REGISTERED

No. Udyog-Bhu(Khani-4)Laghu-480/2016
Government of Himachal Pradesh
Department of Industries
"Geological Wing"
Dated; Shimla- 171001,

-6414

12/9/ 2017

To

Sh. Tepender Singh Saini,
S/o Sh. Hardyal Singh Saini,
Village Shubhkhera, Tehsil Paonta Sahib,
Distt. Sirmour, H. P.

Subject:- **Approval of Mining Plan of auctioned area on contract for extraction of sand, stone & bajri from Satiwala (Yamuna River) bearing Khasra No. 61 over an area measuring 73-17-00 Bighas(6-22-55 Hects., Govt. land, River bed) falling in Mauza & Mohal Satiwala of Tehsil Paonta Sahib, Distt. Sirmour, H. P. for which letter of intent has been issued on 20.8.2016.**

Dear Sir,

In exercise of powers conferred by Rule 36 of Himachal Pradesh Minor Mineral (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules 2015, I hereby approve the above said Mining Plan of the auctioned area for the purpose of obtaining Environment Clearance for which the letter of intent has been issued on dated 20.8.2016. The mining plan is approved for a period of five years from the date of execution of auctioned area deed. This approval is subject to the following conditions:--

1. That the Mining Plan is approved without prejudice to any other laws applicable to the mine/area from time to time whether made by the Central/State govt. or any other authority.
2. That this approval of the Mining Plan does not in any way imply the approval of Govt. in terms of any other provisions of the H. P. Minor Minerals (Concession) Revised Rules, 1971 now repealed as Himachal Pradesh Minor Mineral (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules 2015 or any other laws including Forest (Conservation) Act, 1980, Environment Protection Act, 1986 and the rules made there under and other relevant statutes, orders and guidelines as may be applicable to auctioned area from time to time.
3. That the Mining Plan is approved without prejudice to any orders or directions from any Court of competent jurisdiction.
4. That in case State Geologist, Geologist, any other inspecting officer/official of Geological Wing Department of Industries, after field inspection notices that proposals made and workings shown in the auctioned area by the RQP need certain corrections/ amendments due to change in conditions either natural or man made, the inspecting officer can recommend necessary amendments in the Mining Plan at any point of time in the interest of environment and mineral conservation.
5. That the contractor shall procure Environment clearance from the competent authority as per Environmental Impact Assessment notification, 2006 and amendements/notifications issued time to time in this regard.
6. That the approval of proposed mining operations is restricted to the auctioned area only.

7. That in case additional conditions are imposed by the Ministry of Environment & Forests Govt. of India while according clearance under EIA notification dated 14.9.2006 and any condition imposed by the State Govt. while granting auctioned area the same shall have to be incorporated by making necessary amendments in the Mining Plan by the contractor through R. Q. P.
8. That in case auctioned area is not renewed or is terminated or working is suspended before the expiry of the contract period due to any reason, the approval of Mining Plan shall stand automatically cancelled.
9. That the contractor shall carry out production of mineral in accordance to the production shown in Mining Plan and Environmental Clearance which ever is less.
10. That no person shall undertake mining operations in any auctioned area, except in accordance with a Mining Plan approved under sub rule (2) of Rule 39 of Himachal Pradesh Minor Mineral (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules 2015.
11. That the contractor shall carry out working in the auctioned area as per Mining Plan only after obtaining permission to work in the auctioned area from the competent authority.
12. That if the mining operations are not carried out in accordance with the approved Mining Plan the State Geologist, Geologist, Assistant Geologist and the Mining Officer, may order suspension of all or any of the mining operations and permit continuation of only such operations as may be necessary to restore the conditions in the auctioned quarry as envisaged under the said Mining Plan.
13. That if any thing is found to be concealed as required under various Rules and guidelines pertaining to mining in the context of the Mining Plan and the proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
14. That in case of any violation of terms and conditions of the approved Mining Plan, the financial assurance deposited by the said contractor shall be liable to forfeited.

Enclosed:- Copy of approved Mining Plan.

Yours faithfully,

State Geologist
Himachal Pradesh
Shimla-171001.

Endst. No. As above. Dated; 2017

Copy for kind information to:-

1. Mining Officer, Sirmour at Nahan, Distt. Sirmour, H. P. alongwith a copy of Mining Plan for further necessary action.
2 Smt. Jhumpa Jamwal, R.Q. P. Set No. 21, Type-IV, H. P. Government Officers Residences, Mehli Shimla, H. P.

State Geologist
Himachal Pradesh
Shimla-171001

MINING PLAN
2017

MINOR MINERAL AUCTION CONTRACT OF SATIWALA QUARRY (YAMUNA RIVER), FOR SAND, STONE AND BAJRI, FALLING IN MAUZA & MOHAL SATIWALA TEHSIL PAONTA SAHIB, DISTRICT SIRMAUR, LETTER OF INTENT GRANTED IN FAVOUR OF Shri TEPENDER SINGH SAINI, VILLAGE & P.O SHUBHKHERA, TEHSIL PAONTA SAHIB, DISTRICT SIRMAUR, HIMACHAL PRADESH

MINING PLAN
OF
MINOR MINERAL CONTRACT
OF SATIWALA QUARRY (RIVER YAMUNA)

LETTER OF INTENT GRANTED IN FAVOUR OF
Shri TEPENDER SINGH SAINI,
VILLAGE & P.O SHUBHKHERA, TEHSIL PAONTA SAHIB,
DISTRICT SIRMAUR, HIMACHAL PRADESH

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Seal of Geological Wing, Industries Dept. Govt. of H.P. APPROVED

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MAUZA & MOHAL SATIWALA
TAHSIL PAONTA SAHIB, DISTRICT SIRMAUR,
LETTER OF INTENT GRANTED IN FAVOUR OF
Shri TEPENDER SINGH SAINI,
VILLAGE & P.O SHUBHKHERA, TEHSIL PAONTA SAHIB,
DISTRICT SIRMAUR, HIMACHAL PRADESH

INTRODUCTION:

Shri Tepender Singh Saini, son of Shri Hardyal Singh Saini, resident of Village & P.O Shubhkhera, Tehsil Paonta Sahib, District Sirmaur, Himachal Pradesh, have been issued a conditional 'Letter of Intent' for auctioned quarry, Yamuna, for excavating sand, stone and bajri vide letters Nos. Udyog-Bhu (Khani-4) Laghu-480/2016-5950 dated 20-08-2016.

In accordance with condition 2 of 'Letter of Intent and Rule 35 of the 'Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation, and Storage) Rules 2015' the contractor has to submit 'Mining Plan' for five years of the area applied or granted for mining contract. Therefore, contractor requested for the preparation of Mining Plan of the area after the issuance of 'Letter of Intent'. Accordingly, this 'Mining Plan' is prepared in conformity with the 'FORM 'M' annexed with the said Rules.

The contracted auctioned block is a part of perennial River Yamuna, it lies at about 12 Km. from Paonta Sahib Bus Stand, a sub-Divisional town of district Sirmaur, Himachal Pradesh.

1.0 General

1.1 Name and address of the applicant

1.1. A. Name of the applicant --

Shri Tepender Singh Saini son of Shri Hardyal Singh Saini

1.1. B. Address of the applicant –

Village & Post Office: Shubhkhera,
Tahsil: Paonta Sahib, District: Sirmaur.

1.2 Status of the applicant

Individual.

1.3 Minerals which the Applicant intends to mine

The applicants intend to mine stone, bajri and sand. The stone, sand & bajri collected from the river bed will be sold to construction industry depending upon the market demand.

1.4 Period for which the mining leases are granted and further renewed.

To be specified in Final Grant Order

1.5. Name and address of the RQP preparing the Mining Plan:

1. Subhash Sharma
   Flat No. 207, Basant Vihar
   Kasumpti, Shimla: -171009.
   Registration No. HP/RQP/01/1/2004
   Mobile No. 9816029594
2. Jhumpa C. Jamwal
   No. 21, Type IV, HP Government Officers Residences,
   Mehli, Shimla, Himachal Pradesh,
   RQP Registration No. HP/RQP/21/1/2016
   Mobile No.9418909890

1.6 Name and address of the prospecting agency

The detailed prospecting of the area was carried out by the R Q P for preparation of this report. The secondary base data is collected from various sources such as Geological reports of the Geological Survey of India and various departments of Union and State Government.

2. Location and Approach of the area

2.1 Topo-sheet

Survey of India sheet No. H43L11
Scale; 1:50,000
Surveyed in 1988-89 up dated in 2004-05;
First Edition 2009.

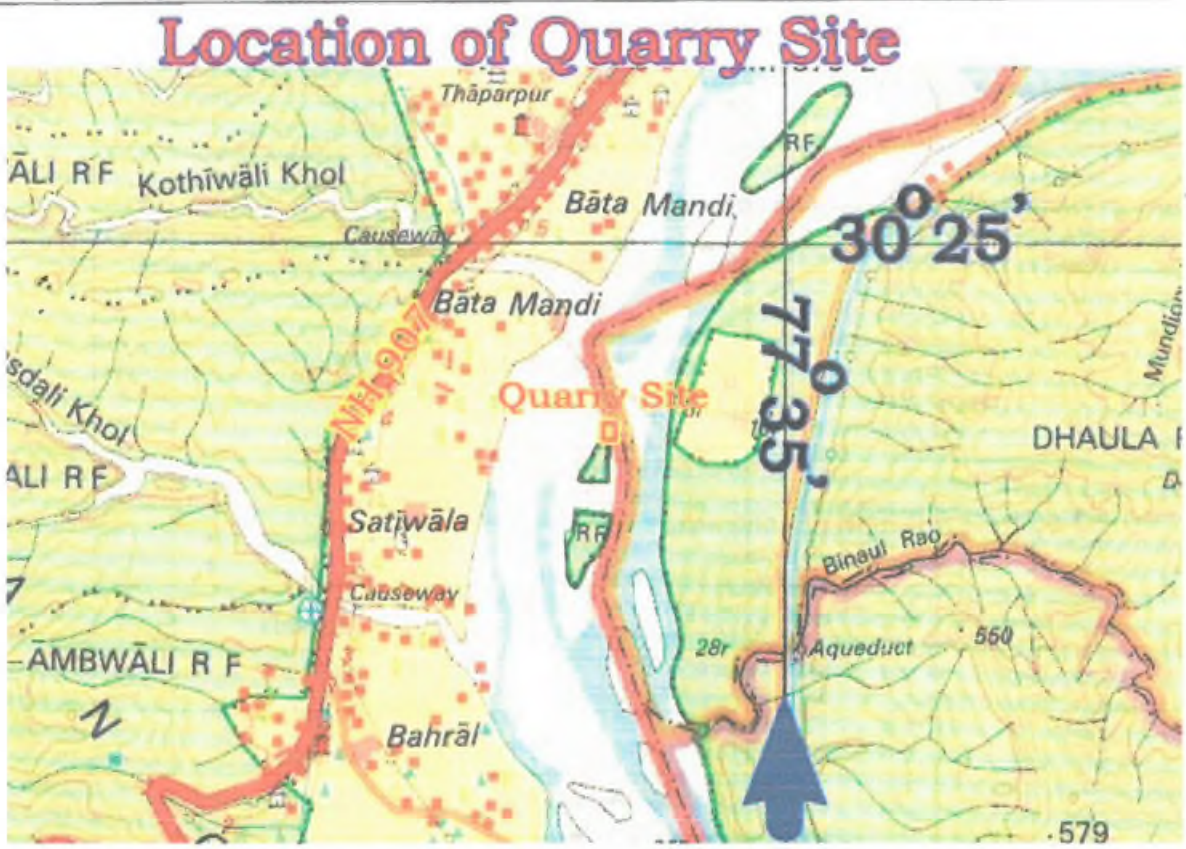


Figure 1:Location and coordinates of auctioned contract area.

The area lies between the latitude and longitude given below in table 1 and shown in the figure 1&2.

Table 1: Showing latitude and longitude of the area

Latitude	Longitude
30° 24' 34.3" N	77° 34' 35.3"E
30°24' 25.8" N	77° 34' 36.7"E

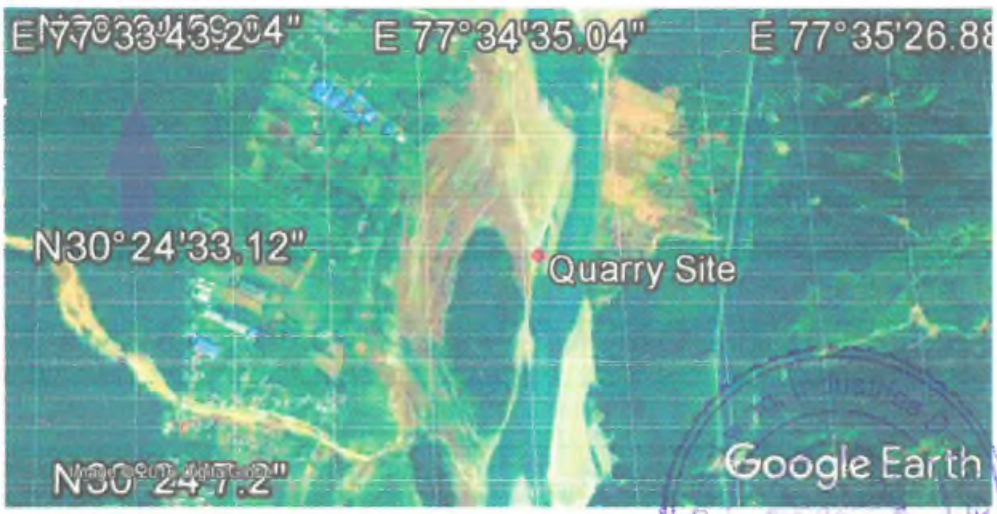


Figure 1 A: Coordinates of contract area as seen of Google Imagery.

2.2 Location of area of contract.

2.2 aDetails of area

The revenue details of the area are given below in table 3.

Table 2: The detail of the contracted- area

Sr. No.	Khasra Number	Area In Hectares	Status	Owner of Land	Kism	Mauza
1	61	6.2255	Kabja forest land	Government land	Gair Mumkin Darya	Satiwala
Total 6.2255Hectares						

2.3 Address & Details of Contract

Village: -	Satiwala
Panchayat: -	Satiwala
Post Office: -	Satiwala
Tahsil: -	Paonta Sahib
District: -	Sirmaur
Sub-Divisional Office (Civil):	Paonta Sahib
Divisional Office (Forest): -	Paonta Sahib
Range Office (Forest): -	Paonta Sahib
Sub Divisional Office (IPH): -	Paonta Sahib
Sub Divisional Office (PWD): -	Paonta Sahib
State :	Himachal Pradesh.

2.4 Distances from Important Places:

The important distances, from the contract area are given below in table 2.

Table 3 :Showing important distances from the area.

Sr. No	Place	Distance
1	Paonta Sahib (Sub- Division Office) • **Road**	12 Km
2	Nahan (District Headquarter) • **Road**	46 Km
3	Shimla (State Capital), • **Road** • **Narrow gauge Railway** • **Airport**	180 Km
4	Chandigarh, (U.T.) • **Road** • **Broad Gauge Railway** • **Airport**	116 Km
5	Dehradun	

	• Road • Broad gauge Railway • Airport (Jolly Grant)	57 Km 57 Km 86 Km

2.5 Approach of the Area

Figure 2: Approach to the Quarry site.

The area is approachable from Paonta Sahib via NH 7 and then via NH907 and further by Track through the river bed as shown in figure 2.

3. Physiographical Aspect of the Area

3. 1 General

The contract area is situated in the Kiar –Da- Dun. In general the area is a part of Siwalik range, particularly the part of Dun Valley .The Siwalik Hills are located within the political boundaries of Pakistan, India, Nepal, and Bhutan, and ranges between 6 to 90 km in width. They gradually become steeper and narrower in relief and width respectively, from northern Pakistan to Bhutan (over 2000 km in length). Ongoing erosion and tectonic activity has greatly affected the topography of the Siwaliks. Their present-day morphology is comprised of hogback ridges, consequent, subsequent, obsequent, and resquent valleys of various orders, gullies, choes (seasonal streams), earth-pillars, rilled earth buttresses of conglomerate formations, semi-circular

choe-divides, talus cones, colluvial cones, water-gaps, and choe terraces. Associated badlands features include the lack of vegetation, steep slopes, high drainage density, and rapid erosion rates. To the south of the Siwaliks are the Indo-Gangetic plains and in the north, the Lesser Himalayas border them

Intermittently located between the Siwaliks and the Lesser Himalayas (exclusively in India and Nepal) are *duns*, flat-bottomed longitudinal structural valleys with their own drainage systems. These essentially comprise several large Himalayan piedmont alluvial fans and terraces, which formed as a result of tectonic episodes in the flanking Siwaliks. The *duns* also consist of lacustrine, fluvial, aeolian and swamp-environment deposits, and range from Middle Pleistocene to Holocene in age. During their formative stage, most of the *duns* were slightly narrower and have gradually expanded over time through the erosion of the adjacent Siwaliks sediments (a continuing process). In Nepal, these *duns* were often naturally filled with alluvial sediments of lacustrine and fluvial deposits, thus burying palaeolithic sites that were later exposed through erosion. The monsoon rains temporarily supply seasonal streams (locally known as choes, Rivers, or nalas) located both within the Siwaliks hills and the adjacent *duns*. These stream banks and their terraces yield sizeable numbers of lithic artefacts, owing to the shared location for both water and raw-material.

The district is bounded by Shimla District in the north and, Solan District in the north-west, state of Haryana in the south and west while the state of Uttarakhand makes its eastern boundary. Geographically the district can be divided into three parts (Figure 4).

1. The Trans – Giri(Giri Par Region)
2. Cis- Giri Region (Giri War Region)
3. Plains of Kiar-da-dun or dun valley

The Trans – Giri region consists of the mountains culminating into the Chur Peak which is commonly known as Chur Chandni Ki Dahr (the hill of silver bangle). It has an attitude of 3647 meter above the mean sea level. From this lofty mountain runs two ranges one in the north – west direction called Dhar Taproli-Jadol and other Dhar Nohra which runs south – east direction toward Haripur Fort at an altitude of 2677 meter above the mean sea level where it is divided into two ranges, one of which runs almost east to the valley of Tons. Two other ranges run north – west called Dudham Dhar and south- west with many minor spurs from them toward the GiriRiver. The second range initially runs south – west under the name of Dhar Nagali and

then turns to east under the name of Dhar Kamrau. Dhar Shalai runs parallel to this Dhar ub northern side and both form the valleys of NeraRiver.

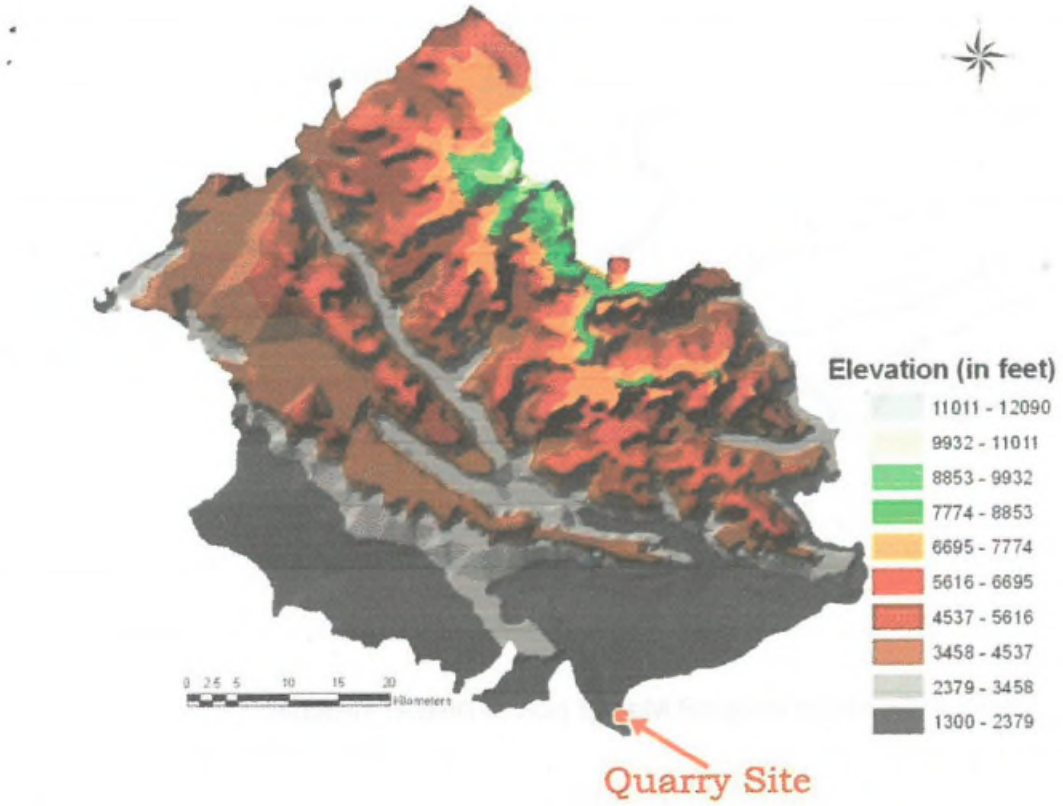


Figure 3: Showing the 3-D Surface view of District Sirmaur.

The Cis- Giri region is intersected by three main ranges which runs from north-west to south –east, the Sain Dhar which runs parallel to the Giri River. The second is the Dharti Dhar or what is called little range. Between these two ranges flows Jalan River. The third is quite low range, which runs from Kala Amb area to south of Nahan tehsil and form an open valley with Dahi Dahr. In the western half of this flow the Markanda River. **Between eastern extremities of this Dharti Dhar lies open valley Known as Kiar –da – dun valley which border the Yamuna and Giri River in the east and form the boundary of District with Uttrakhand**. It also touches western portion of Nahan tehsil. This flat valley is irrigated by Bata River which flows from east to west originating from Dhati Dhar.

Geomorphologically the district can be divided into three zones

1. Steep to very steep high hills of lesser Himalaya
2. Moderately steep to steep low hills and intervening valleys of Siwalik
3. Piedmont Plains

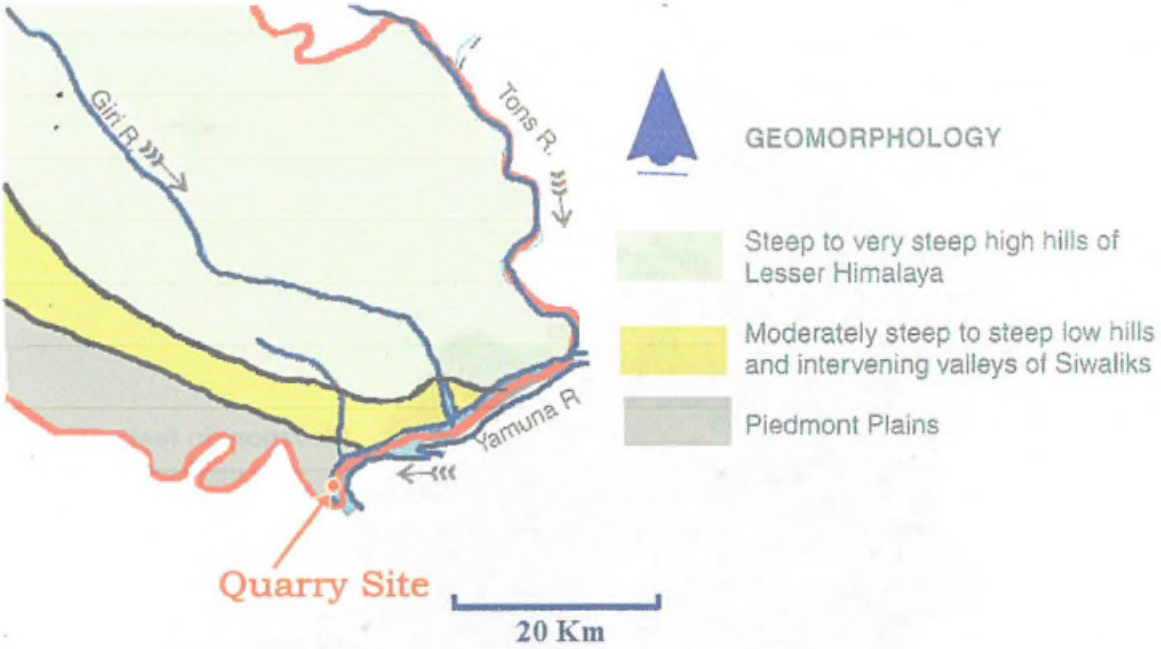


Figure 4: Geomorphological Map of part of District Sirmaur.

