

DISTRICT SURVEY REPORT

FOR SAND MINING

DISTRICT AMRITSAR



PREFACE

In Compliance to the Notification Issued by the Ministry of Environment , Forest And Climate change Dated 15.01.2016 , the preparation of District survey report of River bed mining and other minor minerals is in accordance appendix 10 of the notification . It is also mentioned here that the procedure of preparation of District Survey Report is as per notification guidelines. Every efforts have been made to cover sand mining locations, areas & overview of Mining activity in the district with all it's relevant features pertaining to geology & mineral wealth in replenishable and non-replenishable areas of rivers, stream and other sand sources. This report will be a model and guiding document which is a compendium of available mineral resources , geographical set up , environmental and ecological set up of the District and is based on data of various departments , published reports , and websites. The data may vary due to flood , heavy rains and other natural calamities. Therefore , 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.



Overview of Mining Activity

SURVEY REPORT OF DISTRICT AMRITSAR

As per Gazette notification of 15th January 2016 of Ministry of Environment, Forest and Climate Change a Survey shall be carried out by the District Environment Impact Assessment Authority (DEIAA) with assistance of irrigation department, Drainage department, Forest department, Mining department and Revenue department in the district for preparation of District Survey Report as per the sustainable Sand mining guidelines to ensure identification of areas of aggradations or deposition where mining can be allowed; and identification of areas of erosion and proximity to infrastructural structures and installations where mining should be prohibited and calculation of annual rate of replenishment and allowing time for replenishment after mining in that area.

Every efforts have been made to cover sand mining locations, areas & overview of Mining activity in the district with all it's relevant features pertaining to geology & mineral wealth in replenish-able and non-replenish-able areas of rivers, stream and other sand sources. The mineral potential is calculated based on field investigation & geology of the catchment area of the river or streams. Also as per the site conditions and locations, depth of minable mineral is defined. The area for removal of the mineral in a river or stream is decided depending on geomorphology & other factors, it can be 50% to 60% of the area of a particular river or stream. Other constituents like clay and silt are excluded as waste while calculating the mineral potential of particular river or stream. This District Survey Report shall form the basis for application for environment clearance, preparation of reports and appraisal of projects. The report shall be updated once every five years.

1. INTRODUCTION :-

Amritsar city a holy city of District Amritsar is situated in Northern Punjab state of north-western India lies about 15 miles (25 km) east of the border with Pakistan with an area of 139 Sq. Km . Amritsar is an important city in Punjab and is a major commercial, cultural, and transportation centre. It is the centre of Sikhism and the site of the Sikh's principal place of worship. Amritsar means "the tank of nectar or the tank of immortality" and the district derives its name from the sacred tank in the Amritsar city. The present Golden Temple is surrounded by this tank which was originally a small natural pool. The pool soon acquired a reputation for sanctity, and the followers of the Guru migrated to the sacred spot, and there a small town grew up and was known at first as Ramdaspur or Guru-ka-Chak, and later, as the pool was converted into a tank, it came to be known as Amritsar. Amritsar has been the important educational Hub from the very beginning. Khalsa College, Amritsar was established in 1892. In 1969 Guru Nanak Dev University was established. In addition to this Govt. Medical College, Dental College, Engineering and polytechnics , Indian School of Business management and many other arts colleges were established.

2. PHYSICAL FEATURES & GEOGRAPHICAL AREA:

The district Amritsar is situated between 31degree – 37degree north latitude and 74 degree – 52.3degree and East longitude . The Amritsar District falls in the Jullundur Division of the Punjab. In shape, it is a trapezium, with its base resting on the River Beas. It forms a part of the tract known as the Bari Doab or the territory lying between the rivers Ravi and Beas. Its western side adjoins Pakistan, partly separated by the River Ravi. The north-eastern side is bounded by the Gurdaspur District, and towards it south-east across the River Beas lie the Kapurthala and Tarn Taran districts. The district is divided into four tehsils or subdivisions, viz, Amritsar to the north-east, Ajnala to the north-west, Patti to the south-west. All important places in the district are connected by rail or road. The total area of the district, 267000 Hectares, comprising Tahsil Amritsar, Tehsil Ajnala and Baba Bakala.

