significant suspended material. One water sample was collected from spring & analyzed. However water sprinkling on the foot track shall be carried out during summer month to suppress the dust. However in future air monitoring shall be carried out as per CCOM Circular. 3/92.

iv) Noise levels:

The mining does not include even drilling and blasting. Transportation from mine site to road head will be done by manually or by mules. The road is about 1.5Km. from the proposed working site. Hence, noise level due to transportation is negligible.

v) Vibration levels (due to blasting):

As proposed mining method is opencast semimechanised without drilling and blasting, hence, impact on this aspect will be insignificant.

vi) Water regime:

Surface Water:

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 toe walls along the soil and interburden dumps.

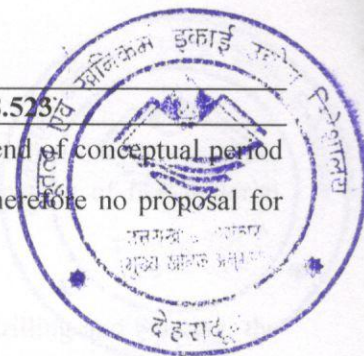
Ground Water:

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

Treatment and disposal of water from mine:

Mining activities will not touch the water table. However due to intermittent rainy shower, some quantities of water will accumulate in the pit & it will be pumped out and channelise through the slopes.

No toxic elements will be preserved in the water hence treatment of water is not required.



Measures for mining adverse effects on water regime:

The mining has been proposed in such a way that there will be no adverse effect on water regime. Toe walls will be provided along the backfilled pits. This will prevent escaping of fine material along with the rain.

Protective measures for ground vibration/air blast caused by blasting:

As the proposed method of mining is open cast semimechanized without drilling and blasting, the impact on this aspect is negligible.

Measure for protecting historical Monuments and for rehabilitation of human settlement likely to be disturbed due to mining activity:

No such feature exists within the mining would be confined to the agricultural land which is far away from the villages. Due to non mechanisation, drilling and blasting there is no adverse effect on this account.

Socioeconomic beneficeate out of mining:

The scale of operation is limited with 90% local employment. Hence some benefit to the local community will occur on this aspect. Besides the direct and indirect employment, better communication will also add to the positive contribution.

Proposed mine working is in agricultural land and residential area is far away, therefore, no impact of mining on human settlement shall be arising.

7.0 NOC from land owners should be provided along with Khasra Map for the area where mining proposed for five years:

The NOC obtained from land owners along with Khasra Map where mining is proposed for next five years is enclosed as **Annexure No. 08**.

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CONSENT LETTER/UNDERTAKING/CERTIFICATE FROM THE LESSEE



01. Mining Plan in respect of **Khatigaon & Rangdeo Soapstone Deposit** over an area of **8.529** ha in village Khatigaon & Rangdeo, Distt-Bageshwar (UK) Notification No. 844/VII-1/2015/68-ख/2015, date, 31.07.2015 and Notification No. 1589/VII-1/2015/68-ख/2015, Date 07.10.2015 has been prepared by **RQP** (Shri Pankaj Pande).

This is to request the Director, Geology and Mining Department, Uttarakhand Dehradun to make any further correspondence regarding any correction of the Mining Plan with the said recognized person as his address below:

Address of RQP:

: B1/21, Sector-B, Aliganj, Lucknow-2206024
 Phone No : 0522-4011565, Mob. 9415102339,
 Fax No : 0522-2338878
 E mail : pankaj_pande@rocketmail.com,
 : sahajsahyog990@gmail.com
 Website : www.sahajsahyog.org

I, hereby undertake that all modifications/updating as made in said Mining Plan by the said recognized person be deemed to have been with all our knowledge and consent and shall be acceptable on us and binding in all respects.

02. It is certified that Progressive Ming Closure Plan (**Khatigaon & Rangdeo Soapstone Deposit**) of Shri Deewan Singh Papola over an area of 8.529ha complies with all statutory rules, regulations, orders made by Central or State Govt., statutory organization, Court etc. which have been taken into consideration & wherever any specific permission is required the applicant will approach the concern authorities.

The information furnished in the Progressive Mine Closure Plan is true & correct to the best of my knowledge and records.

