

# SURVEY DOCUMENT

*A Study on the Drainage System, Mineral  
Potential and Feasibility of Mining in River  
Stream beds of District Bilaspur. (H.P.)*

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## **Survey Document of District Bilaspur, Himachal Pradesh**

### **1. Introduction**

Minerals are valuable natural resources being finite and non-renewable. They constitute the vital raw materials for many basic industries and are a major resource for development. The history of mineral extraction in India dates back to the days of the Harappan civilization. The wide availability of the minerals in the form of abundant rich reserves made it very conducive for the growth and development of the mining sector in India. The country is endowed with huge resources of many metallic and non-metallic minerals and Mining sector is an important segment of the Indian economy. Since independence, there has been a pronounced growth in the mineral production both in terms of quantity and value. India produces as many as 87 minerals which include 4 fuels, 10 metallic, 47 non-metallic, 3 atomic and 23 minor minerals (including building and other materials). Minerals are classified into two groups, namely (i) Major minerals and (ii) Minor minerals. Amongst these two groups minor mineral have been defined under section 3 (e) of Mines and Minerals (Regulation and development) Act, 1957 and further governed by the State rules and River/Stream Bed Mining Policy and Guidelines. They include building stones, gravel, ordinary clay, ordinary sand, limestone used for lime burning, boulders, kankar, murum, brick earth, bentonite, road metal, slate, marble, stones used for making household utensils etc. and other minerals not defined as minor minerals in the said Act are treated as major minerals. They include coal, manganese ore, iron ore, bauxite, limestone, kyanite, sillimanite, barites, chromite, silica sand, fluorite, quartz, sand used for stowing purposes in coal mines and many other minerals used for industrial purposes.

The mining activities in the state of Himachal Pradesh can basically be categorized as in large sector and in small sector. The large sector comprises of limestone projects for manufacturing lime, cement and other lime products while the small mining sector comprises mining of minor

minerals like sand, stone, bajri, slate, shale and clay etc. which are basically building material to meet up the demand for infrastructure development of the state.

In pursuance to the orders of Hon'ble Supreme Court dated 27/02/2012 in the matter of Deepak Kumar etc. vs State of Haryana and Others, prior environment clearance has now become mandatory for mining of minor minerals irrespective of the area of mining lease. As such ministry of Environment, Forest and Climate change, govt. of India vide notification dated 15/01/16 and 20/01/2016 has constituted the District Level Environment Impact Assessment Authority (DEIAA) for grant of Environment Clearance for category "B2" projects for mining of minor minerals. In the aforesaid notification dated 15/01/16, the procedure for preparation of district survey report, which shall form the basis for application for environment clearance, preparation of report and appraisal of projects, has been prescribed. Accordingly the survey report for district Bilaspur has been prepared.

## **2. Overview of Mining Activity**

Minerals constitute the back-bone of economic growth of any nation and Himachal has been eminently endowed with this gift of nature. Minerals are non-renewable natural resources essential for mankind and backbone of economic growth of any country. The progressive industrialization and infrastructural activities has led to increased demand and resulting in large scale production of minerals. But there is no large scale mining activity in Himachal as in some other parts of the country as the State is not a mineral rich State. Almost all the mines are open cast and limited in aerial extent.

The main exploitable minerals in the district are Limestone, dolomitic limestone, shale, brick earth, minor minerals like sand, stone & bajri. The mining activities in district can basically be categorized under large sector and in small sector. The large sector comprises of major limestone projects for cement manufacture and the small mining sector comprises mining of minor minerals like sand, stone, bajri, slates, shale, clay etc. which are

basically building material required to meet the infra-structural development of the district . The Cement plant of ACC Ltd. is located near Barmana in Bilaspur district of Himachal Pradesh, on the National Highway NH 21, connecting Ambala and Manali installed with a capacity of 5.6 Lakh tonnes of cement per annum, it has modernized and expanded to a total capacity of 4.64 million tonnes of cement per annum. In addition to these 9 mining leases for minor minerals has been granted in the district.

### 3. The list of total mining leases in the district

S.No.	Name & Address	Kh.Nos.	Area in Beghas	Mauza/Mohal	Tehsil	Sub Division	Date of Execution of Lease
1	M/S Naina Stone Crusher , Prop. Sh. Mohinder Singh ,Vill. Gasor PO Jukhala Tehsil Sadar Distt. Bilaspur	108,114,117,41,18,19,16,20,7,13,9,14,46	50-10	Padhanu & Bharoli	Sadar	Bilaspur	17/6/2009
2	M/S Jeevan Industries ,Prop. Sh. Ashok Dabra ,Vill. Jabal ,PO. Jukhala Tehsil Sadar Distt. Bilaspur	5/1,6/1,10/1,13/1,197/1	13-05	Kotlu	Sadar	Bilaspur	13/1/2012
3	M/S Sharma Associates ,VPO Bharoli Tehsil Ghumarwin Distt. Bilaspur	214,357/1	08-04	Bharoli Kalan	Jhanduta	Ghumarwin	18/3/2010
4	Jagat Pal S/O Sh. Sita Ram ,Vill. Kothi Batala, PO. Rani Kotla Tehsil Sadar Distt. Bilaspur	35/13,26	08-05	Bhatetar	Sadar	Bilaspur	7/3/2010
5	Smt. Anita W/O Sh. Kuldeep Singh ,Vill. KhaterPO. Barmana Tehsil Sadar Distt. Bilaspur	1147/1095,1100,1105,1101,1098,1103,1108,1110,1096,1097,1102,1104,1106	55-08	Malyawar	Ghumarwin	Ghumarwin	7/3/2012
6	Sh. Bhim Singh S/O Sh. Kirpa Ram VPO Kandror Tehsil Sadar Distt. Bilaspur .	539 A	17-14	Kandror	Sadar	Bilaspur	24/10/2009
7	Sh. Kartar Singh S/O Sh. Narotam Singh VPO Kandror Tehsil Sadar Distt. Bilaspur	539 B	17-14	Kandror	Sadar	Bilaspur	24/10/2009
8	Sh. Subhash Thakur S/O Sh.DSada Ram Vill. Bhageri PO. Nichali Bhatar Tehsil Sadar Distt. Bilaspur	744/430,415,414,742/430/1,743/430,745/430,485/412	26-15	Delag	Sadar	Bilaspur	12/8/2011
9	ACC Barmana Tehsil Sadar Distt. Bilaspur		231-5-00 Hectrs	Barmana,Bhater Upperli,Dhawan Kothi,Baloh,Jamthal,Pan gain	Sadar	Bilaspur	
10	ACC Barmana Tehsil Sadar Distt. Bilaspur	2262/2203/2258/1	4-88-00 Hect.	Dhar Tatoh	Sadar	Bilaspur	
11	Sh. Naresh Kumar, Prop Naresh Construction Company , 97-B Main Market Bilaspur	411	23-19 Bighas	Delag	Sadra	Bilaspur	12/01/2017