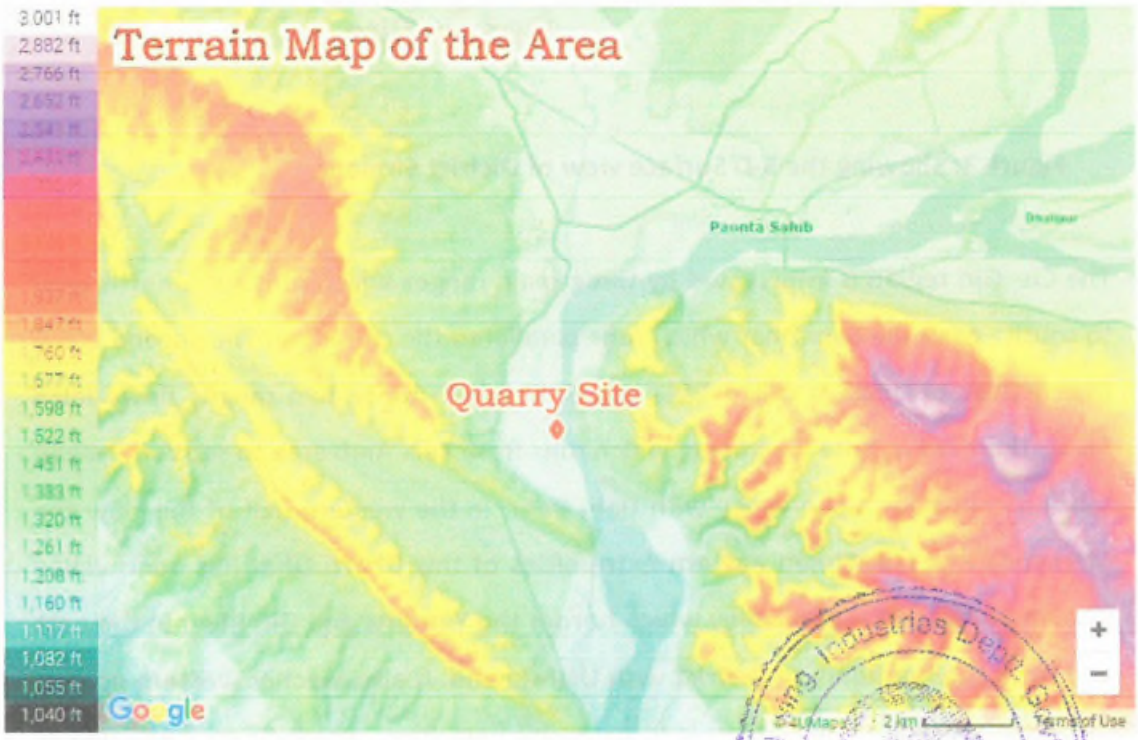


Figure 5 Terrain Map of the area.

The contract is situated in the River Yamuna, a primary tributary of the River Ganga.The river Yamuna, a major tributary of river Ganges, originates from the Yamunotri glacier near Bander Poonch peaks (38° 59' N 78° 27' E) at an elevation of about 6387 meters above mean sea level in district Uttarkashi (Uttrakhand). The Yamuna catchment drains the Punjab- Kimaon Himalayas from Shimla innorthhwest to Mussoorie in the southeast. After flowing in a southeasterly direction for about 120 Km, it is joined by its principal tributary, the Tons near Dakpathar. The Tons drains a large catchment area hence carries a large volume of water than the main river Yamuna. From the west, another important tributary, the Giri, Joins the main river near Paonta Sahib. The river pierces the lower Shiwalik range and enters the plains near Tajewala. From Tajewala onward it flows in a southerly direction for 240 km up to the Okhla headwater near Dehli. The Yamuna after receiving water through other important tributaries joins the river *Ganga* and the underground *Saraswati* at Prayag (Allahabad) after traversing about 950 Km.

The catchment of Yamuna river system covers parts of Uttar Pradesh, Uttrakhand, Himachal Pradesh, Haryana, Rajasthan, Madhya Pradesh & Delhi states. The tributaries contribute 70.9% of catchments area and balance 29.1% accounted for direct drainage into the Yamuna River or to the smaller tributaries.

3.2 Altitude of the area

- **The highest point of contracted area is 366 meters above mean sea level.**
- **The lowest point of the contracted- area is 363 meters above mean sea level.**

3.3 Climate of the Area

The Climate of the contract area can be classified into following three categories

1. Winter
2. Summer
3. Rainy

The climatic information given below is based on the data obtained from I.M.D. Archives, Pune. The Indian Meteorological Department is maintaining a Meteorological Station at Dhaulakuan (Poanta Sahib).

Climate of Contracted area, District Sirmaur,			
Climate	**Winter**	**Summer**	**Rainy**
Period	**Oct.-Mid March**	**Mid-March-June**	**July-September**
Weather	**Cool**	**Hot**	**Humid**

Temperature

The monthly Maximum and minimum temperature recorded at Nahan in the District is given below in the Figure 5.

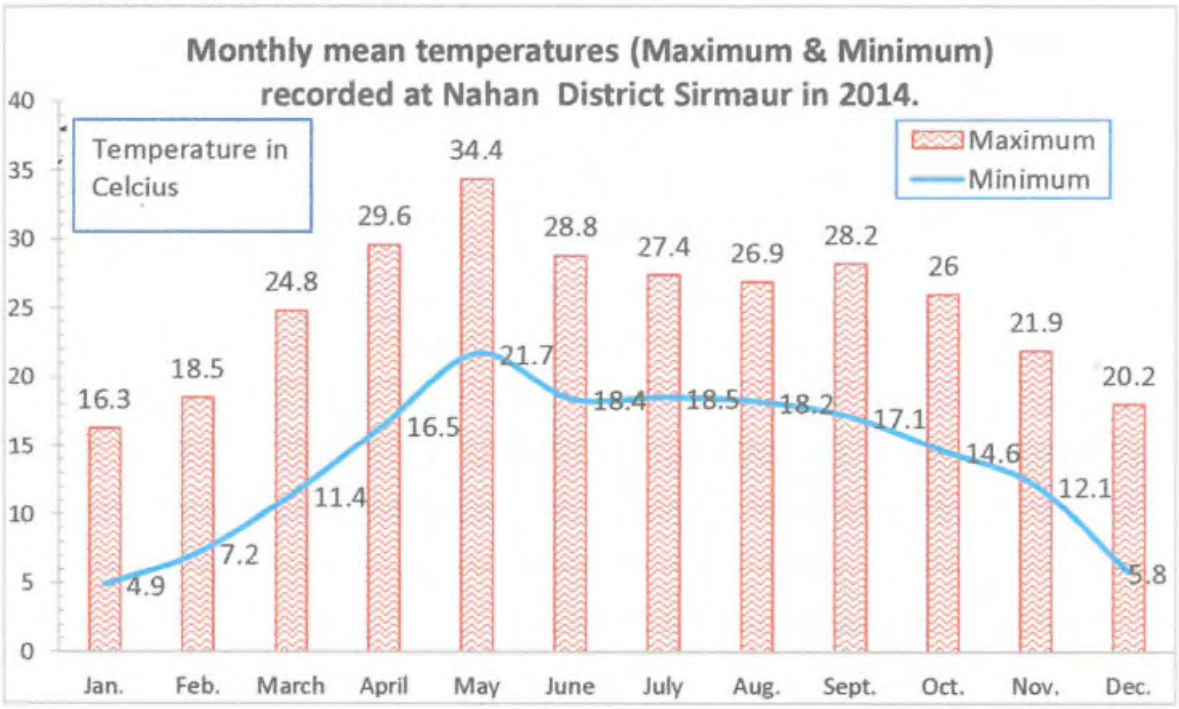


Figure 6: Showing average Monthly maximum & minimum temperature recorded at Nahan

3.4 Rainfall of the area

Year wise rainfall recorded in the district from 2004 to 2014 and mean of this period is shown in figure 6.

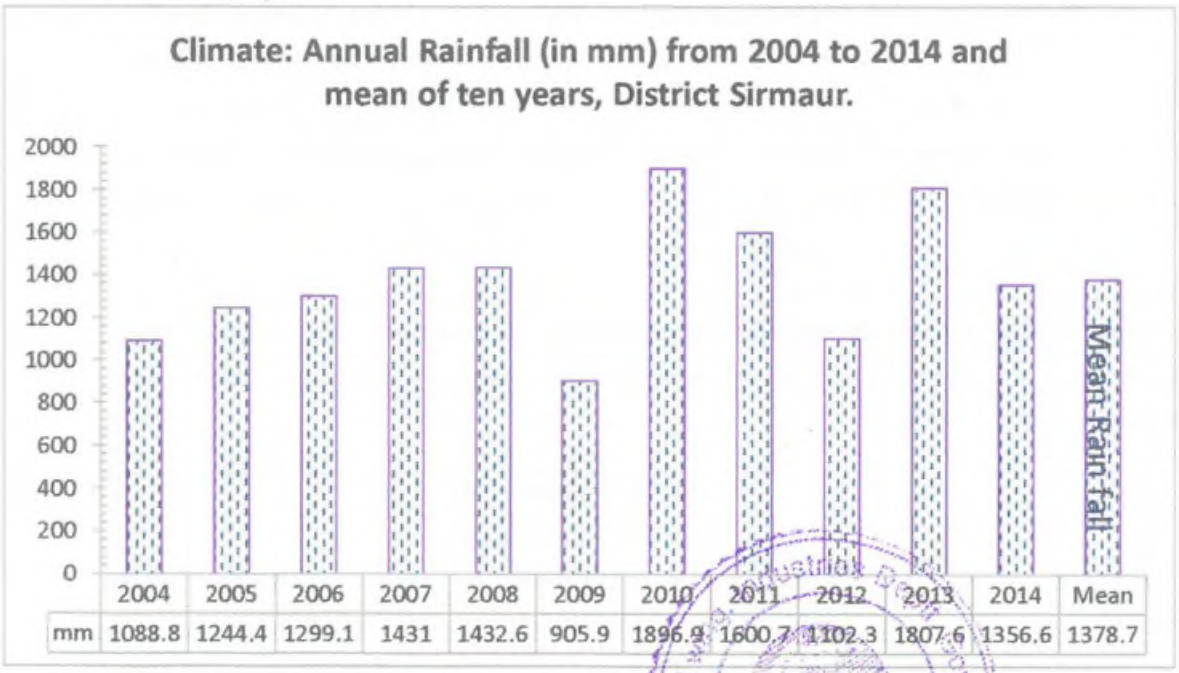


Figure 7: Rainfall data of the District from 2004 to 2014

3.5 Any Important feature

The area is part of River Yamuna falling Himachal Pradesh near the border with Uttarakhad.

PART I

1. DESCRIPTION OF GEOMORPHOLOGY AND MINE DEVELOPMEMT

1.1. General

The contract is situated in the River Yamuna, a primary tributary of the River Ganga. The river Yamuna, a major tributary of river Ganges, originates from the **Yamunotri** glacier near Banderpoonch peaks (38° 59' N 78° 27' E) at an elevation of about 6387 meters above mean sea level in district Uttarkashi (Uttrakhand).

1.2 Name of River/ Stream in which the contract is situated

The contract is situated in the Yamuna River, a primary tributary of the River Ganga.

1.3 Drainage System

Yamuna

1.4 Type of Drainage

Dendritic

1.5 Origin of River/Stream

The river Yamuna, a major tributary of river Ganges, originates from the Yamunotri glacier near Banderpoonch peaks (38° 59' N 78° 27' E) at an elevation of about 6387 meters above mean sea level in district Uttarkashi (Uttrakhand).

1.6 Altitude at Origin

6387 meters above Mean Sea Level.

1.7 Geometry of the catchment of the river

Geometry of YammunaRiver Catchment

Total area of catchment = 11394 SqKm

Area of Catchment up to the Himachal Pradesh = 11394 SqKm.

Number of Majortributaries on right bank = 13

Number ofMajor tributaries on left bank = 9

Stream order up to contract area = 4

Maximum length of water shed = 140 km

Maximum breadth of water shed = 125 Km

Length breadth ratio = 1: 1.2,

Higher the ratio, higher is the asymmetry of water shed.

Elevation at contract area = 375 M

Stage of the River- Sub-Mountainous Stage

Here river leaves the mountain and enters sub-mountainous tract. The slope of the river is obviously flatter.

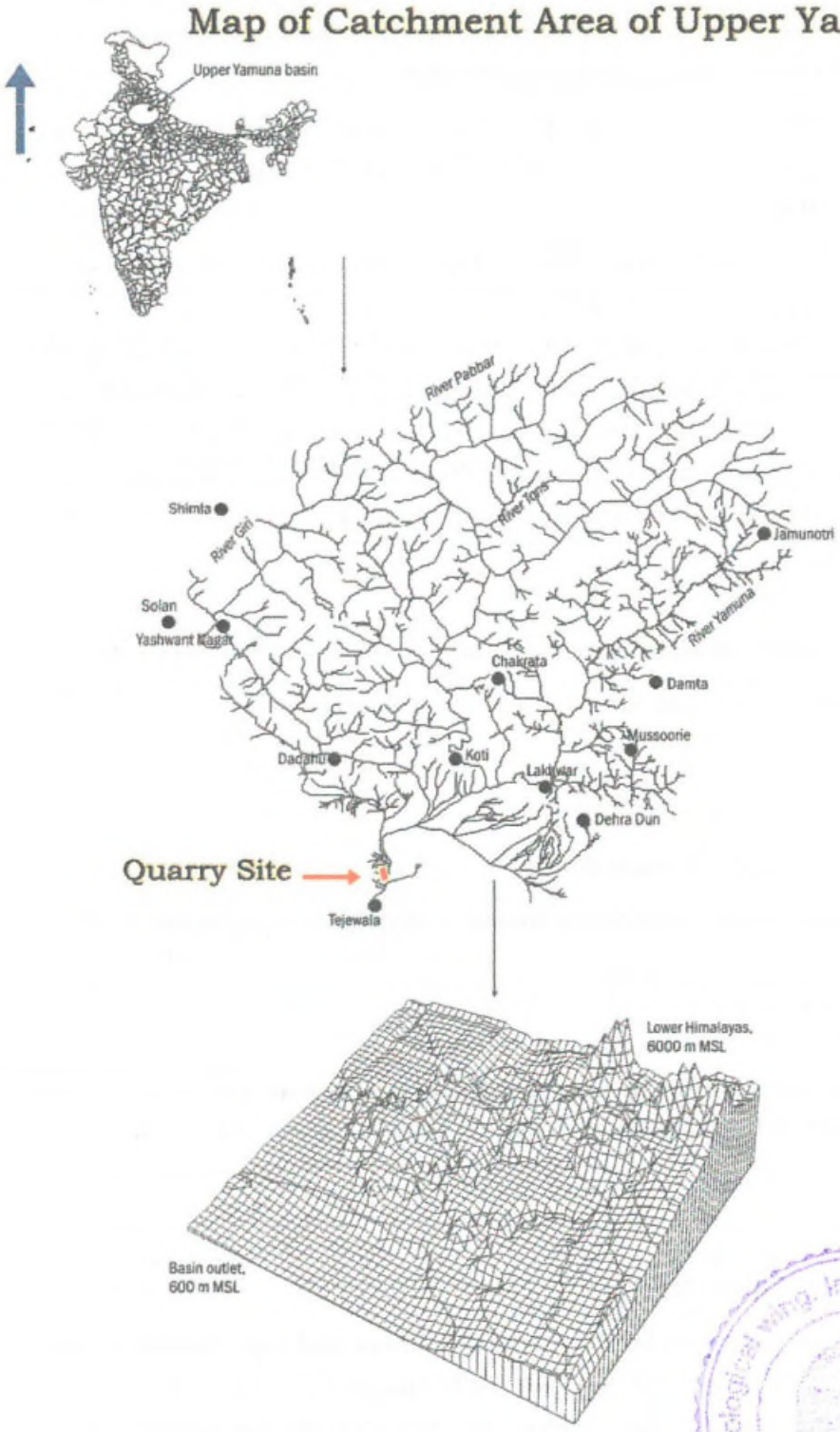


Figure 8: Upper Yamuna catchment area up to Tajewala Barrage.

1.8 The annual deposition at the place of mining:

The annual deposition of river-borne material brought down by the river water is about six centimeters in the contracted- area depending upon the Location. At some places, it may be more than the eight centimeters.

1.9 The Competency of the River/ Stream at the mining site

The general competency at the mining area is six to 30 Kilograms approx. The largest boulders vary 15 to 70 cm X 8 to 35 cm X12to 45cm (length X Width X height).

1.10 Meandering Pattern of River

Here river leaves the mountain and enters sub-mountainous tract. In this stage the bed is made up of a mixture of sand, shingle, gravel and boulders. As the bed material is very pervious there exists good amount of subsoil water flow. Rivers in this stage have straighter courses with wide bed and non-submersible banks. During flood period the coarse material comes in the river channel together with the high velocity flow and when the flood subsides these heavy and material piles up in heaps. The water flows around the heaps and the river flow is bifurcated. Thus, shifting braided and interlaced channels are formed in the river course.

1.10a.The level of HFL

During monsoon floods the water level rises to two to three metres, at times depending upon rainfall in the catchment areas and run off or when the water is released from Dak Pather barrage.

1.10b. The thread of deepest water in meandering.

The landform being depositional the meandering thread is constantly changing during the rainy season depending upon the water level.

1.11 Altitude of the area

- **The highest point of contracted area is 365 metres above mean sea level.**
- **The lowest point of the contracted- area is 363 metres above mean sea level**

2. Geology

2.1 Regional Geology (of Catchment Area)

Sirmaur District lying within the Lesser Himalaya and the Shiwalik Foothill comprises rocks ranging in age from Proterozoic to Quarternary. The oldest rocks of undifferentiated Proterozoic age belong to the Jutogh Group comprising canrbonaceous phyllite, schist, gneiss, quartzite and marble. The Chor granitoid (Undifferentiated Proterozoic age) occurs as an intrusive body within the Jutogh Group of rock. This granite body is well foliated and composed of gneisses, granite

with minor aplite and basic veinlets. The Sundernagar Group of Rocks of Meso-Proterozoic age is represented by quartzite with basic flows. The Deoban/ Shali Group of Rocks (Meso- Proterozoic) Comprising limestone, dolomite, (at places stromatolytic) slate, & quartzite occurs along the Main Boundary Fault and also in the northeastern parto of the District. The argillo- arenaceous sequence of Shimla/Jaunsaur Group rests unconformably over the Deoban Group. The Jaunsaur Group of areno-argillaceous rocks is homotaxial with Shimla Group and assigned Meso-Proterozoicage. Both Shimla and Jaunsaur Group of rocks are unconformably succeeded by the Baliana Group, comprising diamicite, pink dolomite, carbonaceous shale and slate besides quartzite bands. The Krol Group which overlies the Baliana Group is dominantly a carbonaceous sequence with minor shale and sandstone.

The Tal Group of Early Cambrian age is hetrolithic sequence of siltstone, dolomite, shale, ash grey tuff, chert/phosphorite, carbonaceous shale, grit and quartz arenite and recorded algal structures and trilobite. SubathuForamtion is exposed as window and outlier within outer Krol belt in TonsValley. It is composed of olive green shale, limestone, quartzite and laterite. The Sirmaur Group is represented by a thick pile of Palaeogene sediments exposed in the foothill, bounded by the Main Boundary Fault and Krol Thrust. It comprises shale, fossiliferous limestone, quartz arenite, siltstone, clay, sandstone and local pebble bed. The Shiwalik Group of Middle Miocene of Early Pleistocene age comprises coarse clastic fluviatile deposits of sandstone, clay and conglomerates. The Quaternary sediments (Older Alluvium and Newer Alluvium) along prominent channels consisting of sand, silt, clay, pebbles and cobbles occurring along present channels of Middle to Late Pleistone and Holocene age.

The general trend of the rocks is NW-SE and E-W directions with dip varying from 10º to 40º on eitherside. Beside Main Boundary Fault, Krol, Giri, Chail and Jutogh Thrust two major synformal axes running NW-SE also passes through Krol and Tal Group of rocks.

The figure 9 shows regional geology of the area and the general stratigraphy of the district.

2.2 Local Geology

The rocks of the Giri-Yamuna Catchments mainly belong to pre –Cambrian to the Siwalik Group, Older Alluvium and Newer Alluvium. The stratigraphy of the effective Catchments is given in the table below and the geology of the area is given in the figure 9.

The contracted-out area forms a part of the stream bed covered with boulders, cobbles, pebbles, river born bajri, and sand and clay deposit of Channel alluvium. The rocks along the banks are Terrace Alluvium and Fan Alluvium and in higher reach of catchments Upper Siwalik Formation

The lithostratigraphy of the area near contract is given below in figure 9.

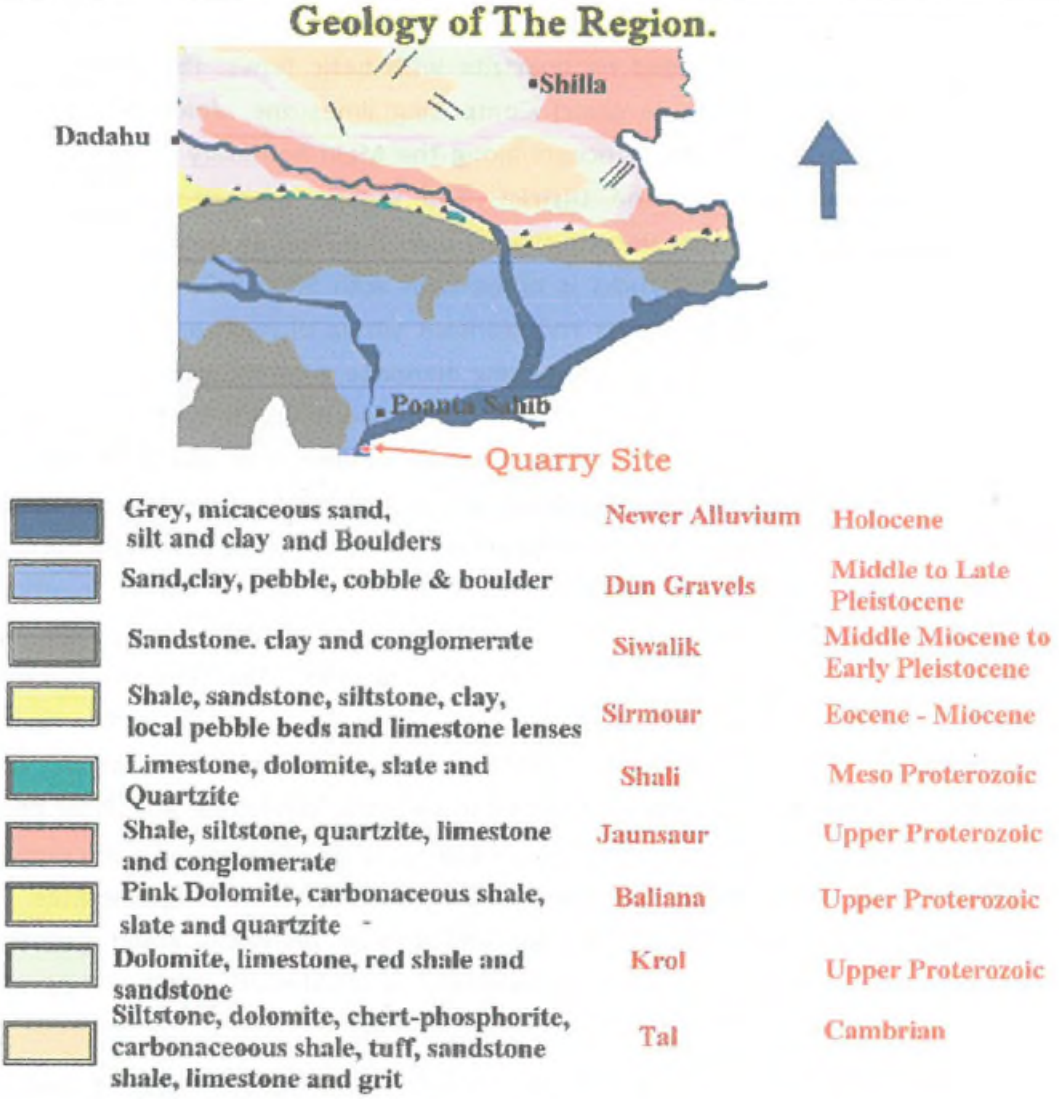


Figure 9; Geological Map of The Region.