BRIEF DETAIL OF AMRITSAR DISTRICT

NAME OF DISTRICT	AREA (PER SQ. KM)	POPULATION	DENSITY(PER SQ. KM)
AMRITSAR	2683	2490656	928

Sub Tehsils (Total : 5)

SR. NO.	NAME OF SUB – TEHSIL
1.	ATTARI
2.	LOPOKE
3.	MAJITHA
4.	RAMDASS
5.	TARSIKKA

Blocks (Total : 9)

SR. NO.	NAME OF SUB – TEHSIL
1.	ATTARI
2.	CHOGAWAN
3.	AJNALA
4.	MAJITHA
5.	VERKA
6.	TARSIKKA
7.	JANDIALA GURU
8.	RAYYA
9.	HARSHA CHHINA

Municipal Councils (Total :6)

SR. NO.	NAME OF MUNICIPAL COUNCIL/ NAGAR PANCHAYAT
1.	AJNALA
2.	RAJASANSI
3.	JANDIALA GURU
4.	RAYYA
5.	MAJITHA
6.	RAMDASS

Population :

In 2011, Amritsar had population of 2,490,656 of which male and female were 1,318,408 and 1,172,248 respectively. In 2001 census, Amritsar had a population of 2,157,020 of which males were 1,152,821 and remaining 1,004,199 were females. Amritsar District population constituted 8.98 percent of total Maharashtra population. In 2001 census, this figure for Amritsar District was at 8.86 percent of Maharashtra population. There was change of 15.47 percent in the population compared to population as per 2001. In the previous census of India 2001, Amritsar District recorded increase of 27.08 percent to its population compared to 1991

3. PHYSIOGRAPHY

Amritsar district lies between the Beas river to the east and the Ravi river the Upper Bari Doab, is one of the inter-fluvial tracts of the Punjab Plain. The Beas river separates the Amritsar district from Kapurthala district. Amritsar has an altitude of 230 m from ASL. It is bowl shaped hence floods certain areas with even small rainfall. The track is alluvial plain with light reddish yellow clayey soil. The important physiographic division of the district is as follows:-

- (a) Upland Plain,
- (b) The flood plain of the Ravi & Beas,
- (c) The Bluff along the Beas,
- (d) The district is a continuous level plain with a flat topography.

Amritsar district lies amidst River Beas (to the east) separating Amritsar from Kapurthala and River Ravi (to the west). It is located in the lower part of Upper Bari Doab Canal giving it a saucer like shape. It is interesting to note that river Beas joins Satluj River at the confluence of Ferozepur, Tarn Taran and Kapurthala districts. As Punjab Plain is a part of Indo-Gangetic system, Amritsar also has alluvial deposits brought by Beas and Ravi Rivers. The soil in Amritsar is a light reddish-yellow loam (colloquially called maira) that becomes somewhat stiffer at the Doab, finally deteriorating into sandy and slightly uneven soil (colloquially called tibba). Amritsar has a leveled plain area situated at an elevation of about 200 meters in the North East to about 175 meters in the South West. The terrain of Amritsar can be put under three categories: The Upland Plain, Bluff along the Beas and Floodplain of Satluj.

The Physiographic of Amritsar district is the product of alleviation by the Beas and Ravi rivers. There are no hills within the limits of the district and nothing of the nature of work or stone is to be met. The formation is strictly alluvial though