#### 4. Detail of Royalty/revenue received in last three years

Year	Major Mineral	Minor Mineral	Total
2013-14	176020172	47231548	223251720
2014-15	284684328	20977000	305661328
2015-16	315838860	10802400	326641260

#### 5. Detail of Production of minor mineral in last three years

Mineral	2013-14	2014-15	2015-16
Lime stone	3320450	3578800	3548682
Shale	560978	634254	532405
Bajri	1760	1208	18040
Sand	5339	3913	
Rough stone	61352	479881	

#### 6. Process of deposition of sediments in the rivers of the district

##### Methodology and Guiding principles

The trace of each and every river/stream was covered and studied on the following principles of Geology/River bed mining:

- The general geology of the area;
- The presence of any major geological structure;
- Origin of river;
- Pattern of primary/ secondary/tertiary streams;
- Total catchments;
- General profile of river/streams;
- Meandering Pattern;
- Bank stability;
- Total potential of river bed in reference to minor mineral;
- General slope of the river/stream;
- Morphogenetic regions.

##### In Addition to above, presence of following object are also studied

- The presence of any WSS Schemes
- Bridges
- Agriculture fields
- Bank protection works
- Plantations etc.

**Following are the important guiding principles considered while recommending the river/stream bed or part of river/stream bed for collection for minor minerals.**

- The production of aggregate in a particular area is a function of the availability of natural resources, the size of population, the economy of the area and various developmental and infrastructural works being undertaken in the area like road construction, hydro-electric projects etc. Further, being a low-value, high-volume mineral commodity, the prices are dramatically affected by transportation distances. If the distances increase, the transportation cost may increase much more than the cost of the aggregates.
- A stable river is able to consistently transport the flow of sediments produced by watershed such that its dimension (width and depth) pattern and Vertical profile are maintained without aggrading (building up) or degrading (scouring down)
- The amount of boulders, cobbles, pebbles and sand deposited in riverbed equals to the amount delivered to the river from watershed and from bank erosion minus amount transported downstream each year.
- It is compulsive nature for river to meander in their belts and therefore they will have to be provided with adequate corridor for meandering without let or hindrance. Any attempt to diminish the width of this corridor (floodway) and curb their freedom to meander would prove counterproductive.
- Erosion and deposition is law of nature. The river/stream has to complete its geomorphological cycle from youth, mature to old age.
- River capturing is unavoidable
- Erosion in upstream and deposition in downstream
- Tendency of the river/stream toward grade
- Fundamentally, the lowest point of any stream is fixed by Sea Level
- The ratio between the width of meander belt and width of the stream decreases as the width of the stream increases.

**Formation, Bank erosion and Replenishment of any specific riverbed depend on:-**

**Primarily upon:**

- The Geology of the area;
- River Profile;
- Nature of source;
- Rainfall in catchments;
- Morphogenetic region;
- Catchments geomorphology;
- Efficiency of River/Stream (i.e. erosive power);

- The competency of the river/Stream (i.e. transport heaviest stone);
- The capacity of the River/Stream (i.e. volume of transportation);
- Hydraulic radius of the River/Stream (ratio between cross sectional area and length of wetted perimeter).

**Secondarily upon:**

- Geological structures;
- Porosity of formation;
- Run off in the catchments;
- Forest cover;

**In addition to above following man made factor's are also involved.**

- Type of agriculture;
- Encroachment on flood plain leaving least space for meandering;
- Any barrier on river/stream bed i.e. bands, dams and bridge foundations etc;
- Throwing of debris into the river/stream course;
- Drying up of river courses due to construction of dams, thereby reducing the efficiency and capacity of the river/stream.

The total potential of the river/stream bed is calculated up to the depth of one meter and in the workable span. Total potential or annual replenishment is not necessarily mineable. Mine ability depends upon the availability of approach roads, distance from the general conditions of policy viz distances from WSS Schemes, bridges etc and overall on the market demand etc. Thus keeping these factors into consideration 60% of the total potential has been taken for the purpose of exploitation of minor minerals.

**Method For Calculation of Reserves:-**

**METHODOLOGY: to calculate reserves**

On an average the competency of stream at the point of mining site is 10 to 15 cm x 4 to 5 cm but it is also important to mention here that there is a provision in the river/stream bed mining policy guidelines where collection of material upto a depth of 1 meter is allowed in a single season where mineral concessions have been granted, and it is noticed that during flood season whole of the pit so excavated is completely filled up and as such the excavated area is replenished with new harvest of mineral.

In order to calculate the mineral deposits in the stream beds, the mineral constituents have been categorized as clay, silt, sand, bajri and boulder and their average %age is taken into account. It is observed in different rivers/streams that % age of boulders varies from 30% to 70%, bajri 15 % to 40%, sand from 15% to 30% and rest is silt .Only boulder, bajri and sand is



the resource mineral i.e. usable mineral and rest is taken as the waste. Further the Survey of India Topo-Sheets was used as base map to know the extent of river course. The mineral reserves have been calculated only up to 1.00 metre depth although there are some portions in the river beds such as channel bars, point bars and central islands where the annual deposition is raising the level of river bed thus causing shifting of the rivers towards banks and causing cutting consequently of banks and at such locations, removal of this material upto the bed level is essential to control the river flow in its central part and to check the bank cutting. While calculating the mineral potentials, the mineral deposits lying in the sub-tributaries of that particular stream/river has not been taken into consideration. Since these mineral deposits are adding annually to the main river, the mineral deposits will be much more.

### **Annual deposition**

The process of mineral potential reclamation/deposition depends upon rainfall received in the catchment areas of the river/stream, their tributaries and the velocity of the river. Thus it is difficult to predict, what will be the quantity of mineral deposited by the river. During less rainfall, %age of deposition is less however during heavy rainfall water gushes into rivers may force the change in the river course, thus old sites of deposition may be irrelevant. Thus the figures may be a mere prediction. Also the figures may vary from area to area and year to year basis. Therefore it is suggested that DEAC committee is at liberty to make the spot inspection of the area under question to make necessary amendments in the document. Therefore factor of average of 30-40% of the total mineral potential is used to calculate the deposition.

## **7. General Profile of the district**

### **ABOUT BILASPUR**

The Bilaspur district lies between 31° 12' 30" and 31° 35' 45" North latitude and between 76° 23' 45" and 76° 55' 40" East longitude in the outer hills of the Himalayas next to the Punjab plains and forms a part of the basin of river Satluj which flows meandering across it for about ninety kilometers. It covers an area of 1,167 sq. kms. Its boundaries touch Una, Hamirpur, Mandi and Solan districts. Satluj is the main river which passes through the middle of the district and divides it into almost equal parts.