2. 3.1: Siwalik Group

The Siwalik deposits are one of the most comprehensively studied fluvial sequences in the world. They comprise mudstones, sandstones, and coarsely bedded conglomerates laid down when the region was a vast basin during Middle Miocene, to Upper Pleistocene times. The sediments were deposited by rivers flowing southwards from the Greater Himalayas, resulting in extensive multi-ordered drainage systems. Following this deposition, the sediments were uplifted through intense tectonic regimes (commencing in Upper Miocene times), subsequently resulting in a unique topographical entity - the Siwalik Hills. The Siwalik are divided stratigraphically into three major Subgroups - Lower, Middle, and Upper. These Subgroups are further divided into individual Formations that are all laterally and vertically exposed today in varying linear and random patterns.

Ongoing erosion and tectonic activity has greatly affected the topography of the Siwalik. Their present-day morphology is comprised of hogback ridges, consequent, subsequent, obsequent, and resquent valleys of various orders, gullies, choes (seasonal streams), and earth-pillars, rilled earth buttresses of conglomerate formations, semi-circular choe-divides, talus cones, colluvial cones, water-gaps, and choe terraces. Associated badlands features include the lack of vegetation, steep slopes, high drainage density, and rapid erosion rates.

Table 4

Table-6: Lithostatigraphyof theGiri River surrounding the contract area

Group			Lithology	Age
Newer Alluvium	Channel Alluvium		Grey micaceous, fine to coarse grained sand, silt and clay	Quarternary
	Terrace Alluvium		Cyclic sequence of grey micaceous sand, silt and clay	
	Fan Alluvium		Brownish grey clay, sand and gravel with boulders	
Older Alluvium	Dun Gravels		Multi-cyclic sequence of brown to grey silt, clay with kankar and reddish brown to grey micaceous sand with pebbles	
Siwalik Group	Upper Siwalik	B	Predominantly massive conglomerate with red and orange clay as matrix and minor sandstone and earthy buff and brown clay stone	Neogene
		A	Sandstone, clay and conglomerate alternation	
	Middle Siwalik	B	Massive Sandstone with minor conglomerate and local variegated clay stone	
		A	Predominantly medium to coarse- grained sandstone and red clay alternation, soft pebbly with subordinate clay-stone, locally thick prism of conglomerate	
	Lower Siwalik	B	Alternation of fine to medium- grained sporadically pebbly sandstone, calcareous cement and prominent chocolate and medium maroon clay-stone in the middle part	
		A	Red and mauve clay stone with thin intercalations of medium to fine grained sandstone	

In the advent of Neogene, a depression was formed in front of the rising mountains (Proto-Himalaya). This depression becomes a repository of a thick sequence of molassic sediments

of the Siwalik.The Siwalik Group comprising conglomerates friable micaceous sandstone, siltstone and clay-stone.

The conglomerates in general are poorly cemented but at places they are very hard. These consist mainly of pebbles and cobbles of quartzite. The stray pebbles of granite, limestone, sandstone, breccias and lumps of clay-stone are also observed at places. Often the size of pebbles is large enough to be called as Boulders. The conglomerates not only occur as regular band but also as lenticular bands alternative with micaceous sandstone and clay-beds. The sediments were bought down 2 to 25 million years ago by the numerous fast flowing rivers issuing forth from rapidly RisingMountain mass of the Himalaya, in the north.

The Siwalik Group is divisible into three sub-groups respectively the Lower, Middle and Upper based on the lithostratigraphy as given in the table 6.

Lower Siwalik: - The lower Siwalik consists essentially of a sandstone-clay alternation. In district Sirmaur the lower sequence of the lower Siwalik consists of medium grained subgraywacke inter-bedded with thick red clay, but higher up in sequence, sandstones are coarser and clasts become more frequent while the clays are less developed. The uppermost horizon consists of conglomerate with well-rounded clasts of grey quartzite possible derived from the Shali. The total thickness is 1600 mts .

Middle Siwalik: - The Middle Siwalik Sub group comprises of large thickness of coarse micaceous sandstone along with some inter-beds of earthy clay and conglomerate. It normally succeeds the Lower Siwalik along a gradational contact. The sandstone is less sorted than those in Lower Siwalik. Clay bends are dull coloured and silty. The general thickness is 1400 to 2000 metres.

Upper Siwalik: -The Upper Siwalik is mainly represented by sandstone inter-bedded with silt and conglomerate. The lower portion of the Upper Siwalik mainly consists of soft, massive, pebbly sandstone with intercalations of conglomerates. In the upper portion the conglomerate intercalation is replaced by the clays intercalations. The general thickness in the district is 2300 metres.

2.2.2 Older Alluvium

The Older Alluvium in Dun valley is designated as Dun Gravels while in the plains as Varanasi (= Ambala). It is a multi-cyclic sequence of brown to grey silt, clay with kankar and reddish brown to grey micaceous sand with pebbles.

2.2.3 Newer Alluvium

Newer Alluvium has been subdivided into Fan Alluvium composing brownish grey clay, sand and gravel sequence, and lies un-conformably over Older Alluvium within a narrow zone immediately to the south of Siwalik hill. Trace alluvium exposed as depositional terraces of Yamuna River, is composed of cyclic sequence of grey, micaceous, fine to coarse grained

sand, silt and clays. Channel alluvium exposed as point bar/channel bars within the active channels is composed of grey, fine to coarse micaceous sand and silts.

The area is comprising predominantly the quartzite Boulders, Sand and river born bajri of Sandstone.

The boulders are white, spotted white, greenish white, pink, purple and dark green in colour.

The geology of the contracted-out area is given in figure 8 & 9 and Map 2.

2.3 Nature of the Boulder/ Cobble/ Sand.

The area lies within the regular course of the Giri River gets flooded in the rainy season

All the deposit comprises quartzite, sand and fraction of granite, limestone and breccias- fragments. The boulders are white, spotted white, greenish white, pink, purple and dark green in colour. Quartzite fragments are rounded, sub- rounded and discoidal in shape having smooth surface. Their size varies from gravel to boulder.

Thickness of the deposit is more than ten metres.

During the monsoon this bed replenishes to a large extend from the Siwalik and Dharamshala Formation rocks due to erosion by heavy flow in higher reached. Due to sudden decrease in the carrying capacity and competency of the river the annual deposition of 1 to 3 cm is received.

Photo 1: **Showing the nature of the Boulders of the Yamuna River in the contracted area.**

Photo 2: Showing the lease area

2.4 The Nature of the rock along the bank

The rocks along the bank belong to Terrace alluvium and Dun gravel of Newer Alluvium Formation consisting of silt, clay, Sand and boulders, pebbles, cobbles etc.

2.5 description of Annual Deposition with respect to Geology of the Catchment and other factors

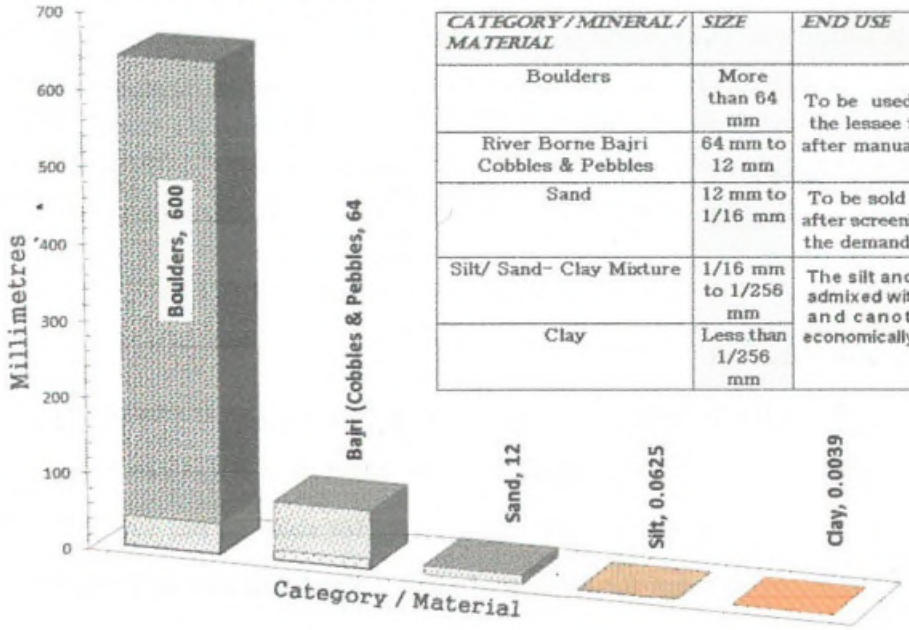
The catchment area of about 12000 square kilometres, comprises of Cambrian to Siwalik formations and thus, has very large area for the replenishment of sediments as compare to the quantum of proposed extraction of mineral. The rocks in the catchment consist of granite, quartzite sandstone limestone etc. The catchment area is eroded by frosty snow in winter and heavy rains of monsoons.

3 Reserve Estimate

3.1 Percentage wise distribution of Mineral

The mining contract area consist of mainly boulders, Bajri, cobbles, gravels, sand silt & clay. However, from commercial point of view it can be classified as stone, Bajri, sand & silt. However, to verify the surface observations, a trial pit was dug having dimensions of 1 m. * 1 m. * 1 m. (Length * width * depth) and to estimate the percentage of each separated and weighed. The constituents of the contract area are shown in figure 10. The percentage thus arrive is depicted in figure 11.

Classificationof River bed Material According to Size (in Millimetres).



CATEGORY / MINERAL / MATERIAL	*SIZE*	*END USE*
Boulders	More than 64 mm	To be used in crusher of the lessee for making grit after manually hand picking
River Borne Bajri Cobbles & Pebbles	64 mm to 12 mm	
Sand	12 mm to 1/16 mm	To be sold in open market after screening, depending on the demand in local market
Silt/ Sand- Clay Mixture	1/16 mm to 1/256 mm	The silt and clay are totally admixed with sand and bajri and canot be separated economically at the mine site.
Clay	Less than 1/256 mm	

Figure 10: Constituents of Deposit.

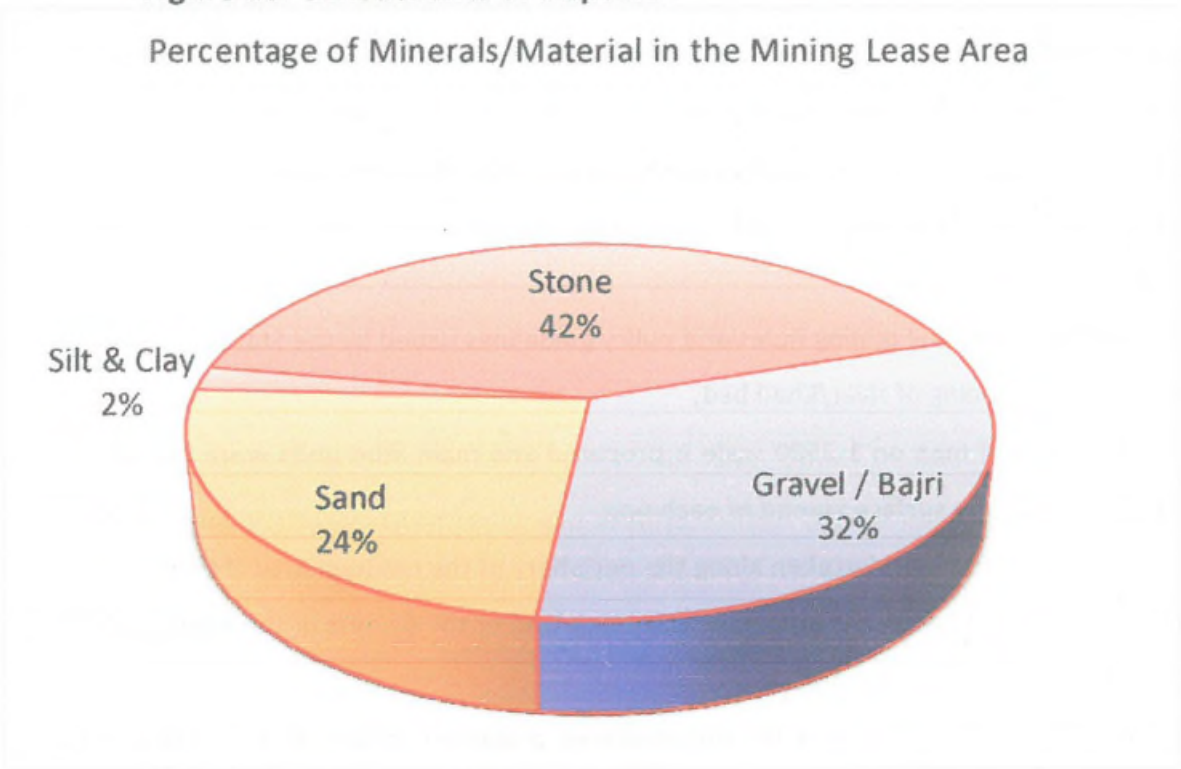


Figure 11: Percentage of material.

3.1a Specific Gravity

The specific gravity of Quartzite and other boulders and bajri is 2.65 and of wet sand is 1.92. Hence, average specific gravity of 2.25 is taken for calculation of the deposit.

3.6 Estimate of Geological Reserve.

The entire block falls within the River corridor. Thus, the mining contract area of 62255 square metres can be considered for estimation of geological Deposit. The estimated thickness of deposit is more than ten metres. However, considering its depth for purpose of estimation of Geological reserves to a depth five metres and specific gravity to be 2.25, the Geological deposits in the area are to a tune of about 700000 metric tons.

3.4. Estimate of Mine able reserves

The basic requirement of the contractor will stone & river born bajri for sale in the market. Hence, the applicants intend to mine stone, bajri& sand by hand shoveling into tractor trolleys / tipper trucks and to transport to the construction site for sale. As per the policy guidelines issued by the State Government for Mining of River / Khad bed and to calculate the mineable reserve the following points are taken into consideration:

The Rule 23(6) (i) stipulates 'the depth of pit below the surface shall not exceed 1 metre from adjoining ground in case of river/stream.

The Rule 23(6) (ii) stipulates natural flow of the water shall not be disturbed.

The Rule 34 (iii) stipulates the depth of mining in the river bed shall not exceed one metre or water level whichever is less.

Thus, keeping in view the mining Rules and policy guidelines issued by the State Government for Mining of river/khad bed,

- ✓ A geological map on 1:2500 scale is prepared and main litho-units were marked on the plan to know the surface spread of each unit.
- ✓ No mining is to be undertaken along the periphery of the contract area if the mining is likely to cause any adverse impact on the adjoining land or the owners of the adjoining land has not given his consent for mining.
- ✓ Since the auctioned Khasra No encompasses protected Forest, three metres extra buffer zone is provided for its unintended damage.
- ✓ Thus, three-meter area is proposed as safety zone as the depth of mining is constrained to one metre.
- ✓ Contract area is situated well within the meandering corridor of Yamuna River

✓ No mining zone is defined after considering the 5-meter safe distance from the bank (HFL)or 1/10 of width from the bank to bank. The width of River is about 631 to 781 metres. Thus, a safe zone from banks (HFL) of 63 to 78 metres has been provided.

✓ The water table level will go down as the water recedes after the monsoon.

✓ The depth of water table will at lowest in the pre-monsoon season.

The study of the area indicates that depth varying from 0.2 meter to more than a meter for mining will be available in the contract area keeping in view numerous factors, such as:

- Season- that is post- monsoon to pre- monsoon.
- Nature river- It is seasonal or *perennial*.
- Distance from water flow.
- Height above surface water level.
- Width of river.
- Age of river at mining site.

✓ Thus, the calculation for mineable reserves become complex. In all it was computed, based on local study and keeping above consideration in view, that on an *average 0.86 meters* mining depth can be assumed for the entire mineable area. Therefore, from a safe block of 62255 square metre it is estimated that about 53540 cubic metres of material will be exploited.

✓ Though the river is perennial but during the non-monsoon period the water recedes to an extent and most mining contract part of the river bed is dry. Hence mining will be possible in all the area only during the dry seasons and dry parts. It will therefore, will not be possible to exploit minerals up to one metre depth in the entire block. Keeping in view rate of replenishment of the River Yamuna in the area the entire block is considered for mining. Thus, the block will be rested only during monsoons for replenishment. The mining in the area will be undertaken only for nine non-monsoon months

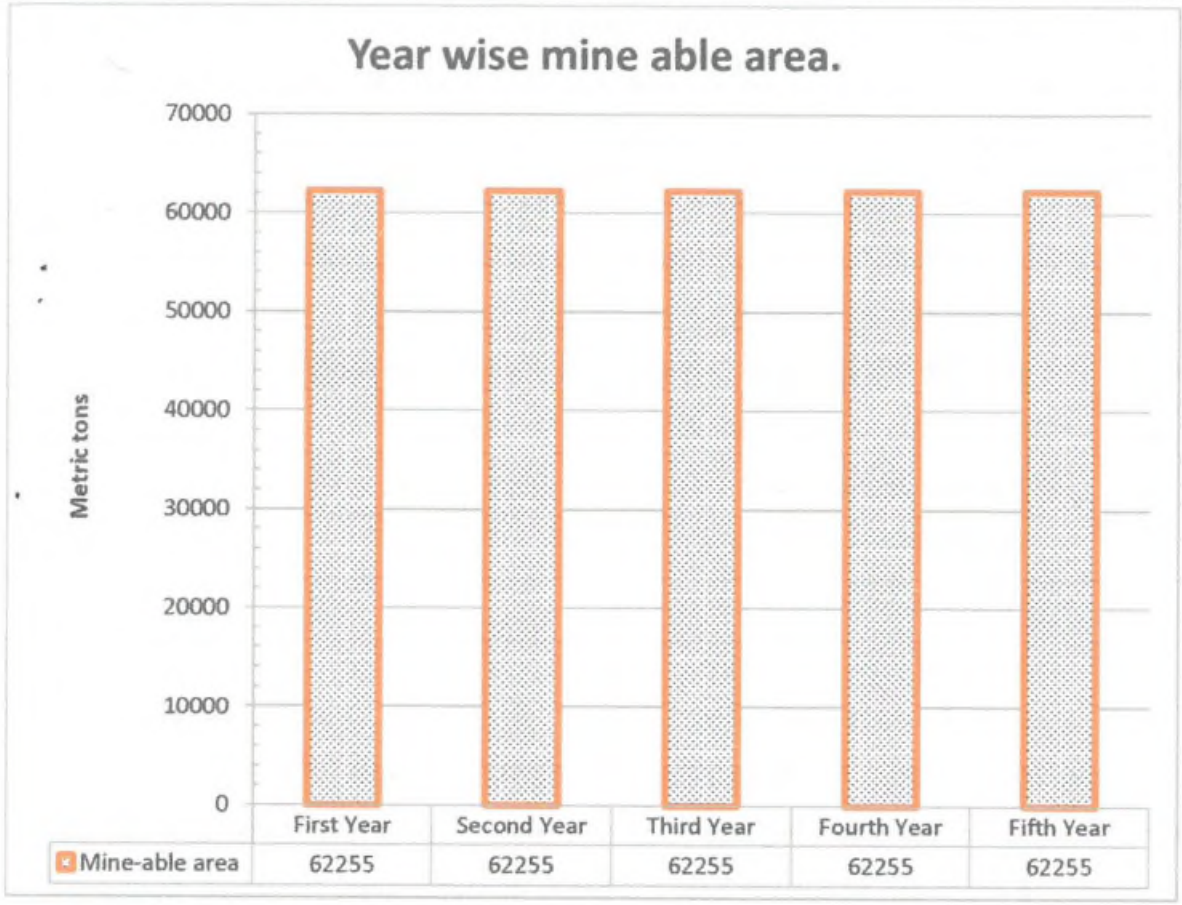


Figure 12:Showing year wise mine-able area.

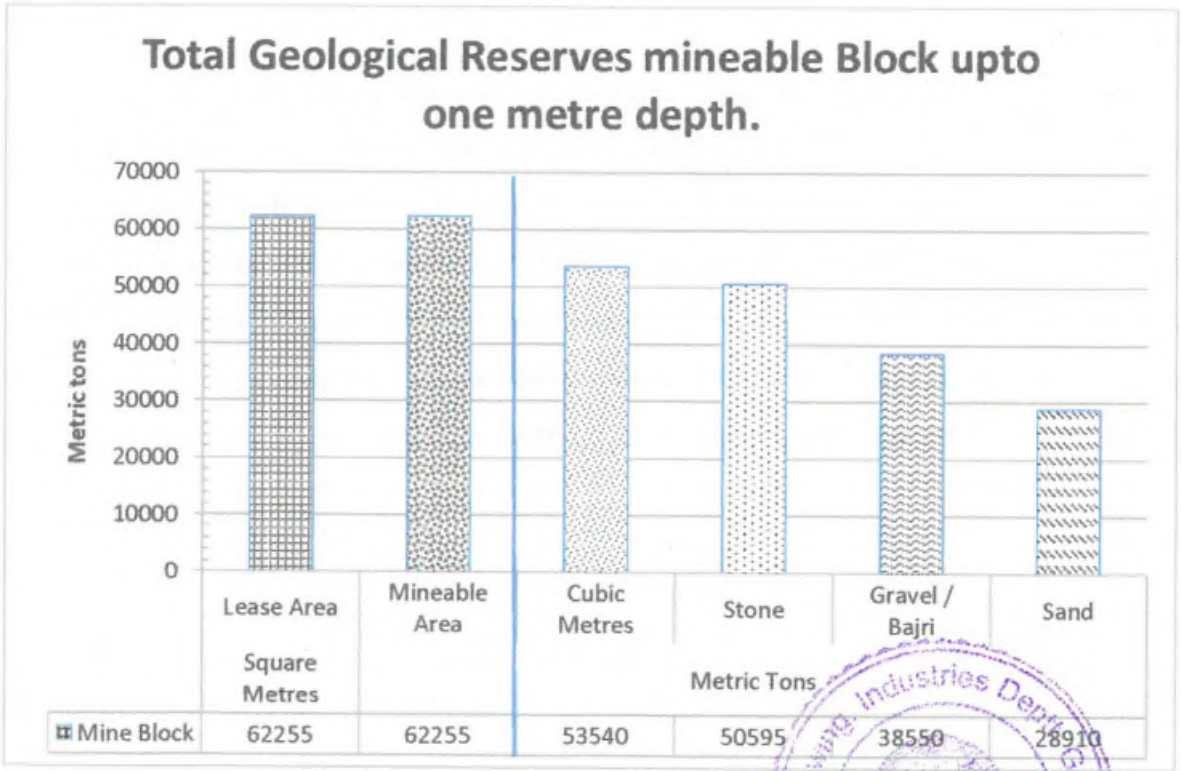


Figure 13: Block wise mineable Reserves.