apparently of a uniform level, the country falls away to the west from the high right bank of the Beas to the left bank of Ravi and there is also a gentle slope of perhaps one foot and a quarter in a kilometer down the doab which slightly broaden out as the two rivers diverge after rising from the hills along Gurdaspur. The district is devoid of impressive natural features except the dhaya as the cliffs forming the right bank of the Beas are called the sandy ridge running down the doab, the scarcely perceptible drainage lines which carry off the surface water and the perennial stream known as the Sakki. However, an inter fluvial tract like that of Amritsar district cannot be homogeneous throughout, as the terrain of the flood plains must differ from that of the upland plains situated away from the rivers. Indeed one can distinguish the following terrain units in the district on close observation. Amritsar district has two major landforms viz. alluvial plain and flood plain. (i) Alluvial Plains: Alluvial plain constitute the major part of the district. This unit is formed by the alluvial deposits brought by Ravi and other rivers of Indus system. The alluvial plain along the Beas river is dissected by the back erosion and there is a chain of gullies or ravines along the river Beas. The upland plain spreads almost the whole district, except the western half of Ajnala tahsil, the eastern margins of Baba Bakala. This plain abruptly rises above the Beas river in the east and slopes very gently towards the Ravi. It possesses a firm base of alluvium and has an appearance of a vast stretch of level land. There are a few sporadically distributed sand mounds and clay mounds, with a local land relief of only 2 to 6 meters. Amritsar has an elevation of 192 meters above the main sea level. (ii) The flood plain of Ravi and Beas: The flood plain of Ravi and Beas rivers is the other landform in the district. The flood plain of Ravi occupies the western half of Ajnala tehsil and accounts for about 7 per cent of the total area of the district. It is locally known as the sea Bet Ravi. It stretches between the Ravi to the west and its tributary Sakki Nala to the east. The Ravi flood plain is low lying

and waterlogged tract due to flooding by both the Ravi and Sakki. Its surface configuration is uneven and, at places, it contains abandoned courses of the river, patches of marshy land and thickly growing grass. In contrast to Ravi, which makes a wide floodplain, the Beas does not form any such feature along its course in the Baba Bakala of the district. The origin of this bluff can be ascribed probably to a tectonic uplift which affected the whole of the Indus Yamuna divide during the Pleistocene Age.

4.RIVER SYSTEM

The water bodies in the district occupy 3153.12 ha area which is 1.18 per cent of the TGA of the district. Further, 309.95 and 438.41 ha area is under canals and village ponds which is nearly 0.12 and 0.16 per cent of the geographical area of the district. The area under river channels of the two rivers i.e. Ravi and Beas flowing along the district boundary is 2404.76 ha (0.90% of TGA of the district). Across the blocks, Rayya block has the maximum area (689.72 ha) under water bodies which is 2.14% of TGA of this block. The Chogawan block has 89.65 hectares area under village ponds/reservoirs in the block which is closely followed by 88.38 ha in Verka block.

The wetlands in the district occupy 2533.73 ha area which was 0.95 per cent of the TGA of the district. Marshes and swamps are mainly along the Ravi river in Chogawan block of the district. Nearly 1221.95 ha area (3.03 % of TGA of block) of Chogawan block is under wetland which is maximum among other blocks of the district. In Ajnala block 1085.45 ha (2.38 % of TGA of block) is under wetland. In addition, Rayya and Jandiala blocks have 223.25 ha and 3.07 ha area respectively under wetlands.

5. RAINFALL & CLIMATE :-

The climate of the district is classified as tropical, semi arid and hot which is mainly dry with very hot summer and cold winter except during south west monsoon season. There are four seasons in a year namely cold season from November to March, hot season from April to June, south west monsoon season from last week of June to middle September and post monsoon season from September to beginning of November. During cold season, series of western disturbances affect the climate of the district. The normal annual rainfall of the district is 680 mm unevenly distributed over 31 rainy days. The south west monsoon contributes 75% rainfall and sets in last week of June and withdraws in middle of September. Rest 25% of annual rainfall occurs in the in non monsoon months in the wake of western disturbances and thunder storms. The rainfall increases from southwest to northeastern part of the district.

A) RAINFALL :

Rainfall in Amritsar varies from 12mm to 670mm per month. The average annual rainfall in the district is 520.9 mm. The rainfall in the district increases generally from the South-west towards the north-east and varies from 435.5 mm. About 75% of the rainfall in the district is received during the period from June to September and as much as about 18% rainfall occurs during the period from December to February.

B) CLIMATE :

The climate of the area is sub Tropical Monsoon climate. The climate of the area is characterized by general dryness except during the brief south-west monsoon season, a hot summer is a bracing winter. The year may be divided into four seasons. It comprises of the winter season (November to March) when temperatures ranges from 16 °C (61 °F) to about 4 °C (39 °F), the hot season (April to June) when temperatures can reach 45 °C (113 °F), monsoon season (July to September) and post-monsoon (September to November). The lowest recorded temperature since 1970 is -2.6 °C (27 °F) recorded on 21 Jan 2005. The highest temperature recorded was 47.7 °C (117.9 °F) on 21 May 1978. The climate is generally characterized by dry weather except the brief southwest monsoon season, hot summer and bracing winter. Amritsar receives on an average 601.5 mm of rainfall with around 33 rainy days. The wind direction of Amritsar is from North-West to South-East.

