

DISTRICT SURVEY REPORT OF RIVER BED MINING OF TEHRI GARHWAL, UTTARAKHAND,

**In Compliance of Ministry of Environment, Forest and
Climate Change Notification No. 2827 dated: 25th July 2018**



Complied by

**District Task Force, Tehri, Geology and Mining Unit, Uttarakhand
September, 2019**

1. Introduction

Uttarakhand, a hill state of India, lies in the northern part of country in the loftiest Himalayan mountain range. It covers in total 53,066 km² area. Out of which approximately 48,000 km² (90%) falls in hilly terrain (Joshi, 2004). Geologically this area is complex and forms a part of the young Himalayan belt. Tehri Garhwal is one of the largest districts in the hill state of Uttarakhand, which falls in hilly terrain. Its administrative headquarters is at New Tehri. The district has a population of 604,747 (in 2001 census), a 16.15% increase over the previous decade. It is surrounded by four districts, viz., Rudraprayag in the east, Dehradun in the west, Uttarkashi in the north, and Pauri Garhwal in the south.

2. Overview of Mining Activity in the District

In the earlier time the mud houses/buildings were constructed with the use of mud. However with the passage of time, new techniques of development activities were started. As such the demand of Minor Mineral started on an increasing trend. In order to meet the requirement of raw material for construction, the extraction of sand, gravel & boulder carried out manually / semi- mechanized process from the river beds.

3. The List of ‘Mining Leases’ in the District with location, area and period of validity:-

3.1.1. Detail of existing mining leases of sand and aggregates in the District.

Sr. No.	Name of lessee	Lot Location	River Name	Type of Mineral	Area (in ha.)	Validity Period
1.	Smt. Sushila Devi Sate Singh Rana, Kailash gate, Muni ki reti, Tehri Garhwal	Village-Ranihaat Tehsil Kirtinagar	Alaknanda	RBM	10.65	01.10.2015 to 31.03.2023
2.	M/s Kilkileshwar mining comp. C/o partner Sate Singh Rana, Kailash gate, Munikireti, Tehri Garhwal	Village- Naithana Tehsil- Kirtinagar	Alaknanda	RBM	9.713	01.10.2015 to 31.03.2023
3.	Mr. Bansidhar Uniyal S/o Sh. Devender Dutt	Village- Kanda Mai Daur, Tehsil- Narendernagar	Daur (Chandrabh aga)	RBM	0.660	12.12.2015 to 18.12.2020

	Uniyal Village Dhalwala, Tehsil- Narendernagar					
4.	Mr. Anil Kothari S/o Sh. Mayaram, Village Hadam Dandasli, Tehsil- Tehri	Village- Ratwari Tehsil- Tehri	Bhagirathi	RBM	0.290	22.02.2016 to 21.02.2021
5.	Mr. Sumer Singh Bhandari, Village Bada Suita, Tehsil- Tehri	Village- Nakot Tehsil- Tehri	Bhagirathi	RBM	0.558	17.01.2016 to 16.01.2021
6.	Mr. Bharat Singh Gusain, S/o Shri Bhagwan Singh, Residence of Village - Ranidang, Post- Ghuttu, Patti – Bhilang, Tehsil- Ghansali, Distt:- Tehri Garhwal	Village Devanj, Patti- Bhilang, Tehsil- Ghansali,	Bhagirathi	RBM	0.523	04.06.2018 to 03.06.2023
7.	Shri Mastan Singh, S/o Late Shri Keshar Singh, R/o Village- Kailash Gate Munikireti, Tehsil- Narendranagar, District- Tehri Garhwal	Village- Kanda Mai Daur, Patti- Dhamandsyun, Tehsil- Narendranagar, District- Tehri Garhwal	Daur (Chandrabha ga)	RBM	1.490	15.09.2018 to 14.09.2023
8.	Shri Hukum Singh Padiyar S/o Shri Amar singh Vill-Doban, Tehsil- Kandisaur, District- Tehri Garhwal	Village- Doban, Tehsil- Kandisaur, District- Tehri Garhwal	Bhagirathi	RBM	0.722	07.06.2019 to 06.06.2020
9.	Shri Atol Singh Chauhan S/o Late Shri Mor singh Chauhan, Vill-Sarot, Tehsil-Kandisaur, Tehri garhwal	Village- Doban, Tehsil- Kandisaur, District- Tehri Garhwal	Bhagirathi	RBM	0.849	10.06.2019 to 09.06.2020
10.	Shri Suman Singh Bist, S/o Late Shri Roopchand singh Bist	Village- Dharwalgaon, Tehsil- Kandisaur, District- Tehri Garhwal	Bhagirathi	RBM	0.227	10.06.2019 to 09.06.2020
11.	GMVN 8 revenue lots under consideration for extension of period to State Govt.					

4. Details of Royalty or Revenue received in last three years

Table 1: Mineral royalty or revenue achieved in last three years

S.No.	Financial year	Royalty (in ₹)
1.	2016-17	13,53,54,120.00
2.	2017-18	13,20,08,158.00
3.	2018-19	14,13,94,659.00

5. Detail of Production of Sand or Bajari or minor mineral in last three years

Table 2: Production of river bed material (RBM) or minor mineral in last three years

S.No.	Financial year	Mineral (In MT)
1.	2016-17	279618
2.	2017-18	580090
3.	2018-19	761099

6. Process of Deposition of Sediments in the rivers of the District

The deposition in a river bed is more pronounced during rainy season although the quantum of deposition varies from stream to stream depending upon numbers of factors such as catchment, lithology, discharge, river profile and geomorphology of the river course. Where annual deposition is much more even two to three meters, but 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 minerals.

In order to calculate the mineral deposits in the stream beds, the mineral constituents have been categorized as clay, silt, sand, bajri and boulder. However during present calculation, the waste material i.e., silt which vary from 10 to 20% in different streams has also been included in the total production. Further the Survey of India Topo-Sheets are used as base map to know the extent of river course. The mineral reserves have been calculated

only upto 1.0 to 1.5 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 resulting in to cutting 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 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.

7. General Profile of the District

7.1. Administrative Setup

The district Tehri Garhwal is divided into two thirteen tehsils, nine blocks, two municipalities and four town area committees. The district covers 76 nyaya panchayats and 928 gram panchayats. It has 1,847 revenue villages and 2,508 clusters.

7.2. People

Generally, the inhabitants of Tehri Garhwal district are the Aryans came from the different parts of northern India. Before the advent of the Aryans, the original inhabitants of this area were Koles, Bhils and Kirats. The western part of the district- Jaunpur block has an impact of a tribal group of Jaunsari. The dialect of the district is Garhwali with different accents. The custom in the different area has some diversity but not so different from one another. Some decades ago, the people used to wear mirzai, pajama, and turban on their heads. In high altitude woollen degla and dumkar. Ghaghra and angra were common among women. However,

with the passing of time pants and shirts, sarees and blouse, salwar and kurta are taking place especially in new generation.

7.3. Religious Place

Lord Shiva temple in Budhakedar, Nag temple in Sem-Mukhem and Mahasartal, Chandrabadni temple, Surkhanda devi temple, Kunjapuri temple, etc. are the famous sidhapithas in the district. In addition to these, there are countless temples belonging to different gods and goddesses. Place situated on the confluence of the rivers are also important in view of religion and faith.