03. "The Provision of **Mines, Act, Rules and Regulations** made there under have been observed in the Mining Plan over an area of 8.529 hectares in Bageshwar district in Uttarakhand state belonging to **Khatigaon & Rangdeo Soapstone Deposit**, and where specific permissions are required, the applicant will approach the **D.G.M.S.** Further, standards prescribed by **D.G.M.S.** in respect of miners' health will be strictly implemented".

04. I authorize RQP Shri Pankaj Pande to submit mining plan for approval and collect the approved copy of mining plan on my behalf.

Place: Bageshwar

Date:

D. S. Papola

Sign of Applicant:


(Deewan Singh Papola)

(सुनील पंवार)
उप निदेशक राजन
भूतत्व एवं खनिकार्य विभाग
उद्योग **CERTIFICATE FROM RQP**



The provisions of the **Uttarakhand Minor Mineral Concession Rule, 2001** have been observed in the preparation of the Mining Plan of Mining for **Khatigaon & Rangdeo Soapstone Deposit** over an area of **8.523 hectares** of **Shri Deewan Singh Papola** in Village Khatigaon & Rangdeo, Distt-Bageshwar (UK) State and whenever specific permission are required, the lessee will approach the concerned authorities of **Director, Geology and Mining Department, Dehradun**.

The information furnished in the Mining Plan is true and correct the best of our knowledge.


(PANKAJ PANDE)
RQP/DDN/086/95/A

Date:

Place: Lucknow

PROGRESSIVE MINT CLOSURE PLAN



PMCP

1.1. Purpose of the Plan

The purpose of this plan is to provide a framework for the closure of the progressive mint.

The plan is to be implemented in accordance with the provisions of the Progressive Mint Act, 1954.

1.2. Scope of the Plan

The plan covers the closure of the progressive mint, including the transfer of assets and liabilities to the Government of India.

1.3. Objectives of the Plan

The objectives of the plan are to ensure the smooth closure of the progressive mint.

1.4. Implementation of the Plan

The plan is to be implemented in accordance with the provisions of the Progressive Mint Act, 1954.

The plan is to be implemented in accordance with the provisions of the Progressive Mint Act, 1954.

1.5. Monitoring and Reporting

The plan is to be implemented in accordance with the provisions of the Progressive Mint Act, 1954.

1.6. Conclusion

The plan is to be implemented in accordance with the provisions of the Progressive Mint Act, 1954.

PROGRESSIVE MINE CLOSURE PLAN



1.0 Introduction:

Shri Deewan Singh Papola
Village Papoli, Post-Kafli
Tehsil & District: Bageshwar (Uttarakhand)
Cell No. 91941131757

b). Location:

The applied area falls in village in Khatigaon & Rangdeo & it is about 40kms from Bageshwar via Bageshwar-Reema-Pachar PWD road. The area can also be approached from Bageshwar via Kothmunia-Dharamghar. From Dharamghar the is about 34kms & it is approach PWD metalled road. The Location Plan is shown in **Plate No.1.**

c). Extent of Lease area:

8.523 Ha.

d). Type of lease area:

The existing land use pattern is given below:

Sl. No.	Type of land use	Area (Ha.)	Village, Tehsil, District State
1.	Agricultural land	8.529	Khatigaon & Rangdeo Distt-Bageshwar
2.	Gazing land	-	
3.	Waste land	-	
	Others ¼lkoZtfud Hkwfe½	-	
	Total	8.529	

1.1. Reasons for Closure:

At present there is no foreseeable reason regarding closure of mine.

The progressive mine closure plan is being submitted, under provisions of Uttarakhand Minor Mineral Concession Rule, 2001.

1.2. Statutory Obligations:

As per the provisions of Uttarakhand Minor Mineral Concession Rule, 2001 for every fresh grant of mining lease, a progressive mine closure plan is required to be submitted in compliance of the aforesaid rule. The progressive mine closure plan is being in accordance with the guidelines issued by DGM, Dehradun vide letter No. 1762/खनन/गौण खनिज-माइनिंगप्लान/26/भ0खनि0ई0फ/2015-16 दिनांक 31.10.2015

1.3. Closure plan preparation:

a). Name and address of the Applicant:

Shri Deewan Singh Papola

Village Papoli, Post-Kafli

Tehsil & District: Bageshwar (Uttarakhand)

Cell No. 91941131757

b). Name, address & Registration No. of R. Q. P.