C) Humidity :

Relative humidity is generally high in the mornings, exceeding 70 per cent except during the summer season when it is less than 50 per cent. The humidity is comparatively less in the afternoons. The driest part of the year is the summer season when the relative humidity in the afternoons is about 25 per cent or less.

D) Winds :

Winds are generally light with some strengthening in the summer and early part of the monsoon season. In the post-monsoon and cold season, winds are light and variable in direction in the morning and mostly from the west or north-west in the afternoons. In April and May, winds are mainly from direction between north-west and north-east in the mornings and between west and north-east in the afternoons. By June, easterlies and south –easterlies also blow and in the south-west monsoon season. winds are more commonly from directions between north-east and south-east.

E) Special weather phenomena :

Western disturbances affect the weather over the district during the cold season, causing widespread rain and gusty winds. Dust-storms and thunderstorms occur in the summer season. Occasional fog occurs in the cold season.

Climate data for Amritsar

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	29.0 (84.2)	31.1 (88)	35.7 (96.3)	41.9 (107.4)	48.1 (118.6)	46.2 (115.2)	42.0 (107.6)	37.2 (99)	36.5 (97.7)	34.6 (94.3)	29.3 (84.7)	23.2 (73.8)	48.1 (118.6)
Average high °C (°F)	19.4 (66.9)	21.6 (70.9)	26.5 (79.7)	33.8 (92.8)	38.7 (101.7)	39.4 (102.9)	35.0 (95)	34.2 (93.6)	34.5 (94.1)	32.3 (90.1)	27.1 (80.8)	21.3 (70.3)	30.3 (86.5)
Daily mean °C (°F)	11.6 (52.9)	13.9 (57)	18.7 (65.7)	25.1 (77.2)	29.9 (85.8)	32.1 (89.8)	30.2 (86.4)	29.7 (85.5)	28.3 (82.9)	23.8 (74.8)	17.9 (64.2)	12.9 (55.2)	22.8 (73)
Average low °C (°F)	3.7 (38.7)	6.0 (42.8)	10.9 (51.6)	16.3 (61.3)	21.1 (70)	24.6 (76.3)	25.3 (77.5)	25.1 (77.2)	22.2 (72)	15.1 (59.2)	8.7 (47.7)	4.4 (39.9)	15.3 (59.5)
Record low °C (°F)	-3.5 (25.7)	-1.6 (29.1)	2.6 (36.7)	5.7 (42.3)	7.7 (45.9)	13.8 (56.8)	14.0 (57.2)	15.0 (59)	10.5 (50.9)	4.6 (40.3)	1.7 (35.1)	-2.7 (27.1)	-3.5 (25.7)
Average rainfall mm (inches)	2.4 (0.94)	3.3 (1.3)	4.8 (1.89)	2.9 (1.14)	2.5 (0.98)	6.2 (2.44)	23.1 (9.09)	18.7 (7.36)	7.9 (3.11)	1.8 (0.71)	6 (0.24)	1.8 (0.71)	760 (29.91)
Average rainy days (≥ 1.0 mm)	2.8	3.7	5.0	3.5	2.8	4.6	11.4	9.1	4.3	1.4	1.2	2.0	51.8
Average relative humidity (%)	74	70	64	47	38	48	72	77	69	67	73	76	64.6
Mean monthly sunshine hours	181.7	192.7	219.4	266.0	294.7	269.0	215.5	227.7	240.8	253.2	220.1	182.2	2,762

6. LAND USE/LAND COVER MAPPING USING SATELLITE DATA

Multi-date satellite imageries of IRS-P6 LISS III acquired in February- March, 2004; June, 2004 and September, 2004 were used for land use mapping. The IRS P6, FCC on 1:50,000 scale, generated from Green, Red and NIR bands were visually interpreted to delineate various land use/ land cover categories. A field survey was carried out to check the validity of various land use classes and sub classes. Necessary corrections were incorporated after ground truth verification. Final land use/land cover map for the district was prepared. Land use/ land cover classes were digitized using Arc-Info GIS package and area under various land use classes computed . The detailed discussion of each category is as follows:

A) Built-up Land

The built-up land includes residential, industrial, commercial, public, road network etc. but with the 23.5 meter resolution data of IRS-P6 LISS III sensor it is not possible to segregate them. Therefore the present study was limited to the identification of urban and rural built-up areas. The total area under built-up land in the district was 22598.19 ha which is 8.44 per cent of TGA of the district. There is 10848.46 ha area under built-up and 433.15 ha area under industrial built-up in the district which is 4.05 and 0.16 per cent of the TGA of the district respectively. The rural built-up area in the district is 11316.58 ha (4.23 % of TGA of district). The Urban (Towns/Cities) and Industrial built-up area is mainly concentrated in

Verka block of the district comprising the city of Amritsar and industrial establishments in and around the city. Block wise analysis of the data shows that Verka block has maximum built-up area (11203.6 ha, 26.28 % of the TGA of Block) including urban, industrial and rural built-up whereas Ajnala block has minimum built-up area (3.35 % of TGA of blocks) closely followed by Chogawan block 3.38 % of TGA. Verka block, located centrally in the district has nearly 21.8 per cent area of the block (9298.48 ha) is under urban settlements/district administrative establishments as Amritsar city and Amritsar cantonment fall in this block and 0.74 per cent of the TGA is under industrial establishments. The Rayya block has largest area under rural settlements compared to other blocks which is 2170.36 hectare (6.73% of TGA).

B) Agricultural Land

The study revealed that total double cropped area in the district is 235002.21 ha which is nearly 87.79 per cent of total geographical area (TGA) of the district . Rice-wheat is the major crop rotation followed in the district. Apart from these two major crops, pulses, oilseeds, sugarcane and maize crops are also grown. Among vegetable crops, potato and chillies are also grown. The vegetable crops other than chillies are mainly grown around the city of Amritsar. Nearly 2042.20 hectares area of the district is under agriculture and horticulture plantations. The total land mass under agriculture comprising of crop land and land under plantations is found to be 237044.21 ha which is 88.55 per cent of the TGA of the district. Across the

blocks Tarsikka block has the maximum per cent area under agriculture (94.51 % of its TGA) whereas the Verka block has minimum per cent area under agriculture plantations (72.37 % of its TGA). Rayya block of the district has the maximum per cent area under agricultural plantations (1.58% of TGA) whereas the Tarsikka block has the minimum per cent area under agricultural plantations (0.02 % of TGA). Maximum per cent area under horticultural plantations (orchards) was mapped in Harsha Chhina block (0.25% of TGA) whereas there Amritsar no map able horticultural plantations in Ajnala, Majitha and Tarsikka blocks.

AREA WISE CROP PROD. IS AS UNDER :

SR. NO.	CROP TYPE	AREA (IN HACTARES)	AVG. PROD . (IN KG. / HA)	PRODUCTION (IN TONNES)
1.	PADDY	44,000	6044	2,66,000
2.	BASMATI	1,37,000	4546	6,18,000
3	MAIZE	1,000	4,000	4,000
4.	SUGAR CANE	4,500	7,000	33,000
5	SEASAME (डिठ)	1,800	225	40
6	WHEAT	1,88,000	3910	1,88,000
7	OIL SEEDS	1200	1250	2000
8	PULSES	4500	1100	5000

C) Wastelands

The total area under wastelands comes to be 2340.45 ha which is nearly 0.87 per cent of the TGA of the district . The wastelands include gullied/ravenous land, land with or without scrub, land under mining (Brick Kilns) and salt affected land. The area under these classes is 356.1, 941.29, 733.66 and 309.38 ha respectively which is 0.13, 0.35, 0.27 and 0.12 per cent of the TGA of the district, respectively . Across the blocks, Rayya block has the maximum per cent area (1.80% of TGA of the block) whereas Tarsikka block has the minimum per cent area (0.15% of TGA of the block) under wastelands. Verka block of the district with its proximity to the city of Amritsar has 167.76 ha of area under brick kilns and their mining fields and is followed by Ajnala (156.14 ha of block). Further, Ajnala block has maximum per cent area under land with/without scrub (351.57 ha, 0.77% of TGA), and salt affected land (96.09 ha, 0.21 % of TGA of block) in comparison to other blocks. The gullied / ravenous land in the district are found along the river Beas bordering the district Kapurthala in Rayya block only occupying an area of 356.1 ha (1.10% of TGA of block). The wastelands with and without scrub are spread over the entire district. Brick kilns with their mining areas are well distributed in the district. Salt affected land parcels are found in the localized pockets in the entire district but mainly concentrated in Ajnala and Chogawan blocks. During field visit it was observed that small parcels of dunal land (sandy areas) are scattered in