7.4. Fairs and Festival

The people of Tehri Garhwal have been fond fair and festivals since very long, which bring them joy and amusement. The month of Baishakha is the month of fairs. On Panchami, Makarsakranti, Vishvat Sakranti and on the different occasion we have fairs in addition to the common fairs in the country to make the life happy and joyful. Chaitra is the month of flowers to welcome the spring. Before the sunrise and the sunset the children use to go out in groups to collect the flowers of different colours and sprinkle them on the threshold of each door in the house and in the neighbourhood throughout the month. Before decades there were some fairs for amusement like BEDWARTH when the BADI had to slip on a rope with connected both ends with two logs in the opposite directions. LANG was also the fair BADI in which he used to make different actions and motions to make to audience laugh. In the name of sacrifice to goddess Durga a male buffalo made to run by hitting it with logs and swords ultimately that was killed. However, such fairs and festivals had gone by. Folk dances (MANDAN) are still popular among the people. The Jaunpur area of the district is

famous for its folk dances and folk songs. Rapid change in socio-cultural life of people, the traditional customs are giving ground to the new urban culture.

7.5. District Tehri Garhwal at a glance

Table 3: District Tehri Garhwal at a glance

S.No	Particular	Year	Unit	Statistics
1	Geographical features			
(A)	Geographical Data			
	i) Latitude			33 ⁰ 1' N and 30 ⁰ 53' N
	ii) Longitude			77 ⁰ 56'E and 79 ⁰ 04' E
	iii) Geographical Area		Sq.Km	3642
(B)	Administrative Units			
	i)) Tehsils	2017-18	No	12
	ii) Sub-tehsil	2017-18	No	2
	iii) Community Development block	2017-18	No	9
	iv) Nyay Panchayat	2017-18	No	75
	v) Gram Panchayat	2017-18	No	1032
	vi) Villages	2011	No	1758
	vii) Non-inhabited villages	2011	No	88
	viii) Forest villages	2011	No	16
	ix) Municipal corporation	2017-18	No	0
	x) Nagar Palika Parishad	2017-18	No	5
	xi) Nagar Panchayat	2017-18	No	5
	xii) Cantonment Area	2017-18	No	0
	xiii) Census town	2017-18	No	0
	xiv) Development authority	2017-18	No	1
	xv) Lok sabha constituency	2017-18	No	2-1 आंशिक क्षेत्र
	xvi) Assembly area	2017-18	No	6
	xvii) Police station(Rural)	2017-18	No	3
xviii) Police station(urban)	2017-18	No	8	
2.	Population			
(A)	Total	2011	No	618931
	i) Male	2011	No	297986

	ii) Female	2011	No	320945
(B)	Rural Population	2011	No	548792
3.	Agriculture			
A.	Land utilization			
	i) Total Area	2016-17	Hectare	485517
	ii) Forest cover	2016-17	“	321564
	iii) Non Agriculture Land	2016-17	“	78007
	v) cultivable Barren land	2016-17	“	74082
4.	Forest			
	(i) Forest	2016-17	Sq.Km.	3221.56
5.	Livestock & Poultry			
A.	Cattle			
	i) Cows	2012	Nos.	48337
	ii) Buffaloes	2012	Nos.	91350
B.	Other livestock			
	i) Goats	2012	Nos.	125899
	ii) Pigs	2012	Nos.	609
	iii) Dogs & Bitches	2012	Nos.	11881
	iv) Railways			
	i) Length of rail line	2017-18	Kms	-
	V) Roads			
	(a) National Highway	2017-18	Kms	234.20
	(b) State Highway	2017-18	Kms	455.20
	(c) Main District Highway	2017-18	Kms	320.60
	(d) Other district & Rural Roads	2017-18	Kms	982.52
	(e) Other roads	2017-18	Kms	358.74
	(f) Kachacha Road	2017-18	Kms	-
	(VI) Communication			
	(a) Telephone connection	2017-18	Nos.	17899
	(b) Post offices	2017-18	Nos.	263
	(c) Telephone center	2017-18	Nos.	51
	(d) Telegraph office	2017-18	Nos.	0
	(e) Density of Telephone	2017-18	Nos./1000 person	21.87
	(f) Density of Telephone	2017-18	No. per KM.	4.91
	(g) PCO STD	2017-18	No.	321
	(h) Mobile	2017-18	No.	109210

(VII) Public Health			
(a) Allopathic Hospital	2017-18	No.	29
(b) Beds in Allopathic hospitals	2017-18	No.	546
(c) Ayurvedic Hospital	2017-18	No.	71
(d) Beds in Ayurvedic hospitals	2017-18	No.	-
(e) Unani hospitals	2017-18	No.	0
(f) Community health centers	2017-18	No.	11
(g) Primary health centers	2017-18	No.	23
(h) Mother child welfare Centers	2017-18	No.	6
(i) Mother child welfare sub-Centers	2017-18	No.	212
(j) T.B. hospitals	2017-18	No.	1
(k) Leprosy hospitals	2017-18	No.	1
(VIII) Banking			
(a) Nationalized Bank	2017-18	Nos.	81
(b) Rural Bank	2017-18	Nos.	20
(c) District Co-Operative bank	2017-18	Nos.	1
(d) Co-operative and rural development Bank		Nos.	1
(IX) Education			
(a) Primary school		Nos.	1777
(b) Middle schools		Nos.	492
(c) Secondary & senior secondary schools		Nos.	343
(d) Colleges		Nos.	16
(e) Technical Institutes		Nos.	19

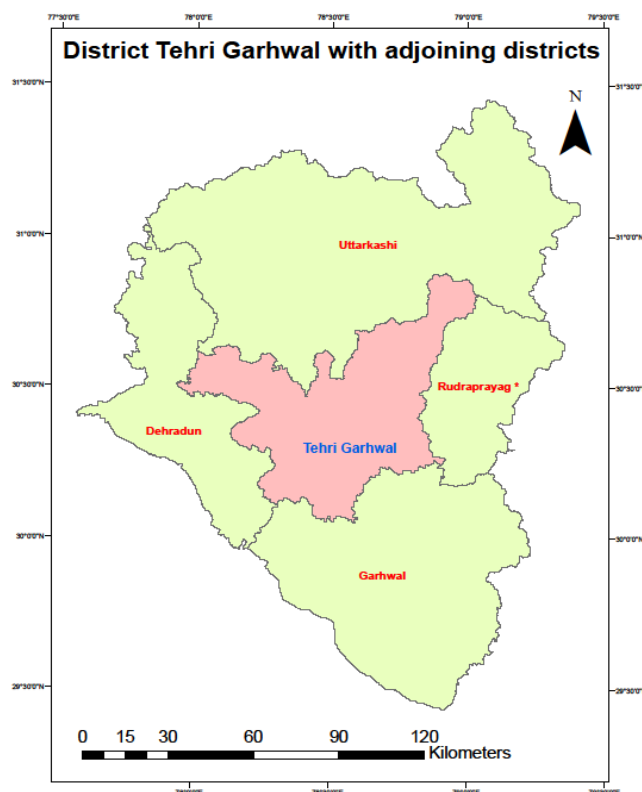


Figure 1 Location of District Tehri Garhwal with respect to adjoining districts

8. Land Utilization Pattern in the District: Forest, Agriculture, Horticulture, Mining etc.

Table 4: The district wise land use data is given below.

