

COMPLIANCE OF TORs

S. NO.	CONDITIONS	COMPLIANCE
1	All documents including approved mine plan (eco friendly mine plan), EIA report and public hearing should be compatible with one another in terms of the mine lease area production levels, waste generation and its management and mining technology.	Agreed & application has been sent for to conduct Public Hearing
2	The terms and conditions imposed, if any, by the Competent Authority in the State Government while granting mining lease/permit/contract should be built into the mine working (length and breadth of the river stretch), mode of working shift, transportation of mineral, restriction, if any imposed for working etc.	All conditions have been complied with.
3	Involvement of forestland, if any, in the project and status of forestry clearance should be given	All clearance has been obtained
4	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.	Study area has been kept as 10 km Radius. Waste generation etc is for the entire lease period.
5	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary and national park, migratory routes of fauna, water bodies, human settlements and other ecological features.	These have been included in the EIA report
6	Land use plan of the mine lease area should be prepared to encompass-pre-operational, operational and post operational phases.	Refer Table no. 4.5 page 27 of EIA.
7	Impact of the project on the wild life in the surrounding and any other protected area and accordingly detailed mitigation measures required should be worked out with cost implications.	There is no wild life sanctuary in the study area as such it is not affected. It is very small project.
8	The vegetation in the RF/PF in the study area, if any, should be indicated.	No Vegetation in the RF/PF
9	A study shall be got done to ascertain the impact of the mining project on wild life of the area including aquatic life.	Wild life & aquatic life in the area has been studied &

		impact indicated in EIA report.
10	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger/Elephant Reserves (existing as well as proposed) within 10 km of the mine lease should be clearly indicated supported by a location map duly authenticated by Chief Wildlife Warden, Necessary clearance from the Chief Wildlife Warden for operating the mine within 10 km of the National Park/Sanctuary, if any, should also be obtained and furnished.	There are no such sites in the study area
11	A detailed biological study for the study area (core zone and buffer zone (10 km radius of the periphery of the mine lease) including the aquatic fauna in the river line system shall be carried out. Details of flora and fauna, duly authenticated, separately for core ad buffer zone should be furnished based on 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 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 project cost.	Complete study has been done & indicated in EIA report. There are no species which fall in Schedule I of Wild Life Act (1972) in the study area. Thus no special mitigation measures are required.
12	Impact of the project on land use including change of river course, if any, should be given.	Project does not affect the general land use nor changes course of any river as it is on a hill slope.
13	The proponent shall specify distances and impact on the nearby water sources and the irrigation/water supply schemes upstream ad downstream.	A small ropa khud is adjoining the mining site, as such there will be no impact in this respect.
14	Siltation increase due to mining in water sources shall be obtained.	No mining is done in water sources. It is a hill slope.
15	Photographs of mining area and adjoining lands and video graphic DVDs of the site feature and the entire area.	Photographs given in EIA. DVD is also sent with EIA

		report and it shall be displayed at the time of presentation.
16	No mechanized mining/basting shall be carried out.	Agreed No mechanized mining will be done
17	Impact on topography, drainage, agriculture fields, cattle fields, wildlife, water logging leading to water borne diseases, if any, it may also be shown whether it will lead to change of water course of river flow dynamics, if any.	No water body in the area is being disturbed. No action is required as it is a small area on a hill slope.
18	Collection of one season (non-monsoon) primary baseline data on ambient air quality (PM ₁₀ SO ₂ and NO _x), water quality, noise level, soil and flora and fauna, site-specific meteorological data should also be collected. The location of the monitoring stations should be justified. Date wise collected baseline AAQ data should from part of EIA and EMP report. The mineralogical composition of PM ₁₀ particularly for free silica should be given. There should be at least one AAQ monitoring station within 500m of the mine lease in the pre-dominant downwind direction.	Done. See table 6.3 page 54.
19	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, locate of sensitive receptors, if any and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	Modeling has been done through ISCST-3 Results are given on page 60 of EIA report. There is no point source of emission. Fugitive dust due to plying of vehicles has been considered.
20	The water requirement for the project, its availability and source to be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.	Water requirement & details have been given in EIA report.
21	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the project should be provided.	Agreed & noted
22	Impact of the project on the water quality should be	Water quality is not

	assessed and necessary safeguard measures, if any required should be provided.	affected as no waste is thrown anywhere.
23	Information on site elevation, working depth, groundwater table should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	Site elevation & working depth has been given in EIA report.
24	Quantity of solid waste generation, if any, should be estimated and details for its disposal and management should be provided.	Details of solid waste given in EIA report.
25	Impact on local transport infrastructure due to the project should be evaluated. Projected increase in truck traffic as a result of the project in the present road network (including those outside the project area) and whether it is capable of handling the increased load should be estimated. Arrangement for improving the infrastructure, if contemplated including action to be taken by other agencies such as State Government, if any, should be covered.	Given in chapter 6 of EIA report.
26	Details of infrastructure facilities to be provided for the mine workers should be furnished.	No special infrastructure required. They will be from local villages. However septic tank has been provided for them at site.
27	Phase-wise plan of greenbelt development, plantation and compensatory forestation clearly indicating the area to be covered under plantation and the species to be planted should be provided.	Refer chapter-7 of EIA report trees compatible to the area and having thick foliage.
28	Occupational health impacts of the project activity should be anticipated and reported and proposed preventive measure indicated. These along with details of pre-placement medical examination and periodical medical examination schedules and medical facilities proposed to be provided should be incorporated in EMP.	Refer chapter-7 of EIA report Para 7.2
29	Measures of socio economic influence to the local community, proposed to be provided by project proponent should be spelt out. As far as possible, quantitative dimension should be given.	Refer chapter-6 of EIA report Para 6.2.6
30	Detailed environment management plan to mitigate	Refer chapter-7 of

	the environmental impacts, specific safeguard measures to control PM ₁₀ as well as pollution due to transportation should be given.	EIA report
31	Public hearing points raised and commitment of the project proponent on the same along with time action plan to implement the same should be provided.	Agreed
32	Details of litigation pending against the project, if any, with direction/order passed by any Court of Law against the project should be given.	No litigation is pending against the project.
33	The cost of the project (capital cost and recurring cost) as well as the cost towards implementation of EMP should clearly be spelt out.	See page 69 of EIA report

Project at a Glance

1. Name of the Project	Sh. Ashwani Kumar Negi, Mining area
2. Location:	<u>Mining area:</u> Village Mauza Shiaso, Tehsil Pooh Distt. Kinnaur (HP) Khasra No. 370/1 at Mauza - Shiaso, Up Mohal-Siaso Longitude : 78°31'45" Latitude : 31°43'35" Elevation : 2576 Meters
3. Product	Crushed stone (Different grades)
4. Type of Project	Mining of Stone
5. Cost of the Project	Rs.60.0 lacs
6. Capacity	20,800 MT/ years
7. Source of Electricity	Not Required.
8. Alternative source	Nil
9. Water Consumption	0.5 KLD
For Sprinklers	0.3
Process	NIL
Domestic	0.2 KLD
10. Source of Water Supply	Ropa Khud
11. Effluent treatment:	
Process waste	Nil
Domestic Waste	0.16 KLD
Disposal	Used for Plantation & for sprinkling within the premises
12. Solid waste	Scree / Top Soil and used within mining area

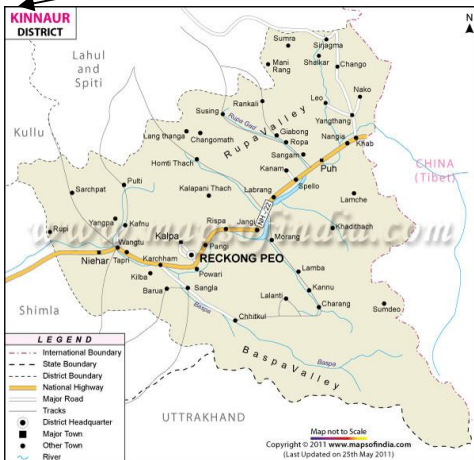
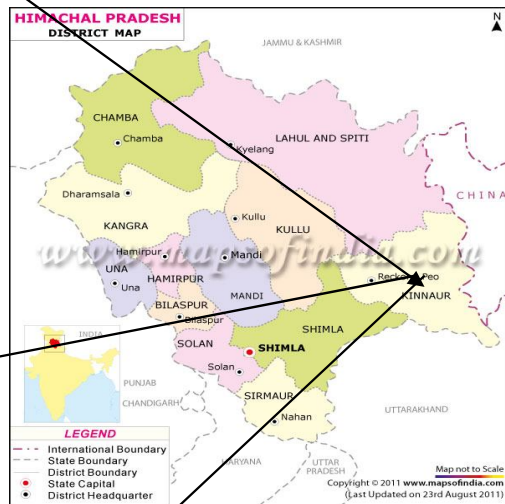
CHAPTER-1.0

INTRODUCTION

Human environment can be defined as the interaction of the surroundings in which he lives. Thus, the air he breathes the water he drinks, the temperature in which he survives and in fact all other items which have a direct bearing on human existence can be classified as environment. Usually the most important and universally accepted components of this complex system are the land, which gives him food, the water bodies which satisfy his thirst and the atmosphere which provides him air to breath. Any imbalance in any of these has a direct detrimental effect on the physical and mental health of man.