Pankaj Pande

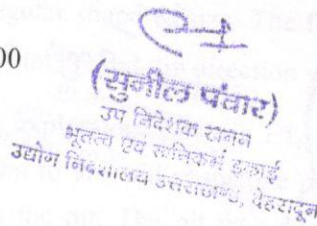
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PANKAJ PANDEY
RQP/DDN/086/95/A

B-1/21, Sector – B, Aliganj, Lucknow-226024.
Tel. No. 0522 – 4011565, Fax No. 0522-2328900

E-mail ID : sahasahyog990@gmail.com
pankaj_pande@yahoo.com

Registration No. RQP/DDN/086/95/A

Validity up to February 14, 2021



2.0 Mine Description:

2.1 Geology:

i) Topography:

The applied area comprises of terraced agricultural fields showing undulating topography. The area comprises of a ridge trending NE-SW having a sinuous shape. The ridge within the applied area has adjoining south-Eastern and Northern to North-Eastern slopes. The higher levels are found towards the western side of the area near boundary pillars C-D whereas the lowest horizons within the area is found towards the north eastern side. The highest & lowest levels found in the area are of RL 1703m. and RL 1636m. respectively. The surface plan showing topographical features is given in **Plate No. 3**.

ii) 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:

Berinag Quartzite

Unconformity

Gangolihat Dolomite

Dolomite and dolomitic limestone with algal structures. Magnesite with minor talc/talcosse phyllite 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:

The area only shows part of carbonates of Gangolihat Dolomite sequence. The local stratigraphy shows that the mineralized zone lies between upper & lower carbonates as below:

Alluvial Cover:

A thin layer of brownish colour of soil exists in the whole area. The average thickness of soil is 0.70m.

Soapstone bearing with Magnesite:

The soapstone mineral in Kumaon Himalaya is an alteration a products magnesium bearing minerals, Soapstone occurs as pocket type massive and some times confined to the upper part of the magnesium

bearing zones. The mineral body occurs in irregular shape & size. The foliation plane of soapstone trending 85° N to 88° N, amount of dip varies 30° to 33° and dip direction varies 5° N. to 8° N. The area was explored with the help of seven exploratory pits viz E1, to E7. During prospecting period the pits were exposed up to depth of 4.0m to 9m and soapstone persists in depth. Soapstone bearing with low grade magnesite was seen in the pit. The pit was dug at different levels in the agricultural field & soapstone encountered in the pits which is further persists in depth as observed during prospecting period. The soapstone occurring in this area is weakly foliated, fine grained off white in colour with its characteristic soapy feel.

The Geological Plan is shown in **Plate No.4**.

2.2 Reserves:

The summary of mineral reserves is summarised below:

	UNFC Code	Quantity in million tons	Grade
A. Total Mineral Reserve			
Proved Mineral Reserve	111	0.478656	Nil
Probable mineral Reserve	122	0.101242	Cosmetic paper
B. Total Remaining Resources			
Feasibility mineral Resource	211	0.027127	Nil
Prefeasibility mineral resource	222	0.035233	Cosmetic Paper
Measured mineral resource	331	Nil	Nil
Indicated mineral resource	332	Nil	Nil
Inferred mineral resource	333	0.107256	Cosmetic paper
Reconnaissance mineral resource	334	Nil	Nil
Total Reserves + Resources		0.749514	

2.3 Mining Method:

(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 opencast semimechanised mine. The overburden & interburden shall be removed deployment of an excavator & its deployment shall be on hire basis as & when required.

The soapstone shall be extracted with deployment of an excavator as well as manually with the help of crow bar, chisels, pickaxe, hammers, spade and different grade of soapstone will be stacked separately near the mining faces. Soapstone is soft mineral; therefore no drilling & blasting shall be required. The soapstone shall be dressed manually & stacked separately. No further beneficiation shall be undertaken during first five years. The 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 through manually and transported to Haldwani.