S. No.	Land Use Details	Area (In Ha.)
1	*Forest Area	322051
2	*Land under Cultivation	88461
3	*Cultivable Barren Land	5681
4	*Total Fallow Land	15707
5	*Barren and Non-cultivable Land	5844
6	*Land under Non-agricultural Use	78366
7	*Pasture and Other Grazing Land	539
8	*Land under Gardens, Bushes, Groves etc.	1372
9	Mining land(River bed)	66.97
	Total	518088.97

(Source:- *Central Ground Water Board)

9. Physiography of the District

Tehri Garhwal is one of the western most district of the Uttarakhand State located on the outer ranges of the mid Himalayas which comprise low line peaks rising contiguously with the planes of the northern India. The district lies between the parallels of 30.3` and 30.53` north latitude and 77.56` and 79.04` east longitude. Uttarkashi from the north, Rudraprayag from the east, Pauri Garhwal from the south and Dehra Dun from the west are bounding the districts. On the western front Yamuna river separates it from Jaunsar Pragana of the Dehra Dun district while Bhagirathi rising from the north of the Gangotri in the district Uttarkashi touches the district near village Nagun. Total area of the district is 4421 sq. kms (Census 1991). The district headquarter is located at New Tehri Town since 1.4.1989. Earlier Narendranagar was the district headquarter.

Tehri Garhwal district is bounded by Uttarkashi from the north side, Pauri Garhwal from the south side, Rudraprayag from the east side and Dehra Dun from the west side. Its covers *4421 sq.km.* area which is about 8% of the total area of the Uttarakhand state. Yamuna River separates it from the western front to Jaunsar Pragana of the Dehra Dun district while Bhagirathi rising from the north of the Gangotri in the district Uttarkashi touches the district near village Nagun.

9.1. Drainage

Drainage of the area is mainly controlled by the major perennial rivers like Bhagirathi, Bhilangana, Alaknanda and their tributaries like Bal Ganga and Dharma Ganga. Bhagirathi River flows from north to south and meets Alaknanda River at Devprayag. Bhilangana River flows from north east to south west and meets Bhagirathi River near Old Tehri. Bhagirathi and

Bhilangana Rivers drain the central part of the district while Alaknanda River flows in the southernmost part close to the district boundary. Apart from the major rivers, many seasonal streams and rivulets (locally called gad and gadhera) drain the area. Important among them are Nailchami Gad, Lastar Gad, Nagun Gad, Bhadri Gad, Chandrabhaga Gad, Bandal Nadi etc. Sub-trellis and sub-dendritic are the most common drainage patterns in the area. The perennial rivers are primarily fed by snowmelt with relatively smaller contribution from ground water. However, during the lean period, the rivers are fed by ground water occurring as base flow.

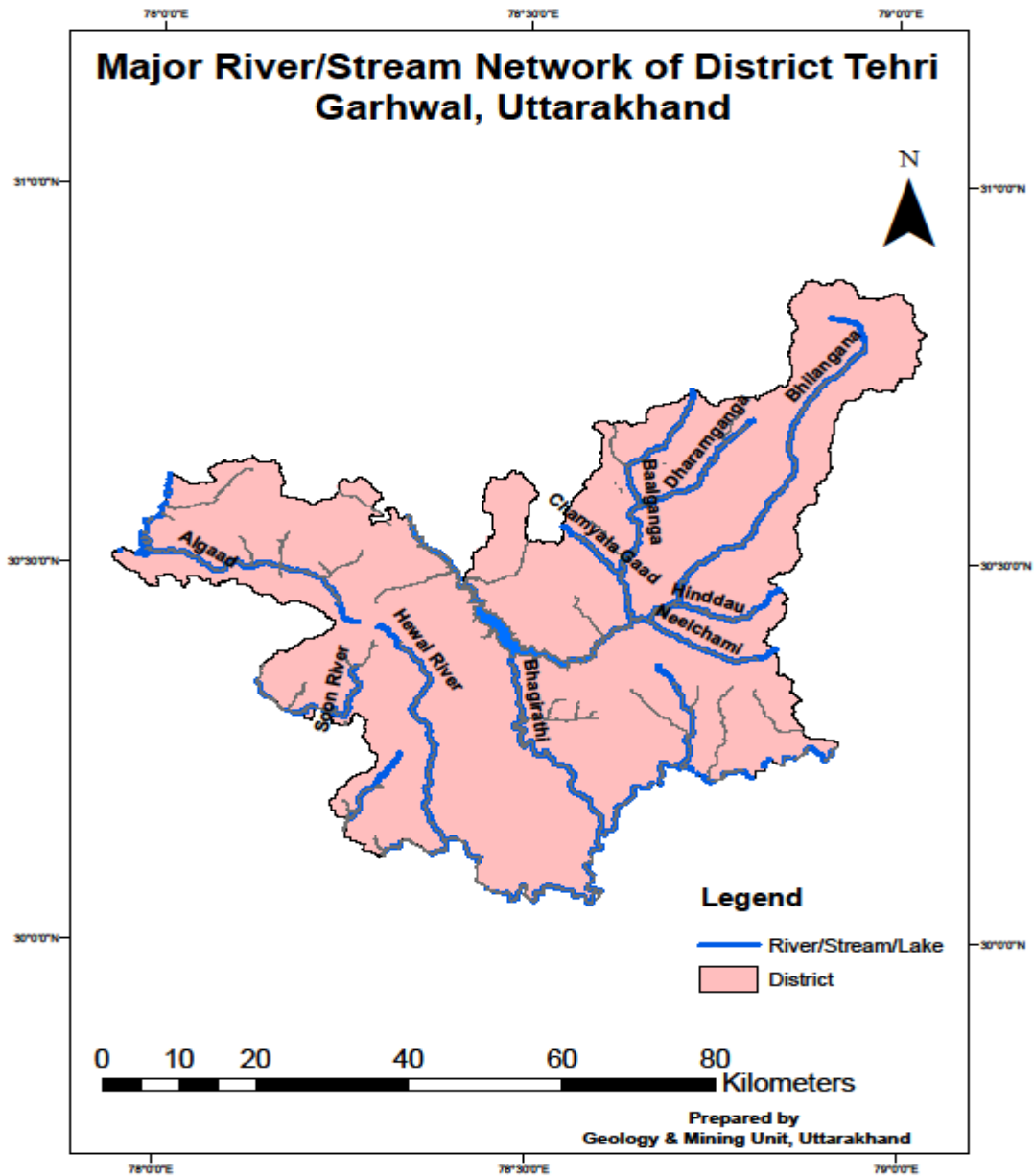


Figure 2 Major Rivers which passage through District Tehri Garhwal

9.2. Soil Types

The soils of Tehri Garhwal district can be broadly classified into two types, viz. soils of Central/Higher Himalaya and soils of Lesser Himalaya. The soils of Central Himalaya have been broadly classified under a) Soils of Summits, Ridge Tops and Mountain Glaciers, b) Soils of Side Slopes, c) Soils of Upper Glacio- Fluvial Valleys and d) Soils of Cliffs. Major soil type of the study area is Hilly Soil, developed from graniteferous biotitic, scetics granites, gnesiss, phyllites. These are brown to dark grayish in color and acidic in reaction. Soil type of the study area may be broadly subdivided into three soil types. Soils of the first type are moderately shallow, excessively drained, thermic, fine loamy, moderately eroded and slightly stony and are known as Dystric Eutrudepts. The second type, Lithic Udorthents, is characterised by very shallow, excessively drained, severely eroded and strongly stony, thermic loamy soils exposed on steep slopes with loamy and sandy surface. Typic Udorthents, the third major soil type, is moderately shallow, excessively drained, moderately eroded and slightly stony, loamy soils on moderate slopes with loamy surface. The soils of the study area are basically the product of fluvial process of the river Bhagirathi and its tributaries (Bhilangana, Balganga etc.). The alluvial soil of the area is dry, porous, sandy, faint yellow and consists of clay and organic matter. Soils of the area are slightly acidic. The pH value of the soils varies depending upon the type of forests. The soil of oak forest is sandy loam. The pH values on all sites and depths ranged 5.80 to 6.27. The soil of pine forest is clay to sandy clayey loam. The pH values ranged 5.42 to 6.71 (Sheikh and Kumar, 2010).