Ashwani Kumar Negi has applied for mining lease of an area of 0-63-00 hectare for mining of stone at Village Shiaso, Tehsil Pooh Distt. Kinnaur (HP) to the Industry Department, Himachal Pradesh based on a mining plan prepared by a registered Geologist. Earlier areas less than 5 hect were not required to get environmental clearance and they were mining after getting NOC from the Pollution Control Board, Himachal Pradesh. As per latest requirements they have to get Environmental Clearance according to G.O.I Notification No. 1533 dated 14-09-2006. The project was considered by the SEAC in their 22nd meeting held on 31.12.2012 & 1-01-2013 and they laid down Terms of Reference for preparation of EIA report. The committee also desired that public consultation be done by the PCB and final outcome of the same be incorporated at the time of final EIA report. Accordingly PCB has been requested separately to arrange Public hearing. Key plan of the site is attached as Fig.1.1

FIGURE – 1.1
KEY – PLAN



CHAPTER-2.0

SCOPE OF STUDY

2.1 GENERAL

This study contains various information on the Environmental factors viz-a-viz contribution of pollution, if any by the proposed unit. These factors include air, water, noise, health and welfare facilities, land use and agricultural pattern etc. It discusses the predicted impact of the proposed activities on these factors. Broadly under the scope of E.I.A. report it is envisaged:-

- To assess the present status of air, water, land, noise, biological & socio-economic components of environment.
- To identify, quantify & evaluate positive or negative impacts of various operations on different environmental components.
- To evaluate proposed pollution control measures and to suggest additional control strategies, if any, to mitigate the adverse effects.
- To prepare Environmental Management Plan for utilization and adoption of safety measures.
- To delineate future Environmental quality monitoring programme.

2.2 METHODOLOGY

Various steps involved in Environmental Impact Assessment study of the proposed project are divided into the following phases:

- Identification of significant environmental parameters and to study the existing status within the impact zone with respect to air, water, noise, soil and socioeconomic components of the environment.
- Identification/Prediction of impacts for identified activities and to study levels of impact on various environmental components.
- Evaluation of impacts after superimposing the predicted impact over the baseline quality.
- Formulation of Environmental Management Plan for implementation in the proposed project.

CHAPTER-3.0

PROFILE OF THE PROMOTORS & COMPANY

Sh Ashwani Kumar Negi, the mining lease holder, is well experienced in this trade which, he has been handling for the last more than 5 years. He is well educated, business minded, energetic and a hard worker.

CHAPTER-4.0

BASELINE SETTINGS

4.1 THE STATE

Himachal Pradesh having world's mightiest mountain ranges is one of the hilly States situated in the Northern part of India. It is blessed with some of the most spectacular and beautiful landscapes. It came into being in November, 1966 after the re-organization of States. Earlier, it was part of the combined State of Punjab. The various hill towns in the State not only provide visitors reprieve from the sultring heat of the planes, but offer beautiful scenic sites which are real treat to the eyes. Kullu and Kangra valleys offer natural beauty which is no less than Kashmir Valley. Valleys and streams, snow clad mountains and temperate forests offer tourists and sportsmen all they want.

The total area of the State is about 55,700 sq. km., with a population of more than 60 lac. The literacy rate is about 63%. The main fruits / crops in the State are apple, plum, ginger, peach, potato, forest produce, rice and wheat. The State has good deposits of minerals like gypsum, lime stone and slate etc.

Earlier the economy of the State mostly depended on tourism and a large number of tourist sites had been developed by the State. However, after the re-organization, the State has made big strides in the field of industrialization also. It has big reserve of minerals which can be used in various types of industries. Mining of minor minerals is also, therefore, an extensive Industry in the State. Industries like Cement, Electronics, Fertilizers, Pharmaceuticals and Liquor can be found in good number at different places in the State. Hydel Power in the State has given a big boost to the Industries. A number of Industrial areas have been developed in the State, where all facilities are provided to the entrepreneurs.

Parwanoo, Barotiwala, Baddi, Paonta Sahib and Raja Ka Bag are some of the important industrial areas developed by the State in the last two decades.

4.2 KINNAUR DISTRICT:

Kinnaur district is located in eastern part of Himachal Pradesh. The district is entirely hilly except few small, deep valleys in between. The district lies between 31° 06' & 32° 06' North latitudes and 77° 45' & 79° 00' East longitudes and falls in the Survey of India degree-sheet nos. 53I, 53E and 52L. The district has a total geographical area of 6401 sq km which covers about 11.5 % area of the State. The district is bounded by Lahaul & Spiti district in the north, Kullu district in the northwest, Shimla district in the southwest, Uttranchal State in the south and international border with China (Tibet) in the east. The district is divided into five tehsils namely Nichar, Kalpa, Sangla, Pooh and Moorang and one sub-tehsil namely

Hangrang. The district headquarters, Recong Peo town falls in Kalpa tehsil. For development purpose, the district has been subdivided in to 3 Community Development

Blocks viz., Nichar, Kalpa and Pooh. There are 660 villages in the district out of which 234 villages are inhabited and 426 are uninhabited. According to the 2011 census Kinnaur district has a population of 84,298, roughly equal to the nation of Andorra. This gives it a ranking of 620th in India (out of a total of 640). The district has a population density of 13 inhabitants per square kilometre (34 /sq m). Its population growth rate over the decade 2001-2011 was 7.61 % . Kinnaur has a sex ratio of 818 females for every 1000 males, and a literacy rate of 80.77 %.

4.3 PROJECT SITE

The unit in question i.e. mining area of Ashwani Kumar is located at Village Shiaso, Tehsil Pooh, District Kinnaur, Himachal Pradesh, on NH-22(Shimla-

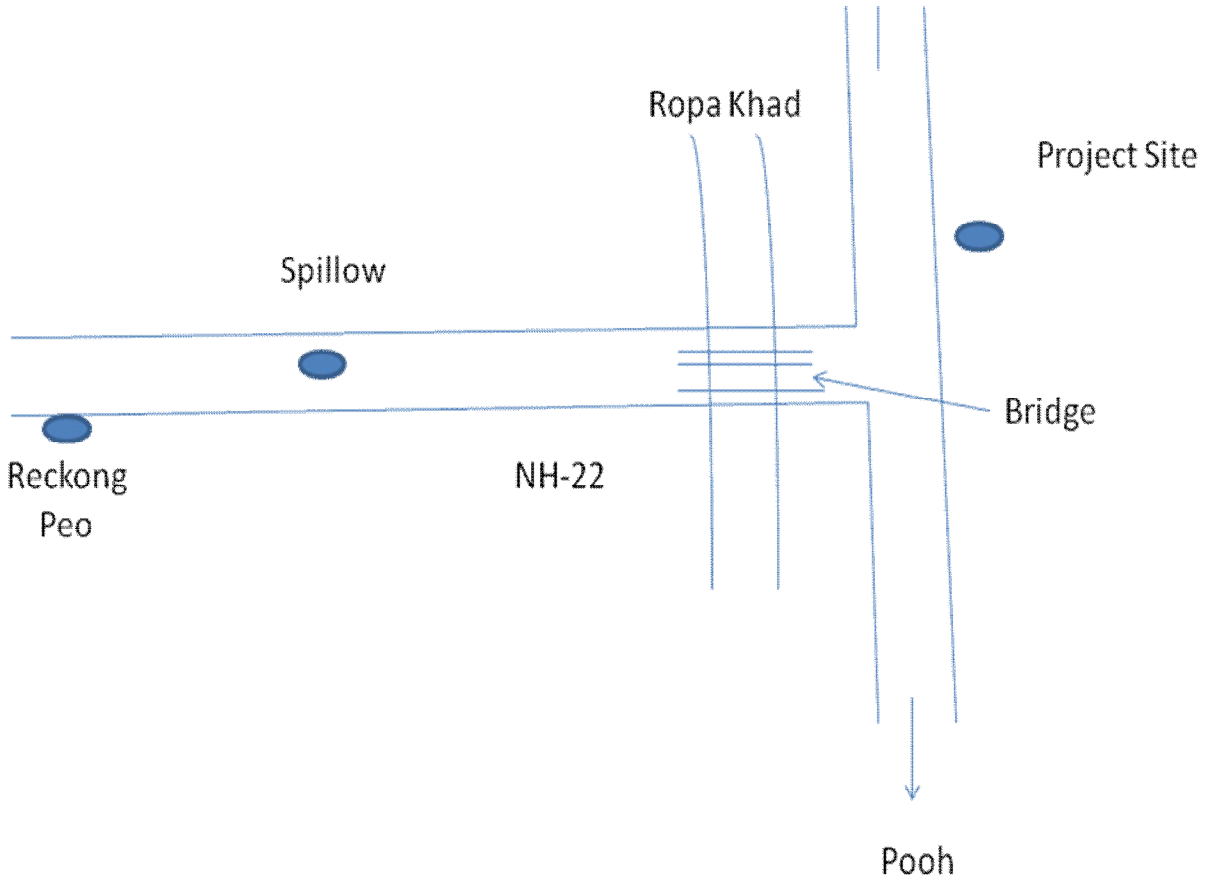
Pooh). It is about 36 Km from Recong Peo & Pooh is about 12 KM from mining site. It is at 78°31'45" East Longitude and 31°43'35" North Latitude. Its height above MSL is about 2576 mtrs. Location details of the site are shown in table **4.1**. Total area of mining is 0-63-00 hectare. Copy of Joint inspection report for site approval is attached at **ANNEXURE-I**. Location & Site plan of the unit is given in **Fig. 4.1** respectively.

PLANT SITE AND LOCATION DETAILS

TABLE 4.1

S.No	Particulars	Details
1	Location	About 300 mt from NH-22 (Shimla-Pooh)
a)	Village	Up Mohal Shiaso (mining)
b)	Tehsil	Pooh
c)	District	Kinnaur
d)	State	Himachal Pradesh
e)	Latitude	31°43'35" North
f)	Longitude	78°31'45" East
2	Elevation	2576 mts. Above MSL
3	Climatic Conditions	
i)	Tem. Min/Max	Min: -2 °C, Max: 23 °C
ii)	Rainfall : Average,	816 mm
iii)	Relative Humidity, %	Min: 19%, Max: 82%
iv)	Wind speed, Kms/hour	12-15 Km (approx.)
4	Nearest highway	National Highway-22 (Shimla-Pooh)
5	Nearest railhead/Railway station	Shimla (235 km)
6	Nearest airport	Shimla (235 km)
7	Nearest Major City	Recong Peo (About 36 km)
8	Nearest Major Settlement	Pooh (About 12km)
9	Features within 10 kms	
i)	Defence installations	Nil
ii)	Archaeological important places	Nil
iii)	Wild life/ Elephant & Tiger reserve sanctuaries	Nil
iv)	Reserved/Protected forest/National Park	No reserve/protected forest exist in mining site
v)	Industries	Nil
vi)	Rivers	Ropa Khud
vii)	State boundary	Nil
vii)	Hill ranges	Dhauladhar

Figure 4.1
LOCATION PLAN



4.4 CLIMATE:

Kinnaur due to its geographical situation has a long winter from October to May the snowy season and a short summer from June to September. From April to May is spring and from September to October is autumn. It has two distinct climatic zones , the wet and the arid .The temperature during Winter season vary from -1°– 2° in Peo and at Morang the temperature of July and august ranges from 20 °C to 23 °C the October temperature is about 10 °C at 3500 meters, the summer temperature appears from 13 °C to 3 °C. May and October have very low humidity and are generally the drought months. Clouding is more heavy, persistent and prolonged in the long winter season .There are strong winds in the winter months .