3.4 Estimate Annual Deposition of Mineral

The annual replenishment of the material depends on the discharge, grade of river and geology of catchment area. The factor of six cms annual replenishment is assumed, while calculating the reserve. However, it is generally observed that replenishment of more than eight cm occurs in a year as all the old pits get filled with mineral during the very first flood of the monsoon. *Hence mined out area of the pre- monsoon will be filled with mineral during monsoon and even during winter rains.*

It is pertinent to mention that floods carry load from about 12000 square kilometres of catchment area above mining contract.

3.5 Depth of Mining.

The depth of mining in the contract area does not exceed one metre or water level whichever is less.

4. MINE DEVELOPMENT AND PLAN OF PROGRESSIVE MINING

4.1 Development & Production Program

The mining / collection of minerals shall involve shoveling by simple hand-tool, manual sorting / picking and stacking in the form of dumps at site and loading into truck / tractors-trailers for transporting them to market.

- No blasting is required.
- Only manual extraction of sand will be undertaken.
- Mining activity will be undertaken only during the dry seasons and dry parts of the river.
- The contract area is having gentle slope with the gradient of hardly 7', hence, tracks for the movement of tipper trucks and tractors can be made and maintained in any part of the contract area.
- Trenches and pits for the mining purposes shall be made in such a way so that these are not deeper than one metre and follow the general / normal channel direction of the River.
- *The silt & clay are mixed with sand and can only be separated by washing. Washing of sand in the river will pollute the river water. However, the silt being small percentage of sand finds ready market, therefore it will be sold along with sand.*

4.2 Year wise Production

The year wise working is shown in the map 3. The year wise production of the all category is shown in the figure 14, 15, 16, 17& 18.

4.2a Production of the First Year

Out of the total 62255 square metres of auctioned area 53540 cubic metre material will be mined during the year.

- 50595 metric tons of Boulder and 38550 metric tons of Bajri will be produced which will be sold in the market.
- 28910 metric tons of sand will be produced and sold along with inseparable 2410 metric tons of silt/clay in open market depending upon demand.

✓ There is no area within mining contract which can be used for plantation.

✓ The auctioned area is confined within the river corridor. Moreover, the Yamuna River when in spate rises about two to three metres for short spells and there is no place along bank which can be protected with check dams.

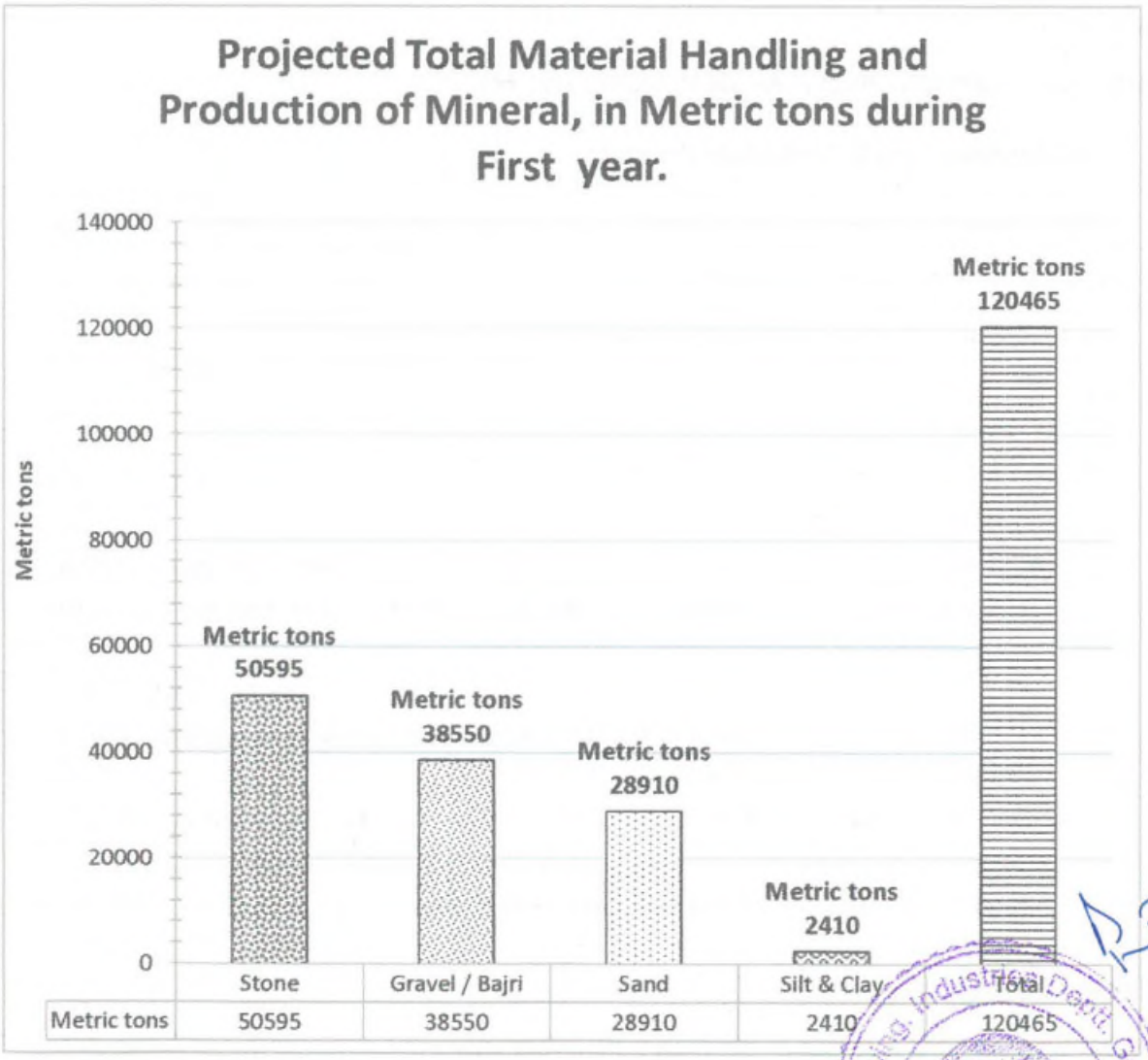


Figure 14: Proposed production and Total material handling in first Year.

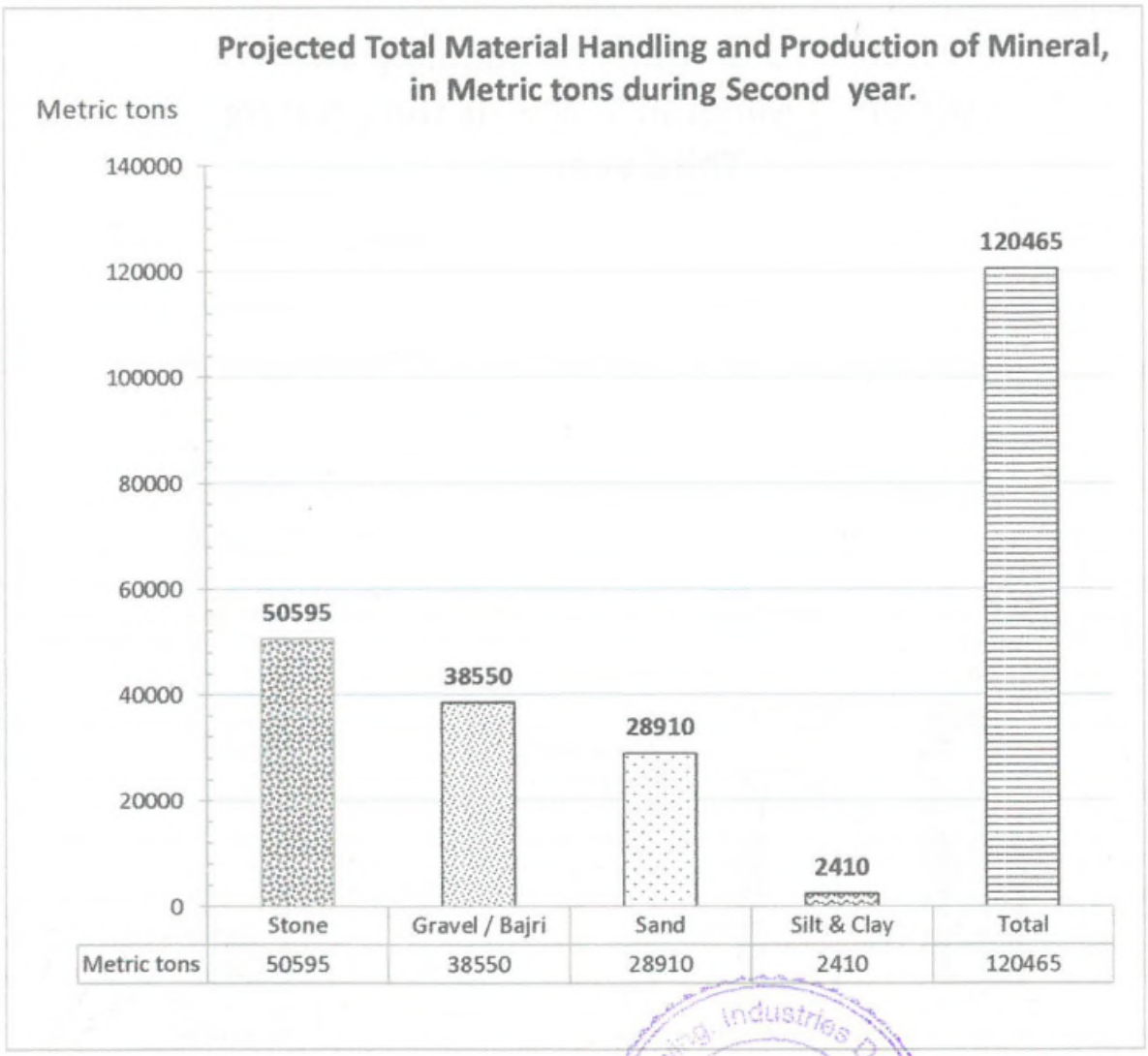
4.2b Production of the Second Year:

Out of the total 62255 square metres of auctioned area 53540 cubic metre material will be mined during the year.

- 50595 metric tons of Boulder and 38550 metric tons of Bajri will be produced which will be sold in the market.
- 28910 metric tons of sand will be produced and sold along with inseparable 2410 metric tons of silt/clay in open market depending upon demand.

✓ There is no area within mining contract which can be used for plantation.

✓ The auctioned area is confined within the river corridor. Moreover, the Yamuna River when in spate rises about two to three metres for short spells and there is no place along bank which can be protected with check dams.



	Stone	Gravel / Bajri	Sand	Silt & Clay	Total
Metric tons	50595	38550	28910	2410	120465

Figure 15:Proposed production and Total material of the Second Year.

4.2c Production of the Third Year.

Out of the total 62255 square metres of auctioned area 53540 cubic metre material will be mined during the year.

- 50595 metric tons of Boulder and 38550 metric tons of Bajri will be produced which will be sold in the market.
- 28910 metric tons of sand will be produced and sold along with inseparable 2410 metric tons of silt/clay in open market depending upon demand.

✓ There is no area within mining contract which can be used for plantation.

✓ The auctioned area is confined within the river corridor. Moreover, the Yamuna River when in spate rises about two to three metres for short spells and there is no place along bank which can be protected with check dams.

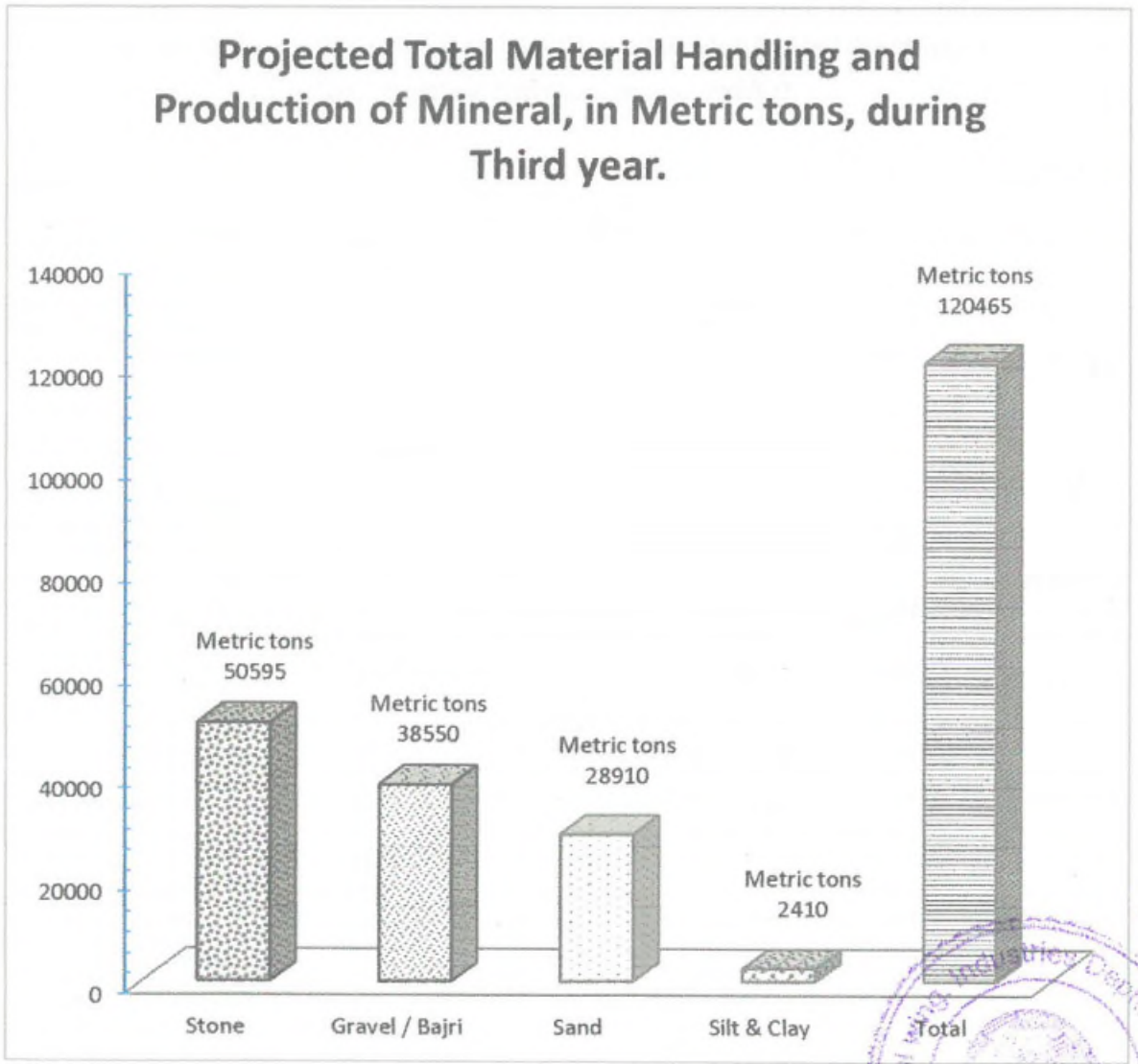


Figure 16: Proposed production and Total material of the 3rd Year.

4.2dProduction of the Fourth Year

Out of the total 62255 square metres of auctioned area 53540 cubic metre material will be mined during the year.

- 50595 metric tons of Boulder and 38550 metric tons of Bajri will be produced which will be sold in the market.
- 28910 metric tons of sand will be produced and sold along with inseparable 2410 metric tons of silt/clay in open market depending upon demand.

✓ There is no area within mining contract which can be used for plantation.

✓ The auctioned area is confined within the river corridor. Moreover, the Yamuna River when in spate rises about two to three metres for short spells and there is no place along bank which can be protected with check dams.

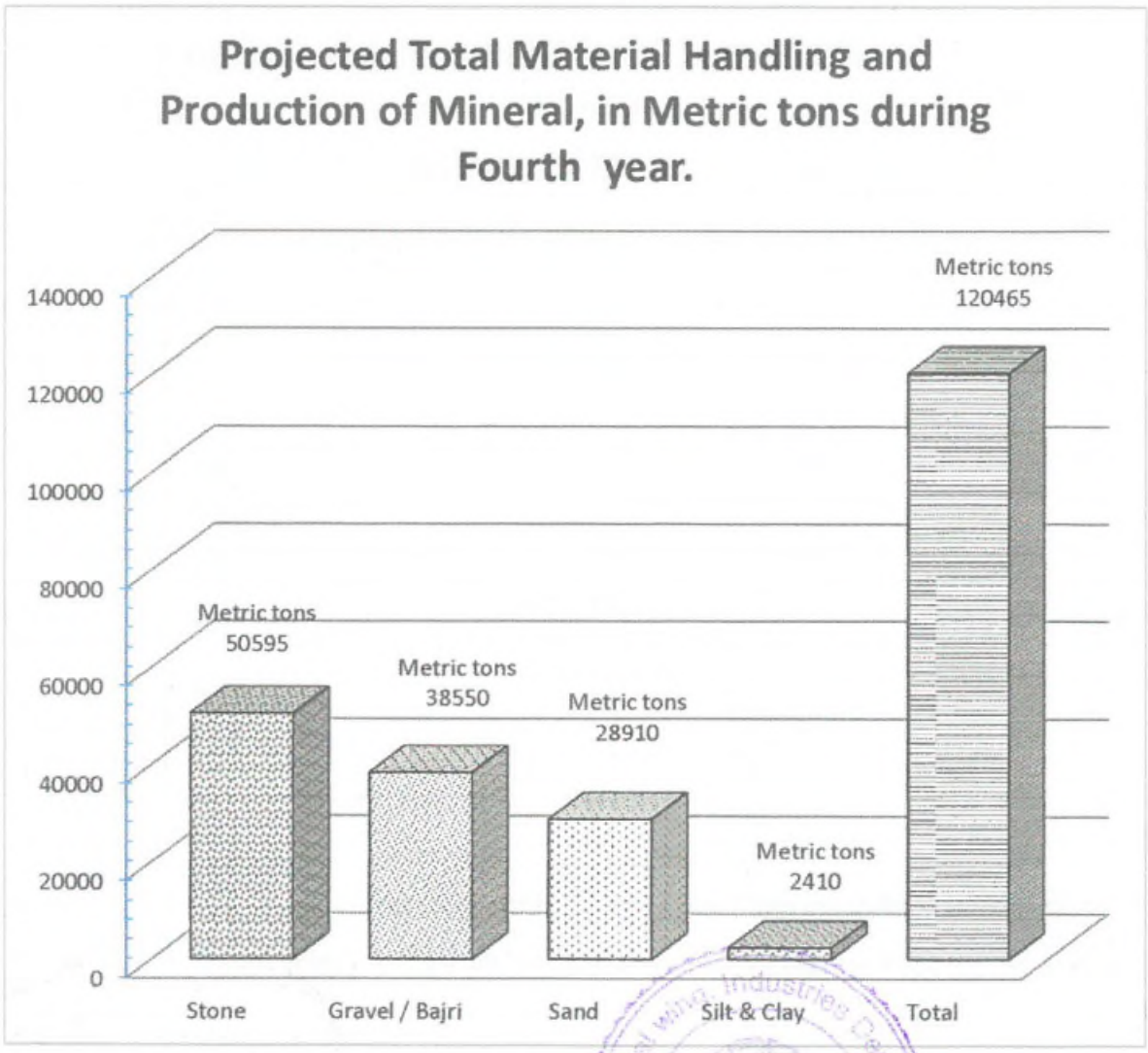


Figure 17: Proposed production and Total material of the 4th Year.

4.2e Production of the Fifth Year

Out of the total 62255 square metres of auctioned area 53540 cubic metre material will be mined during the year.

- 50595 metric tons of Boulder and 38550 metric tons of Bajri will be produced which will be sold in the market.
- 28910 metric tons of sand will be produced and sold along with inseparable 2410 metric tons of silt/clay in open market depending upon demand.

✓ There is no area within mining contract which can be used for plantation.

✓ The auctioned area is confined within the river corridor. Moreover, the Yamuna River when in spate rises about two to three metres for short spells and there is no place along bank which can be protected with check dams.

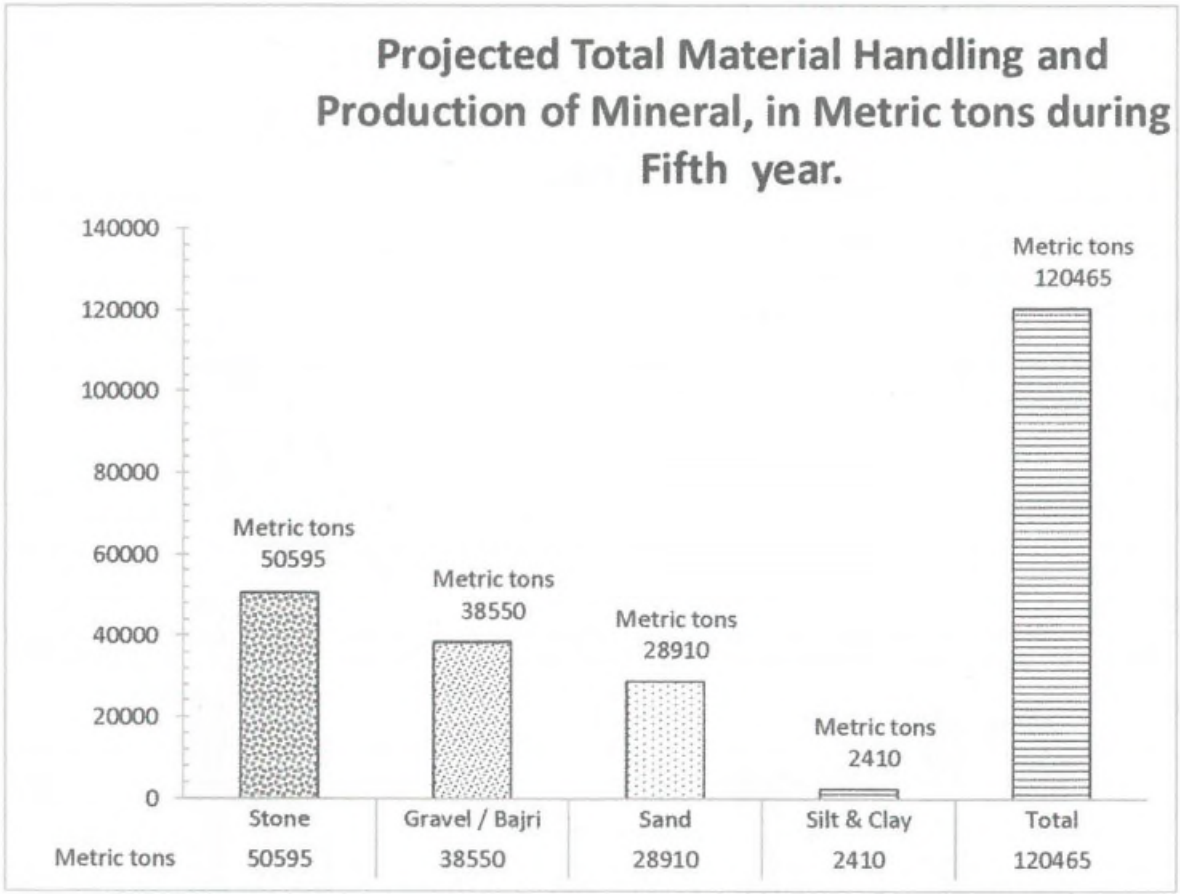
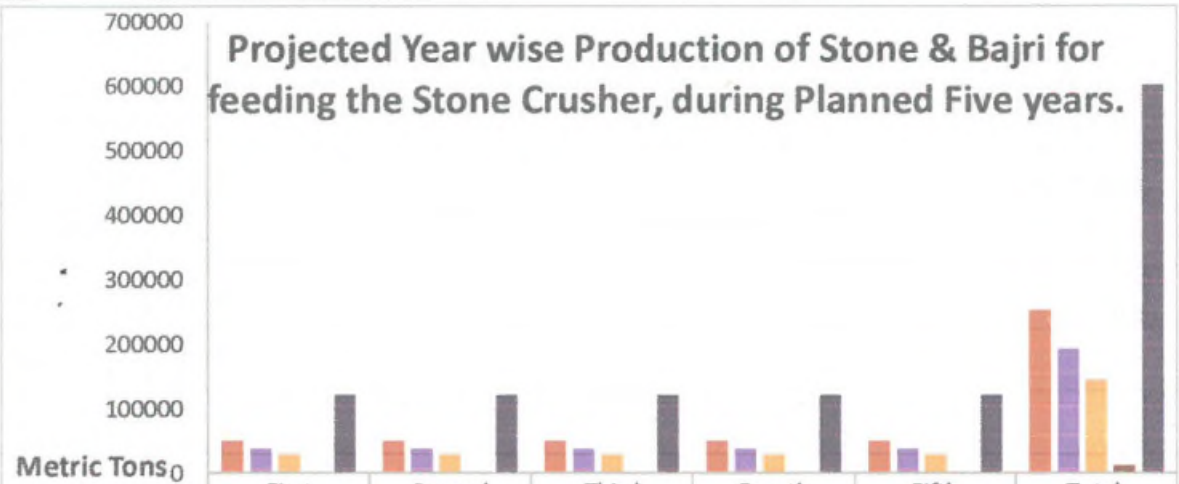


Figure 18: Proposed production and Total material of the 5th Year.