9.3. Ground water Scenario

Ground water, in Tehri Garhwal district, generally occurs locally within disconnected bodies under favourable geohydrological conditions such as in channel and alluvial terraces of river valleys, joints, fractures and fissures of crystalline and metasedimentary rocks, well vegetated and relatively plain areas of valley portions and in subterranean caverns of limestone and dolomitic limestone country rocks. The occurrence and movement of ground water depend not only on the nature of the litho-units and the nature of the interspaces/ interstices, but also on the degree of interconnection between them, the vertical and aerial extension of joints, faults and/or shear zones and the local and regional geomorphology. Ground water emerges as springs and seepage (locally called Srots and Naolas) under favourable physiographic conditions such as in gently sloping areas, broad valleys of rivers and along the lithological contacts. Gadheras are the group of springs coming from higher reaches of the mountainous tracts.

Rainfall is the principal source of ground water replenishment. A part of the precipitation received (either as rainfall or snowfall) is lost into the atmosphere as evaporation and evapotranspiration from soils and plants, another considerable part flows as surface run off due to extremely rugged and undulating topography with steep slope and the remaining part directly infiltrates through the soil profile to form the ground water storage in joints, fractures, fissures etc.

In Tehri Garhwal district, ground water flows out as springs and seepages where the water table intersects the ground surface. Based on the observations of various workers of Central Ground Water Board over the last couple of decades, the source of hydrogeological map of Tehri Garhwal

district is from concerned dept. A study of this map indicates the general hydrogeological scenario of the district and reveals the presence of two main types of aquifers viz. a) Local or Discontinuous Aquifers and b) Localised Aquifers. Ground water in the district occurs in fissured formations characterised by secondary porosity.

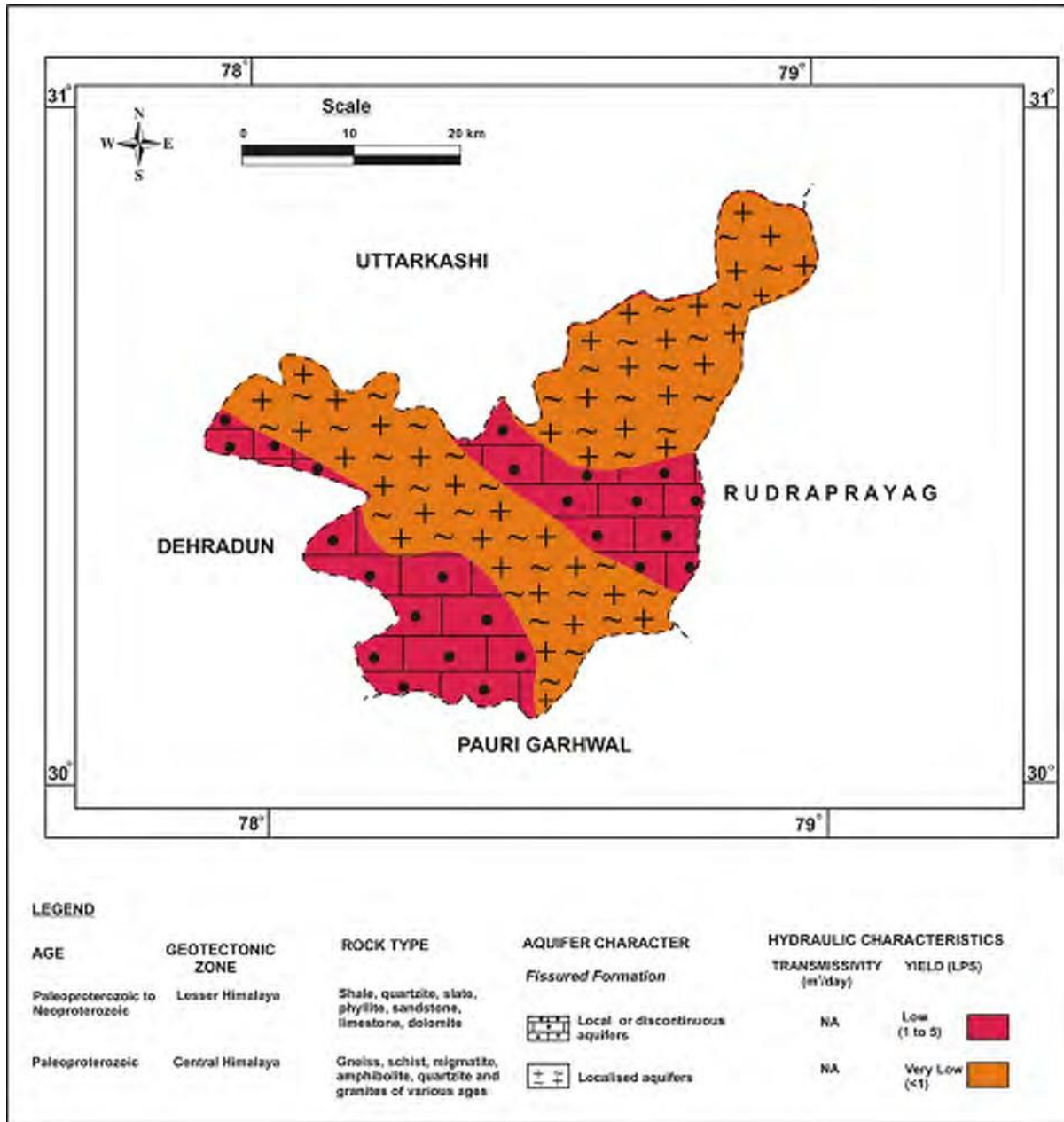


Figure 3: Hydrogeological Map of District Tehri Garhwal

10. Rainfall of the district and climatic condition:

Rainfall, in the study area, occurs almost throughout the year. Maximum rainfall is recorded during the monsoon period i.e. from July to September. There is slight decrease in rainfall from December till March. Rest of the year rainfall is quiet low. Average rainfall (Month-wise), for five years (2007-2011), is tabulated below.

Table 1: Rainfall data in five year (2014-2018)

Month		2014	2015	2016	2017	2018
January	R/F	31.7	-	0.9	58.2	15.8
	%DEP	-42	-	-98	7	-71
February	R/F	143	-	51.9	22.6	9
	%DEP	174	-	-1	-57	-83
March	R/F	64.8	-	32.2	43.9	23.4
	%DEP	15	-	-43	-22	-58
April	R/F	35	-	14.9	44	32
	%DEP	10	-	-53	39	1
May	R/F	74.6	-	38.8	74	39.1
	%DEP	33	-	-31	32	-30
June	R/F	26.4	-	80.6	135.8	144.1
	%DEP	-81	-	-41	0	6
July	R/F	249.4	-	415	294.8	216.8
	%DEP	-6	-	12	-21	-42
August	R/F	200.5	-	225.5	164.4	247
	%DEP	-45	-	-39	-55	-33
September	R/F	93.7	-	31.4	192.9	141
	%DEP	-46	-	-82	12	-18
October	R/F	10.2	-	0.2	0	6.5
	%DEP	-79	-	-99	-100	-87
	R/F	0	-	0	0.4	23.1

November	%DEP	-100	-	-100	-96	124
December	R/F	15.8	-	4.5	26.8	0.9
	%DEP	-45	-	-84	-6	-97

Source: Indian Meteorological Department

11. Geology and Mineral Wealth

District Tehri Garhwal is represented by the rocks of Lesser Himalaya and Central Himalaya. The geological set up is very complex due to the repeated tectonic disturbances caused by different orogenic cycles. Valdiya (1980) carried out extensive geological and structural mapping in the area

11.1. Geology

The salient features of geology are depicted in the geological map of Tehri Garhwal district. The map is based on Geological Survey of India, 2002.