4.5 TEMPERATURE:

The area is hilly with steep slopes and has Semi-arid climate. December and January are the coldest months whereas in May and June the heat is quite intense. The wettest months of the seasons are July, August and September. The temperature varies from about -2°C minimum to about 23°C maximum during the year. Monthly average temperatures of the area are given in **Table-4.2**

TABLE - 4.2**MONTHLY AVERAGE TEMPERATURE**

Month	Mean Temperature °C	
	Daily Minimum	Daily Maximum
Jan	0.3	5.4
Feb	4.6	12.2
Mar	13.5	20.1
Apr	17.9	23.5
May	19.2	26.0
Jun	20.1	27.8
Jul	21.0	27.1
Aug	22.0	26.5
Sep	22.4	22.8
Oct	16.9	22.0
Nov	9.8	13.9
Dec	1.9	8.1

Source: IMD HP

Period: 2008-2012

4.6 RAINFALL

The district receives precipitation in the form of rainfall, mainly during the monsoon period from July to September. During winter the rains are scarce and extend in between 15th December to 15th February. The average rain fall for last five year is given in **table 4.3**

TABLE - 4.3
MONTHLY AVERAGE RAINFALL

RAINFALL (mm)	
January	87.8
February	89.6
March	48.8
April	25.7
May	49.8
June	36.9
July	58.7
August	79.9
September	127.4
October	9.8
November	8.6
December	26.1
TOTAL	649.1

Source: Meteorological Department HP
Period: 2008-2012

4.7 HUMIDITY

In summer months of April, May and June, which is the driest part of the year, the afternoon humidity comes down to around 23 % to 32 % while the relative humidity during monsoon months goes upto 75 % to 85 %. Monthly humidity is given in **Table-4.4**

TABLE - 4.4
MONTHLY AVERAGE RELATIVE HUMIDITY

Months	Relative humidity (%)	
	830*	1730*
January	61	56
February	50	44
March	32	23
April	47	40
May	45	38
June	61	50
July	72	52
August	85	75
September	69	55
October	59	56
November	38	41
December	44	31

Source: IMD HP (2010)
*Hours IST

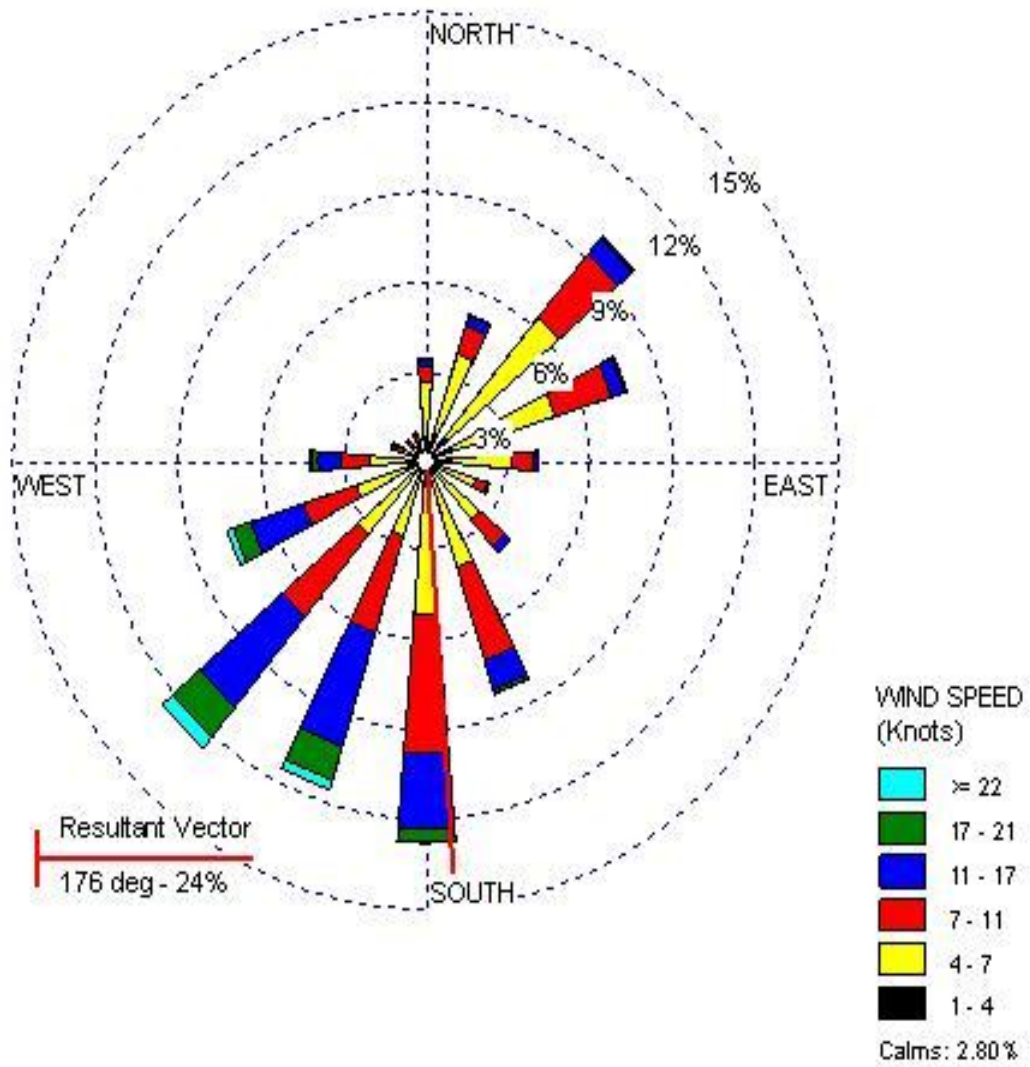
4.8 CLOUDINESS

During monsoon season skies are over cast with moderate to heavy clouds. During rest of the year, the sky is mostly clear. It is lightly clouded occasionally during winter season.

4.9 WINDS

The Wind direction in the area is mostly from South-West to North-East. During January to May the winds are quite strong while July to October is calm months. The general trends of various meteorological data from meteorological observatory are used to draw Wind Rose Diagram. The Wind rose diagram is shown in **Figure-4.2**

Fig. 4.2
WINDROSE DIAGRAM



4.10 HUMAN SETTLEMENTS

The unit is situated about 300 meters from Shiaso bridge at NH-22. The nearest major town is Sunnam at a distance of about 8 kms from the site. Pooh is at a distance of about 12 Kms.

4.11 PLACES OF TOURIST INTEREST

There are no major places of tourist interest near the site.

4.12 SOIL

Geomorphologically the district has been sub divided into the fluvial terrain, fluvio-glacial terrain, Alpines / meadows and Rocky terrain Taking into consideration the morphological and physio-chemical characteristics of the soils and general similarity in them the various types of soils observed in the district can be grouped into three major types. Type-I soil is coarse loamy, mixed in nature. This type of soil is developed from granites, highly metamorphosed genesis, schist and occurs on moderately sloping to steep lands. These soils are well drained with moderately rapid permeability. Natural vegetation exists in these soils and various crops are cultivated according to the suitability. Type-II soil is fine loamy, mixed, frigid in nature. They have developed on parent material consisting of granite-gneiss and mica schist on steep to very steep slopes at an altitude of about 3000 m amsl. These are grazing lands supporting alpine grasses. Type- III soil includes various series like Sangla, Spillo, Kalpa, Leo, Rocky I, Rocky II and Scree series.

4.13 DRAINAGE

The area is drained by river Satluj and it shows the dendritic type of drainage pattern. Number of perennial / Streams joins with this river and following are the important stream which joins with Satluj river in the Indian Territory.

Sr.No.	Left Bank	Sr.No.	Right Bank
1.	Trung	1.	Spiti
2.	Geganthing	2.	Ropa
3.	Baspa	3.	Taiti
4.	Duling	4.	Kashang
5.	Sholding	5.	Mulgoon
6.	Thuls		
7.	Wangar		
8.	Ropi		

4.14 LAND USE

The changes in land utilization pattern have been brought in **Table 4.5**. The table shows that in the district there was marginal increase in the area under forest (42.44 per cent to 44.08 per cent) while there was considerable increase in the area under barren land, current fallow and other fallow during the year 1990-91 to 2002-03. It should be noted that there was sharp decline in area put to non-agricultural uses. The net sown area, however, remained almost unchanged during the period, except in the nineties when it decreased by nearly 2.5 per cent. The pattern of change in land utilization for the state was, however, different from that of the district.