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

Mining shall be carried out in two pits viz pit-I & pit-II.

It will be open cast semi-mechanised mine. Average thickness of soil has been considered as 0.50m & it shall be stacked separately.

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BOD/DIN/0861051A

An excavator shall be deployed for the removal of overburden & interburden & its deployment shall be 3-4 days in a week.

Bench height will be kept 3.0m width of benches shall be kept 3.0m with face slope 70° to 75°. Development work will be construction of foot track to different working benches and removal of the top soil. Seasonal nalla & habitation are for away from proposed mining pits. However 60m long wire crated wall having width & height 3.0m & 3.0m shall be provide along the nalla in pit I for the protection of nalla by mining activities & siltation of waste dump. Mining shall be carried out by using an excavator as well as conventional hand tools without adoption of drilling & blasting & habitation is for away from the proposed mining area, therefore there shall be no adverse impact on habitation due to mining activities.

2.4 Mineral beneficiation:

No mineral beneficiation will be under taken for next five years. The soapstone will be dressed manually and different grade of soapstone stacked separately, which will be filled in to the bags and dispatched to Haldwani.

3.0 Review of implementation of mining plan / scheme of mining including five years progressive closure plan up to the final closure of mine:

This is fresh grant case of mining lease; it is therefore premature to make any comments about review of implementation.

4.0 Closure Plan:

4.1 Mined out land:

Mining is proposed in three pits. The mining will commence from the top levels and advance towards lower levels. As the pit shall reach the maximum economical depth, backfilling will commence so that terraced agricultural fields will be formed. Reclamation will be undertaken in such a manner that original land use will be restored i.e. terraced agricultural fields. The soil & interburden to be generated space available for backfilling, quantities of soil & interburden to be backfilled & balance quantities to be dumped is given below:

Pit I:

Year	Quantities of soil + interburden to be generated & dumped	Space available for backfilling (Cum)	Dimension of backfilled pit (m)			Quantities of soil+ interburden to be used in backfilling (Cum)	Balance quantities to be dumped (Cum)
			L	W	D		
I st	1782	0	0	0	0	Nil	1782
II nd	5849	0	0	0	0	Nil	5849
III rd	6206	10260	45	38	10	6206	0
IV th	7577	7800	50	26	8	7577	0
V th	8063	8208	36	38	8	8063	0
Total	29477	26268				21846	7631

Pit II:

Year	Quantities of soil + interburden to be generated & dumped	Space available for backfilling (Cum)	Dimension of backfilled pit			Quantities of soil+ interburden to be used in backfilling (Cum)	Balance quantities to be dumped (Cum)
			L	W	D		

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I st	8122	0	0	0	0	0	0
II nd	9262	11400	50	38	6	9262	0
III rd	10880	18240	76	40	6	10880	0
IV th	14285	17100	95	30	6	14285	0
V th	14460	16200	90	30	6	14460	0
Total	57009	62940				48887	8122

The average depression during third year with respect to original topography shall be 2.0m. The area backfilled during first five year is shown in **Plate Nos. 5 to 9**.

The area already degrades due to mining & likely to be used during next five years is given below:

Activities	Area already used (Ha)	Area likely to be used in mining during next five years (Ha)
Pits & quarries	0.24	2.02
Foot track/ PWD	0.014	0.038
Soil stack	0	0.034
Interburden dump	0	0.038
Backfilled pit	0	0
Total	0.254	2.13

(A) **Mining:**

Sl. No.	Activities	Area(ha)
1.	Area already broken up	0.24
2.	Area already backfilled /reclaimed	0

Sl. No.	Activities	Area(ha)
1.	Additional area proposed to be broken during first five years	2.02
2.	Additional area proposed to be backfilled / reclaimed	0

(B) **Dump:**

Sl. No.	Activities	Area(ha)
1.	Area already covered by dump	Nil
2.	Additional area to be covered by soil stack	0.034
3.	Addition area to be covered by sub soil stack	Nil
4.	Additional area to be covered by interburden dump.	0.038
5.	Dump area to be covered by protective measures	Nil

(C) **Plantation:**

Sl. No.	Activities	Area(ha)
1.	Area already covered under plantation	-
2.	Area proposed to be covered under plantation in next five years (out side the area)	-
	Total	-

4.2 **Water Quality Management:**

No surface or ground water body exists with in the area. Seasonal drainages exist within the area & flows from west-east & confluence other drainages which flows south-west to north-east directions.