The rock units exposed in various parts of Tehri Garhwal district are exposed in two broad geotectonic zones viz. Central or Higher Himalaya and Lesser Himalaya. The Central Himalaya lies to the north of Main Central Thrust (MCT) whereas the Lesser Himalaya occurs to the south of it. A group of regionally metamorphosed rocks known as Central Crystallines are exposed in the Central Himalaya. The Central Crystallines occur as thrust sheets over the metasedimentary and sedimentary rocks of Lesser Himalaya in varied tectonic settings. Major rock types of Central Crystallines are migmatites, psammitic and mica gneiss, calc gneiss, quartzite, marble, mica schist and amphibolite. Granites of different ages ranging from Paleoproterozoic to Mesozoic-Tertiary intrude the Central Crystallines. The Lesser Himalaya occupies major part of the district and comprises of different groups like Jaunsar Group, Blaini-Krol Group and Tal Group. The groups are subdivided into various formations like Bhilangana Formation, Rautgara Formation, Bijni Formation. A suite of granitic intrusive known as Granitoids of Kedarnath and basic volcanics of Garhwal Group are also exposed in parts of the district. Generally, the rocks of the Lesser Himalayan Zone show signs of multiple phases of deformation and metamorphism.

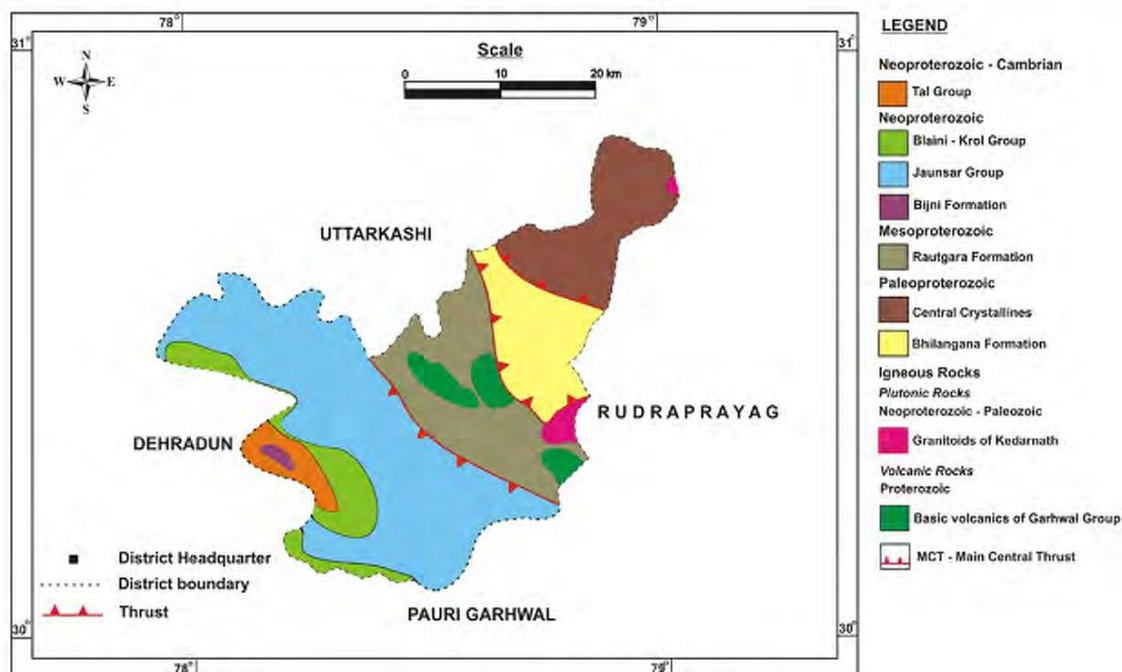


Figure 4: Geological Map of District Tehri Garhwal

(Source:GSI:2002)

11.2. Mineral Wealth

In Tehri Garhwal district important minerals are dolomite, limestone, phosphorite and gypsum. Dolomite of excellent quality is available in Ragam gaon-Chipaldir area. This is suitable for flux in steel melting.

High grade limestone occurs in Dubra Ghansalgaon-Nagni area. It is useful for Sugar mill, paper mill and Chemical industries.

The phosphorite unit extends from Toneta in the northwest to Nagni and Agrakhal in the southeast over a length of 120km. Phosphorite deposits around Durmala, Kimoi, Jalikhal and Bhusti are located in the northern limb of mussoorie syncline in District Tehri Garhwal. Which are useful for fertilizer in natural state and also for manufacturing of phosphoric acid.

Copper mineralisation in Tehri Garhwal District occurs in rocks of the Garhwal Group and Chandpur Formation (Jaunsar Group) of Proterozoic age. Dharkot, Bagori and Partap nagar hills have shown mineralization in old workings.

A number of scattered occurrences of gypsum associated with the rocks of Krol Group are known from this district. Bands and pockets of gypsum are seen in dolomite of the Krol Group around Garur Chatti, The main gypsum bearing zone extends for about 1.5km with thickness varying from 1.5m to 61m. Dhaultot and Nigad, Gugthani, Rangargaon and other localities with minor occurrences. *Source: (Misc. Pub. 30 (XIII) GSI: 2012)*

In addition to above:-

(a). District wise detail of river or stream and other sand sources;

Name of River	Tehsil	Minable Area (in Ha.)
Alaknanda	Kirtinagar & Devprayag	29.697
Bhagirathi	Kandisaur	16.11
Yamuna	Nainbag	1.1175
Song	Dhanaulti	13.78
Aglar	Dhanaulti	3.453
Bhilangana	Ghansali	1.32
Chandrabhaga	NarendraNagar	2.09
		67.5675

(b) District wise availability of sand or gravel or aggregate, resources;

S. No.	Location	Area (in ha.)	Calculated Mineable Reserves yearly (per ton)
1.	Village- Bagwan, Tehsil Devprayag	5.256	30000
2.	Village- Bhaldi, Tehsil Devprayag	1.181	7800
3.	Village- Juyalgarh, Tehsil Devprayag	1.400	30800
4.	Village- Jhoti/Koti, Tehsil Dhanolti	1.550	44175
5.	Village- Dubri, Tehsil Dhanolti	0.165	4703
6.	Village- Mahendrapur, Tehsil Dhanolti	2.406	68571
7.	Village- Gyalidanda, Tehsil Dhanolti	1.442	20000
8.	Village- Saundana, Tehsil Dhanolti	3.624	30000
9.	Village- Naingaon, Tehsil Dhanolti	0.942	13275
10.	Village- Ranihaat, Tehsil Kirtinagar	10.65	232142
11.	Village- Naithana, Tehsil- Kirtinagar	9.71	211680
12.	Village Kandi, Tehsil Kandisaur	1.019	33627