The total production of all category of river bed material during five year is shown below in the figure 19.

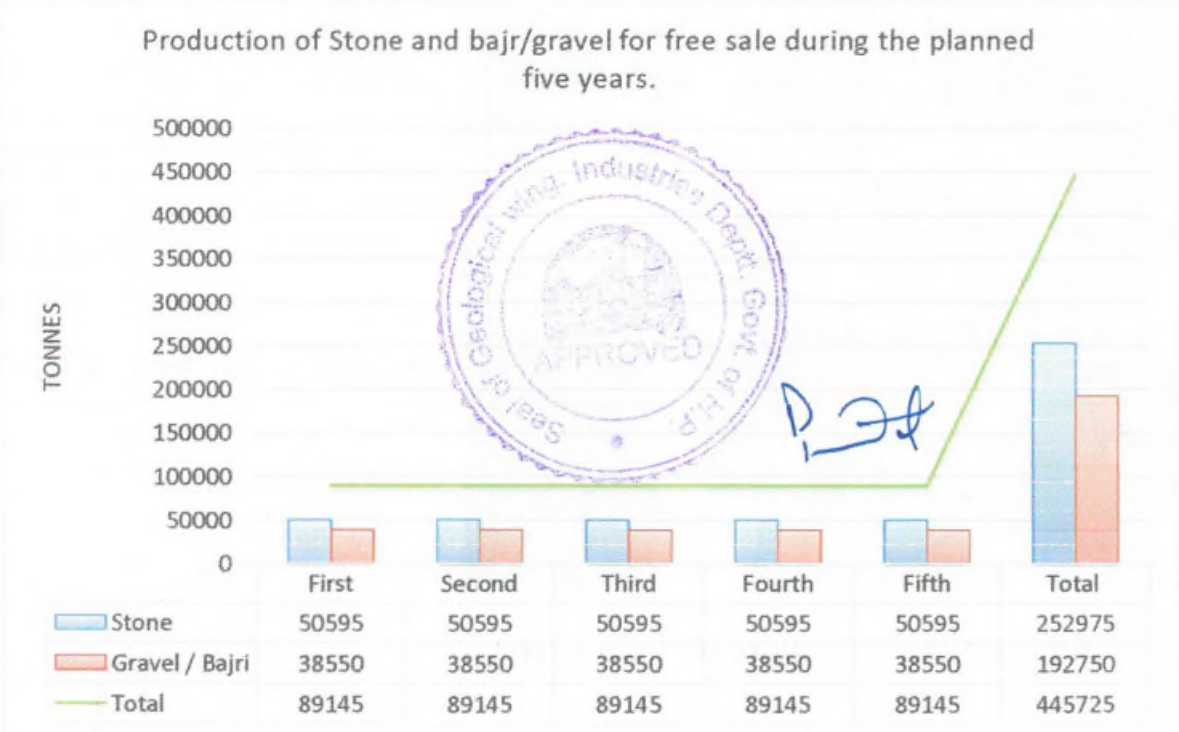


	First	Second	Third	Fourth	Fifth	Total
Stone	50595	50595	50595	50595	50595	252975
Gravel / Bajri	38550	38550	38550	38550	38550	192750
Sand	28910	28910	28910	28910	28910	144550
Silt /Clay	2410	2410	2410	2410	2410	12050
Total	120465	120465	120465	120465	120465	602325

Figure 19: Proposed production of contracted minerals during five Years.

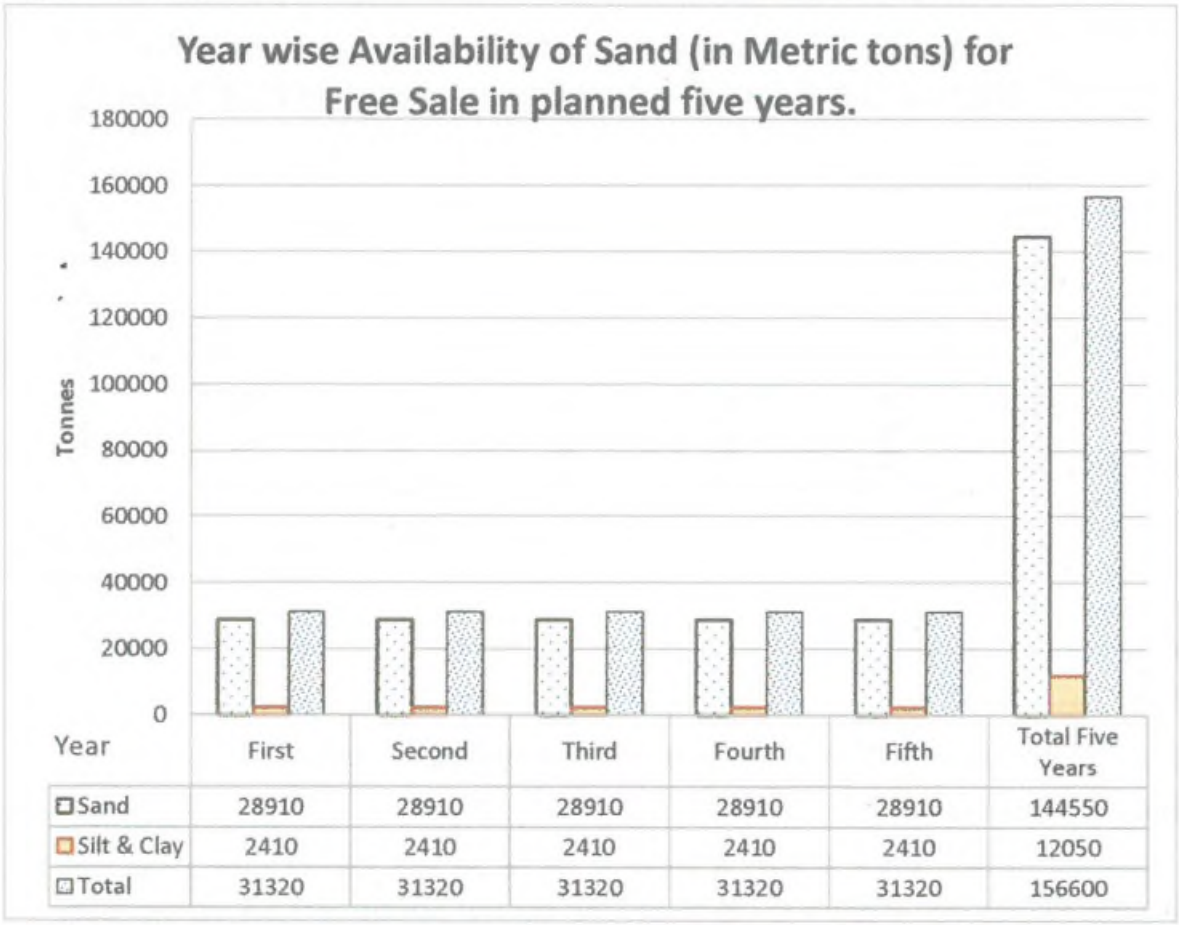
4.3 End Use of Mineral

The extracted mineral stone & Bajri is given in figure 20 and that of sand along with inseparable silt and clay is given in Figure 21. The mineral constituents are commercially marketable. The Contract being auction contract the material will be openly sold in the market as per market demand.



	First	Second	Third	Fourth	Fifth	Total
Stone	50595	50595	50595	50595	50595	252975
Gravel / Bajri	38550	38550	38550	38550	38550	192750
Total	89145	89145	89145	89145	89145	445725

Figure 20: Proposed production of contracted minerals during five Years.



Year	First	Second	Third	Fourth	Fifth	Total Five Years
Sand	28910	28910	28910	28910	28910	144550
Silt & Clay	2410	2410	2410	2410	2410	12050
Total	31320	31320	31320	31320	31320	156600

Figure 21: Proposed production of Sand & inseparable silt and Clay during five Years

4.4 Detail of road Transport.

The mining contract area is part of Yamuna River near Satiwala, about 10 km from Paonta Sahib Town. From the quarry site to the road a track can be maintained as it is almost flat terrain. From river bank a road track through the village exist leading to NH 907 as shown in figure 22.

Figure 22 Evacuation route from quarry.

PART II

ENVIRONMENTAL MANAGEMENT

1. BASE LINE DATA

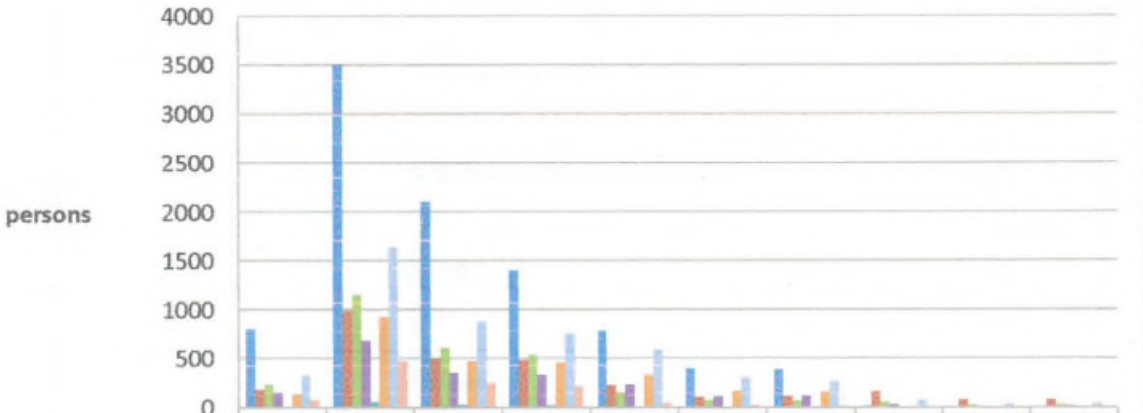
The base line information of the existing environment was collected from various sources to have in depth understanding of the existing environment and to assess the likely impact of mining activity in the Area.

1.1 Detail of Population Distribution

The total population of the surrounding villages, as per the 2011 Census is given below in the figure -23

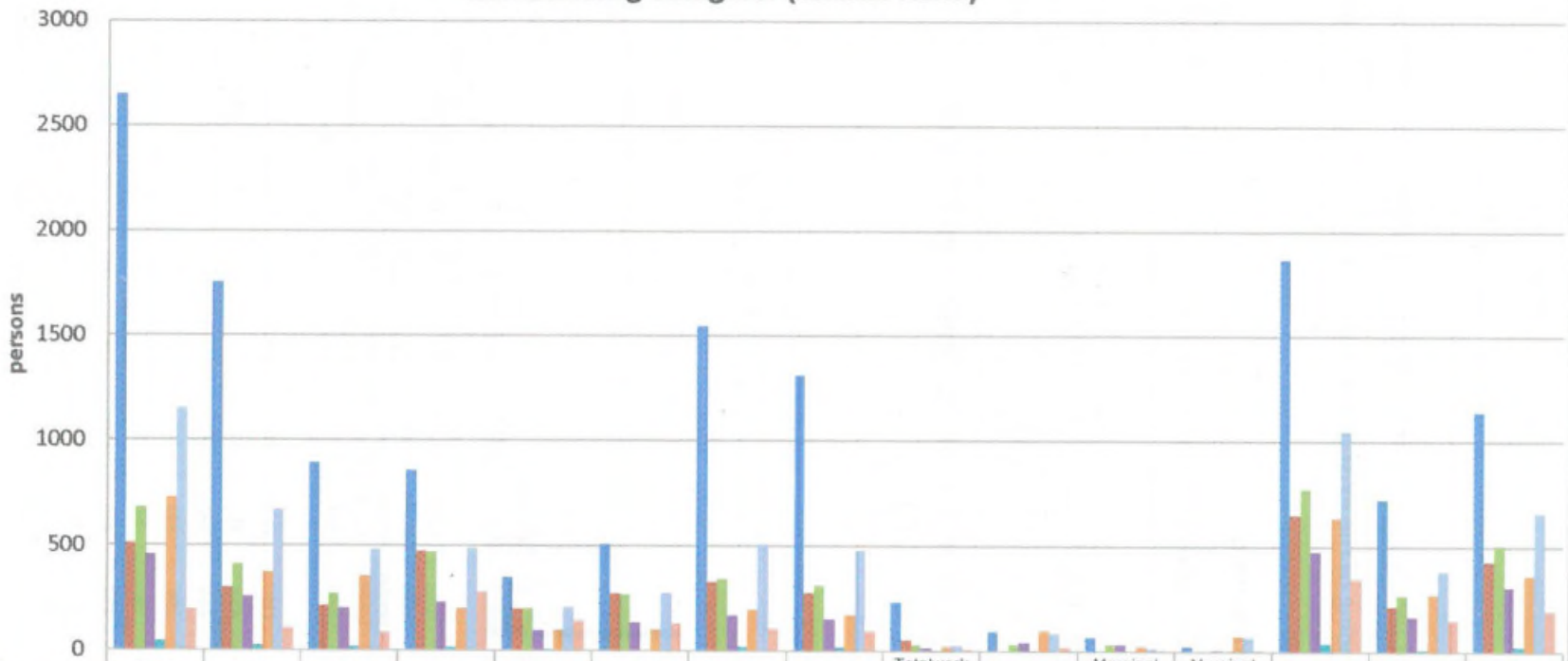
The break of population, per gainful employment is given in figure 24.

The population breakup of Tehsil is given in figure 25.



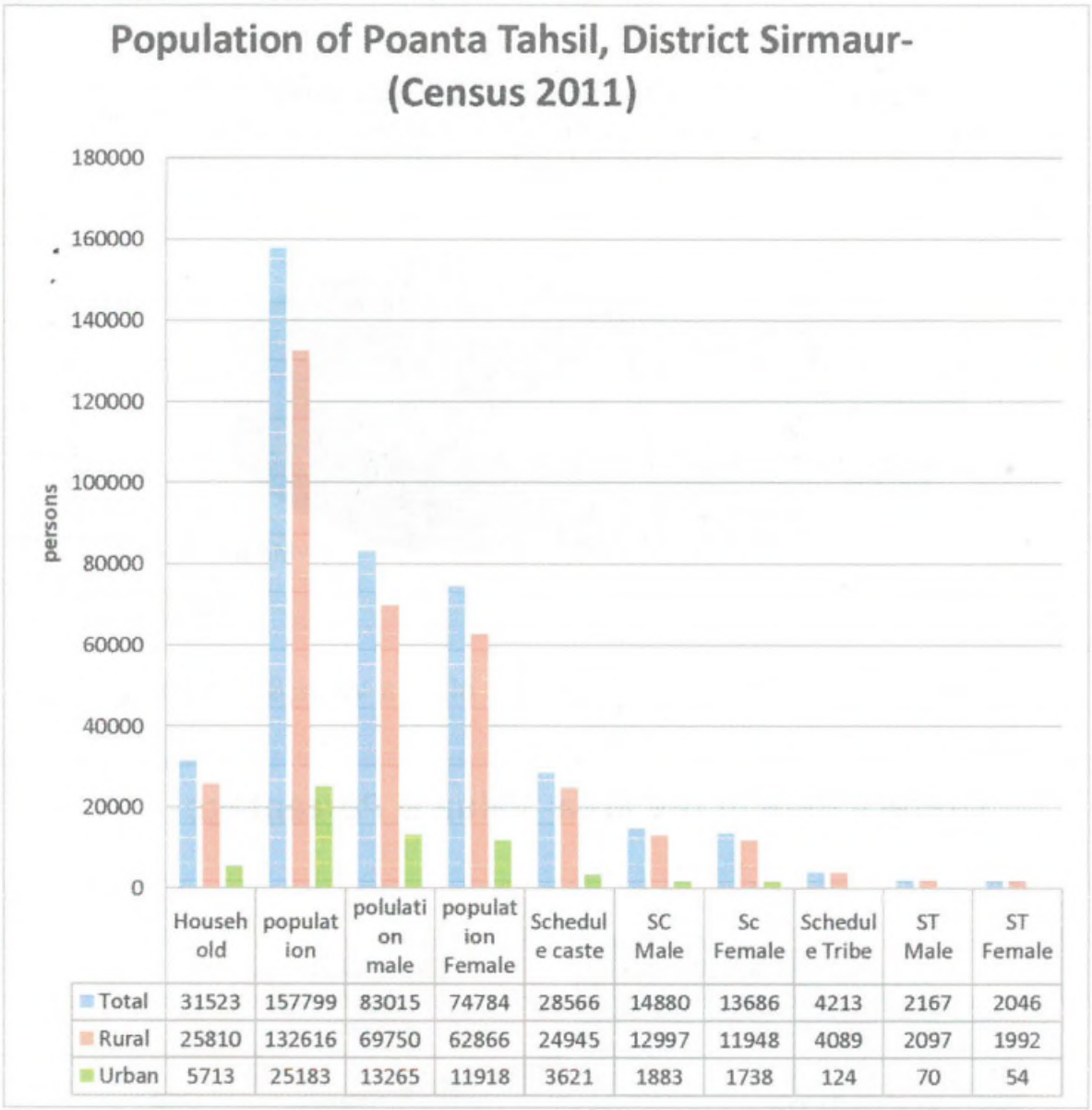
	Total Households	Total Population of Village	Total Male Population of Village	Total Female Population of Village	Total Scheduled Castes Population of Village	Total Scheduled Castes Male Population of Village	Total Scheduled Castes Female Population of Village	Total Scheduled Tribes Population of Village	Total Scheduled Tribes Male Population of Village	Total Scheduled Tribes Female Population of Village
Patlion	802	3511	2107	1404	789	404	385	21	10	11
Ghutanpur	186	987	499	488	234	115	119	161	80	81
Bahral	241	1152	614	538	158	82	76	64	27	37
Satiwala	150	689	354	335	240	118	122	38	16	22
Ganguwala	8	61	34	27	8	5	3	0	0	0
Kedarpur	135	931	472	459	335	175	160	0	0	0
Bhatanwali	331	1642	880	762	586	312	274	83	43	40
Up Sampda Batamandi	78	473	254	219	51	27	24	0	0	0

Figure 23:- Population of Villages in the Zone of Influence. (CENSUS 2011)



	Total literate	Male Literate	Female literate	Total Illiterate	Male illiterate	Female Illiterate	Totalworkers	Totalworkers Male	Totalworkers Female	Marginal Workers	Marginal Workers Male	Marginal Workers Female	Nonworkers	Nonworkers Male	Nonworkers Female
Patlion	2653	1758	895	858	349	509	1547	1313	234	94	67	27	1870	727	1143
Ghutanpur	514	300	214	473	199	274	330	277	53	6	4	2	651	218	433
Bahral	682	412	270	470	202	268	344	313	31	33	33	0	775	268	507
Satiwala	457	257	200	232	97	135	170	154	16	42	34	8	477	166	311
Ganguwala	45	25	20	16	9	7	20	19	1	2	2	0	39	13	26
Kedarpur	730	373	357	201	99	102	194	172	22	99	25	74	638	275	363
Bhatanwali	1155	671	484	487	209	278	508	479	29	86	17	69	1048	384	664
Up Sampda Batamandi	194	109	85	279	145	134	106	93	13	20	10	10	347	151	196

Figure 24: Break up of literacy and employment of Population in Surrounding Villages (Census 2011).



	Household	population	polulation male	population Female	Schedule caste	SC Male	Sc Female	Schedule Tribe	ST Male	ST Female
Total	31523	157799	83015	74784	28566	14880	13686	4213	2167	2046
Rural	25810	132616	69750	62866	24945	12997	11948	4089	2097	1992
Urban	5713	25183	13265	11918	3621	1883	1738	124	70	54

Figure 25: Population break up of Tehsil Poanta Sahib (Census 2011).

1.2 Socio Economy of the Village/Population

No adverse impact on the socio-economic condition of the area is envisaged.

The induction of mining sector development in and around predominantly agricultural area is bound to create its impact on the socio-economic life of the local inhabitants. The impact is generally positive. As can be seen in figure 26 there is high percentage of *unemployed (61.88%)* and *underemployed (4.04%)* people in the area despite moderately high level, (68.07% literates, figure 27) of literacy.

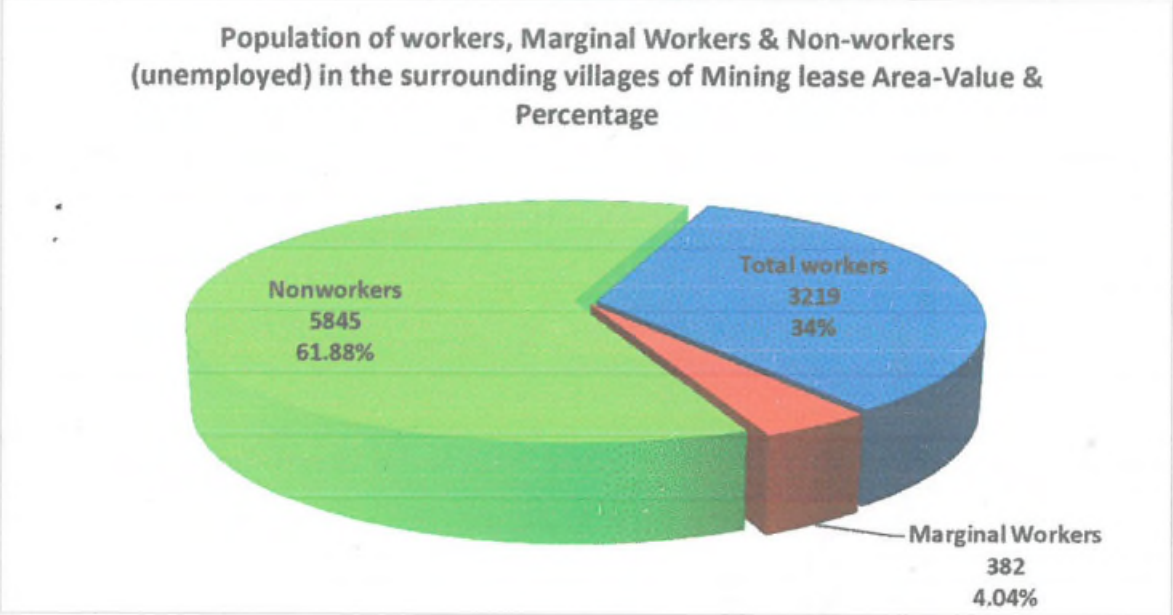


Figure 26: showing rate employement of area-Value & Percentage.