TABLE-4.5
LAND USE PATTERN OF KINNAUR

S.n.	Name of Village	Total Area (in Hectare)	Total Population	Forest	Unirrigated (in hectare)	Irrigated (in hectare)	Culturable waste (in hectare)	Area not available for cultivation (in Hectare)
1.	Sunnam	119	37	13	0	5	91	23
2.	Shaiso	313	251	128	0	22	285	6
3.	Spillow	455	828	348	34	60	11	350
4.	Kanam	78	609	304	5	25	2	46
5.	Nasang	455	354	192	0	30	165	23

4.15 FLORA AND FAUNA

Flora:

No systematic botanical survey has been conducted in Kinnaur district. The following varieties of plants and forest trees are generally found in Kinnaur district are as under:

<u>Sr.No.</u>	<u>Common Name</u>	<u>Sr. No.</u>	<u>Common Name</u>
1.	Kemal	8.	Akhrot
2.	Kashnala	9.	Neoza
3.	Karundn	10.	Deodar
4.	Bhojpatra	11.	Chir
5.	Reesh	12.	Chuli
6.	Agru	13.	Nashpati
7.	Pag	14.	Kainth
		15.	Kushi

Fauna:

No systematic survey of the local fauna has ever been conducted in the area . Nature has endowed the tract with various fauna due to considerable varieties in the elevation and climate .The following are the species of Fauna in the district .

<u>Sr.No.</u>	<u>Common Name</u>	<u>Sr.No.</u>	<u>Common Name</u>
1.	Bharal	6.	Dark brown rat
2.	Brown Bear	7.	Ghoral
3.	Hill fox	8.	Himalayan Langur
4.	Common Rat	9.	Himalayan Black bear
5.	Common Indian rat		

4.16 WILD LIFE SANCTUARIES

There are no Notified Wild Life Sanctuaries within 10km of the study area. Confirmation to this effect has been given by Divisional Forest Officer, Recong Peo. Copy of the same is attached as **Annexure - I**. List of wild Life Sanctuaries in the Kinnaur district is given in **Table 4.6**.

Table-4.6
LIST OF WILD LIFE SANCTUARIES

S.No.	NAME OF NPS/SANCTUARIES	NAME OF DISTRICT	AREA AS PER NOTIFICATION (KM²)
1	Lipa Asrang	Kinnaur	31
2	Raksham Chhitkul	Kinnaur	304
3	Rupi Bhaba	Kinnaur	503

4.18 DEMOGRAPHY AND SOCIO-ECONOMIC SCENARIO:

As per census 2011, the population of Himachal Pradesh & Kinnaur district is given on **Table 4.7**:

Table-4.7

Demography & Socio-economy

Description	Dist. Kinnaur	Himachal Pradesh
Census	2011	2011
Male Population	46,364	3,382,617
Female Population	37,934	3,473,892
Total Population	84,298	6,856,509
Sex Ratio	818/1000	974/1000
Density of Population/Km ²	13	123
Literacy Rate: Total (%)	80.77	83.78

Ref: Census of India 2011.

CHAPTER-5.0

PROJECT DESCRIPTION

5.1 GENERAL

This is a project for mining of stone in an area of about 0–63-00 hectares in village Shiaso Tehsil Pooh district Kinnaur ,Himachal Pradesh and then crushing the stone into bajri at village Shiaso. While the stone mining area is on the sloping hill, the crusher will be installed in a comparatively flat area near the road.

5.2 GEOLOGY

According to Geological Survey of India, the known geological formations in the district are as follows:-

Recent to Sub-recent	Soils
Triassic- Rhaetic	Limestone, Shales, dolomite etc.
Carboniferous	Quartzite and Limestone's
Silurian	Coral Limestone, quartzite
Late to Pre-cambrianto	Halmanta system-phyllites, quartzites
Cambrian	Conglomerates, Shales and slates
Pre-Cambrian	Schists, gneisses, granites, quartzite's

Rocks varying in age from pre-Cambrian to permo-carboniferous are exposed in the Kinnaur district. The district can be sub-divided in these main sectors on the basis of geological formations as follows:-

5.2.1 Between the border of Kinnaur and Shimla district and Jangi :

The geological formations exposed in this area have been named as Sarahan series. The Sarahan series constitute Schist and gneisses with granite and pegmatites intercalations and basic rocks. The main type of schist is biotite schist, quartz – muscovite schist and quartz talc schist. These are intruded by basic intercalations which have been metamorphosed to amphibole schist. Gneisses of Sarahan series are grey in colour and medium to coarse grained in texture. They frequently pass in to the schist. Igneous rocks belong to three different periods of intrusions. The rocks of the Sarahan series belong to Pre-Cambrian period.

5.2.2 Geology of the Area

The rock exposed in the area belong to Jangi series commonly known as Haimantas and have thrust contact with Sarahan series. These rocks are seen exposed towards both the sides of River Sutlej upto Khab and then extend further along the Spiti valley right upto Maling Nala and beyond Chango. The rocks comprises of Slate, quartzite, phylletes with granites and pegmatites. This formation ranges in age from precambrian to Cambrian. The general trend of formation is NE- SW with 35° - 40° dip due NW. In order to demarcate different litho units, Geological Plan of mining lease area on 1 : 500 scale with 2 metres contour interval has been prepared.

5.2.3 The nature of rocks and their attitude:

There are alternate bands of shales and slaty quartzite in the uphill side of lease area which is hard in nature. The rocks trend in NW-SE direction with 50° - 55° amount of dip due NE. The rocks exposed in the area show the presence of discontinuities in the form of joints and fracture.

5.2.4 Mineable area

To select the mineable area from the total area granted on mining lease, the provisions made in the Himachal Pradesh Minor Mineral (Concession) Revised Rules, 1971 and the land form studies was taken in to consideration. The following points of public utilities/ Feature is available in and around to the mining lease area. After leaving 5 Mts. from the lease boundary, the area has been planned for mining. The available material consist of big boulders rolled down from uphill side and accumulated in the lease area. These boulders are to be first broken into small size to be fed in the stone crusher. Any dimension stone could be used for making dressed stone to be sold in the open market.

5.2.5 Total Geological Reserve

The Geological Reserves have been estimated by the cross-sectional area method and 2 numbers of cross sections A-A' and B-B' were plotted at 50.00 metres interval. The cross section area of rock was measured separately and to obtain the volume it was multiplied by strike influence of each section. The volume thus obtained was multiplied by the specific gravity to obtain the reserves. Although, the specific gravity of the quartzite rock is 2.60 however lower specific gravity of 2.25 has been taken for calculation of reserves. As no exploration by way of boring has

been done, but it is implied from the field observations that same type of rock is available at depth as the beds are dipping in to the hill and they are visible on the surface. In view of above, the reserves in first five metres depth have been categorized as proved and at subsequent 5 metres depth under provable category. The details of geological reserves of the rock are given below :-

Table Showing Geological Reserves in metric tonnes

Section Line	Surface area in Square metres		Section interval in Metres	Reserves in Metric Tonnes	
	Proved	Probable		Proved category (in MetricTonnes)	Probable category (inMetricTonnes)
A-A'	175	160	50	19687	18000
B-B'	230	190	50	25875	21325
Under proved			45562	Metric Tonnes	
Under probable			39375	Metric Tonnes	

5.2.6 Mineable Reserve

All of the mineable reserves occupying the lease hold area are not mineable during practical course of mining because there are constraints like height and width of benches, angle of repose and physical obstruction like escarpments slope angle etc. In order to carry out scientific mining, bench formation of 6 x 6 metres is done and for individual benches reserves are calculated by multiplying the surface area of the bench with height of the bench taken as 6 metres and then multiplied with 2.25, the average specific gravity of the rock. Therefore, in order to arrive at mineable reserves, 3 Nos. of benches from 2570 metres R.L. to 2560 metres R.L. (as per the ultimate pit limit) were plotted and bench wise/ slice wise reserves were calculated and the detail is as given below :-

Table Showing Calculation of Reserve

S.N.	R.L. of Benches in (M.R.L.)	Reserves (in Metric Tonnes)	Reserves in metric tones after losses of 5% & 5% top soil	Cumulative Reserves	Waste	Top soil
1	2570	15000	13500	13500	750	750
2	2564	29700	26730	40230	1485	1485
3	2560	23000	20700	60930	1150	1150
	Total	67700	60930		3385	3385

5.3 DEVELOPMENT AND PRODUCTION PROGRAMME

5.3.1 Development

Mining lease area is located on a hilly terrain and suitable material for extraction of stone is available in whole of mining lease. Keeping in view the suitability of material, scientific mining & safe distance from road the mining is proposed between 2570 metres R.L. to 2560 M. R.L. and area below this R.L. shall be used as stacking place as shown in the map. Within the lease area, open cast method of mining by bench formation 6 x 6 metres from top to bottom shall be followed. This method is adopted on the basis of the concept of changing hill slope within the proposed limits of mining that the Ultimate pit limit and restoring the area by making benches and terracing the hill slopes there by affecting least disturbance of the area due to mining. Working in the area shall be manual.

Following conditions have been taken into consideration while preparing this plan.

1. Demarcation of the area as shown in the field by Revenue Authorities has been taken in the preparation of contour cum Geological plan on 1:1000 scale.
2. 200 working days have been taken for the purpose of calculation.
3. Angle of repose has been kept as 45° .
4. Insitu parapet walls shall always be maintained towards valley side of working benches, so that no sand rolls down.
5. An approach path of about 250 metres length from lease boundary to uphill side is to be constructed as shown in the map No. 8. It is proposed that the gradient of the proposed path shall be maintained in between 1 in 8 for labour to reach the top most bench at 2570 metres R.L. The hard material shall be used for construction of parapet walls towards valley side and construction of check dams.

5.3.2 Year-wise production programme

(Refer Plate No. 8, 9,10,11 & 12)

Details of the production of the stone from various benches from first to fifth year are given below:-

Table Showing Year-wise production programme

Period	Level of Benches (MRL)	Opening reserves of bench (M.T.)	Production from bench (M.T.)	Closing reserves of bench (M.T.)
(1)	(2)	(3)	(4)	(5)
First Year	2570	13500	6000	7500
	Total	13500	6000	7500
Second Year	2570	7500	7500	Nil
	Total	7500	7500	Nil
Third Year	2564	26730	7500	19230
	Total	26730	7500	19230
Fourth Year	2564	19230	8000	11230
	Total	19230	8000	11230
Fifth Year	2564	11230	10000	1230
	Total	11230	10000	1230

Thus during five year total production of stone shall be 39000 metric tonnes from 2 number of benches.