13.	Village Palam, Tehsil- Tehri	0.550	6600
14.	Village- Kanda Mai Daur, Tehsil- Narendernagar	0.660	17241
15.	Village- Ratwari, Tehsil- Tehri	0.290	4598
16.	Village- Nakot, Tehsil- Tehri	0.558	6600
17.	Village- Kandi talli,,Tehsil- Dhanolti	0.351	7722
18.	Village- Sarot, Tehsil- Kandisaur	0.849	16810
19.	Village- Doban, Tehsil- Kandisaur	0.722	20577
20.	Village Devanj, Patti- Bhilang, Tehsil- Ghansali,	0.523	10752
21.	Village- Kanda Mai Daur, Patti- Dhamandsyun, Tehsil- Narendranagar,	1.490	38927
22.	Village Dawla Matela, Tehsil - Dhanolti,	0.200	4400
23.	Village Dubda, Tehsil - Dhanolti	0.300	6066
24.	Village Kherad, Tehsil - Nainbag ,	0.100	2200
25.	Village Ghudsalgaon, Tehsil - Dhanolti ,	0.300	6600
26.	Village Almas, Tehsil - Dhanolti	0.100	2200
27.	Village Kharsaon, Tehsil - Nainbag ,	0.400	13200
28.	Village Kandi Talli, Tehsil - Nainbag,	0.600	13200
29.	Village Kulali i.e Kumali (Kaali Paury Tok), Tehsil - Narendernagar,	0.150	4950
30.	Village- Syalsi Tehsil:- Dhanolti,	0.20	4400
31.	Village- Taulyakatal Tehsil:- Dhanolti,	1.20	26400
32.	Village- Bhutgaon Tehsil:- Nainbag,	0.0175	578
33.	Village-Chopdiya, Tehsil- Kirtinagar,	1.50	33000
34.	Village-Ragadgaon, Song, Tehsil- Dhanoti	1.00	22000
35.	Village-Dhanadgaon, Aglargad, Dhanoti	0.531	9240
36.	Village Almas, Aglar river, Tehsil - Dhanolti ,	0.260	5720
37.	Village-Munglodi, river- Aglar Tehsil- Dhanoti	1.309	9000
38.	Village- Pilkhi, Bhilgana river, Tehsil- Ghansali,	0.797	26301
39.	Village- Dharwalgaon, Tehsil- Kandisaur,	0.227	2420
40.	Village- Sarot, Bhagirathi river, Tehsil- Kandisaur,	2.854	62788

41.	Village- Khan Bidkot, Bhagirathi river, Tehsil- Kandisaur,	2.815	61930
42.	Village- Biryani-I, Bhagirathi river, Tehsil- Kandisaur,	1.193	39369
43.	Village- Biryani-II, Bhagirathi river, Tehsil- Kandisaur,	2.268	74844
44.	Village- Bandrakoti, Bhagirathi river, Tehsil- Kandisaur,	0.500	16500
45.	Village- Khan Bidkot, Bhagirathi river, Tehsil- Kandisaur,	2.815	61930
46.	Aglar gad Village- Dolsi-1 Tehsil- Dhanolti	0.853	28050
47.	Aglar gad Village- Dolsi-2 Tehsil- Dhanolti	0.500	11000

(c) District wise detail of existing mining leases of sand aggregates;

Table 2: District wise detail of existing mining leases of sand aggregates

S. No.	Location	Area (in ha.)	Calculated Mineable Reserves yearly (per ton)
1.	Village- Bagwan, Tehsil Devprayag	5.256	30000
2.	Village- Bhaldi, Tehsil Devprayag	1.181	7800
3.	Village- Juyalgarh, Tehsil Devprayag	1.400	30800
4.	Village- Jhoti/Koti, Tehsil Dhanolti	1.550	44175
5.	Village- Dubri, Tehsil Dhanolti	0.165	4703
6.	Village- Mahendrapur, Tehsil Dhanolti	2.406	68571
7.	Village- Gyalidanda, Tehsil Dhanolti	1.442	20000
8.	Village- Saundana, Tehsil Dhanolti	3.624	30000
9.	Village- Naingaon, Tehsil Dhanolti	0.942	13275
10.	Village- Ranihaat, Tehsil Kirtinagar	10.65	232142
11.	Village- Naithana, Tehsil- Kirtinagar	9.71	211680
12.	Village- Kanda Mai Daur, Tehsil- Narendernagar	0.660	17241
13.	Village- Ratwari, Tehsil- Tehri	0.290	4598

14.	Village- Nakot, Tehsil- Tehri	0.558	6600
15.	Village- Kandi talli,,Tehsil- Dhanolti	0.351	7722
16.	Village- Sarot, Tehsil- Kandisaur	0.849	16810
17.	Village- Doban, Tehsil- Kandisaur	0.722	20577
18.	Village Devanj, Patti- Bhilang, Tehsil- Ghansali,	0.523	10752
19.	Village- Kanda Mai Daur, Patti- Dhamandsyun, Tehsil- Narendranagar,	1.490	38927

Table: Drainage System in the District Tehri Garhwal

S.No.	Name of River	Area drained (in sq.km.)	% Area drained in the District
1.	Alaknanda	5.26	0.13
2.	Bhagirathi	28.8	0.75
3.	Ganga	6.82	0.17
4.	Song	1.72	1.045
5.	Bandal	0.2428	0.006377
6.	Chandrabhaga	1.14	0.0299
7.	Yamuna	1.92	0.5043
8.	Aglar	0.69	0.0181
9.	Bhilangna	12.63	0.33
10.	Hewal	0.99	0.026
11.	Baal Ganga	2.436	0.0597
12.	Dharam Ganga	0.529	0.013

Salient Features of Important Rivers and Streams:

Table: Information of main drainage

S.No.	Name of the River or Stream	Total Length in the District (in Km)	Place of origin	Altitude at Origin (in metre.)
1.	Alaknanda	82.489	Satopanth Glacier	4600
2.	Bhagirathi	91.21	Gomukh	4255
3.	Ganga	61.09	Devprayag	470
4.	Song	38.45	Uniyal Gaon	1896
5.	Bandal	17.36	Bhangla Sera	1254
6.	ChandraBhaga	13.646	Gwar	1133
7.	Yamuna	26.42	Nain Gaon	876
8.	Aglar	34.34	Marora	1865
9.	Hewal	38.61	Saur	1659

10.	Bhilangna	80.05	Khatling Glacier	3717
11.	Nailchami Gad	19.30	Tharti	1858
12.	Jalkur Gad	22.45	Kodar	1477
13.	Baal Ganga	43.50	Giwali	2157
14.	DharamGanga	12.60	Pinswad	2217

Table 3: Mineable Potential with respect of drainage

S. No.	Portion of the River or Stream Recommended for Mineral Concession	Length of area recommended for mineral concession (in Km)	Average width of Area recommended for mineral concession (in meters)	Area recommended for mineral concession (in square meter)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)
1.	Village-Bagwan, Tehsil Devprayag	-	-	52560	104068.8
2.	Village- Bhaldi, Tehsil Devprayag	-	-	11810	23383.8
3.	Villa-Juyalgarh, Tehsil Devprayag	-	-	14000	27720
4.	Villa-Jhoti/Koti, Tehsil Dhanolti	-	-	15500	30690
5.	Village-Dubri, Tehsil Dhanolti	-	-	1650	3267
6.	Village-Mahendrapur, Tehsil Dhanolti	-	-	24060	47638.8
7.	Village-Gyalidanda, Tehsil Dhanolti	-	-	14420	28551.6
8.	Village-Saundana, Tehsil Dhanolti	-	-	36240	71755.2
9.	Village- Naingaon, Tehsil Dhanolti	-	-	9420	18651.6
10.	Village-Ranihaat, Tehsil Kirtinagar	-	-	106500	210870
11.	Village- Naithana, Tehsil- Kirtinagar	-	-	97100	192258
12.	Village Kandi, Tehsil Kandisaur	-	-	10190	20176.2
13.	Village Palam, Tehsil-	-	-	5500	10890