## HISTORY

**Pre Independence:** The erstwhile ruling family of Bilaspur claims its descent from Chanderwanshi Rajputs who reigned at Chanderi in the Bundelkhand region of Madhya Pradesh. The place now forms part of Guna district. It is said that the seventh ruler of Chanderi Kingdom Harihar Chand had a dream of Goddess Jawalamukhi. Thereafter, he decided to seek his fortune in a shrine. As a result of this, he handed over the kingdom to his youngest son Govind and then proceeded towards Jawalamukhi along with his remaining four sons and established themselves at Jindbari where they constructed a fort and settled there for some time before proceeding to Jawalamukhi. They paid a visit to Nadaun the then capital of Kangra. The Raja of Kangra arranged a tent pegging contest and promised his daughter to the men who succeeds in taking a certain peg. In reality this peg was the trunk of a tree, entered the fray. Sabir Chand lost the control of his horse and was killed and the deception practiced by the Kangra Raja was discovered. Thereafter the battle ensued and the Kangra forces were defeated. Kangra Tikka and the Chanderi King Hari Chand were both among the slain.

The remaining three Chanderi princes retired to the Jawalamukhi shrine. The reigning Goddess appeared and promised each of them a kingdom. In the fulfillment of her prophecy one of the three princes was adopted by the Raja of Kumaon and other prince Gambhir Chand took possession of Chamba and the eldest son Bir Chand got Jindbari at present in tehsil Anandpur Sahib in Rupnagar district of Punjab. It was Bir Chand who constructed the Naina Devi temple. He extended the Jurisdiction of his kingdom Kahlur during his 33 years of rule and subjugated about 15 neighboring princely states. His ambition of extending jurisdiction was ultimately halted by the Raja of Sirmaur with whom he concluded treaty of peace. Thus, he carved out a kingdom of Kahlur for himself. Bir Chand was followed by a number of his successors and last of them was Kahan Chand who conquered the Hindur state (Nalagarh) and gave it to his second son Surjeet Chand from whom the present ruling family of Nalagarh descends.

The Capital of ruling dynasty continued to be located at Kotkahlur till 1600 A.D. when the heir apparent Bir Chand fled to Sunhani across the river Satluj along with mother where he settled. His father, the then ruler, Gyan Chand embraced Islam at the behest of Mughal ruler at Sirhand who was so impressed with his fine appearance that he gave his own daughter in marriage. He returned to Kotkahlur after conversion. After the death of Raja Gayn Chand, Bir Chand returned to Kotkahlur and got himself installed as the King. He kept his capital at Sunhani on the right side of river Satluj. In

1650 A.D. when Deep Chand of the same dynasty succeeded as Raja of Kahlur state, he decided to shift his capital as he developed strong disliking for the place. It is generally said that accompanied by 2 Hindus and 2 Mohammdan faquirs he sought new site for the capital and finally settled at a place on the left bank of Satluj river traditionally called "Beas gufa" after the name of Rishi Vyas. He built a palace called 'Dholar' over looking the river and founded a town on the river bank which was named after Beas gufa and was later on called Bilaspur. Since then the capital of Bilaspur continued to be at Bilaspur though the original town which was established by the Chandel dynasty was submerged in the 'Govind Sagar' on 1<sup>st</sup> July, 1954. A new township above the old one has come up at an elevation of 673 metres above sea level.

**Post Independence :** Himachal Pradesh came into being as a part 'C' State of the Indian Union on 15<sup>th</sup> April, 1948 as result of merger of 30 Punjab and Shimla Hill State in the Indian Union viz. Baghat, Bhajji, Baghal, Beja, Balson, Koti, Kumarsain, Kunihar, Kuthar, Mandi, Bushahr, Chamba, Darkoti, Delath, Dhadi, Dhami, Ghund, Jubbal, Khaneti, Keonthl, Madhan, Mahlog, Mangal, Ratesh, Rawringarh, Sangri, Sirmaur, Suket, Tharoach, Theog. At that time the state had 4 districts viz. Chamba, Mahasu, Mandi, Sirmaur and its area was 2,716,850 hectares. The State was taken over under the Central administration on the 12<sup>th</sup> October, 1948. By an act of Parliament the 31<sup>st</sup> state of Bilaspur which was till then a separate entity under the control of Chief Commissioner, was integrated with Himachal Pradesh on 1<sup>st</sup> July, 1954 thereby adding one more district with an area of 106,848 hectares.

Initially, it consisted of two tehsils namely, Ghumarwin and Bilaspur Sadar. In January, 1980 the state government created a separate sub-tehsil called Naina Devi with headquarters at Swarghat out of Bilaspur Sadar Tehsil. In 1984 one new sub-tehsil namely, Jhandutta was created by carving out some areas of tehsil Ghumarwin. Jhandutta sub-tehsil was given full tehsil status in January, 1998. Administratively, the district is divided into two sub-divisions, 3 tehsils, 1 sub-tehsil, 3 community development blocks, 136 panchayats, 2 municipal committees and 2 notified area committees.

Bilaspur had been a town in 1891 and 1901 Censuses but was declassified thereafter in the year 1911. In 1931 Census, it was again classified as town and has been continuing as such since then. Naina Devi a place of religious importance was declared as town for the first time in 1953. A small town committee was setup to look after the affairs of this place till 1960. In the year 1961 it was notified as municipal committee. After 1981 Census, one more place Shah Talai has been classified as notified area committee.



**DEMOGRAPHIC PROFILE OF THE DISTRICT BILASPUR****Population ( As per 2011 Census )**

Total	3,82,056
Male	1,92,827
Female	1,89,282
Sex Ratio	981 / 1000 ( F / M )
Density of Population ( Per Square KM )	327

**People and Culture**

Major Religions	Hindu, Muslim, Sikh
Language Spoken	Kahluri or Bilaspuri ( Written Script is Devnagiri ), Hindi
Traditions Food :	Maize, Rice and Wheat
Economy	Agriculture based and Service

**Literacy Rate Aggregate ( As per 2011 Census )**

Male Literacy	92.39 %
Female Literacy	78.90 %
Total	85.67 %

**Geographical Area**

Total ( In Hectares )	111776
Forest Area	14013
Cultivated Area	56011
Unusable Area	72423
Altitude	610 m ( above sea Level )
Major River	Satluj ( Hot in the summer and cold in the winter )

**Climate**

Rainfall	Max 62 mm Min 1.5 mm
Temperature	Max 37° C Min 5° C

**Distances**

From State Capital Shimla	85 Kms
Near Railway Station Kiratpur	65 Kms
Nearest Airport Shimla	85 Kms