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The mining is being carried in hilly region. The problem of ground water pumping will not arise. Rain water will not accumulate in the mining pit & it will be channelised along the slopes. The mining work will usually be confined within gullies driven from north east to south & a ledge of about one meter height will be kept on the outer edge so that in discrete water flow will be avoided. The interburden and top soil will be used in backfilling. Further no significant impact on water quality is anticipated as material exposed will be magnesite and dolomite. Both of these very feebly react with water that too when water becomes acidic. Even of reaction takes place it gives rise to increased temporary hardness of matter. Water is being supplied from the spring. No hydrological studies have been carried out in the area.

4.3. Air Quality Management:

No doubt the mining in this remote area will deteriorate the air quality. The base line values are too low due to remoteness of the area with our past experience. In this kind of terrain, the SPM, SO₂ and NO_x will always be below 100, 10 & 10 microgram per meter cube respectively. Air quality monitoring shall be conducted once in a year as per CCOM'S circular No 3/92.

4.4. Waste management:

5. The top soil having average thickness 0.50m lies all over the applied area. The top soil will be scrapped manually, stacked separately In pit I top soil & interburden shall be stacked for first two years & from third year onwards all the quantities shall be used in backfilling. In pit II, topsoil & interburden shall be dumped for first year & from second year all quantities shall be used in backfilling. The low grade magnesite boulders are high silica percentage and hence the same is treated as interburden and will be dumped separately. No mineral reject will be produced during next five years.
6. The quantities of soil and interburden material to be generated during first five years is given below:

Year	Pit I Interburden (cum)	Pit II Interburden (cum)
I	2995	1260
II	2827	1539
III	3305	2007
IV	3663	14141
V	4185	15293
Total	16975	34240

4.5 Top Soil Management:

The top soil material will be dumped towards slope side of working pits. In pit-I top soil dump during first two years shall be dumped towards slope of working pits. Dumping shall be carried out in single terrace & slope of dump shall be kept 37°. From third year onwards all the quantities shall be used in backfilling therefore no proposal has been envisaged for separate dumping of top soil. 30m long toe wall having width & height 1m shall be made at the base of dump for its stabilization. In pit-II top soil stack during first year shall be dumped towards slope of working pits. Dumping shall be carried out in single terrace & slope of dump shall be kept 37°. From second year onwards all the quantities shall be used in backfilling therefore no proposal has been envisaged for separate dumping of top soil. 30m long toe wall having width & height 1m shall be made at the base of stack in pit-I and pit-II for its stabilization.

The Quantities of soil to be generated to as below:

Year	Pit I Top Soil (cum)	Pit II Top Soil (cum)
------	-------------------------	--------------------------

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I	249	180
II	282	200
III	330	218
IV	366	233
V	419	312
Total	1646	1143



4.6. Tailing Dam Management:

No tailing dam is proposed in the soapstone mine.

4.7. Infrastructure:

No infrastructure facilities like aerial ropeway, conveyor belts, water treatment plant, transport & water supply sources are present with in the lease area. Therefore no utilization & their physical stability & maintenance will be required. Also no infrastructure facilities like telephone line, water pipe line sewer line, gas pipe line, electrical cables, culvert, bridges are not existing with in the lease area. So question does not arise for their restoration. A foot track passed with in the lease area & applicant shall maintain the foot track during PMCP period.

4.8. Disposal of Mining Machinery:

Mining shall be carried out open cast semi-mechanized without adoption of drilling & blasting. For the removal of overburden, the excavator shall be deployed during working hour on regular basis. Mining activity shall be abandoned during every year in the month of 15th June to 15th September.