	Tehri				
14.	Village- Kanda Mai Daur, Tehsil- Narendernagar	-	-	6600	13068
15.	Village- Ratwari, Tehsil- Tehri	-	-	2900	5742
16.	Village- Nakot, Tehsil- Tehri	-	-	5580	11048.4
17.	Village- Kandi talli,,Tehsil- Dhanolti	-	-	3510	6949.8
18.	Village- Sarot, Tehsil- Kandisaur	-	-	8490	16810.2
19.	Village- Doban, Tehsil- Kandisaur	-	-	7220	14295.6
20.	Village Devanj, Patti-Bhilang, Tehsil- Ghansali,	-	-	5230	10355.4
21.	Village- Kanda Mai Daur, Patti-Dhamandsyun, Tehsil- Narendranagar,	-	-	14900	29502
22.	Village Dawla Matela, Tehsil - Dhanolti,	-	-	2000	3960
23.	Village Dubda, Tehsil - Dhanolti	-	-	3000	5940
24.	Village Kherad, Tehsil - Nainbag ,	-	-	1000	1980
25.	Village Ghudsalgaon, Tehsil - Dhanolti ,	-	-	3000	5940
26.	Village Almas, Tehsil - Dhanolti	-	-	1000	1980
27.	Village Kharsaon, Tehsil - Nainbag ,	-	-	4000	7920
28.	Village Kandi Talli, Tehsil - Nainbag,	-	-	6000	11880
29.	Village Kulali i.e Kumali (Kaali Pairy Tok), Tehsil - Narendernagar,	-	-	1500	2970
30.	Village- Syalsi Tehsil:-	-	-	2000	3960

	Dhanolti,				
31.	Village- Taulyakatal Tehsil:- Dhanolti,	-	-	12000	23760
32.	Village- Bhutgaon Tehsil:- Nainbag,	-	-	175	346.5
33.	Village-Chopdiya, Tehsil- Kirtinagar,	-	-	15000	29700
34.	Village-Ragadgaon, Song, Tehsil-Dhanoti	-	-	10000	19800
35.	Village-Dhanadgaon, Aglargad, Dhanoti	-	-	5310	10513.8
36.	Village Almas, Aglar river, Tehsil - Dhanolti ,	-	-	2600	5148
37.	Village-Munglodi, river- Aglar Tehsil- Dhanoti	-	-	13090	25918.2
38.	Village- Pilkhi, Bhilgana river, Tehsil- Ghansali,	-	-	7970	15780.6
39.	Village- Dharwalgaon, Tehsil- Kandisaur,	-	-	2270	4494.6
40.	Village- Sarot, Bhagirathi river, Tehsil- Kandisaur,	-	-	28540	56509.2
41.	Village- Khan Bidkot, Bhagirathi river, Tehsil- Kandisaur,	-	-	28150	55737
42.	Village- Biryani-I, Bhagirathi river, Tehsil- Kandisaur,	-	-	11930	23621.4
43.	Village- Biryani-II, Bhagirathi river, Tehsil- Kandisaur,	-	-	22680	44906.4

44.	Village- Bandrakoti, Bhagirathi river, Tehsil- Kandisaur,	-	-	5000	9900
45.	Village- Khan Bidkot, Bhagirathi river, Tehsil- Kandisaur,	-	-	28150	55737
46.	Aglar gad Village- Dolsi-1 Tehsil- Dhanolti			8530	28050
47.	Aglar gad Village- Dolsi-2 Tehsil- Dhanolti			5000	11000

Mineral Potential

Table 4: Cumulative River bed Material (RBM) Potential

S. No.	Lot Location	Boulder (MT)	Bajri (MT)	Sand (MT)	Total Mineable Mineral Potential (MT)
1.	Village- Bagwan, Tehsil Devprayag	-	-	-	104068.8
2.	Village- Bhaldi, Tehsil Devprayag	-	-	-	23383.8
3.	Village- Juyalgarh, Tehsil Devprayag	-	-	-	27720
4.	Village- Jhoti/Koti, Tehsil Dhanolti	-	-	-	30690
5.	Village- Dubri, Tehsil Dhanolti	-	-	-	3267
6.	Village- Mahendrapur, Tehsil Dhanolti	-	-	-	47638.8
7.	Village- Gyalidanda, Tehsil Dhanolti	-	-	-	28551.6
8.	Village- Saundana, Tehsil Dhanolti	-	-	-	71755.2
9.	Village-	-	-	-	18651.6

	Naingaon, Tehsil Dhanolti				
10.	Village-Ranihaat, Tehsil Kirtinagar	-	-	-	210870
11.	Village- Naithana, Tehsil- Kirtinagar	-	-	-	192258
12.	Village Kandi, Tehsil Kandisaur	-	-	-	20176.2
13.	Village Palam, Tehsil- Tehri	-	-	-	10890
14.	Village- Kanda Mai Daur, Tehsil- Narendernagar	-	-	-	13068
15.	Village- Ratwari, Tehsil- Tehri	-	-	-	5742
16.	Village- Nakot, Tehsil- Tehri	-	-	-	11048.4
17.	Village- Kandi talli,,Tehsil- Dhanolti	-	-	-	6949.8
18.	Village- Sarot, Tehsil- Kandisaur	-	-	-	16810.2
19.	Village- Doban, Tehsil- Kandisaur	-	-	-	14295.6
20.	Village Devanj, Patti- Bhilang, Tehsil- Ghansali,	-	-	-	10355.4
21.	Village- Kanda Mai Daur, Patti- Dhamandsyun, Tehsil- Narendranagar,	-	-	-	29502
22.	Village Dawla Matela, Tehsil - Dhanolti,	-	-	-	3960
23.	Village Dubda, Tehsil - Dhanolti	-	-	-	5940
24.	Village Kherad, Tehsil - Nainbag ,	-	-	-	1980
25.	Village Ghudsalgaon, Tehsil - Dhanolti ,	-	-	-	5940
26.	Village Almas, Tehsil - Dhanolti	-	-	-	1980

27.	Village Kharsaon, Tehsil - Nainbag ,	-	-	-	7920
28.	Village Kandi Talli, Tehsil - Nainbag,	-	-	-	11880
29.	Village Kulali i.e Kumali (Kaali Paity Tok), Tehsil - Narendernagar,	-	-	-	2970
30.	Village- Syalsi Tehsil:- Dhanolti,	-	-	-	3960
31.	Village- Taulyakatal Tehsil:- Dhanolti,	-	-	-	23760
32.	Village- Bhutgaon Tehsil:- Nainbag,	-	-	-	346.5
33.	Village-Chopdiya, Tehsil- Kirtinagar,	-	-	-	29700
34.	Village-Ragadgaon, Song, Tehsil-Dhanoti	-	-	-	19800
35.	Village-Dhanadgaon, Aglargad, Dhanoti	-	-	-	10513.8
36.	Village Almas, Aglar river, Tehsil - Dhanolti ,	-	-	-	5148
37.	Village-Munglodi, river- Aglar Tehsil-Dhanoti	-	-	-	25918.2
38.	Village- Pilkhi, Bhilgana river, Tehsil-Ghansali,	-	-	-	15780.6
39.	Village- Dharwalgaon, Tehsil- Kandisaur,	-	-	-	4494.6
40.	Village- Sarot, Bhagirathi river, Tehsil-Kandisaur,	-	-	-	56509.2
41.	Village- Khan Bidkot, Bhagirathi river, Tehsil-Kandisaur,	-	-	-	55737
42.	Village- Biryani-I, Bhagirathi river, Tehsil-Kandisaur,	-	-	-	23621.4