5.3.3 Development and Production at the end of the 1st year

(Plate No.8)

Annual production proposed to meet the requirement of stone will be around 6000 metric tonnes for the 1st year. For this, bench at 2570 M.R.L. will be opened with a total reserve of 13500 metric tonnes and shall be partly excavated and the balance material will be extracted in second year. Plantation of bushes and local trees will be done at the location marked as 'P-1' where soil cover exist in the area. A check dam of 5.00 metres length

with 1.5 meter height will be constructed at the C-1 location shown in Plate-8. The top soil available on the surface shall be collected and stacked at soil dump S-1 location marked on Plate No. 8.

Activity during first year

1. Stone will be extracted from 2570 M.R.L. and remaining will be used in 2nd year.
2. Plantation will be carried out at P-1 location.
3. A Check Dam to arrest flow of debris will be constructed C-1 locations.
4. Top soil will be dumped at S-1 location.

5.3.4 Development and Production at the end of 2nd year

(Plate No. 9)

During this year, 7500 metric tonnes of stone production is proposed to meet the proposed requirement. To fulfill this requirement, remaining bench of 2570 M.R.L. will be fully exhausted. The top soil generated shall be dumped at location marked on Plate No. 9 at soil dump S-2. The plantation of bushes and local trees will be done at location 'P-2' on the Plate No. 9 on 2570 M.R.L. bench. A check dam of 5.00 meter length and 1.00 meter height shall be raised at C-2 location shown on Plate No. 9.

Activity during second year

1. Production of 7500 metric tonnes of stone will be met by excavating material from 2570 M.R.L. and will be fully exhausted.
2. Plantation will be done at P-2 location.
3. A Check Dam to arrest flow of debris will be constructed at C-2 locations.
4. Top soil will be dumped at S-2 location.

5.3.5 Development and Production at the end of 3rd year

(Plate No.10)

During this year, material from 2564 M.R.L. bench will be extracted to meet the requirement of 7500 metric tonnes of stone with total reserves of 26730 Metric Tonnes. The top soil generated shall be dumped at location marked on Plate No. 10 at soil dump

S-3. The top soil dumped at Dump No. 2 shall be lifted and spread over the bench of the 2570 M.R.L. The plantation shall be raised on this bench at `P-3`. A check dam will be constructed with a length of 5.00 meter and 1.5 meter height at C-3 location.

Activity during third year

1. Stone will be extracted from benches of 2564 M.R.L. bench.
2. Plantation will be carried out at P-3 location.
3. Top soil will be dumped at S- 3 location.
4. A Check Dam will be constructed at C-3 locations.

5.3.6 Development and Production at the end of 4th year

(Plate No.11)

During this year, 8000 metric tonnes of stone production is proposed. In order to meet the above requirement of stone, it shall be extracted from remaining reserves of 19230 Metric Tonnes from 2564 M.R.L. bench.

The top soil shall be dumped at S-4 and top soil from soil dump S-3 shall be spread on the bench of 2570 M.R.L. The plantation shall be raised over 2570 M.R.L. bench by growing bushes and trees at `P-4` location. A check dam will be constructed with a length of 5.00 meter at C-4 location as shown in Plate No. 10.

Activity during fourth year

1. Material from 2564 M.R.L. bench will be extracted to meet the requirement of 8000 metric tonnes of stone.
2. Plantation will be carried out at P-4 location.
3. A Check Dam to arrest flow of debris will be constructed at C-4 locations.
4. Top soil will be dumped at S-4 location.

5.3.7 Development and Production at the end of the 5th year (Plate No.12)

During this year, 10,000 metric tonnes of stone production is proposed. To meet this requirement of stone, 2564 M.R.L. bench will be partly exhausted. The top soil shall be stacked at soil Dump S-5. The soil Dump No. 4 shall be spread over 2564 M.R.L. bench

and plantation shall be raised over this bench. A check dam will be constructed to check the flow of any debris at C-5 location.

Activity during fifth year

1. About 10,000 metric tonnes of stone will be extracted from 2564 M.R.L. bench.
2. Plantation will be carried out at P-5 location.
3. Top soil will be dumped at C-5 location.
4. A Check Dam to arrest flow of debris will be constructed at S-5 locations.

Waste disposal arrangement if any :-

As already explain in Para 7.6 about 3385 metric tonnes of top soil/ waste and 3385 Metric Tonnes of Top Soil will be generated which contains Silt and Clay mixture and it do not have any market value. The following quantity of waste/ Top Soil shall be generated from the benches after extraction of mineral.

Table Showing Bench-wise Waste Disposal

Sr. No.	R.L. of Benches in (M.R.L.)	Waste/ bench wise (in Metric Tonnes)	Top Soil
1	2570	750	750
2	2564	1485	1485
3	2560	1150	1150
	Total	3385	3385

5.4 RECLAMATION PLAN

(Plate No. 3)

5.4.1 Plantation

The afforestation programme is the most important programme to improve the environment and ecological balance of the area. Grasses and bushes which have fibrous roots are at the first instance grown which give the binding property to the soil. After growing grasses and bushes, other tree species in consultation with the experts will be raised, based on the characteristics of soil, topography and climatic conditions.

5.4.2 Check Dam

Five No's of check dams will be raised at five different locations to check the flow of debris to downhill side. The location and dimension of check dams is shown in Plate Nos. 8, 9,10,11 & 12.

5.5 ESTIMATED COST OF RECLAMATION

To carry reclamation programme, a gardener on regular basis will be employed. The gardener will work 10 days per month. The total reclamation cost arrived for five years shall be total cost = 10 days x 9 months x 5 years x Rs.150 = Rs. 67,500/- or Rs. 13,500/- per annum.

5.5.1 Check dam construction

For construction of check dams, the local material will be used. However, for construction, one mason and one labour will be employed as and when required. The construction of one check dam cost will be about Rs.2000/-.

PLATE-5.1
LOCATION MAP

PLATE-5.2
GEOLOGICAL MAP

PLATE-5.3
GEOLOGICAL PLAN SHOWING SURFACE FEATURE

PLATE-5.4
SECTION OF MINING AREA

PLATE-5.5
CONTOUR PLAN

PLATE-5.6
WORKING PLAN AREA (1-5 YEAR)

5.6 POWER

There is no requirement of power at mining area.

5.7 WATER SUPPLY

No water is needed for the mining.

5.8 MANPOWER

The requirement of personnel for the proposed unit has been assessed keeping in view the following:

- Technical concept of work.
- Smooth and efficient operation of the unit.
- Optimum organization well defined and judicious job distribution
- Optimum utilization of different grades of workmen and supervisory staff and
- Maximum capacity of the facilities.

In all about 8-10 workers will be needed in the unit.

This waste is neither toxic nor harmful in any manner but is a part of the stone excavated. The same will be used for filling undulated portions of the pit to have smooth surface. Top soil will be used for covering the final pit surface for raising plantation.

5.12 POLLUTION CONTROL MEASURES

(i) **Air Pollution:-** There is no point source of air pollution in the unit. Excavated stone material is likely to be damp due to soil moisture and thus the dust emission will almost be nill. However, some dust particles may be expected during mining, crushing & transport as fugitive emission. To suppress SPM water will be sprinkled on the dry material and on the approach road so that the dust particles do not fly into the air. Trees shall also be planted in the mining area so that dust particles, if any, do not go outside the specified limits of the two operations all over & affect the general atmosphere in the locality. Wind breaking curtains shall be provided at vulnerable points.

(ii) Water Pollution:- Water is not required in the process of mining. Thus no waste water is generated from the process. Waste water from the toilets for the workers shall be treated through septic tank and used within the premises partly for plantation & partly for recycling for sprays. No water will flow outside the unit & go to any water body.

(iii) Noise Pollution:- Since no blasting is involved in the process no noise of significance is generated at site. Maintenance of the transport vehicles shall be done regularly so that they do not produce sound of high intensity which could affect the overall sound level in the atmosphere. Drivers of the vehicles will be asked to maintain vehicles in good conditions and not to blow horn unnecessarily. Green belt provided along the mining area will also attenuate noise level.

CHAPTER - 6.0

ENVIRONMENT IMPACT ASSESSMENT & MITIGATION MEASURES

6.1 GENERAL

In order to assess the impact of the unit on the Environment, it is necessary to know the existing level of various parameters & then super impose the effect of the units on them to know the end results of the same. For this purpose an area of 10 Km radius has been selected around the unit which is shown in **Figure 6.1**. Details of Monitoring sites in the study area have been given in **Table 6.1**.

6.2 PRESENT BENCH MARK

ENVIRONMENT STUDY

Various Environmental factors as existing in the study area which are liable to be affected by the activities have been assessed both quantitatively and qualitatively. Following are the factors which are sensitive to the plant activities.