Voltoha block of the district Tarntaran, but due to scale limitations the area less than 2.25 ha under this category could not be separately mapped and measured.

D) LAND HOLDING PATTERN

(Cropping Pattern) : Rice-wheat is the major crop rotation followed in the district. Other crops like maize, barley, gram, mustard, cotton, etc. occupy negligible area as compared to wheat and rice. Besides agriculture, the area has a good potential for horticultural crops like grapes, pear, peach, guava, kinnow and ber.

LAND UTILISATION PATTERN IN THE DISTRICT

District	Geographical Area	Forests	L.N.A. for cultivation	Cultivable waste	Fallow land	Net Area Sown	% age of N.A.S	Total Cropped Area
Amritsar	508	15	40	1	(a)	449	89	805

Area in, 000 Hectares)

(a) = Less than 500 hectares

L.N.A. : Land not available (land put to non-Agricultural use), N.A.S. = Net Area Sown

7. FOREST :

An area of 10,000 hectare is covered under reserved, protected, private and unclassified forests. The main species of plants in district Amritsar are Eucalyptus, Shisham, Kikar and Poplar etc. Forest cover in the district is very little; only 30.31 ha area which is 0.01 % of the TGA of the district is under this category. This is negligible when compared to 33 per cent required as per National Forest Policy. The forest plantations along roads, railway lines and canals could not be mapped due to coarser data resolution (23.5 m). The Harsha Chinna block has 27.68 hectares area (0.12 % of TGA of the block) followed by 2.63 ha in Verka block under reserved/ protected forests whereas the Ajnala, Chogawan, Jandiala, Majitha, Rayya and Tarsikka blocks have no mappable area under forests. Small acreage under forest plantations emphasizes the need to bring additional area under forest cover. It may be pointed out that area less than 2.25 ha under forest cover or the strip plantations, along the roads, canals etc. could not be mapped on 1:50,000 scale due to mapping limitations.

8. TOPOGRAPHY:

Lying between the River Beas to the east and the River Ravi to the west, the Amritsar District, which forms the lower part of the Upper Bari Doab, is one of the inter fluvial tracts of the Punjab Plain. The River Beas, which separates the Amritsar District from the Kapurthala District, joins the Satluj River near the point where the four districts of i.e. Lahore (Pakistan), Ferozepur, Amritsar and Kapurthala meet.

9. AVAILABILITY OF MINERALS:

The whole of the Amritsar District is composed of the recent deposits known collectively as the Indo-Genetic alluvium, which consists of the alluvial sand, clay and loam.

9.1 Alkaline Earth

Sand is the basic raw material for its utilization in any development activity through out the world. Sand is primarily produced from mining operations on the surface of the earth, near the river beds and the sand quarrying below the surface of earth. Some brick earth and foundry sands are reported from the district.

9.2 Groundwater

The entire area in the district is underlain by quaternary alluvium comprising fine to coarse sand, silt and clay, with intercalations of pebbles and kankar. Bore holes drilled down to a depth of about 100 meters have encountered 70-90 per cent of sand.. Groundwater occurs both under confined and unconfined conditions. The depth of reach water in the area ranges from about 1 to 20 meters below the land surf aces. The water-table is generally deep towards the high banks of the Beas and the Sutlej. However, in the vicinity of the canal-irrigated area and also in the floodplains of the Beas and the Satluj, the water-table is very shallow. In many parts of the canal-irrigated areas, waterlogged conditions prevail. Land Stalinization is also observed in areas 3 affected with water logging. The groundwater available in the greater part of the district is generally fresh but hard, except in the southern part of t he district where it is of inferior quality, being saline to bitter. The groundwater in general is suitable for irrigation and domestic purposes.