**Cattle Population(As per Cattle Census 2007)**

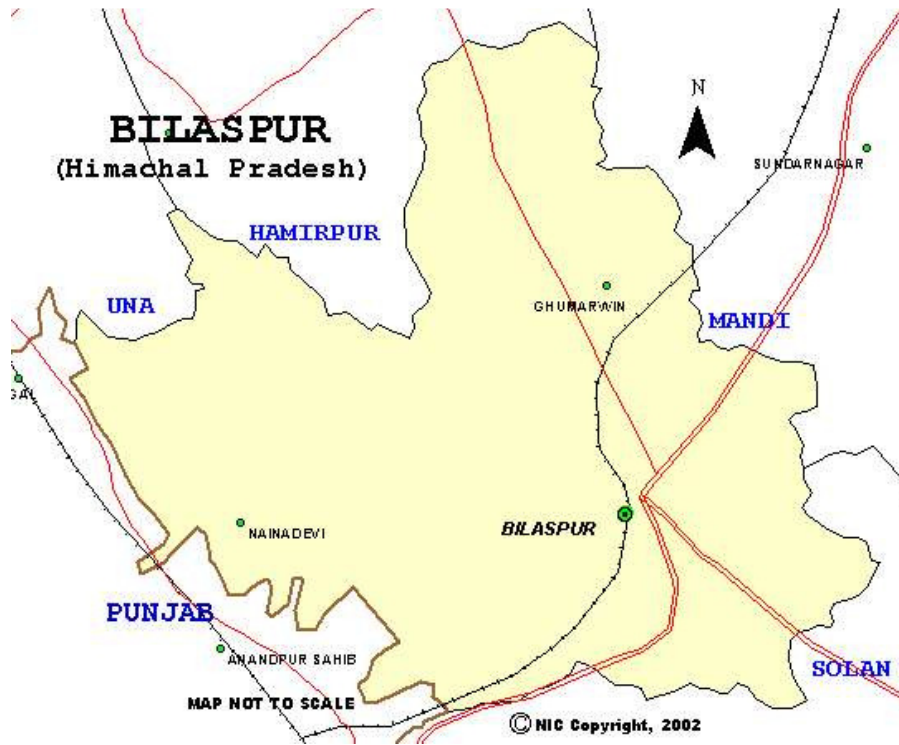
Buffaloes	100004
Dogs	8437
Sheeps	1313
Goats	76033
Others	950

**Industrial Units**

Large Industries	1 ( ACC Barmana, Bilaspur )
SSI Units	2200
Handicraft Units	402
Handloom Units	204
Khadi & Village Industries	2399

**General**

Length of Pucca Roads (Road in Km.)	691.932
Length of Kutchra Roads (Road in Km.)	504.106
Number of Post Offices	146
Electrified Villages	965
Nationalized Bank Branches	62
Name of Lead Bank	UCO Bank
Cooperative Bank Branches	21



<u>Education</u>			
	<u>Govt.</u>	<u>Pvt.</u>	<u>Total</u>
Primary Schools	600	58	658
Middle Schools	123	9	132
High Schools	44	21	65
Sr. Secondary Schools	81	8	89
Colleges	4	4	8
Industrial Training Institute	3		3
Others	2		2

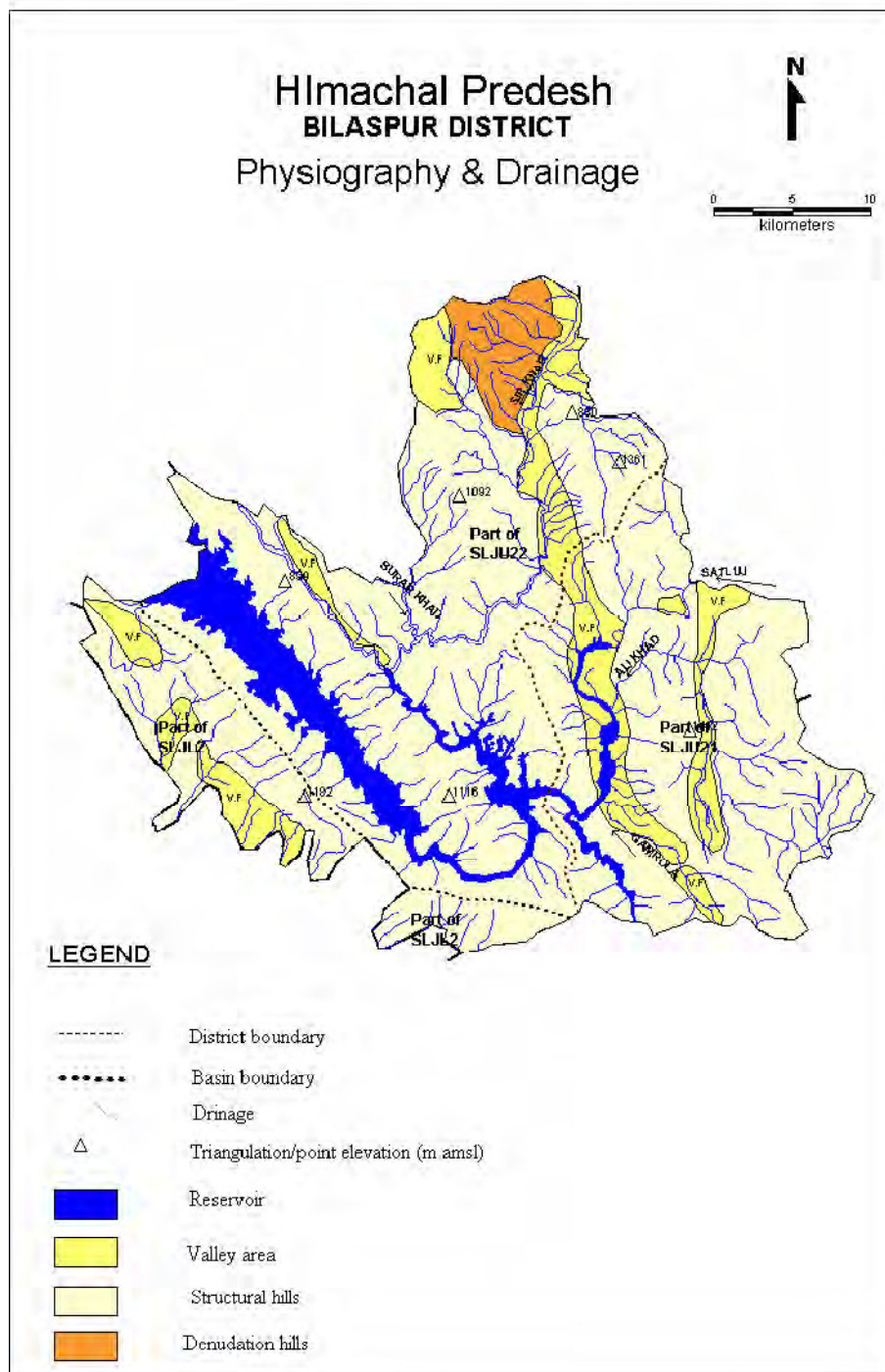
<u>Animal Husbandry</u>	
Hospitals	18
Central Veterinary Dispensaries	2
Dispensaries	71
Mobile Units	1
Veterinary Check Post	1
AI Centres	2