- i) Ambient Air
- ii) Water Quality
- iii) Noise Quality
- iv) Soil and Agriculture
- v) Land use pattern
- vi) Demography and Socio-economic pattern
- vii) Transport & Communications
- viii) Biodiversity

FIGURE-6.1
AREA OF 10 KM RADIUS

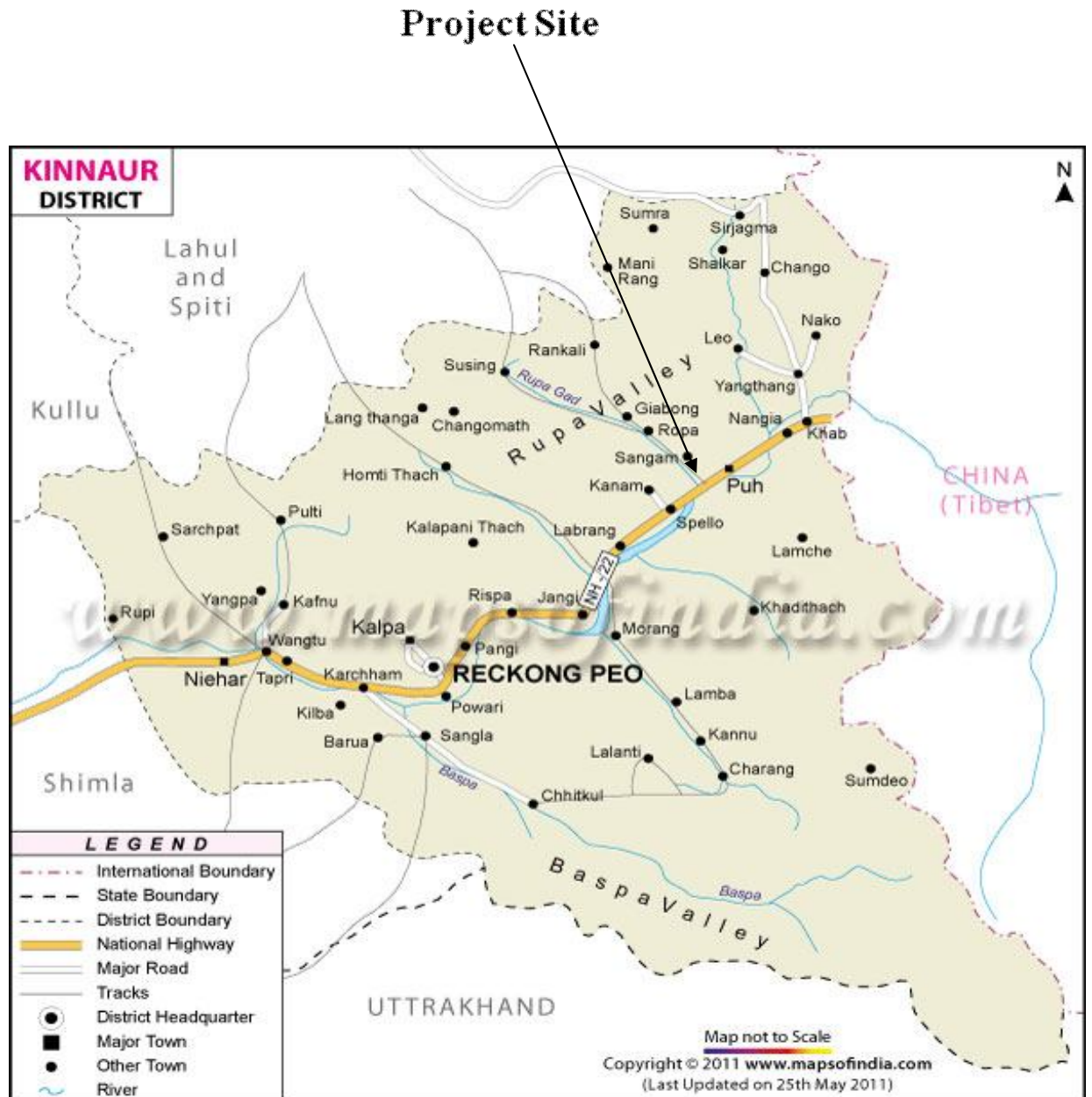


TABLE 6.1
AMBIENT AIR MONITORING STATIONS

S. No.	Sample Code	Name of Village	Distance (Km)	Direction
1.	AA-1	Project Site	0	-
2.	AA-2	Project Site II	3	NORTH
3.	AA-3	Project Site III	5	N-EAST
4.	AA-4	Sunnam	8.0	N
5.	AA-5	Spillow	10.0	S-WEST

FIGURE :6.2

AMBIENT AIR MONITORING STATIONS

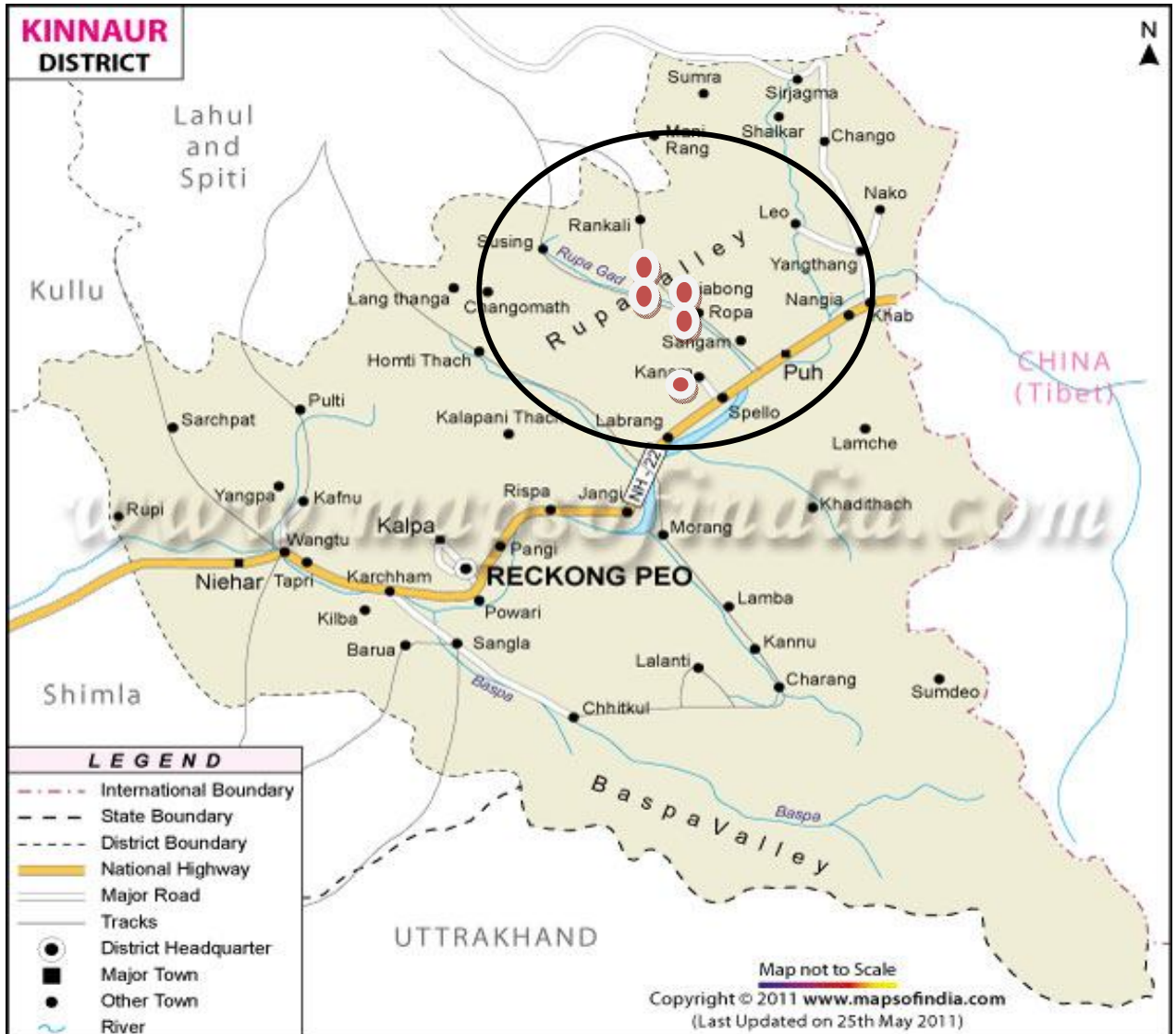


TABLE-6.3
AMBIENT AIR QUALITY MONITORING RESULTS

(Source: Chandigarh Pollution Testing Laboratory)

S.NO	DATE OF MONITORING	PM _{2.5} ug/m ³	PM ₁₀ ug/m ³	SO ₂ ug/m ³	NO _x ug/m ³	CO mg/m ³
AA1 Project Site	January 2013	32.9	52.9	2.8	6.0	0.2
	February 2013	31.3	51.5	2.7	6.8	0.2
	March 2013	31.8	52.7	2.7	6.3	0.3
AA2 Project Site II	January 2013	33.2	50	2.1	5.8	0.2
	February 2013	33.1	55	2.5	6.8	0.2
	March 2013	31.2	41	2.2	5.9	0.1
AA3 Project III	January 2013	32.2	45.9	2.8	6.6	0.2
	February 2013	31.2	48	2.3	6.3	0.3
	March 2013	31.4	49	2.4	5.8	0.2
AA4 Sunnam	January 2013	33.7	43.8	2.2	5.4	0.2
	February 2013	34.8	44	2.3	5.5	0.1
	March 2013	33.4	46.9	2.3	5.8	0.3
AA5 Spillow	January 2013	34.6	46	2.4	6.1	0.2
	February 2013	31.7	47.5	2.8	5.9	0.2
	March 2013	32.8	46	2.1	5.2	0.1
PERMISSIBLE LIMITS		60	100	80	80	4

The monitoring for PM_{2.5}, PM₁₀, SO₂, Pb, CO and NO_x etc has been undertaken for month of January to March, 2013 as per CPCB guidelines.

AMBIENT AIR QUALITY MONITORING

The Status of Ambient Air Quality in the Study Area has been determined by monitoring air quality in the Project Area at Five different Locations as shown in **Fig 6.2**. The study area is mostly Forest & agricultural land and the various sources of pollution are dust arising from agricultural activities and vehicular traffic apart from some fugitive emission from the unit. Location of the monitoring stations for Ambient Air Quality is given in **Table 6.2** and the results are given in **Table-6.3**

Study of various parameters for three months i.e. Jan.-March 2013 has been made at various places. The result of the study shows that:-

- i) $PM_{2.5}$ varies from $30\mu\text{g}/\text{m}^3$ to $35\mu\text{g}/\text{m}^3$ at various places against permissible limit of $60\mu\text{g}/\text{m}^3$ which is well with the norms.
- ii) PM_{10} varies from $41\mu\text{g}/\text{m}^3$ to $53\mu\text{g}/\text{m}^3$. These are also within the norms.
- iii) SO_2 varies from 2.1 to $2.7\mu\text{g}/\text{m}^3$ against norms of $80\mu\text{g}/\text{m}^3$.
- iv) NO_x varies from 5.0 to $6.6\mu\text{g}/\text{m}^3$ against limit of $80\mu\text{g}/\text{m}^3$.
- v) CO varies from 0.1 to $0.3\text{mg}/\text{m}^3$ against limit of $4\text{mg}/\text{m}^3$.