4.9. Safety and Security:

1. Each worker shall be provided with helmets & safety shoes.
2. Safety belt shall be provided to workers an working the top benches.
3. Hanging of loose boulders shall be removed from mine faces.
4. The mining area shall be properly fenced to avoid any inadvertent entry in to mining pit.
5. Warning boards & working hours shall be displaced at conspicuous places.
6. Mining shall be carried out thought the formation of benches & slope of faces shall not exceed 70°.
7. There will be only one opening entry of mine which will have a manual gate & barricade under supervision of one Chowkidar.
8. Mining shall be carried out through the formation of four benches of each 3.0m height. Mining pit shall reach maximum economical depth backfilling shall be carried out to restore maximum original topography of the area. The soil & interburden shall be backfilled, leveled it & used for agriculture purpose.

4.10 Disaster Management and risk assessment:

The mining is proposed in a gentler agricultural field. The mining will go up to the economical depth of 6m. and there after backfilling will commence to restore the topography of the area. The mining faces shall be dressed properly because any hanging boulders/loose material may create fatal accidents to the laborers while working in the pit.

The area lies seismic zone IV, therefore precautionary measures shall be adopted. Tin shaded wooden houses shall be constructed in place of cemented houses in and around the area & lessee shall provide the sufficient amount of funds for these activities. In the land slide prone zone area, fast growing soil

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binding species shall be planted & cemented bunds shall be made at the lower side so that minimum damage could be observed during land slide period.

Some of the aspects to be included in emergency plan are as follow:

Organisation-details of command structure, working systems, implementation procedures, emergency control centre & have of incident controller, site main controller, their duties & other key personnel.

- Communication centers & persons involved, call signs & list of telephone numbers.
- Availability of special emergency equipment e.g. heavy lifting gear, bulldozers, trucks, special fire fighting equipment.
- Details of voluntary organizations with names of organisers, telephone numbers, resources etc.
- Humanitarian arrangements e.g. transport evacuation centers, emergency feeding, treatment of injured, first aid, ambulances etc.

No other accidents like subsidence of flood, tailing dam failure etc. shall be observed during mining in hilly region.

4.11 Care & maintenance during temporary discontinuance:

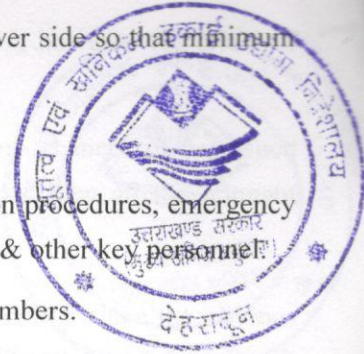
During monsoon period (i.e. from June to September) every year mining operations shall be temporarily discontinued and all the quantities soil & interburden shall be temporarily backfilled into mining pits levelled it & make it use for agriculture purpose. The backfilled mining pits shall properly fenced to avoid any accident. Local person shall be employed to supervise the area & broken walls, check dams, linear drain, wire fencing shall be repaired immediately.

5.0. Economic repercussions of closure of mine and manpower retrenchments:

All the workers being employed are contractor labours.

Any industry will provide direct and indirect employment. The local residents will earn tremendous amount of money due to mining activities. It will change their life style. Due to closure of mine, it will create very negative impact on the economy of the workers for their survival. Those earning good money will get some occupation for survival of their families. The literate workers will move here and there for the search of job. In the overall view the closure of mine will give very bad impact on the society and surrounding areas.

- 5.1 Mining shall be carried out through contractor in the proposed area & likely to be continued in the same manner. So no retrenchment of manpower is envisaged. Status of joining the family business back on the event of closure of mine & will depend on the circumstances prevailing at that time. However, chances of joining the family business back will not be so bright.
- 5.2 The compensation to given will depend on the labour laws prevalent at that time. Since 80% employees will be contract. They will not be compensated. Other will get benefit of compensation as per labour laws, while the staff will get only notice pay.
- 5.3 There are some satellite occupations connected to mining operations at present with in a distance of 5km. e.g. workshop/truck repair shops, tyre shops, general stores, small restaurants, fruit shops, tea



shops etc. Such business at the time of closure is likely to get closed down, however the effect of single mine closure may not be felt at all.