Key Village Centre	13
Go Sadan	2
Farm	1

### **GEOMORPHOLOGY**

Bilaspur district nestles between Siwalik ranges and forms part of the lesser Himalaya. It has a diverse landscape made of the hills, valleys with piedmont zone. There are seven main hill ranges i.e. *Naina Devi, Kot, jhanjhar, Tiun, Bandla, Bahaurpur and Ratanpur* constituting the hill system of District Bilaspur. The district is mostly hilly and has no mountains of higher altitude from the mean sea level. The elevation of the lowest point is about 290 m and the highest peak is *Bhadurpur hill* with an elevation of 1980 m msl.





The major river that passes through the middle of the district from east to west is Satluj. It enters the district near a place known as *Kasol* in the North- West and after traversing a course of 90 kms, leaves it near Naila and enters the territory of Punjab in the South- West. The Satluj is joined by several tributaries from both the sides, the main three tributaries are Ali Khad, Gamrola Khad and Seer Khad.. The length of Ali khad is about 26

kms. It rises in the Shimla district and after passing through Bahadurpur Dhar joins the river Satluj at Bilaspur. Gamrola khad also rises in the Shimla district and after draining the Rattanpur Dhar joins the river about 5 kms downwards from Bilaspur town. Seer Khad which is the third tributary of Satluj originates at Wah Devi which is 10 kms from Sarkaghat in Mandi district. After draining Kot-Ki-Dhar and a greater portion of Ghumarwin tahsil it joins Satluj river at village Serimatla nearly 15 kms downwards from Bilaspur town.

## **8. Land utilization pattern in the district**

### **GENERAL INFORMATION**

- i) Geographical area (Sq. Km) = 1167
- ii) Administrative Divisions  
Sub divisions= 3  
Number of Tehsils= 4  
Number of Sub Tehsils= 2  
Development blocks= 4  
No. of Panchayats/Villages= 151/1080  
Population (As on 2011 census) = 381956  
Average annual rainfall (mm) = 1106.28 mm  
About 81.5% during monsoon

### **GEOMORPHOLOGY**

Major physiographic units Structural Hill, Denudational hill, and Valley fill  
General altitude 610 m amsl Major Drainages  
Sutlej Basin  
Satluj, Ali Khad, Gamrola Khad and Seer khad

#### **Land Use** (hectares)

- a) Forest area: 14013
- b) Total cropped area 56500

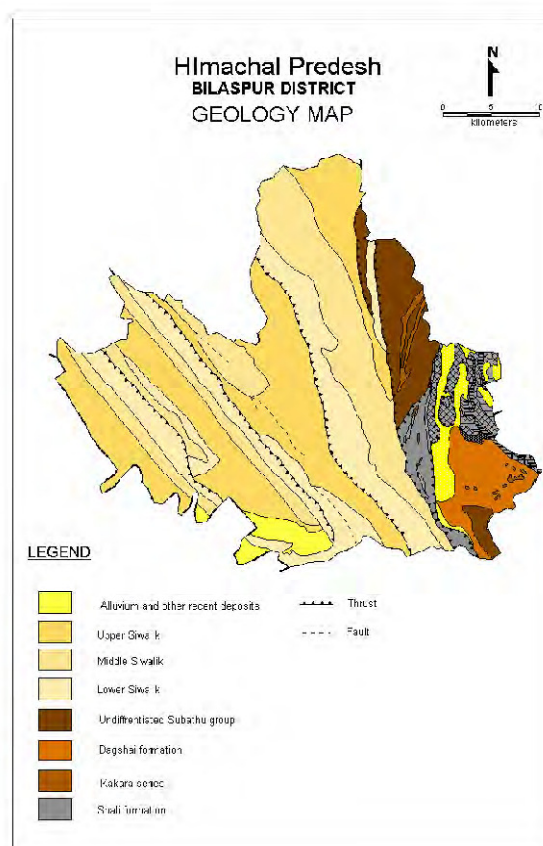
#### **MAJOR SOIL TYPES**

Alluvial soils and Non- calcic  
Brown soils

**AREA UNDER PRINCIPAL CROPS** Maize, Paddy, Wheat.

## 9. Geology and Mineral wealth

### GEOLOGY



The rock formations occupying the district range in age from pre-Cambrian to Quaternary period. The generalized geological succession in the district is given below

<u>Eon</u>	<u>ERA</u>	<u>PERIOD</u>	<u>GROUP FORMATION</u>	<u>DESCRIPTION</u>
Phanerozoic	Cenozoic	Quaternary (Recent to sub-Recent)	Alluvium; fluvial, terrace, piedmont	Sand, silt, clay, gravel, pebble and cobble etc.
Undifferentiated			Sand, clay, gravel, pebble, cobble and boulders	

Tertiary Pliocene to Mid. Miocene	Upper Siwalik	Soft sandstone, brownish clay, shale, poorly sorted, crudely bedded conglomerate & boulder beds.	
Middle Siwalik	Gray sandstone, and brownish clay/shale		
Lower Siwalik	Red and purple sandstone and shale		
Oligocene-Lower Miocene	Subathu Group Kasauli Formation Daghshai Formation Subathu Formation	Grey sandstone, shale, Clay Greenish to greyish hard sandstones Dark-red and purple coloured shales Dark nodular clays	
Proterozoic	Upper proterozoic III Proterozoic II	Krol Formation Shali Formation	Greyish massive dolomites and Limestones Cherty Dolomite, Quartzite and Lime stone

### Mineral wealth of Bilaspur District:

#### Bilaspur district:

##### 1. Limestone Reserves

**Gagal- Barmana Limestone** : Large reserves of limestone (both dolomitic and non-dolomitic) occur amongst the Pre Tertiary rocks near Jamthal (31°24': 76°52'), Aur or Gagal-Hill (31°06': 31° 20': 76°51'), Chhabiwae (31°23' : 76°51') and Darobn (31° 21': 76° 51'). The limestone is suitable for cement manufacture. In Gagal-Burmana area, the reserves of cement grade limestone have been estimated as 117.1 million tonnes.

##### 2. Quartzite Reserves:

Soft white quartzite, found near Sirha (:-51°21': 76° 47'), Aruali (31° 18' : 76° 47'), Banda (31° 19' : 76° 47') and Solag (31° 21' : 76° 50'), may be suitable for glass industry.