Conclusion:

On the whole the above results show that the ambient air in the study area is environmentally quite clean and all parameters are within the Permissible limits. Even after considering the incremental effects of the project these will still be within limits.

6.2.2 WATER QUALITY

Water quality of ground as well as surface resources in the study area has been studied for assessing the water environment and to evaluate the anticipated impact of the project. The monitoring locations have been identified considering drainage pattern, population and croplands and likely areas that represent base line conditions. Location of the monitoring stations for Surface Water is given in **Table 6.4**. The results are given in **Table-6.5**

TABLE-6.4
DETAILS OF WATER MONITORING STATIONS

S.No.	Name	Source
1.	Surface water	Ropa Khud (Near Bridge)

Quality of water in the study area is good as will be evident from the following;

1. Surface Water

- Result of surface water shows that:-
- BOD is less than 2 mg/l.
- pH is about 7.4 & water is alkaline
- Dissolved solids & suspended solids are 232 & 28 mg/l respectively which are well below the desired limits for a flowing water body.
- Other parameters like chloride & sulphates are within permissible limits.
- Metals like lead, iron & chromium are not detected.

TABLE-6.5
RESULTS OF WATER SAMPLES
(mg/l except pH)

(Source: Chandigarh Pollution Testing Laboratory)

Parameter	Ropa Khad (SW-1)
pH	7.4
Total Suspended Solids	28
Total Dissolved Solids	232
Biological Oxygen Demand	<2
Chloride (as Cl)	11
Sulphate(as SO ₄)	14.8
Iron (as Fe)	ND
Lead (as Pb)	ND
Total Chromium (as Cr)	ND

6.2.3 AMBIENT NOISE QUALITY

Noise is defined as unwanted sound due to any operation. It has become a common problem and ambient noise levels are on the rise all around. Noise levels were measured at various locations and are reported in **Table 6.5**.

Noise in the study area is mainly due to day to day agriculture activities & plying of vehicles on the roads. NH-22, Shimla–Pooh runs at a distance of about 300m from the mining site.

➤ Noise levels near the site have been found to be 40 dB(A).

➤ On other sites it varies from 38 -42 dB(A).

Overall in the study area the levels are within permissible limits.

TABLE-6.5
NOISE LEVEL RESULTS dB(A)
(BETWEEN, 9.00 A.M. – 12.00 P.M.)
(Source: Chandigarh Pollution Testing Laboratory)

Sr.No.	SITE	NOISE LEVEL
1.	Project Site	40
2.	Project Site II	41
3.	Project Site III	40
4.	Sunnam	38
5.	Spillow	39

6.2.4 Soil

The soil texture in Study area varies from medium to fine having sandy loam to clay loam soils. The pH of soil is slightly acidic in nature in some parts of the district.

6.2.5 Socio Economics Pattern

Social aspects can be defined as the consequences to people of any proposed action that changes the way they live, work, relate to one another, organize themselves and function as individuals and members of society. This includes social-psychological changes, for example to people’s values, attitudes and perceptions of themselves and their community and environment.

Broadly social aspects could be classified as under:-

- i) Lifestyle aspects-** These are the way people behave and relate to family, friends and cohorts on a day-to-day basis.
- ii) Cultural aspects -** These are shared customs, obligations, values, language, and religious belief another elements, which make a social or ethnic group distinct.
- iii) Community aspects -** These are infrastructure, services, voluntary organizations, activity networks and cohesion.
- iv) Health aspects -** These includes mental, physical and social wellbeing.
- v) Rehabilitation and Resettlement-** These include displacement of families beyond defined thresholds and the impact on public and community properties, assets. Accordingly ameliorative measures for addressing the said impact, are also required to be taken.

6.2.6 Transport and Communication

The site is well connected with major towns & settlement through metalled roads. NH-22 (Shimla-Pooh) is quite close to the unit & is the main artery for communication & transport in the District. It is also used by large no. of tourists going to district etc. The traffic on this road is about 500 vehicles per day both sides.

6.3 IMPACT ASSESSMENT & MITIGATION MEASURES

Under the "Present Environment", the important factors which can be affected either positively or negatively have been brought out. Anticipated impact of the project on them and mitigation measures to combat the same are discussed here under.

6.3.1 Ambient Air Quality

Impact on ambient air quality at site and in the immediate neighborhood could be attributed to the following sources of emissions.

- ◆ Fugitive Emission from the mining.
- ◆ Fugitive Emission due to vehicle movement on roads.

Since the mining is manual and no blasting is involved impact of the fugitive emission from the unit will be negligible. SPM level due to movement of vehicles will also be checked. Total quantity of stone in the entire process is about 20800 MT per year, which gives an average of about 70 ton/day. This will need about 10 trucks per day. The existing Traffic on the National Highway -22 is of the order of about 500 vehicles per day both ways. Although addition in the traffic density of about 0.02% trucks per day is not likely to make much difference on the overall Air Environment, however their incremental effect has also been checked through ISCST-3 Model (based on Gaussian dispersal equation). It has been found that the increase in SPM level will be of the order of $2.5\mu\text{g}/\text{Nm}^3$ at a distance of about 20m from the center of the road. Present average PM_{10} is $50\mu\text{g}/\text{Nm}^3$ and with this increase the ultimate level will be about $52.5\mu\text{g}/\text{Nm}^3$ which will be well within the permissible limits. It comes down to $0.5\mu\text{g}/\text{Nm}^3$ at a distance of 100 m.

Conclusion: - In view of the above discussion it is considered that impact of the unit on the air environment in the area will not have any significant effect. Planting of trees & sprinkling water on the roads will further reduce the effect.

6.3.2 Water Quality

There is no generation of waste water from the mining process. The water quality of the area is potable.

Thus water environment is not likely to be affected.

6.3.3 Noise Level

The project does not involve any blasting nor it uses any heavy noise creating machinery some noise may be expected from plying of vehicles. Person will be asked to maintain them properly. 'NO HORN' Sign shall be displayed at prominent places in the unit. More over green belt has been provided all around the unit which will attenuate Sound levels, if any. **Thus there is no likelihood of any appreciable change in noise environment of the area causing adverse effect.**

6.3.4 Land Environment

It is a new unit having mining area about 0-63-00 Hectare. The land is located in forest area, as such mining operation in such a small portion will not effect the overall land use pattern in the area. Agriculture operations are not being affected anywhere, there is no agriculture land adjoining the mining land. Rather after mining the land will be rehabilitated in benches and will be developed for plantation & agriculture purpose. Thus in the end it will improve the environmental conditions by providing more trees. **The over all land environment in the area will improve with the coming up of the unit.**

6.3.5 Soil and Agriculture

The soil in the study area contains medium level of primary and secondary nutrients. Since no waste is thrown on any land, Agricultural operations will not be affected with the setting up of the unit. The major crops in the study area are Paddy, Wheat, Maize and Vegetables. **The fugitive emissions from the unit having insignificant pollution load, will not be of any threat to the vegetation & soil in this area.**

6.3.6 Transport & Communication

Shimla-Pooh, NH-22 runs very near to the site of the project. It is an important road from tourism point of view. Thus the existing transport communication system is good and the same would be utilized by the workers for this unit which are about 10 in number. The total quantity of the product will be about 20800 MT per annum, which does not require any special heavy transport arrangements. The disposal will need only 10 trucks /dumpers per day. This addition is not of much significance so far as pollution load is concerned.

The existing Transport & Communication facilities are good enough to take care of the activities of the unit. **Thus the impact of the unit on this aspect will be insignificant.**

6.3.7 Demographic and Socio-Economic Growth

There are about 3 villages in the study area mostly with very small population. The project does not intrude on any residential area nor is influx of any large population

expected. The project does not involve any uprooting of population involving rehabilitation. The strength of workers and staff in the unit is about 10 persons. All workers are drawn mostly from the local population. Thus, there will not be any appreciable change in population in the nearby villages/towns. In view of the above individual, community, life or health of the persons in the area will not be affected. However, additional employment potential will be generated not only within the unit but in ancillary activities also which will be helpful to the local area. **Ultimately this will have some positive effect.**

6.3.8 Hazardous Materials

No hazardous materials are used in the process nor the finished goods fall in this category. **There is no impact on the environment on this score.**

6.3.9 Waste Disposal

No liquid or solid waste will be disposed off outside the unit. No waste water shall be allowed to go outside. **There will be no effect of waste disposal on the environment in general.**

6.3.10 Ecology & Biodiversity

The study area has quite sizable number of forests & local khads having flowing water. These have natural flora & fauna flourishing in the area .The project will not disturb habitat of any flora & fauna. Since the domestic effluent after treatment will be used within the premises and will not be thrown in any water body, the aquatic life in the area will not be affected in any manner. **Thus the existing ecology & biodiversity of the area shall be maintained & will not be affected.**

CHAPTER – 7.0

ENVIRONMENT MANAGEMENT PLAN

7.1 GENERAL

Environment Management Plan (E.M.P) in a project is prepared to mitigate the possible adverse effect of various activities on the existing environmental factors, during operational stage, to avoid their deterioration, if any. It is desirable that necessary steps are taken right from the beginning of the project to be more effective. As a social and moral obligation on the part of every body it becomes the bounden duty of every one to leave the environment to the next generation in a state at least what is inherited from the ancestors, if not in a better condition.

E.M.P. for this project has been prepared keeping in view the existing conditions and likely changes which may occur due to the proposed project. The implementation and monitoring of different control measures have also been covered. These are discussed as under:-

7.1.1 Air Environment:

During mining stage generation of dust is not expected as the stone layers are loose and moist due to soil moisture. However, water will be sprinkled on the soil to avoid dust generation due to plying of vehicles. The top soil shall be removed & stacked separately which shall be used later on the surface of the pit bed for raising plantation. The scree obtained during mining shall also be kept separately and will be used for filling & leveling the uneven portion of the pit bed. All vehicles for service activities at the project site shall be checked for vehicular emission. The agencies will be asked to keep them within prescribed limits. They will also be asked to maintain them properly.