43.	Village- Biryani-II, Bhagirathi river, Tehsil- Kandisaur,	-	-	-	44906.4
44.	Village- Bandrakoti, Bhagirathi river, Tehsil- Kandisaur, Tehri garhwal	-	-	-	9900
45.	Village- Khan Bidkot, Bhagirathi river, Tehsil- Kandisaur,	-	-	-	55737
46.	Aglar gad Village- Dolsi-1 Tehsil- Dhanolti	-	-	-	28050
47.	Aglar gad Village- Dolsi-2 Tehsil- Dhanolti	-	-	-	11000

Annual Deposition

Table 5: Annual deposition of RBM

Boulder (MT)	Bajri (MT)	Sand (MT)	Total Mineable Mineral Potential (MT)
--	--	--	1326095.00

Table 6: Grand Total of mineable mineral potential

S. No.	River or Stream	Portion of the river or stream recommended for mineral concession	Length of area recommended for mineral concession (in km)	Average width of Area recommended for mineral concession (in meters)	Area recommended for mineral concession (in square meter)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)
1.	Alaknanda river	Village- Bagwan, Tehsil Devprayag	--	--	52560	61970.00
2.	Alaknanda river	Village- Bhaldi, Tehsil Devprayag	--	--	11810	468000.00
3.	Alaknanda river	Village- Juyalgarh, Tehsil Devprayag	--	--	14000	18480.00
4.	Song river	Village- Jhoti/ Koti, Tehsil Dhanolti	--	--	15500	26505.00
5.	Song river	Village- Dubri, Tehsil -Dhanoti	--	--	1650	2882.00
6.	Song river	Village- Mahendrapur, Tehsil -Dhanoti	--	--	24060	41143
7.	Song river	Village-Gyalidanda, Tehsil -Dhanoti	--	--	14420	19064.00
8.	Song river	Village-Saundana, Tehsil -Dhanoti	--	--	36040	61970.00
9.	Yamuna river	Village-Naingaon, Tehsil -Dhanoti	--	--	3300	1980.00
10.	Alaknanda river	Village- Ranihaat, Tehsil- Kirtinagar	--	--	106559	140580.00
11.	Alaknanda river	Village- Naithana, Tehsil- Kirtinagar	--	--	97166	128259.00
12.	Yamuna River	Village- Shyalsi Tehsil- Dhanolti,	--	--	2000	4400.00

13.	Yamuna River	Village-Almas-1 Tehsil- Dhanolti	--	--	9080	22000.00
14.	Yamuna River	Village- Almas-2 Tehsil- Dhanolti	--	--	2600	5720.00
15.	Aglar gad	Village- Dolsi-1 Tehsil- Dhanolti	--	--	8530	28050.00
16.	Aglar gad	Village- Dolsi-2 Tehsil- Dhanolti	--	--	5000	11000.00
17.	Chifalti River	Village- Tolyakatal Tehsil- Dhanolti	--	--	12000	26400.00
18.	Aglad River	Village- Kandi talli, Tehsil- Nainbagh	--	--	6000	13200.00
19.	Yamuna River	Village- Kharson, Tehsil- Nainbagh	--	--	4000	12540.00
20.	Song River	Village- Dubra, Tehsil- Dhanolti,	--	--	3000	6066.00
21.	Kaali Paury Tok Nala	Village- Kumali, Tehsil- Narendranagar	--	--	1500	6600.00
22.	Yamuna River	Village- Bhutgaon, Tehsil- Nainbagh	--	--	175	577.50
23.	Aglar river	Village-Dabla Matela, Tehsil- Dhanaulti	--	--	2000	4400.00
24.	Yamuna river	Village- Khairar Tehsil- Nainbag,	--	--	1000	2200.00
25.	Song river	Village -Ghurshal Tehsil- Dhanaulti	--	--	3000	6600.00
26.	Bhilangana river	Village- Pilkhi, Tehsil- Ghansali	--	--	7970	26301.00
Total for the District					444920.00	1146888.00

12. General recommendations

During the preparation of the present report prominent rivers/ streams has been studied in detail, as the rest of the streams/rivers either have very insignificant annual replenishment/ approachability problem or are very narrow at most of the places and as such are not fit for grant of mineral concession for mineral based industries, however it is also important to mention here that because of the regular demand of sand, stone and bajri for the developmental activities in the respective areas, such streams are prone to illegal mining, It is suggested that the auctions of quarries be done regularly to meet out the local demand subject to the approval from the joint Inspection Committee as Uttarakhand Minor Mineral Concession Rule, 2001(as amended time to time). These mineral concessions shall also reduce demand load and will be helpful to minimize illegal extraction of minerals, failure of which may result in to illegal mining at odd hours and shall be haphazard and more detrimental to the local ecology. Irrespective of it following geo-scientific considerations are also suggested to be taken into account during the river bed mining in a particular area:

1. RBM lots should be allocated on actual area rather than revenue plot area.
2. Restricted area for RBM picking on Upstream and Downstream distance from motor/Suspension bridges, should be based on field parameters and vulnerability assessment of bridges rather than fixing an arbitrary distance from bridges for the lots to promote lessees and restrict illegal picking.
3. Assessment of RBM Quantity and delineation of lot should be prepared and monitored in 'DRONE PLATFORM' in a digital spatial environment.

4. Demarcation on the ground with geo-fencing way to avoid illegal unscientific mining.
5. Abandoned stream channels or terrace and inactive floodplains may be favoured rather than active channels and their deltas and floodplains.
6. Stream should not be diverted to form inactive channel.
7. Mining below subterranean water level should be avoided and monitored to safeguard environment and environmental contamination and over exploitation of resources.
8. Large rivers and streams whose periodic sediment replenishment capacities are larger, may be preferred than smaller rivers.
9. Segments of braided river system should be used preferably falling within the lateral migration area of the river regime that enhances the feasibility of sediment replenishment.
10. Mining at the convex side of the river channel should be avoided to prevent bank erosion. Similarly meandering segment of a river should be selected for mining in such a way as to avoid natural eroding banks and to promote mining on naturally building (aggrading) meander components.
11. Continued riverbed material mining in a given segment of the river will induce seasonal scouring and intensify the erosion activity within the channel. This will have an adverse effect not only within the mining area but also both in upstream and downstream of the river course. Hazardous effects of such scouring and enhanced erosion due to riverbed mining should be evaluated periodically and avoided for sustainable mining activities.

12. Mining area should be demarcated on the ground with defined pillars' sites so as to prevent illegal and unscientific mining.
13. It is recommended that Sub Divisional Level Committee may take into consideration all its relevant aspects / data while scrutinizing and recommending the application for EC to the concerned Authority.
14. The *DSR datasets* need to be organised in *GIS environment*. As in every five year it is obligatory to update. Therefore, it will be easier and more accurate to understand changing scenario of lots in *GIS platform* for supplementary planning, execution monitoring and as well considering other *techno-socio-economic-environmental and legal* issues related to excavation of the RBM. Then it will be possible to lease out all RBM lots.



Dy. Director/Geologist
Dist Tehri Garhwal