##### 3. Coal : A lenticular carbonaceous matter occurs in the Subathu Shale near Dela (31° 24': 76° 46'), Maliwarkhad and Bandla (31° 20': 76° 46')

## 10. District wise detail of river

### DETAILS OF RIVER/KHADDs IN DISTRICT BILASPUR

s. no	Name of river/stream/khadd	Part of topo Sheet No.	Average width	Length	Enters Bilaspur district from	Meets BBMB reservoir at	RL at Origin (at the entrance in the ditric t)	RL at Confluence	Villages falling in near course from Origin to Confluence	Mineral composition(%age)				Areas identified for granting mineral concessio n
										San d	Bou lder	Bajr i	Sil t/c lay	
1	Satluj River	53A/15	60-70m	14 km	Kasol		600m	545m	Bilaspur, BBMB area	San d	Bou lder	Bajr i	Sil t/c lay	Bilaspur, BBMB area
2	Seer khadd	53A/11	100-350(mtrs)	35km	Jahu-Dehra(from Mandi district)	Mandwan(Lag)	700m	529m	Bhadrog, talwara, Chudani, Dehlwin, Bamm, Sunhani, Ree, Jharari, Nihan, Barad	25	35	25	15	Bhadrog, talwara, Chudani, Dehlwin, Bamm, Sunhani, Ree, Jharari, Nihan, Barad
3	Snehal khadd	53A/10	50-100(mtrs)	8.7km	Kot-Samlog(from Hamirpur district)	meets Seer khadd at Jahu	825m	712m	Diara, Hatwarh	25	25	35	15	Diara, Hatwarh
4	Sukkar khadd	53A/11	50-250(mtrs)	17Km	Dhalo(from Hamirpur district)	Malangan	700m	523m	Fagog, Bhallu, Androli, Malagaon, Sandyar, Mandwan(BBMB)	25	35	25	15	Fagog, Bhallu, Androli, Malagaon, Sandyar, Mandwan(BBMB)
5	Saryali khadd	53A/11	50-200(mtrs)	15.5km	Naghiar(from Hamirpur district)	Maandwan(kallar)	865m	520m	Shahtalai, Jhabola, Bharoli Khurd, Bagru	25	35	30	10	Shahtalai, Jhabola, Bharoli Khurd, Bagru
6	Ali Khadd	53A15	50-75(mtrs)	10km	Jabal(from solan district)	Chandpur	800m	600m	Jabbal, Bholi, Jhukala, Ashamanjari, Kuddi,	20	30	25	25	Jabbal, Bholi, Jhukala, Ashamanjari, Kuddi,
7	Ghambher Khadd	53A/15,16	25-100(mtrs)	20Km	From Swarghat, Solan District	Ghambherpul	980m	690m	Neri and Charrol(BBMB)	40	20	30	10	Neri and Charrol(BBMB)

## Detail of Rivers /Khadds in District Bilaspur

### 1.Satluj River

<b>Part of Topo sheet of Survey of India</b>	53A/15		
<b>TOTAL LENGTH</b>	14 Km(14000m)		
<b>GENERAL WIDTH</b>	60-70m		
<b>AVERAGE WIDTH</b>	65m		
<b>TOTAL CATCHMENT AREA(appx)</b>	800sqkm		
<b>RL AT ENTRANCE</b>	600m at Kasol where river enters in bilaspur district		
<b>RL AT CONFLUENCE</b>	515 m near confluence with Govind Sagar		
<b>TOTAL RIVER BED AREA</b>	91-00-00 hect		
<b>VILLAGES</b>	Bilaspur, BBMB area		
<b>GEOLOGY</b>	Satluj passes through shivalik formations in entire bilaspur district		
<b>TOTAL RESERVE CALCULATED(60%)</b>	<b>= 12,01,200 MT</b>		
<b>TOTAL DEPOSITION</b>	<b>4,20,420MT</b>		
	<b>Sand</b>	<b>Boulder</b>	<b>bazri</b>
<b>Reserve(MT)</b>	300300	420420	300300
<b>Deposition (MT)</b>	105105	105105	147147

It is evident from the above table about 1201200 MT of mineable mineral of different sizes are available up to a depth of 1 m. The annual deposition of mineral in the stream bed has been calculated approximately 420420 MT. As such mineral concession can be granted in the whole length of river bed along river bank and flood plains at suitable places where transportation is smooth and material can be easily transported. However, no lifting/mining shall be allowed where any work allotted (supply scheme, Bridge etc) by any agency. The above said reserves are total reserves in the above mentioned stretch of river bed and mineable reserve is area specific, for which mineral concession are granted/or to be granted.

## 2. Seer Khad

<b>Part of Topo sheet of Survey of India</b>	53A/11		
<b>TOTAL LENGTH</b>	35Km(35000m)		
<b>GENERAL WIDTH</b>	100-350m		
<b>AVERAGE WIDTH</b>	150m		
<b>TOTAL CATCHMENT AREA(appx)</b>	1200sqkm		
<b>RL AT ENTRANCE</b>	700m		
<b>RL AT CONFLUENCE</b>	529 m		
<b>TOTAL RIVER BED AREA</b>	525-00-00 hect		
<b>VILLAGES</b>	Bhadrog, talwara, Chudani, Dehlwin, Bamm, Sunhani, Ree, Jharari, Nihan, Barad		
<b>TOTAL RESERVE CALCULATED</b>	<b>=6930000 MT</b>		
<b>ANNUAL DEPOSITION</b>	<b>=2079000 MT</b>		
	<b>Sand</b>	<b>Boulder</b>	<b>BAZRI</b>
<b>Reserve(MT)</b>	1732500	2425500	1732500
<b>Deposition(MT)</b>	519750	519750	727650

It is evident from the above table about 6930000 MT of mineral of different sizes are available up to a depth of 1 m. The annual deposition of mineral in the stream bed has been calculated approximately 2079000MT. As such mineral concession can be granted in the whole length of river bed along river bank and flood plains at suitable places where transportation is smooth and material can be easily transported. However, no lifting/mining shall be allowed where any work allotted (supply scheme, Bridge etc) by any agency. The above said reserves are total reserves in the above mentioned stretch of river bed and mineable reserve is area specific, for which mineral concession are granted/or to be granted.