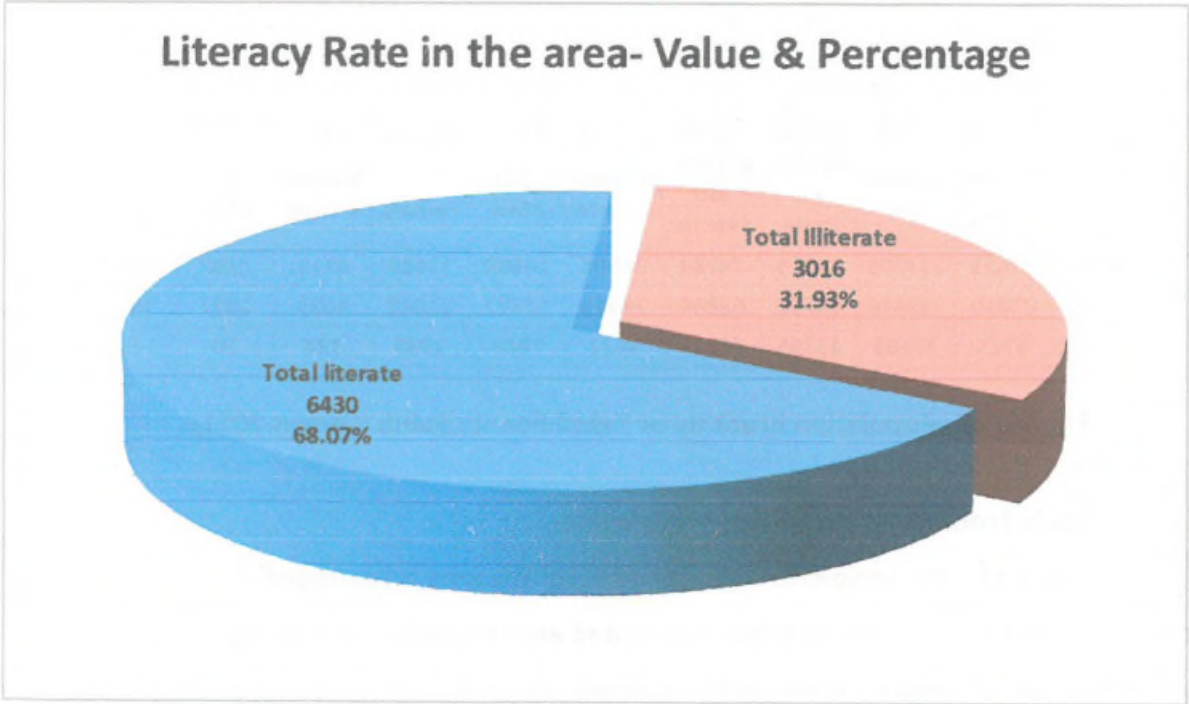


Figure 27: showing rate of literate and illiterate Population in the Surrounding area-Value & Percentage.

1.3 Land use Details with map of 5 kilometre Radius

Primarily the land of the district can be classified in following 9 categories.

S. No	Item	S. No.	Item	S. No	Item
1	Forest Area	4	Permanent Pastures and Other Grazing Land Area	7	Fallows Land other than Current Fallows Area
2	Area under Non-Agricultural Uses	5	Land Under Miscellaneous Tree Crops etc. Area	8	Current Fallows Area
3	Barren & Un-cultivable Land Area	6	Culturable Waste Land Area	9	Net Area Sown

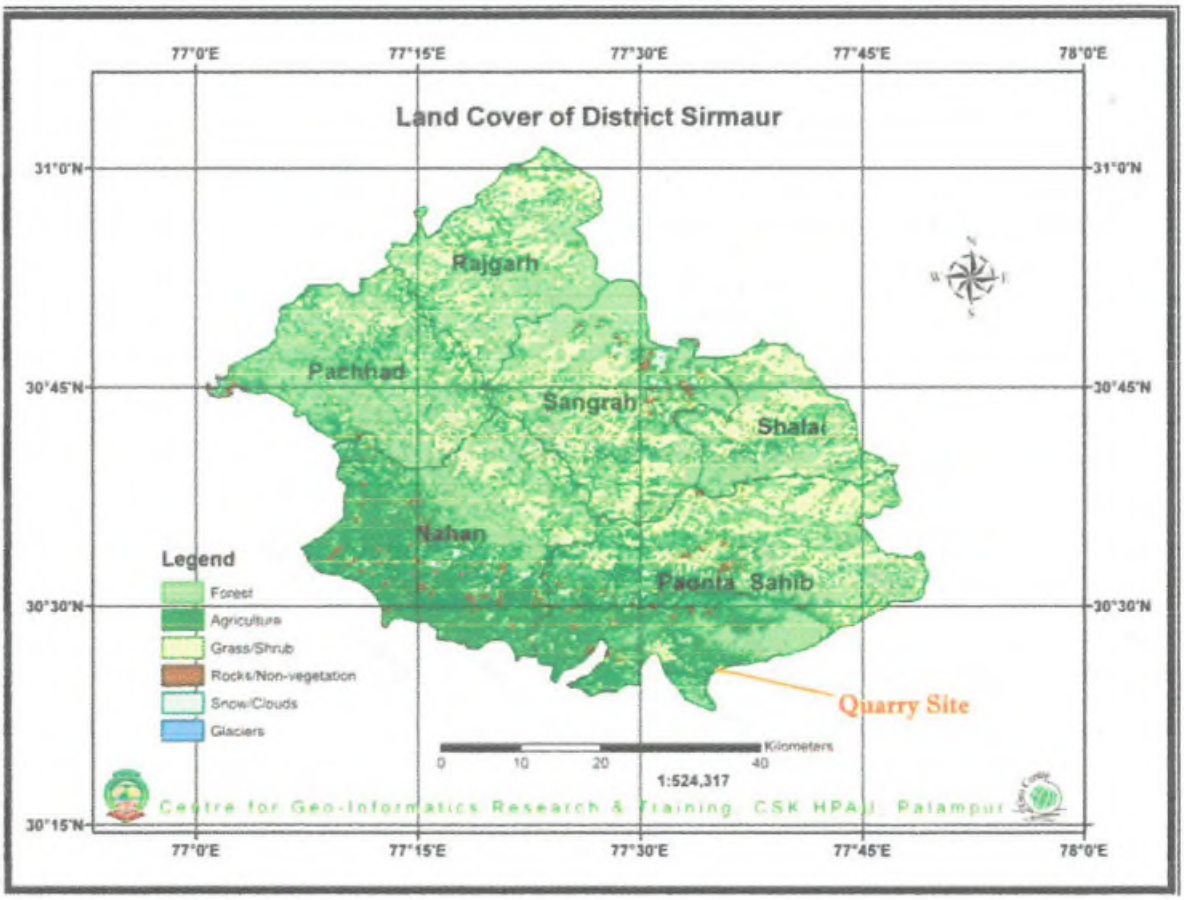


Figure 28 Land cover Map of District Sirmaur.

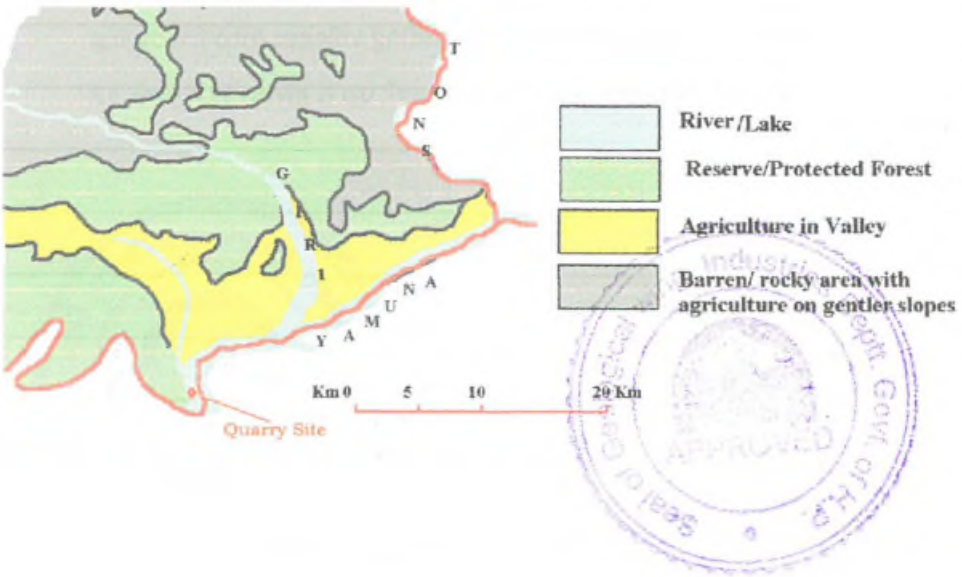


Figure 29: Showing General Land Use Pattern of the region.

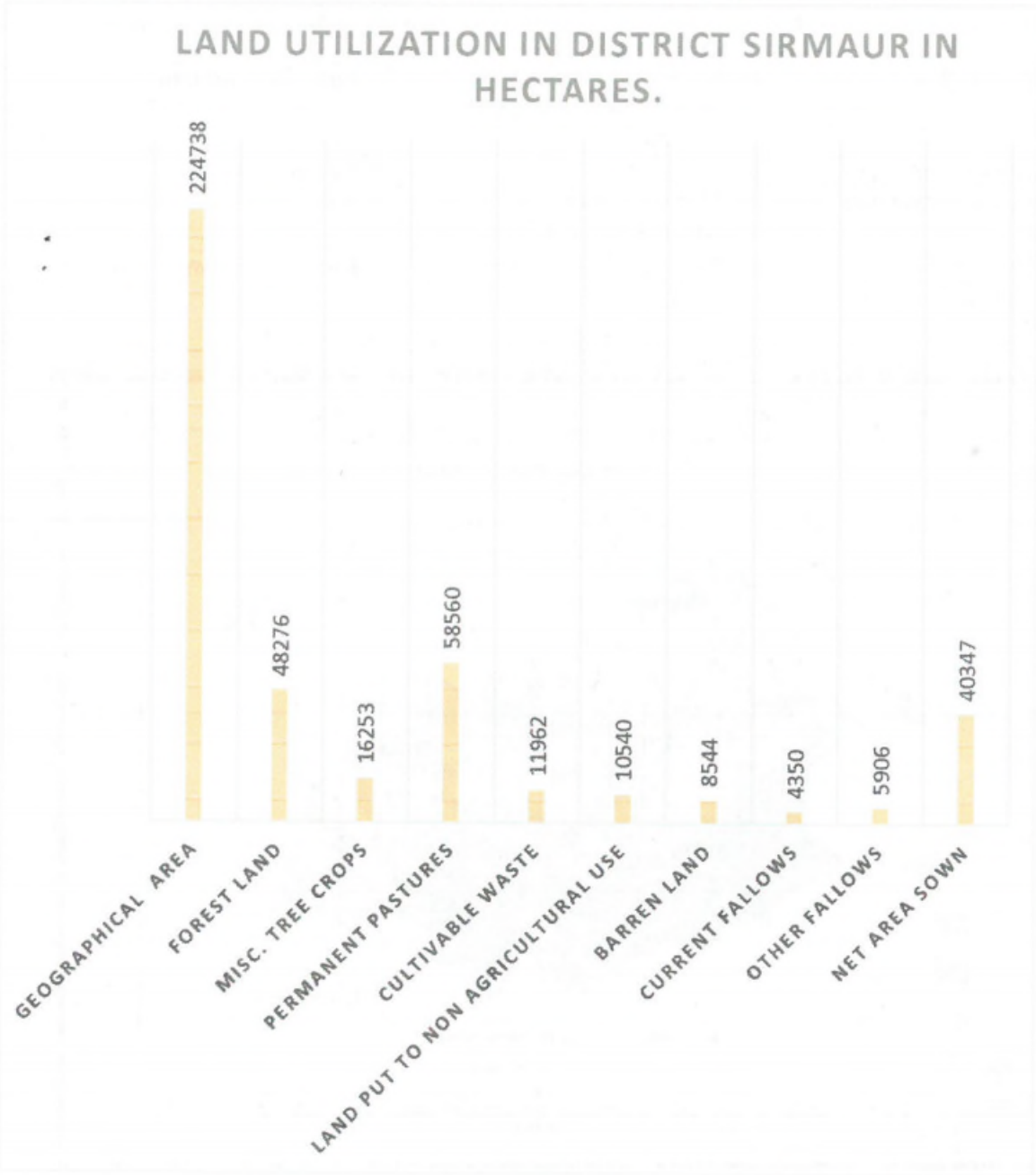
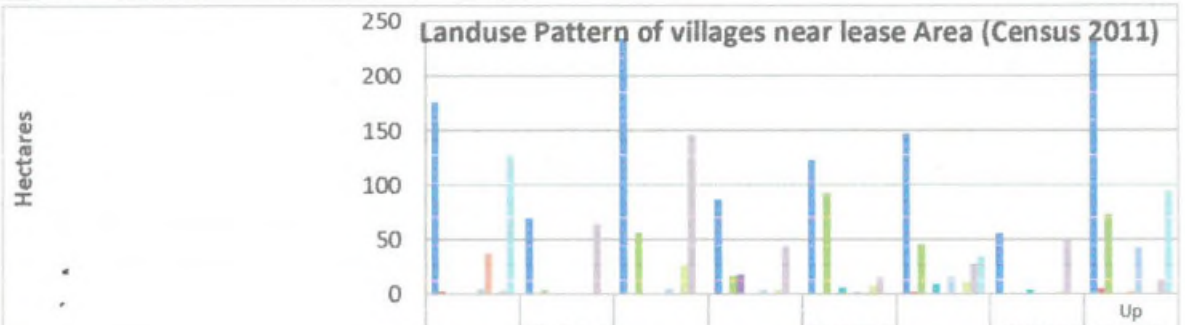


Figure 30: Land use and land utilization district Sirmaur in 2012.

The District Census 2011 classified the land available in surrounding villages into following five categories as shown in figure 31 and its percentage wise break up is given in figure 32



	Patlion	Ghutanpur	Bahral	Satiwala	Ganguwala	Kedarpur	Bhatanwali	Up Sampda Batamandi
Total Geographical Area	176.27	69.2	234	87	123	147	56	231
Forest Area	2.42	0	0	0	0	2	0	5
Area under Non-Agricultural Uses	0	4.05	57	17	93	46	0	73
Barren & Un-cultivable Land Area	0	0	0	18	0	0	0	0
Permanent Pastures and Other Grazing Land Area	0	0	0	0	6	9	4	0
Land Under Miscellaneous Tree Crops etc. Area	0	0	0	0	0	0	0	2
Culturable Waste Land Area	4.14	1.1	5	4	2	16	0	43
Fallows Land other than Current Fallows Area	37.94	0	0	0	0	0	0	0
Current Fallows Area	0	0	26	4	7	11	2	0
Total Unirrigated Land Area	3.31	64.05	146	44	15	28	50	13
Area Irrigated by Source	128.46	0	0	0	0	35	0	95

Figure 31: Land Use Pattern of Villages around the Mining Contract Area

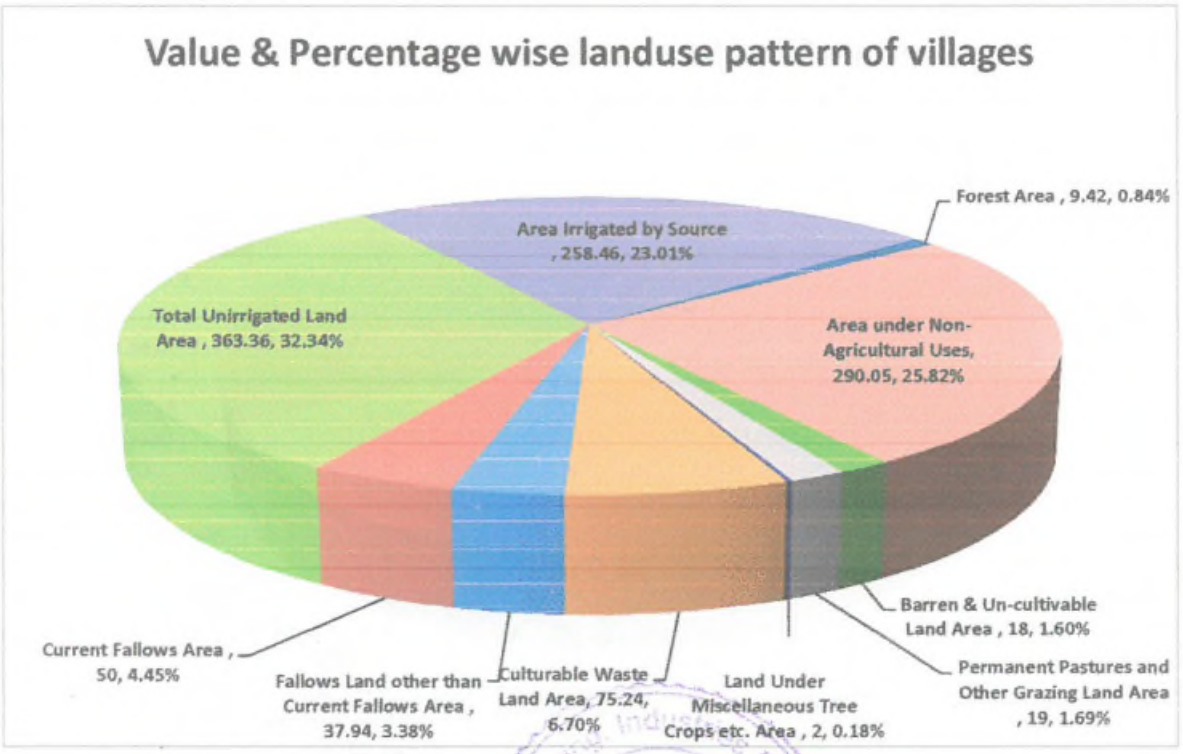


Figure 32: Percentage wise Land Use Pattern of some Villages in Zone of Influence.

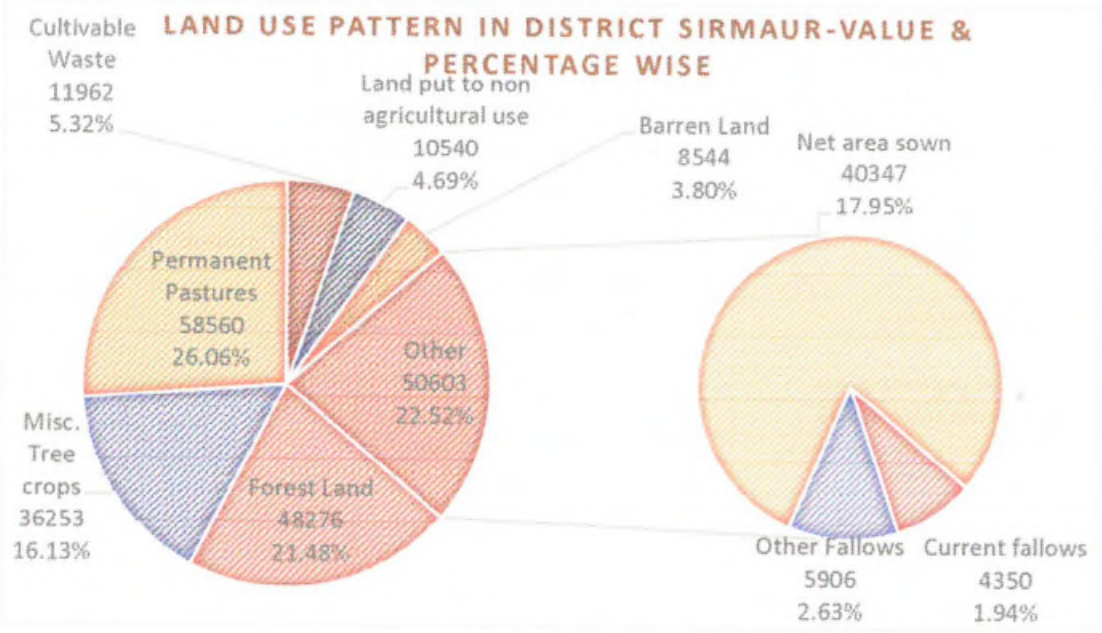


Figure 33: Showing value &Percentage wise Land use in District Sirmaur.

The contract is situated in Poanta Tehsil; thus, the land use pattern of Tehsil Paonta Sahib is given in figure 34 shows value and percentage wise land use pattern of the Tehsil.

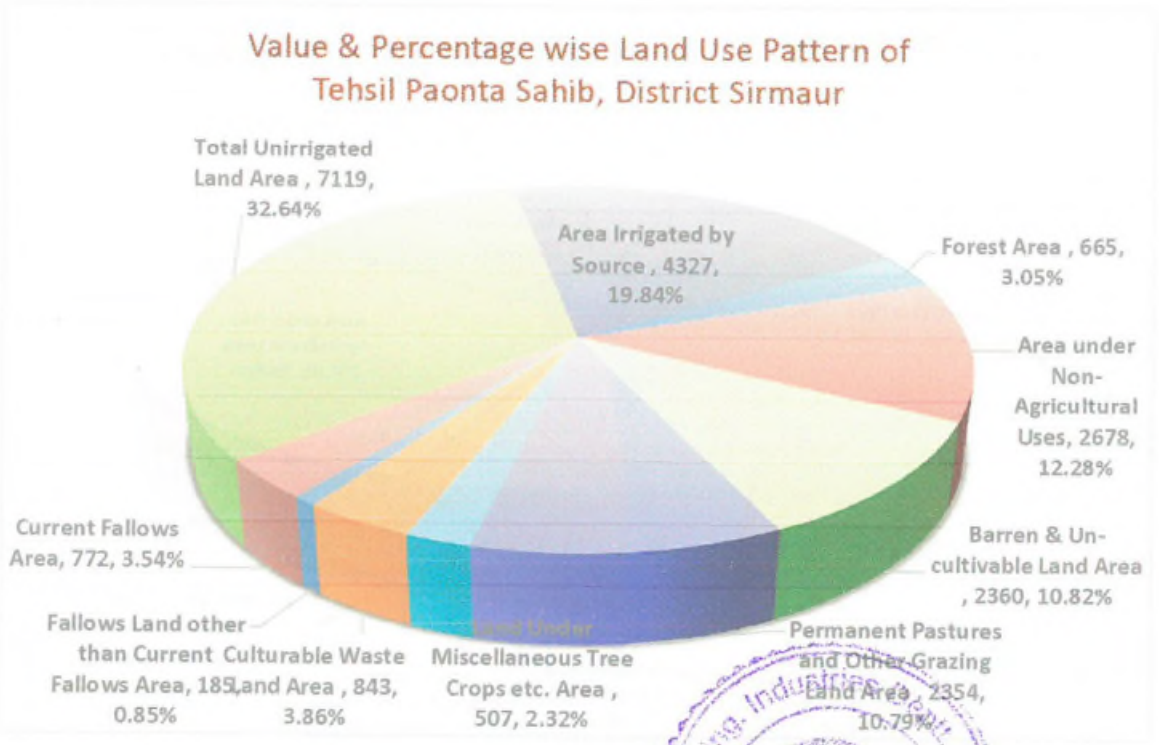


Figure 34: Showing the Percentage of the Land Use Pattern of Paonta Sahib Tahsil.