Green belt shall be developed all around in the periphery of the working area.

7.1.2 Water Environment:

There is no use of water in the process.

7.1.3 Noise Environment

Since neither any blasting is involved nor any heavy noise creating machinery will be working no special arrangement are necessary. Tree plantation along the periphery will suppress minor noise levels due to plying of vehicles. Drivers of the vehicles shall be asked not to blow horn unnecessarily. NO HORN sign shall be displayed at prominent places

7.1.4 Land Environment:

To avoid erosion of the top soil the development is planned in such a manner that the benches will be created at different heights and the soil will be stacked on them with proper parapet. Later on the same shall be spread on the pit beds. Presently entire land is Forest land and after completion of mining operations the area will be fit for agriculture & plantation. This will be a definite improvement in the sense that some type of vegetative cover appropriate to the site shall be established on presently barren land .Natural waterways/drainage pattern shall be not be disturbed during operation. The land use is thus likely to improve and it will have positive affect.

7.1.5 Solid Waste

The solid waste generated from the mining shall be effectively recycled within the project to fill up undulating pit beds. No waste material will be thrown outside premises of the unit which could create any environmental problem.

7.2 OCCUPATIONAL HEALTH AND SAFETY OF WORKERS

The major health hazards in a mining unit are dust & noise. Accidental rolling of stones along slopes could also be a hazard in the working area. Following mitigation measures will be provided:-

1. Dust

- All workers will be provided Personal Protection Equipment
- Water sprinkles will be provided for suppression of dust
- Face masks and side covered glasses will be provided to all workers.
- Frequent check-up of the workers will be done which shall, include chest X-ray, ECG & vision testing. Necessary treatment shall be provided wherever required.
- Fresh water shall be made available near the working area for use by the workers any time.
- All check ups will be documented and reviewed monthly for occupation health and safety of the workers.

2. Noise

- Since mining operations are manual noise in the working area is not of significant levels. However, ear plugs will be provided to all workers in the area.
- Audiometry test of the workers shall be done regularly & medical health provided wherever required.

3. Accidental Rolling Down Of Stone

6m X 6m benches have been provided at different levels with proper parapets. Further, check dams have also been provided at vulnerable places to hold such stones, if any

7.3 GREEN BELT

Trees, apart from giving shade, aesthetic beauty, recreational spots and playing host to wide variety of birds and insects, play an important role in amelioration of environment due to their tremendous potential to act as:-

- i) Organic sponges to absorb gaseous pollutants via their leaf stomata and breaks them down to less harmful molecules during the photosynthesis.
- ii) Store house of Carbon dioxide by assimilating the Carbon dioxide in the form of sugar.
- iii) Supplier of much needed vital oxygen
- iv) Nature's air conditioners as well as purifier of air
- v) Vegetative measures of soil and water conservation

Main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas.

CHAPTER – 8.0

ENVIRONMENT MONITORING PROGRAMME

8.1 No project can succeed unless it is monitored at regular intervals & results analyzed. Keeping this requirement in view an elaborate Monitoring programme has been developed for this project. Regular monitoring of all significant environmental parameters will be carried out to check the compliance status vis-à-vis the environmental laws and regulations. The objectives of the monitoring will be as follows:

- To verify the results of the Impact Assessment Study with respect to the proposed projects.
- To study the trend of concentrated values of the parameters, which have been identified as critical and then planning the mitigating measures.
- To check and assess the efficacy of pollution control equipment.
- To ensure that any additional parameters, other than those identified in the impact, do not turn critical after the commissioning of proposed project.

8.2 A comprehensive Environmental Monitoring Program that has been prepared for the purpose of implementation in the proposed unit is described below:

S.No	Item	Parameters to be checked	Frequency
1	Ambient Air	RSPM, SPM, NO _x Silica & SO ₂	Every six months
2	Vehicles	PUC	Every Quarter
3	Noise Level	dB (A)	Once in a year
4	Ground water	As per IS 10500	Once in a year

All the above observations will be compiled and documented to serve the following purposes.

- Identification of any environmental problems that are occurring in the area.
- Initiating or providing solution to those problems through designated channels and verification of the implementation status.
- Controlling activities inside the project, until the environmental problem has been corrected.
- Suitably responding to emergency situations.

8.3 To implement the EMP, a structured Environment Management Cell (EMC) interwoven with the existing management system will be created. EMC will be responsible to undertake regular monitoring of the environment and conduct yearly audit of the environmental performance during the entire period of the project. It will also check that the stipulated measures are being satisfactorily implemented and operated. It shall also co-ordinate with local authorities to see that all environmental measures are well coordinated.

8.4 Environment Management Cell:

The Environment Management Cell shall include:

- Representative of Management (Head of Environment Cell)
- Mining Incharge
- A representative of Environmental Consultants

The cell shall be constituted immediately at the start of the project so that appropriate actions to protect the Environment are taken from the very beginning. All actions taken by the cell shall be documented.

CHAPTER – 9.0

EXPENDITURE ON ENVIRONMENTAL MEASURES

S.No.	TITLE	MEASURES	CAPITAL COST RS. LACS	RECURRING COST RS. LACS (ANNUM)
1	Air Pollution Control	Water sprinkling system & wind breakers etc.	3.0	1.0
2	Noise Pollution Control	Tree plantation (Including cost of Landscaping, Green Belt & maintenance of vehicles)	1.0	0.2
3	Environment Monitoring and Management	Testing of Parameters for Air, Water & Noise	2.0	0.5
4	Miscellaneous	Appointment of Experts, Consultants, Management of Environment cell, Consent fees and monitoring	2.0	0.3
	Total		8.0	2.0

CHAPTER – 10.0

POLLUTION CONTROL STANDARDS & SAFETY MEASURES

Various regulatory standards for different parameters fixed by P.C.B. / MINAS shall be strictly followed by the unit. Storage &. Handling of Materials shall also be regulated as per instructions laid down. Briefly these are discussed as under

10.1 AMBIENT AIR

Ambient Air Quality standard fixed by the Central Pollution Control Board U/S 16(h) of the Air Act 1981 are as below:-

NATIONAL AMBIENT AIR QUALITY STANDARDS

S. No	Pollutant	Time Weighted Average	CONCENTRATION IN AMBIENT AIR		
			Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1.	Sulphur Dioxide (SO ₂)ug/m ³	Annual 24 hours	50 80	20 80	- Improved West and Geake - Ultraviolet fluorescence
2.	Nitrogen Dioxide (NO ₂), ug/m ³	Annual 24 hours	40 80	30 80	- Modified Jacob & Hochheiser (Na-Arsenite) method
3.	Particulate Matter (size less than 10um) or PM ₁₀ ug/m ³	Annual 24 hours	60 100	60 100	-Gravimetric - TEOM Beta attenuation
4.	Particulate Matter (size less than	Annual 24 hours	40 60	40 60	-Gravimetric TEOM Beta

	2.5um) or PM _{2.5} ug/m ³				attenuation
5.	Ozone (O ₃) ug/m ³	8 hours	100	100	-UV photometric Chemilumini scence
		1 hours	180	180	
6.	Lead (Pb) ug/m ³	Annual	0.50	0.50	- AAS/ICP method after sampling on PPM 2000 or equivalent filter paper - ED-XRF using Teflon filter
		24 hours	1.0	1.0	
7.	Carbon Monoxide(CO) mg/m ³	8 hour	02	02	-Non Dispersive Infra -Red (NDIR) Spectrocopy
		1 hour	04	04	
8.	Ammonia (NH ₃) µg/m ³	Annual	100	100	
		24 hours	400	400	
9.	Benzene(C ₆ H ₆) µg/m ³	Annual	05	05	- Gas Chromatogra phy Based continuous analyzer - Adsorption and Desertion followed by GC analysis
10.	Benzo(a)Pyren e (B _a P) particulate phase only, ng/m ³	Annual	01	01	-Solvent extraction Followed by HPLC/GC Analysis
11.	Arsenic (As) ng/m ³	Annual	06	06	`AAS/ICP method after sampling on

					EPM 2000 or equivalent filter paper
12.	Nickel (Ni) ng/m ³	Annual	20	20	AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* **Annual** arithmetic mean of minimum 104 measurements in a year at a particular site taken twice week 24 hourly at uniform intervals.

** **24 hours** or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year and 2% of the time they may exceed the limits but not on two consecutive days of monitoring.

10.2 EFFLUENT

National Standards have been developed based on achievability & environmental requirements. These shall be followed by the unit as given below:-

ParameterLimiting	Concentration mg/l
pH	5.5-9.0
Suspended Solids	100
Dissolved Solid	2100
BOD	30
COD	200
Oil &. Grease	10
Chromium (Hexavalent)	0.1
Chromium (Total)	2.0
Copper	1.0
Arsenic	0.2
Lead	0.1
Cyanide	0.1
Phenolic Compounds	1.0
Sulphide	2.0
Phosphate	5.0
Nitrates	50.0
Bio-Assay test	90%

10.3 NOISE LEVELS

A. Ambient Noise Standards fixed by C.P.C.B. are as below:-

Sr. No.	Category of Area	Limit in dB(A)	
		Day time	Night Time
1.	Industrial Area	75	70
2.	Commercial Area	65	55
3.	Residential Area	55	45
4.	Silence Zone	50	40

B. Permissible noise exposure for Industrial workers is as below:-

LOCATION	NOISE LEVEL dB (A)
Rural	25-35
Suburban	30-40
Urban (Residential)	35-45
Urban (Residential & Business)	40-50
City	45-55
Industrial Area	50-60

ANNEXURE-I

Certificate from DFO

Site Photographs



Site Photographs



Site Photographs