5.4 Since the lessee will hand over the lease area to State Govt., there are no chances of continued engagement in the backfilled/reclaimed status. Once the lease is determined then all the remnant activities will come to an end barring the period of reclamation period.

5.5 The closure of mine will have grave repercussion on the expectations of society since the obvious advantages received will cease & the closure will directly affect their livelihood. Land owners will cease to get compensation in lieu of surface rights. The local habitant in general will feel insecure as their education, health standards & life expectancy will be badly affected.

6.0 Time Scheduling for abandonment:

It is proposed in the mining plan that mining will open from upper levels and subsequently advance towards lower elevations so that concurrent reclamation will be under taken to restore the topography of area.

The backfilled area will be again use for agricultural purposes.

Toe walls having width & height 1.0m will be made at the slope base of top soil stack & interburden dump. Retaining wall having width & height 1.0m respectively will be made along the base of backfilled pit. The year wise schedule of completion of quantities is given below:

Activities	YEAR				
	I	II	III	IV	V
Toe wall at the base of soil stack	20m	10m	Nil	Nil	Nil
Retaining wall along backfilled pit	Nil	50m	100	100	100
Backfilling (Cum)	Nil	11400	28500	24900	24408
Plantation (No. of sapling, out side the area)	40	40	40	40	40
Toe wall at the base of interburden dump	75	30	Nil	Nil	Nil

The tentative cost of implementation of activities during first five years is given below:

Sl. No.	Activities	Year					Total amount on Rs.
		I	II	III	IV	V	
1.	Retaining at the edge of backfilled wall pit (Rs. 50/m)	Nil	2500	5000	5000	5000	17500
2.	Plantation (Rs. 45/- sapling out side the area)	1800	1800	1800	1800	1800	9000
3.	Backfilling (Rs. 40/Cum)	Nil	456000	1140000	996000	976320	3568320
4.	Toe wall at the base of soil stack @40/m	800	400	Nil	Nil	Nil	1200

PANKAJ PANDEY

5.	Toe wall at the base of interburden dump @40/m	3000	1200	Nil	Nil	Nil	Nil
	Total						

7.0 Abandonment Cost:

The tentative cost for implementation the protective and rehabilitation measures, the proposal given in the mining plan for first five years period is as under:

Activity	Year						Rate In Rs.	Amount In Rs.
	I	II	III	IV	V	Total		
i) Retaining wall at the edge of backfilled pit (m)	Nil	50	100	100	100	350	50/m	17500
ii) Plantation (no. of sapling out side the area.)	40	40	40	40	40	200	45/sapling	9000
iii) Reclamation (Cum)	Nil	11400	28500	24900	24408	89208	40cum	3568320
iv) Toe wall at the base of soil stack	20m	10m	Nil	Nil	Nil	30	@ Rs. 40/m	1200
Total								3596020


Pankaj Pandey
PANKAJ PANDEY
 RQP/DDN/086/95/A

Annexure IV
National Park-Wildlife NOC

Dated : - 07/03/17

TO WHOM IT MAY CONCERN

It is certified that no any National Park/Wild Life Sanctuary or any other Eco Sensitive Area Lies. Within the 15km radius of the proposed mining lease Khatigawn, Rangdev Soap Stone Mine over an area measuring 8.529 hect. in favour of Shri Diwan Singh Papola, Village- Kafli, P.O. Papoli, Tehsil Dugnakuri, Distt. Bageshwar, Uttarakhand. This is for your kind information and further necessary action.


Divisional Forest Officer
प्रभागीय वनाधिकारी
District Bageshwar
बागेश्वर वन प्रभाग, उत्तरांचल
Uttarakhand


Annexure V

NOC from the Forest Department

Dated : —07/03/17

TO WHOM IT MAY CONCERN

It is certified that no any forest land falls within the proposed mining lease Khatigawn, Rangdev, over an area measuring 8.529 hect. in favour of Shri Diwan Singh Papola, Village- Kafli, P.O. Papoli, Tehsil Dugnakuri, Distt. Bageshwar, Uttarakhand. This is for your kind information and further necessary action.


Divisional Forest Officer
प्रभागीय वनाधिकारी
बागेश्वर जिला प्रभाग, बागेश्वर
District Bageshwar
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