Zone of influence: The mining activity will remain restricted to very small area hence the zone of influence will be only surrounding grazing land of the contracted out area. In the hilly the zone of influence will be micro shed that is along the ridges. However extended zone of influence with radius of five kilometers is shown below in figure 35.

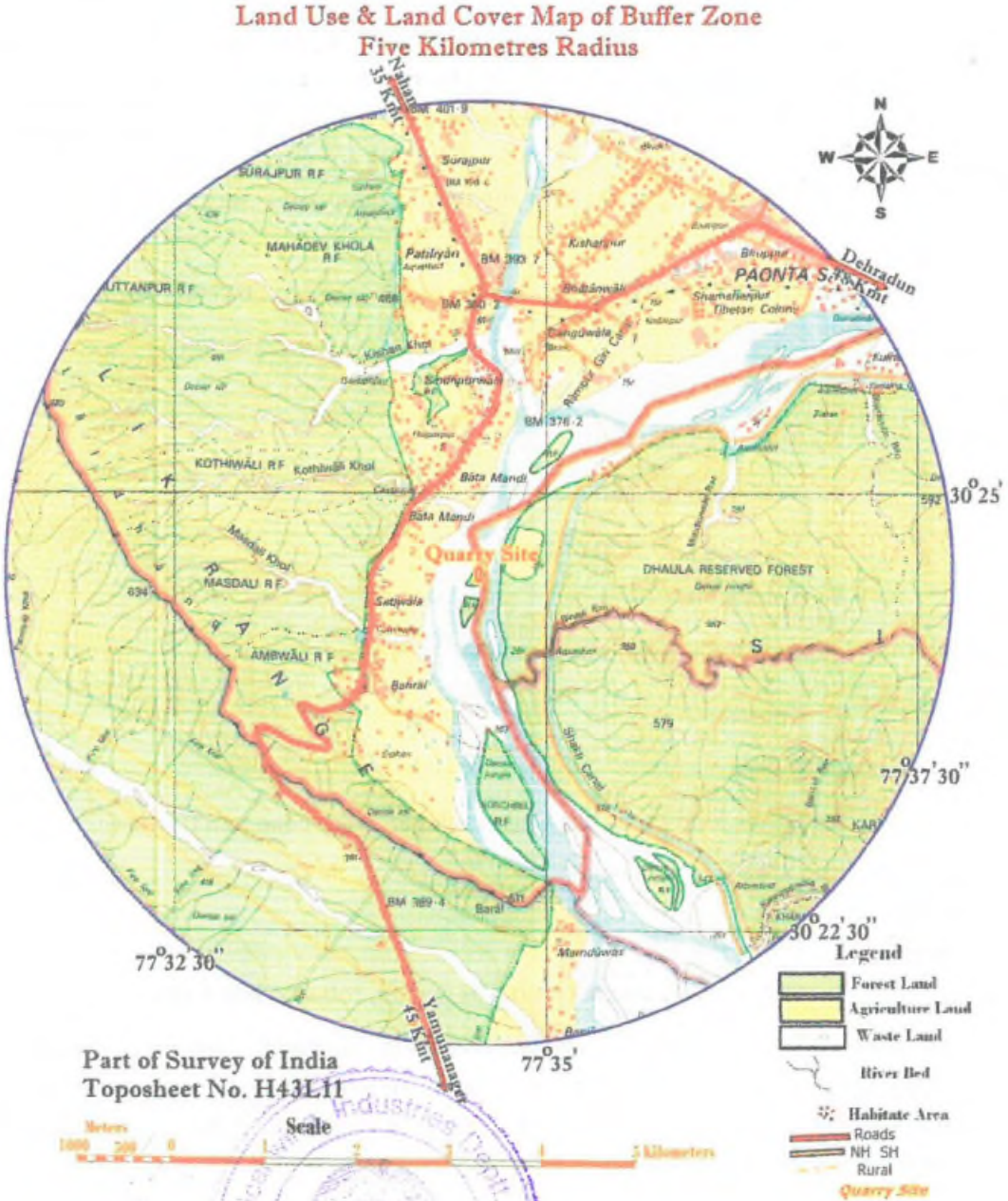


Figure 35: Land Use & Land Cover Map of the area.

1.4 AGRICULTURE: -

The economy of Sirmaur district is predominately agrarian and 82 percent of population is mainly dependent on agriculture and activities allied to it for earning their livelihood. Most of Paonta Valley consists of foot hills and Yamuna and its primary tributary valleys up to elevation of 600 metres above mean sea level with sub-tropical climate. The area is highly prone to erosion due to weak geological formations and scanty vegetation. The moisture retention capacity of the area is poor due mainly to the fact the bed rocks are argillaceous and the land the undulating. Generally, the soil in the district varies from light sandy to heavy clay and in Paonta valley ranges from sandy to sandy loam. The yield of various crops is below norm. The irrigation facilities are provided by lifting water from steams, shallow dug wells and medium - deep tube wells in the valley areas.

The source of water and irrigation in district Sirmaur can be classified into following five classes

1. Lift Irrigation Scheme
2. Kuhls / small canals.
3. Well used for domestic purposes
4. Well used for irrigation
5. Tube wells

Major food crops are grouped into three categories:

1. Cereals
2. Pulses
3. Other food crops like Chilies, ginger, sugarcane and turmeric.

Non- food crop area is of two kinds:

1. Oil seeds
2. Other non-food crops such as cotton, tobacco and fodder crop

The area under each category of the crop is given below in Figure 34awithpercentage of area. Production and percentage of production of agricultural crops in district Sirmaur displayed in Figures 36.The area under vegetables & potatoes and their production is given in the Figure 37.

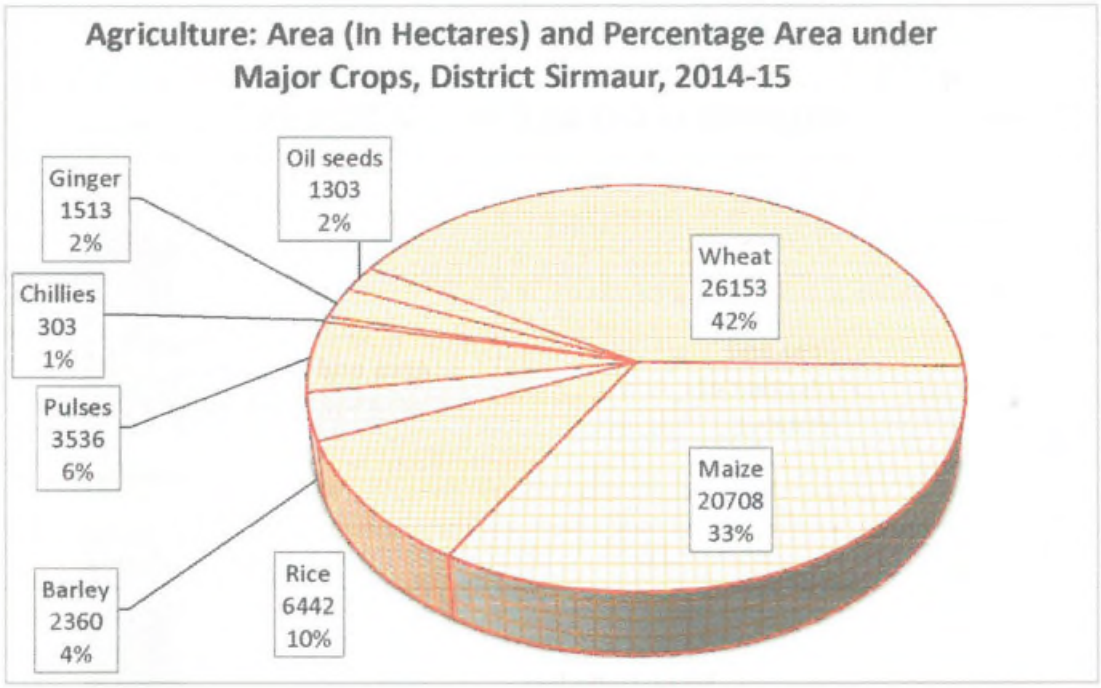


Figure 36: Showing; Percentage of area under each crop, District Sirmaur

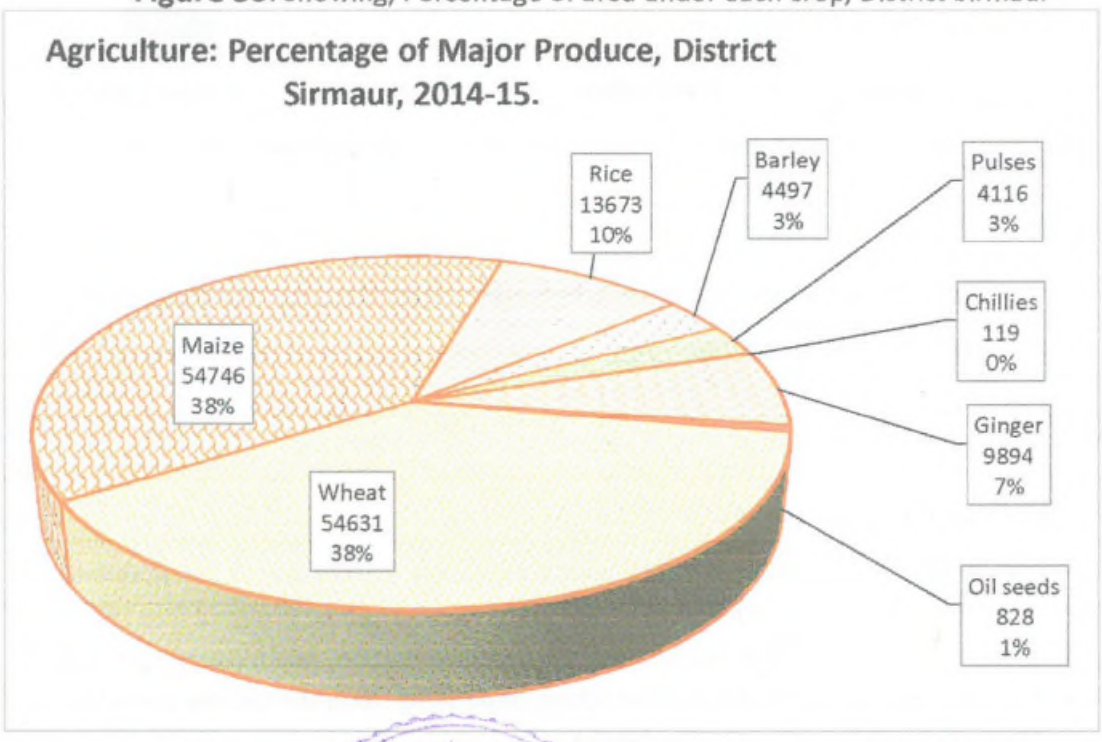


Figure 37: Showing production & Percentage Production of each crop in District Sirmaur

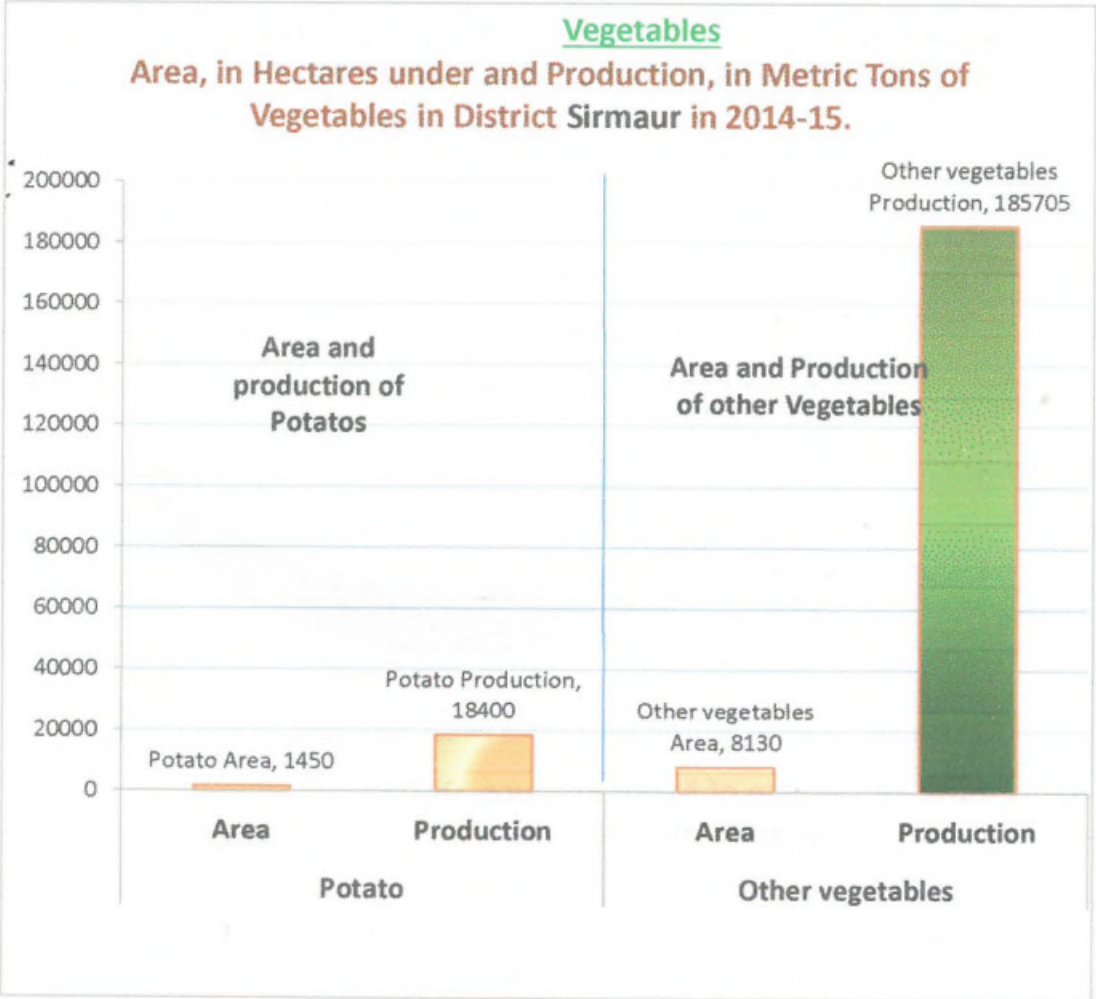


Figure 38: Showing Area, in Hectare, under vegetables and their Production, in Metric Tons, District Sirmaur.

1.5 HORTICULTURE: -

The topography and the agro- climatic conditions of the district are quite suitable to produce the various fruits. The topography of the district can be grouped into three categories namely high hill areas located at a higher elevation, mid hill areas and low lying valley areas. Fruits of different varieties, depending upon the terrain, climatic condition and soil are grown in the district.

The main horticulture produce of the area are can be classified into following five categories.

1. Apple
2. Other temperate fruits
3. Subtropical fruits
4. Nuts and dry fruits
5. Citrus fruits

In the Poanta valley following fruits are mainly grown

i. Mango
ii. Litchi
iii. Mandarin
iv. Sweet orange
v. Lime
vi. Lemon
vii. Guava

The area under each fruit and their production in District Sirmaur is given in the Table 8 as per 2014-15 survey.

Table 5: **Area under each fruit and their annual production, District Sirmaur.**

District Sirmaur Status of Horticulture 2014-15.		
Fruit	Area (In Hectares)	Production (In Metric Tons)
Apple	**2912**	**2290**
Plum	1358	911
Peach	2988	2292
Apricot	570	802
Pear	412	402
Cherry	0	0
Kiwi	2	16
Olive	1	0
Persimmon	1	2
Strawberry	38	548
O T F	**5370**	**4973**
Almonds	110	65
Walnut	1126	648
Piccanut	7	1
Nuts & Dry Fruits	**1243**	**714**
Orange	383	285
Malta	12	57

K. Lime	1142	1241
Galgal	154	254
Others	6	26
Citrus	**1697**	**1863**
Mango	2804	1148
Litchi	101	112
Guava	115	147
Aonala	154	147
Pomegranate	244	330
Jackfruit	38	151
Papaya	8	0
O S T F	**3464**	**2035**

1.6 Animal Husbandry

Economy of the district is predominantly agrarian therefore, the role of Animal Husbandry is very important as the farmers must keep the cattle for ploughing and to obtain manure for maintaining fertility of the fields and to meet daily need of milk of their family.

The total population of the livestock in District Sirmaur is given in the figure 39. The population of the Buffaloes and Cattle in District Sirmaur is given in the figure 40.

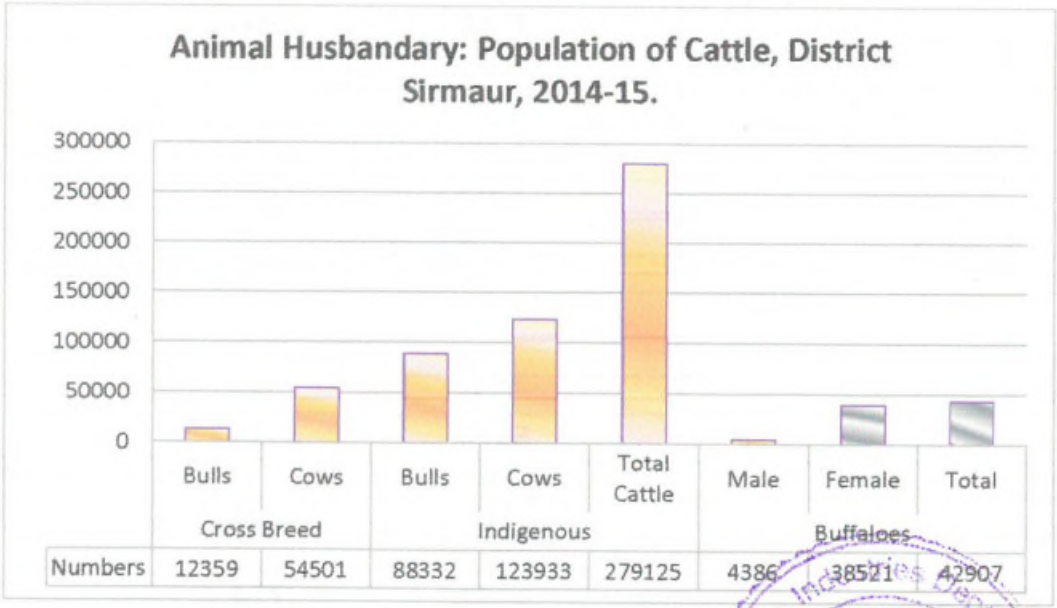


Figure 39: Livestock population of District Sirmaur.

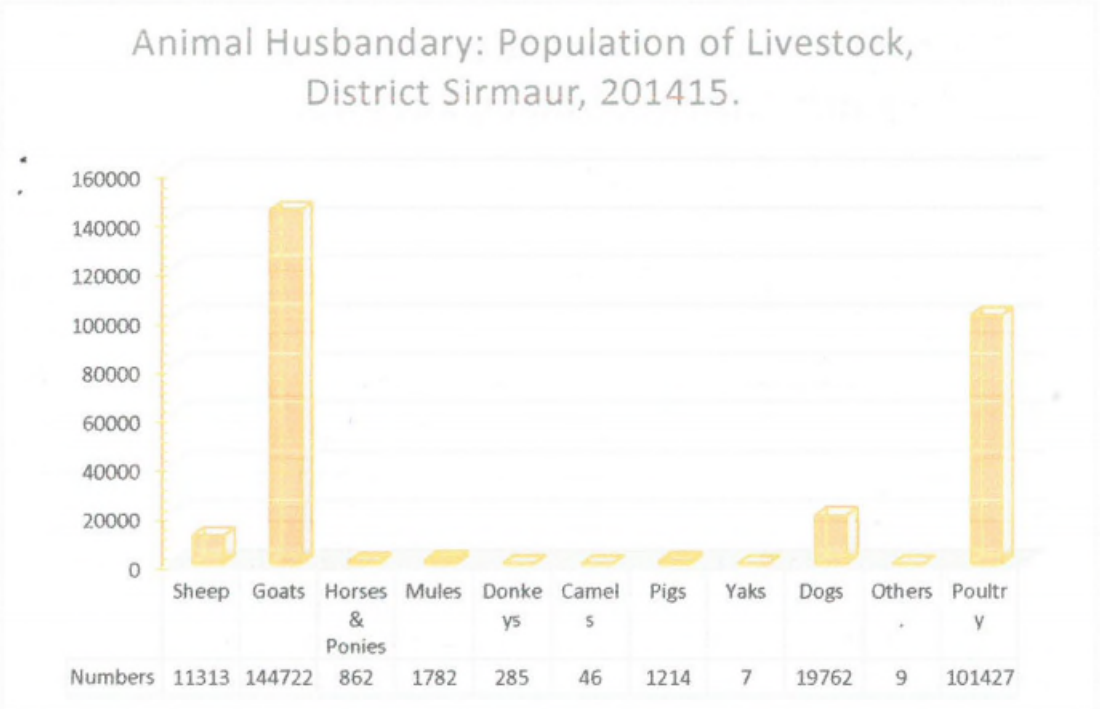


Figure 40: Showing Population of Cattle & Buffaloes in District Sirmaur.

1.7 Fisheries

The district is bestowed with some perennial rivers/streams spread over in 284 kms of length which includes big rivers like the Yamuna, the Giri and the small streams like Bata, Jalal, Nera and Markanda. Following variety of fish are found in these rivers:-

Mahaseer(Tor-putitora)
Bata
Gid
Labeo-doro
Gungli(*Schiozothoraxplagiiostmous*)
Gooch
Mirror Carp

The yield of fish has increased in the district considerable as shown in figure 41.

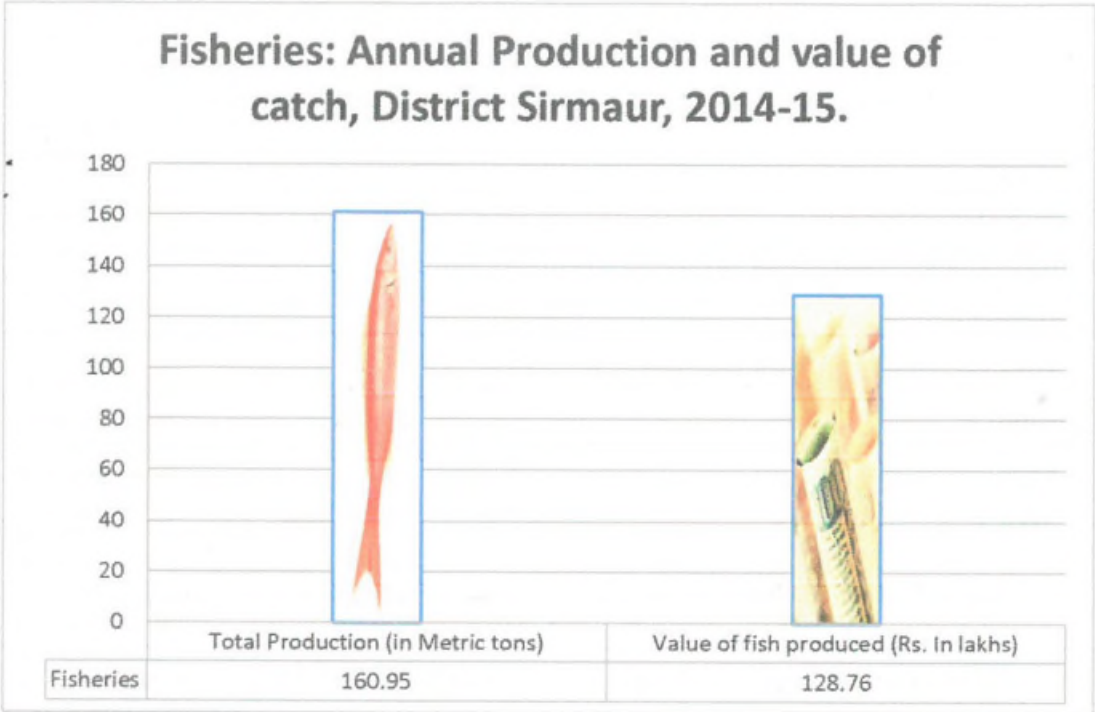


Figure 41: Showing Production and value Fish in 2013-14, District Sirmaur.