### 3. Snehal Khad

<b>Part of Topo sheet of Survey of India</b>	53A/10		
<b>TOTAL LENGTH</b>	8.7 Km(8700m)		
<b>GENERAL WIDTH</b>	50-100m		
<b>TOTAL WIDTH</b>	65m		
<b>TOTAL CATCHMENT AREA(appx)</b>	80sqkm		
<b>RL AT ENTRANCE</b>	825m		
<b>RL AT CONFLUENCE</b>	712m		
<b>TOTAL RIVER BED AREA</b>	56-55-00 hect		
<b>VILLAGES</b>	Diara, Hatwarh		
<b>TOTAL RESERVE CALCULATED</b>	<b>=746460 MT</b>		
<b>ANNUAL DEPOSITION</b>	<b>=223938 MT</b>		
	<b>sand</b>	<b>boulder</b>	<b>BAZRI</b>
<b>Reserve(MT)</b>	186615	186615	261261
<b>Deposition(MT)</b>	78378.3	55984.5	55984.5

It is evident from the above table about 746460MT of mineral of different sizes are available up to a depth of 1 m. The annual deposition of mineral in the stream bed has been calculated approximately 223938MT. As such mineral concession can be granted in the whole length of river bed along river bank and flood plains at suitable places where transportation is smooth and material can be easily transported. However, no lifting/mining shall be allowed where any work allotted (supply scheme, Bridge etc) by any agency. The above said reserves are total reserves in the above mentioned stretch of river bed and mineable reserve is area specific, for which mineral concession are granted/or to be granted.



#### 4. Sukkar Khad

<b>Part of Topo sheet of</b>	53A/11		
<b>TOTAL LENGTH</b>	17 Km(17000m)		
<b>GENERAL WIDTH</b>	50-250m		
<b>TOTAL WIDTH</b>	100m		
<b>TOTAL CATCHMENT AREA(appx)</b>	250sqkm		
<b>RL AT ENTRANCE</b>	700m		
<b>RL AT CONFLUENCE</b>	523m		
<b>TOTAL RIVER BED AREA</b>	170-00-00 hect		
<b>VILLAGES</b>	Fagog, Bhallu, Androli, Malagaon, Sandyar, Mandwan(BBMB)		
<b>TOTAL RESERVE CALCULATED</b>	<b>=2244000 MT</b>		
<b>TOTAL DEPOSITION</b>	<b>=673200 MT</b>		
	<b>SAND</b>	<b>BOULDER</b>	<b>BAZRI</b>
<b>Reserve(MT)</b>	561000	785400	785400
<b>Deposition(MT)</b>	235620	168300	235620

It is evident from the above table about 22,44,000 MT of mineral of different sizes are available up to a depth of 1 m. The annual deposition of mineral in the stream bed has been calculated approximately 6,73,200 MT. As such mineral concession can be granted in the whole length of river bed along river bank and flood plains at suitable places where transportation is smooth and material can be easily transported. However, no lifting/mining shall be allowed where any work allotted (supply scheme, Bridge etc) by any agency. The above said reserves are total reserves in the above mentioned stretch of river bed and mineable reserve is area specific, for which mineral concession are granted/or to be granted.

### 5. Saryali Khad

<b>Part of Survey of India</b>	53A/11		
<b>TOTAL LENGTH</b>	15.5 Km(15500m)		
<b>GENERAL WIDTH</b>	50-200m		
<b>TOTAL WIDTH</b>	100m		
<b>TOTAL CATCHMENT AREA(appx)</b>	200sqkm		
<b>RL AT ENTRANCE</b>	865m		
<b>RL AT CONFLUENCE</b>	520m		
<b>TOTAL RIVER BED AREA</b>	155-00-00 hect		
<b>VILLAGES</b>	Shahtalai, Jhabola, Bharoli Khurd, Bagru		
<b>TOTAL RESERVE CALCULATED</b>	<b>=2046000 MT</b>		
<b>TOTAL DEPOSITION</b>	<b>=613800 MT</b>		
	<b>SAND</b>	<b>BOULDER</b>	<b>BAZRI</b>
<b>Reserve(MT)</b>	511500	716100	613800
<b>DEPOSITION(MT)</b>	184140	153450	214830

It is evident from the above table about 2046000 MT of mineral of different sizes are available up to a depth of 1 m. The annual deposition of mineral in the stream bed has been calculated approximately 613800MT . As such mineral concession can be granted in the whole length of river bed along river bank and flood plains at suitable places where transportation is smooth and material can be easily transported. However, no lifting/mining shall be allowed where any work allotted (supply scheme, Bridge etc) by any agency. The above said reserves are total reserves in the above mentioned stretch of river bed and mineable reserve is area specific, for which mineral concession are granted/or to be granted.

## 6. Ali khad

<b>Part of Topo sheet</b>	53A/15		
<b>TOTAL LENGTH</b>	20 Km(20000m)		
<b>GENERAL WIDTH</b>	50-75		
<b>TOTAL WIDTH</b>	60m		
<b>TOTAL CATCHMENT AREA(appx)</b>	135sqkm		
<b>RL AT ENTRANCE</b>	800m		
<b>RL AT CONFLUENCE</b>	540m		
<b>TOTAL RIVER BED AREA</b>	120-00-00 hect		
<b>VILLAGES</b>	Jabbal,Bholi, Jhukala, Ashamanjari, Kuddi,		
<b>TOTAL RESERVE CALCULATED</b>	<b>=1584000 MT</b>		
<b>TOTAL DEPOSITION</b>	<b>=475200 MT</b>		
	<b>SAND</b>	<b>BOULDER</b>	<b>BAZRI</b>
<b>Reserve(MT)</b>	316800	475200	396000
<b>DEPOSITION(MT)</b>	118800	95040	142560

It is evident from the above table about 1584000 MT of mineral of different sizes are available up to a depth of 1 m. The annual deposition of mineral in the stream bed has been calculated approximately 475200MT. As such mineral concession can be granted in the whole length of river bed along river bank and flood plains at suitable places where transportation is smooth and material can be easily transported. However, no lifting/mining shall be allowed where any work allotted (supply scheme, Bridge etc) by any agency. The above said reserves are total reserves in the above mentioned stretch of river bed and mineable reserve is area specific, for which mineral concession are granted/or to be granted.

### 7. Ghambher khad

<b>Part</b>	53A/15,16		
<b>TOTAL LENGTH</b>	20 Km(20000m)		
<b>GENERAL WIDTH</b>	25-50m		
<b>TOTAL WIDTH</b>	40m		
<b>TOTAL CATCHMENT AREA(appx)</b>	350sqkm		
<b>RL AT ENTRANCE</b>	900m		
<b>RL AT CONFLUENCE</b>	680m		
<b>TOTAL RIVER BED AREA</b>	80-00-00 hect		
<b>VILLAGES</b>	Neri and Charrol(BBMB)		
<b>TOTAL RESERVE CALCULATED</b>	<b>=1056000 MT</b>		
<b>TOTAL DEPOSITION</b>	<b>=316800 MT</b>		
	<b>BOULDER</b>	<b>SAND</b>	<b>BAZRI</b>
<b>Reserve(MT)</b>	422400	211200	316800
<b>DEPOSITION(MT)</b>	126720	2851200	63360

It is evident from the above table about 1056000 MT of mineral of different sizes are available up to a depth of 1 m. The annual deposition of mineral in the stream bed has been calculated approximately 316800MT. As such mineral concession can be granted in the whole length of river bed along river bank and flood plains at suitable places where transportation is smooth and material can be easily transported. However, no lifting/mining shall be allowed where any work allotted (supply scheme, Bridge etc) by any agency. The above said reserves are total reserves in the above mentioned stretch of river bed and mineable reserve is area specific, for which mineral concession are granted/or to be granted.

## Drainage system with description of rivers

### Salient features of important rivers and stream

S.no	Name of river/stream	Total length in km(in district)	Place of entrance in district	Altitude at place of entrance in district
1	Satluj	14	Kasol	600m
2	Seer khad	35	Jahu-dehra	700m
3	Snehal khad	8.7	Kot-Samlog	825m
4	Sukkar khad	17	Dhalo	700m
5	Saryali khad	15.5	Naghiar	865m
6	Ali khad	10	Jabal	800m
7	Ghambrola khad	20	Swarghat	980m

River/stream	Portion of the river/stream recommended for mineral concession	Length of area recommended for mineral concession	Average width of the area recommended for mineral concession	Mineable mineral potential(in MT)
Satluj	Along the river banks and flood plain, mineral concession can be granted in the whole length of river bed at suitable places where transportation is smooth and material can be easily transported, Detail of places where mineral concession may be granted can be obtained by Mining office.	14	60-70	1201200
Seer khad	Do	35	100-350	6930000
Snehal khad	Do	8.7	50-100	746460
Sukkar khad	Do	17	50-250	2244000
Saryali khad	Do	15.5	50-200	2046000
Ali khad	Do	10	50-75	1584000
Ghambrola khad	Do	20	25-100	1056000

### Mineral potential in MT

	<b>Boulder</b>	<b>Bajri</b>	<b>Sand</b>	<b>Total mineable mineral(60% of total mineral potential)</b>
Satluj	420420	300300	300300	1021020
Seer khad	2425500	1732500	1732500	5890500
Snehal khad	186615	261261	186615	634491
Sukkar khad	785400	785400	561000	2131800
Saryali khad	716100	613800	511500	1841400
Ali khad	475200	396000	316800	1188000
Ghambrola khad	422400	211200	316800	950400

### Annual deposition

Mathematical calculations based upon various geomorphological indicators which is done for average profile of river bed throughout the length of river in the district.

The process of mineral potential reclamation/deposition depends upon rainfall received in the catchment areas of the river/stream and their tributaries and the velocity of the river. Thus it is difficult to predict, what quantity of mineral is deposited by the river. During less rain, %age of deposition is less however during heavy rainfall water gushes into rivers may force the change in the river course, thus old sites of deposition may be irrelevant. Thus the figures may be a mere prediction. Also the figures may vary from area to area and year to year basis. Therefore it is suggested that DEAC committee is at liberty to make the spot inspection of the area under question to make necessary amendments in the document.

<b>River/stream</b>	<b>Boulder</b>	<b>Bajri</b>	<b>Sand</b>	<b>Total annual deposition</b>
Satluj	105105	147147	105105	357357
Seer khad	519750	727650	519750	1767150
Snehal khad	55984.5	55984.5	78378.3	190347.3
Sukkar khad	168300	235620	235620	639540
Saryali khad	153450	214830	184140	552420
Ali khad	95040	142560	118800	356400
Ghambrola khad	126720	63360	2851200	3041280

**General Recommendations:**

The part of river/stream beds recommended for grant of mineral concessions in this report are based on studies of Topo Sheets of Survey of India in consultant with Mining Officer, Bilaspur, however before grant of any mineral concession in a particular river/stream bed, the guidelines contained in River/Stream bed mining policy are to be followed in addition to site specific conditions as specified by the Joint Inspection Committee and recommendation thereof. In the ibid Policy Guidelines, following general conditions are mentioned.

- 1 No River/Stream bed mining shall be allowed without the recommendations of the Sub-Divisional Level Committee.
- 2 No River/Stream bed mining shall be allowed without getting clearance under Forest Conservation Act, 1980 if the area attracts the provisions of FCA. 1980.
- 3 No River/Stream bed mining shall be allowed within 75 meters from the periphery of soil conservation works, nursery plantation, and check dams or within the distance as recommended by the Sub-Divisional Committee, whichever is more.
- 4 No River/Stream bed mining shall be allowed within 1/5<sup>th</sup> of its span or 5 meters from the bank or as specified by the Sub-Divisional Committee which ever more is.
- 5 No River/Stream bed mining shall be allowed within 200 meters U/S and D/S of Water Supply Scheme or the distance as specified by the Sub- Divisional Committee whichever is more.
- 6 No River/Stream bed mining shall be allowed within 200 meters U/S and 200 to 500 mts D/S of bridges depending upon the site-specific conditions.
- 7 No approach road from PWD road shall be allowed to River/Stream beds mining, unless lessee/contractor obtains written permission from XEN PWD for making road leading to all intake places from the PWD Roads.
- 8 No mechanical mining through mechanical excavator including any other earth moving machines like JCB, Bulldozer, Pocklain, Loaders etc shall be carried out in river or stream Bed by the lease holder or permit holder or contractor as the case may be.

- 9 No boulder/cobbles/hand broken road ballast shall be allowed to be transported outside the State from River/Stream beds, so as to reduce pressure on the River/Stream beds.
- 10 No digging of more than 3 feet shall be allowed in River/Stream beds.
- 11 Every leaseholder shall supply in advance, the Registration Nos of vehicle engaged in transportation of mineral from mining area to his industrial unit. This would ensure checking of illegal vehicles carrying minerals.
- 12 Every lessee/contractor shall ensure that his labour does not involve in fish poaching.
13. No blasting shall be allowed in river/stream beds.

**General Conditions:**

1 Some of the rivers/streams or portion of rivers/streams have been prohibited for grant of mineral concession. In such portions if any person applies for open sale of mineral the mining lease for open sale may be granted in private lands to meet out the local demands or any exigency subject to the approval from the joint Inspection Committee.

2 In certain stretches of river/streams, islands are developed which are undesirable and causes cutting of banks. In such places i.e. central islands etc. mining can be done more than one meter in rare and exceptional circumstances after a detailed study.

3 The possibility for conducting the auction of river/stream bed as one unit where the same are forming inter District boundary should be explored for the rivers flowing through the boundary of two districts.

4 The auction shall be done as per the recommendation /approval of the Sub-Divisional Level Committee.

**5** It is recommended that mining leases of more than 20 Hect lease area in river bed should be discouraged and priority may be given to local residents with small applied for areas so that maximum no. of local people could be accommodated and employment may be generated accordingly.