As the mining activity is to be confined to the dry bed no fishing spot near the contract area is likely to be effected by mining operation.

1.8 Flora and Fauna

1.8a Flora

The Chil is considered the prevailing conifer up to about 1950 meter when it gives place to the Deodar and the blue pines. In Sirmaur district the forest range between scrub, sal and bamboo forest of the low hills to the fur and alpine forests of the higher elevation. Lowest point of the southern boundary of the district is less than 300 meter above sea level and highest range of is at more than elevation of 3000 meters in the north East. The forests grown between these two extremes vary as the elevation itself.

In the area under consideration following are the most common trees

The most prominent varieties of trees found in the area are

Simbal (Bombexmalabaricum),

Mango (Magniferaindica)

Tun (Cedrelatoana)

Several species of acacia and albizia

Salambra (Odinawodier)

Termnalia

Jamun (Engenia jambolana

Larger tour

Bamboo

Shrubs

The most common shrub at the higher elevation is Barberis, indigopera and Desmodium and following other shrubs are also found

1. Vitex
2. Munj
3. Ber
4. Ipomea
5. Dodonea&
6. Bamboo

1.**8b Fauna**

Animals: Due to wide variations in the attitude a large variety of fauna is available in the forests of the district. The black bears are common in the higher valley. The leopards are found throughout the district. Barking dears and gural are found at medium elevation the musk deer or Kastura and serao are found in certain areas. Most commonly found is the porcupine, which is found in almost in the entire District. Common Mammals & Birds in the Sirmaur District is given in the Table 8.

Table 7: **Common mammals in the Sirmaur District.**

Zoological Name	English Name	Common Name
Felisbengalensis	Leapard Cat	Mirag, Bagh
Felis Chane	Jungle Cat	Jangli Billi
Muntucusmuntisk	Barking Dear	Kakkar
Vaulpesbengalensis	Fox	Lomari, Fohiki
Camis aureus	Jackal	Gidder
Macacamulatta	Ressus monkey	Lal Bander
Preshytes entellus	Languor	Languor
Sussacrofa	Boar	Suar
Hystrixindica	Porcupine	Sehal
Lepus nigricoilis	Hare	Khargosh, Sherru, farru
Moschusmoschifarus	Musk deer	Kastura
Capra ibex Ibex	Ibex	
Hemitragusjemlahicus	Himalayan Thar	Thar
Selenarctosthebatanus	Black Bear	
Ursusarctos	Brown Bear	
Pantheraunica	Snow leopard	
Susscrofa	Wild Boar	
Axis axis	Spotted deer	Chital
Cervus unicolor	Samber	
Hylopetesfimbriatus	Flying squirrel	
Pantherapardus	Leopard	Cheetah
Felischaus	Jungle cat	
Paradoxurushermaphroditus	Indian Civet	Sakralu
Hipposideros armiger	The great Himalayan leafnosed Bat	Chamgadar

Pagumalarvata	Himalayan Palm Civet	

Table 8: Common Birds of the Sirmaur District

Birds		
Zoological Name	**English Name**	**Common Name**
Milvus migrants	Vulture	Cheel, Gidh, Eell
Eudynamysscolopacca	Koel	Koel
Columbia livia	Pigeon	Kabuttar
Coraciasbengalensis	Blue jay	Nilkantha
Columslivia	Hawk	Baj
Francoliusfrancolinus	Black partridge	Kala Tittar
Francoliuspondicerians	Grey partridge	Safed Tittar
Payocrisslatus	Peacock	Mor
Coturnixcolurnix	Common quail	Bater
Alectorisgraeca	Chakor	Chakor
Crovussplendens	Crow	Kanwa
ProttaculaKarneri	Parrot	Totta
Lophophorusimpejanus	Monal	Monal / Karadi
Tertaogallushimalayanensis	Snow cock	
Tragopanmelanocephalus	Western horned Tragopan	Phulgar/Jujurana
Picoidesmacei	FulvourbreastedPied Woodpecker	Kathfowra
Streptopeliadecaocto	Ring dove	Gughi
Streptopeliachinesis	Spotted dove	Gughi
Accipiter badius	Shikra	
Aquila rapaxvindhian	Tawny eagle	
Ducula bicolor	Green Pigeon	

Parusrufonuchalis	Tits	
Picuscanus	Black napped Woodpecker	Woodpecker
Drycocopusjavensis	Woodpecker	
Muscicapasubrubra	Himalayan Fly Catcher	
Acidotherestristis	Common Myna	Ghatari
Terpsiphoneparadisi	Paradise flycatcher	Choti- Pinja
Grus spp.	Cranes	
Grus antigone	Sarus Crane	Saras
Passer domesticus	House sparrow	
Carduelisspinoides	Himalayan Green Finch	Chiria

In the contracted area and surrounding hills following are the common animals:-

- Leopard (Bagher)
- Hare
- Wild Bore (JangliSoor)
- Jackal
- Barking Deer (Kakkar)
- Monkey
- Sambar
- Pig

Birds

- Chakor
- Crow
- Red Jungle Fowl (JangliMurga)
- Black Partridge (KalaTitar)
- Grey Partridge (SafedTitar)
- Woodpecker

1.9 Climate and Rainfall

The Climate of the contract area can be classified into following three categories

1. Winter
2. Summer
3. Rainy

Rainfall varies significantly with altitude of the area. The catchment area receives rainfall due to western disturbances that pass over the north-western part of the country during winter months.

Rainy season starts from July and extends up to mid-September. During winter the rains are scarce and extends in between 15th December to 15thFebruary..

The general temperature, rainfall and humidity corresponding to each type is given below in table 13.

Climate of Sirmaur, Himachal Pradesh				
Climate		Winter	Summer	Rainy
Period		Oct-Mid March	Mid March-June	July-September
Weather		Cool	Hot	Humid
Humidity		84%	55%	98%
Temperature	Max	26.0 ^{0}C	34.4 ^{0}C	28.0 ^{0}C
	Min	4.9^{0}C	15.0^{0}C	17.0^{0}C
Rainfall	Max	82.0 mm	69.0 mm	175.0 mm
	Min	1.0 mm	1.0 mm	1.0 mm

2 ENVIRONMENT MANAGEMNET PLAN

Any development activity such as mining is likely to have beneficial as well as adverse impact on existing environment on following parameters:

- Change in Topography and Land Use Pattern
- Climate
- Air Quality,
- Noise level and Ground vibrations,
- Flora & Fauna
- Soils
- Water Resources and Quality,
- Drainage,
  and
- Socio- economic conditions

2.1 CHANGE IN TOPOGRAPHY & LAND USE PATTERN.

IMPACT & MITIGATION

- The contract area is part of foot hills of Himalayas.
- It is part of a River bed.
- The highest point of the contract area is at 366 metre above mean sea level.
- The lowest point is at 363 m above MSL.
- Mine Area is compact one block.
- The entire block is rested during monsoons for replenishment.
- The mining shall be confined to well within the river bed corridor.
- No mining near the banks up to 1/10th of its width can be undertaken as per guidelines, i.e. 63 to 78 metres, from banks.
- Mining shall be undertaken to a depth of one metre only.
- The contract area is and shall remain river bed.
- Thus, the topography or land use of the River bed *per se* will not be changed.
- The mining contract area is devoid of any vegetation.
- The land use of the mining contract area is defined in the Revenue record as 'Gair Mumkin Nadi'.
- The land under active mining would always remain river bed, during as well as post mining.

2.2 EFFECT ON CLIMATE

- The mining contract area is very small, only 6.2255 hectares.
- The mining will be confined to, within the river banks.
- The mining will be confine to top one metre.
- Some micro level impact near the freshly exposed surface may happen for short duration as some humid material may be exposed
- The impact will need no mitigating measures.

2.3 Impact on air

- No blasting material is to be used.
- The major contributors of air pollution in open cast mining are excavation, loading and transportation, generating dust, which leads to momentary rise in the suspended particulate matter (SPM).
- The mining activity will be limited to excavation of about 446 metric tons of stone and bajri, and of sand with silt for free sale per day.
- Five tipper trucks will be able to move the required stone and bajri from mine to market which is within 10-kilometer radius from the mine, in about 112 truck trips depending upon market requirement.
- This activity would generate negligible disturbance to air quality.

2.4 NOISE POLLUTION

IMPACT

- The mining area represents calm surroundings.
- The mining shall be manual causing hardly any noise.
- The noise would be generated by the movement of trucks / tractor trolleys engaged in the transportation of the mined material.
- About nine trucks trips would be required for transporting mined material per working day from mining area to crusher.

MITIGATION MEASURES

- The dedicated tipper truck would properly and regularly undergo maintenance to minimize noise.
- Particular care would be taken to properly maintain the silencers of the vehicles.
- No use of horn shall be allowed in or near the mining area.
- There is already vegetation along the banks which fall outside the contracted area.

2.5 EFFECT ON FLORA & FAUNA

- The mining contract area is river bed.
- There is hardly any flora or fauna on the river bed to attract any protective or mitigating measures

2.6 SOIL COVER

- The mining will be confine to River bed.
- It has no soil cover as the area gets frequently flooded during heavy rains.
- Thus, there shall be no impact on any natural soil cover.

2.7 EFFECT ON HYDROLOGY

- The mining area is part of river bed.
- The mining will be confine to top one metre of river bed.
- The mining will be confine to central part of river bed, away from banks.
- Thus, mining would be dredging the dry river bed and reducing the silt burden downstream.
- The mining will be undertaken during dry seasons.
- The ground water (undercurrent of the river) will not be disturbed

2.8 Waste disposal Management

The area is in a regular course of Yamuna River and no waste will be produced during the mining activity.

2.9 SOCIO- ECONOMIC IMPACT

- No adverse impact on the socio-economic condition of the area is envisaged. The induction of mining sector development in and around predominantly agricultural area is bound to create its impact on the socio-economic life of the local inhabitants. The impact is generally positive. As can be seen in figure 24 there is high percentage of *unemployed (61.88%)* and *underemployed (4.04%)* people in the area despite moderately high level, 68.07% of literacy, (figure 25). The mining activity though with small direct employment potential but would create jobs for at least 30 persons directly and indirectly.
- However, the mining project in the area will have various positive impacts in the area. The mining project and *its downstream* project construction activity will provide work to as many as 70

persons. Considered their total minimum earning per day to a tune of Rs. 24500 (@Rs.350/= per person per day), the area will get a supplementation in its financial and social wellbeing to some effect.

2.10 Transport of Mineral

The mining contract area is part of Yamuna River near Satiwala. From the quarry site to the river bank a track can be maintained as it is almost flat terrain. From river bank a Rural road exist leading to NH 907 as shown in figure 42. In all about 446 tonnes of material will be evacuated daily during the working season of 270 days. From National Highway material, can be transported to various market places.

Figure 42 Evacuation route.

PART III

1 PROGRESSIVE MINE CLOSURE PLAN/RECLAMATION PLAN

1.1 Reclamation

- The mined area being part of the river course cannot be reclaimed for any other purpose.
- The land under active mining would always remain river bed, during as well as post mining.
- However, mid-stream mining in accordance with approved mining plan would lead to systematic channelization of river bed and minimize chance of boulders overflowing the banks. This would protect the adjoining area from fury of monsoon floods.

1.2 Mine Waste Disposal:

a) Year wise generation of mine waste and soil cover.

As explained earlier the following category of the waste is generated during river bed mining.

- Silt/ Clay Mixture

The silt and clay are generally being inseparable from sand and sold along with it.

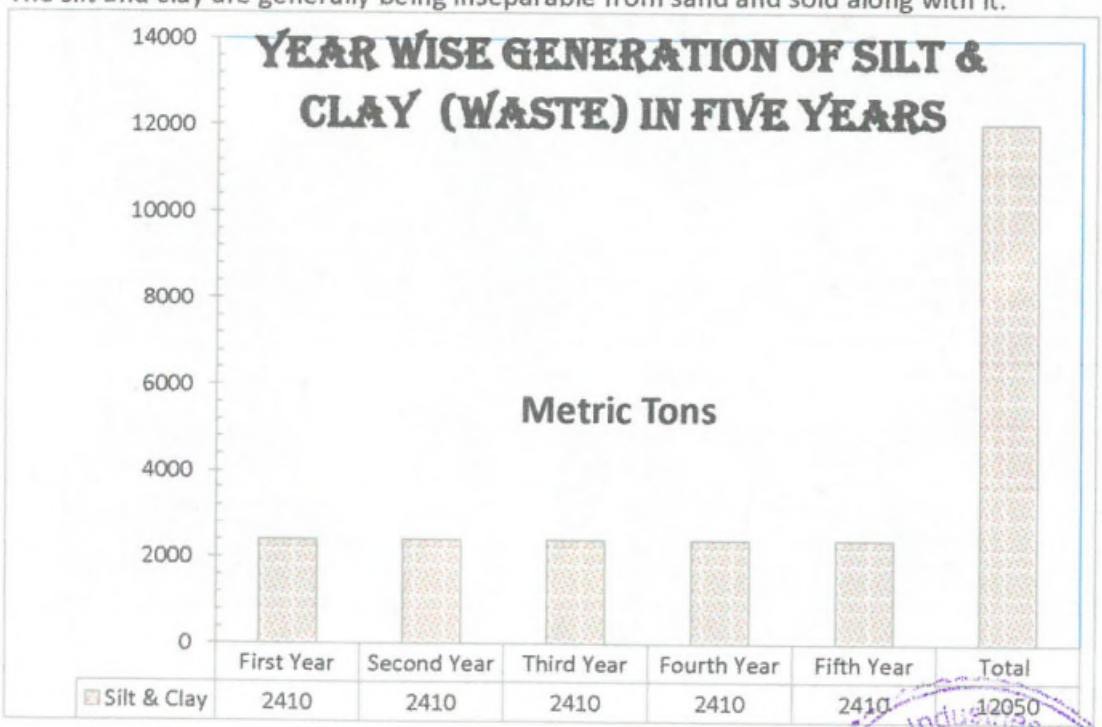


Figure 43: Year wise generation of waste and total waste expected to be generated in five years.

b) Year wise disposal of waste and soil cover:

Yearly about 2410 metric tons of waste will be generated (In case it is separable) while mining stone, bajri and sand. Special arrangements for the disposal of waste, if any, is separated from sand, shall be made by transporting separated silt and clay to designate site where it will be spread over and plantation would be done to consolidate it.

c) Cost of the mine waste disposal scheme.

The waste, silt and clay, whenever separable, are required to be moved from the mining pits in the river bed to designated site on the bank. However, the quantity being little, about 9 tonnes per day the annual cost would be around Rs.24100, for its disposal.

1.3 The arrangements made for top soil utilization, if any

As the mining area is part of river bed, having no top soil cover therefore, no top soil is required to be removed, disturbed or disposed of.

1.4. Preventive Check dams

- As the riverbanks on both side are well away from the areas, and the River in spate during monsoon rises more than three metres. Therefore, no protective measures for protection of banks are feasible.

1.5 Plantation work

The entire mining contract area falls within river course and gets flooded during monsoons, therefore, no plantation is possible within this area.

2 STRATEGIES FOR PROTECTION OF POINT OF PUBLIC UTILITY etc.

There is no point of utility within radius of 200 metres of the mining contract periphery, which may need any kind of protection.

3 WORKFORCE DEVELOPMENT

The mining activity will be mainly manual. Worker are mainly required in river bed mining for extraction and loading of river bed material in to

tipper truck and tractor trolleys. Drivers for tippers and tractors will be another category of workers. Thus, employment potential is as given below:

Mines Supervisor cum clerk	1
Drivers	5
Unskilled workers	64

Thus total generation of Employment will be to a tune of 70 both skilled and unskilled workers.

4 USE OF MINERAL

The stone, sand and Bajri are used as raw material in the construction and infrastructure industry. Thus, these minor minerals will be marketed directly to the consumers.

5 DISASTER MANAGEMENT & RISK ASSESSMENT:

The mining contract area part of River bed which is prone to some risk hazards but there will not be any major risk hazard associated with the process. The possible scenarios selected for this project are as below:

- Inundation / Flooding
- Drowning
- Accident during mineral loading, transporting and dumping
- Accident due to vehicular movement
- Earthquakes

Inundation/Flooding

The consequences of flooding/ inundation are catastrophic or fatal. The likelihood of occurrence of flooding is occasionally possible. As per mining plan the mining work will not be carried out during monsoon season. The likelihood of occurrence of drowning is rare due to dry season mining.

Accident during mineral loading, transporting and dumping

The consequences of this scenario are minor which may be taken care with first aid care.

Accident due to vehicular movement

The consequences of this scenario are moderate and may result in hospitalization and day loss. The likelihood of occurrence is occasionally possible.

Earthquakes

The area falls in seismic zone V. The mining operations are open cast pit mining. The mining pits will be only of one metre depth. There won't be any structure in the area likely to cause risk to worker. The workers rest sheds, store building and toilets will be constructed of lightweight wood and tin sheets.

6. RECOMMENDATION FOR RISK REDUCTION

Measures to prevent Inundation/Flooding/drowning

- Being on riverbed there should not be any mining operation during monsoon or rainy day
- Formation of deep pits should not be allowed
- Whenever there is any alert of flooding the workers will be moved to safer area along the banks.

Measures to Prevent Accidents during Loading

- The truck should be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
- The loading should be done from one side of the truck only.
- The workers should be provided with gloves and safety shoes during loading.
- Opening of the side covers would be done carefully and with warning to prevent injury to the loaders.
- Operations during daylight only.

Measures to Prevent Accidents during Transportation

- Vehicles will be periodically checked and maintained in good condition.
- Overloading will not be permitted;
- To avoid danger of accident roads and ramp near embankment should be properly maintained.

- The truck would be covered and maintained to prevent any spillage;
- The maximum permissible speed limit should be ensured;
- The truck drivers with proper driving license would only be employed.

Measures to Prevent Accidents during Earthquakes

- Occasional drills to create awareness for safety measures during mining operations and specially the measures to be adopted during earthquakes etc will be undertaken in consultation with experts.

Declaration

This is to declare that the Mining Plan of Minor Mineral contract for Stone, situated in Khasra No. 61; area measuring 73-17-00 Bigha (6.2255 Hectares), Mauza & Mohal Satiwala, Tahsil Paonta Sahib, District Sirmaur, has been prepared with our consent and approval and that we will abide by all commitments there under.

The 'Mining Plan and Progressive Mine Closure Plan' complies all statutory rules, regulation, orders made by competent authorities of State or Central Government or orders passed by courts have been taken into consideration and wherever specific permissions are required, shall be obtained.

We undertake to implement all measures proposed in the 'Mining Plan and Progressive Mine Closure Plan' in time bound manner.

We have deposited a sum of Rs..... with the competent authority of the State Government in form of fixed deposit Receipt as financial assurance of the same.

In case of default on our part, the approval of Mining Plan may be withdrawn and aforesaid sum assured may be forfeited

Date
Place

Tepinder Singh Saini
Village Shubhkhera,
Tehsil Paonta Sahib,
District Sirmaur,
Himachal Pradesh.

Certificate

Certified that the provisions of the Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules 2015, Metalliferous Mines Regulation 1961 and other guidelines issued in this regard, from time to time, have been complied for, in the preparation of Mining Plan , of Minor Minerals contract for Stone, bajri & sand situated in Khasra No. 61; area measuring 73-17-00 Bighas (6.2255 Hectares), Mauza & Mohal Satiwala, Tahsil Paonta Sahib, District Sirmaur, granted in favour of Shri Tepender Singh Saini, village Subhkhera & post Office, Tehsil Paonta Sahib, District Sirmaur, Himachal Pradesh.

- While preparing the 'Mining Pan' including progressive mine closure plan all statutory Rules, Regulations, Orders made by competent authorities of State or Central Government or orders passed by Courts have been taken in consideration.
- The information provided and data furnished in this 'Mining Plan' is correct to the best of my knowledge.

Date
Place: Shimla

Jamwal

Jhumpa C. Jamwal
No. 21, Type IV,
HP Government Officers Residences,
Mehli, Shimla,
Himachal Pradesh RQP Registration No.
HP/RQP/21/1/2016
Mobile No. 9418909890

Seal of Geological wing, Industries Dept. Govt. of H.P.
APPROVED

HIMACHAL PRADESH

Geological Wing, Industries Dept. Govt. of H.P. APPROVED Seal of Lessee

Map 1

Lessee
Sh. Tepender Singh Saini,
Village Shubkhera,
Tehsil Paonta Sahib,
Distt. Sirmaur.

Jamwal
JHUMPA JAMWAL
No. HP/RQP/21/1/2016

DISTRICT SIRMAUR

KILOMETRES
5 0 5 10 15

RAJGARH
NOHRA
SARAHAN (PACHHAD)
SANGRAH (RENUKA)
RONHAT
SHALAI
DADAHU
NAHAN
KAMRAU
PAONTA SAHIB

Quarry Site

FEATURE PLAN

INDEX

- 368 CONTOUR
- LEASE BOUNDARY
- HFL
- 1/10TH
- CHANNEL DEPOSIT
- SAFE ZONE LIMIT
- BUFFER ZONE

APPLICANT: SH. TAPENDER SINGH SAINI
SCALE: 1: 2500
CONTOUR INTERVAL: 1 METER
CERTIFIED THAT THE PLAN IS CORRECT

JHUMPA JAMWAL

Seal of Geological wing, Industries Deptt. Govt. of HP
APPROVED

PLATE NO. 2

FIVE YEAR MINE PLANNING

INDEX

- 368 CONTOUR
- LEASE BOUNDARY
- HFL
- 1/10TH
- CHANNEL DEPOSIT
- SAFE ZONE LIMIT
- BUFFER ZONE
- MINE PLANNING

APPLICANT: SH. TAPENDER SINGH SAINI
SCALE: 1: 2500
CONTOUR INTERVAL: 1 METER
CERTIFIED THAT THE PLAN IS CORRECT

JHUMPA JAMWAL

APPROVED
Geologist Incharge, Industries Deptt. Govt. of H.P.

PLATE NO. 3

Land Use & Land Cover Map of Buffer Zone
Five Kilometres Radius

Map 4

Part of Survey of India
Toposheet No. H43L11

Scale

Meters 1000 500 0 1 2 3 4 5 Kilometers

Legend

- Forest Land
- Agriculture Land
- Waste Land
- River Bed
- Habitate Area
- Roads
- NH SH
- Rural
- Quarry Site

Lessee **Sh. Tepender Singh Saini,** **Village Shubkhera,** **Tehsil Paonta Sahib,** **Distt. Sirmaur.**	JHUMPA JAMWAL No. HP/GQP/21/1/2019