10. OVERVIEW OF MINING ACTIVITY

Mainly three types of Minor Minerals constituents such as Stone Baji are required for any type of construction apart from other material like cement and steel. In the earlier time the mud houses/buildings were constructed with the use of mud . However with the passage of time, new technique 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 carried out manually / semi- mechanized process from the river beds .

The local residents used to lift sand etc. from the river beds to meet out their bonafide requirement. However after coming into being the Punjab Minor Mineral rules 1964, and amended rules in 2013 . The mining is regulated in accordance with the rules. At present 07 mining quarries have been granted/executed under the above said rules in different parts of the District and 04 quarries under process for getting the environment clearance .

10.1) LIST OF MINING QUARRIES IN THE DISTRICT AND LOCATION AREA AND PERIOD OF VALIDITY:-

Sr. No.	LOCATION	AREA (IN ACRES)	PERIOD OF VALIDITY
1	SUNDERGARH	3.00	2008-2010
2	KOT RAZADA	8.16	2008-2010
3	MOHLEKE	2.37	2008-2010
4	VANJHAWALA	6.07	2008-2010
5	NANGAL AMBH	1.63	2008-2010
6	KHANWAL	18.51	2008-2010
7	RAIPUR	19.68	2008-2010
8	GHONEWAL	22.73	2008-2010
9	CHAHARHPUR	4.00	2008-2010
10	CHHANA	14.65	2008-2010
11	BALARHWAL	14.32	2008-2010
12	BAL LABHE DARIYA	11.71	2008-2010
13	BHINDI AULAKH KHURD	1.90	2008-2010
14	BHINDI SAIDAN	0.75	2008-2010
15	DARIYA MUSSA	11.00	2010-2011
16	RURHEWAL	3.00	2010-2011
17	CHAHARHPUR	21.40	2010-2011
18	KOTLI BARWALA	26.10	2010-2011
19	RAIPUR	9.75	2010-2011
20	KHANWAL	0.4	2010-2011
21	BALHARWAL	0.4	2010-2011
22	SAHOWAL	3.00	2010-2011
23	WAZIR BHULLAR	35.80	2010-2011
24	BUDHA THEH	7.25	2010-2011
25	KOT MEHTAB	2.5	2010-2011
26	KOTLI BARWALA	6.40	2011-2012
27	CHAHARHPUR	10.75	2011-2012
28	DARIYA MUSSA	9.40	2011-2012
29	DADDIYAN	9.11	2011-2012
30	RURHEWAL	10.00	2011-2012
31	BALHARWAL	4.87	2011-2012
32	BAL LABHE DARIYA	1.50	2011-2012

33	RAIPUR KALAN	9.45	2011-2012
34	KHANPUR	2.06	2011-2012
35	BUDHA THEH	6.00	2011-2012
36	KOT MEHTAB	2.48	2011-2012
37	WAZIR BHULLAR	18.42	2013-2014
38	KOTLI BARWALA	6.45	2013-2014
39	CHAHARHPUR	10.80	2013-2014
40	DADDIYAN	4.35	2013-2014
41	RURHEWAL	10.00	2013-2014
42	BALHARWAL	4.85	2013-2014
43	RAIPUR KALAN	9.40	2013-2014
44	KHANPUR	12.00	2013-2014
45	KOTLI BARWALA	6.45	2014-2015
46	CHAHARHPUR	10.85	2014-2015
47	KOTLI BARWALA	6.45	2015-2016
48	CHAHARHPUR	18.83	2015-2016
49	RURHEWAL	10.00	2015-2016
50	BALHARWAL	4.90	2015-2016
51	DADDIYAN	4.16	2015-2016
52	KHANPUR	2.10	2015-2016
53	KOT MEHTAB	2.50	2015-2016

10.2) DETAILS OF ROYALTY OR REVENUE
RECEIVED IN LAST THREE YEARS

SR.NO	YEAR	ROYALTY(IN RS.) SAND
1	2013	7670202
2	2014	31541
3	2015	5260110

10.3) DETAIL OF PRODUCTION OF SAND OR MINOR
MINERAL IN LAST THREE YEARS IN DISTT.

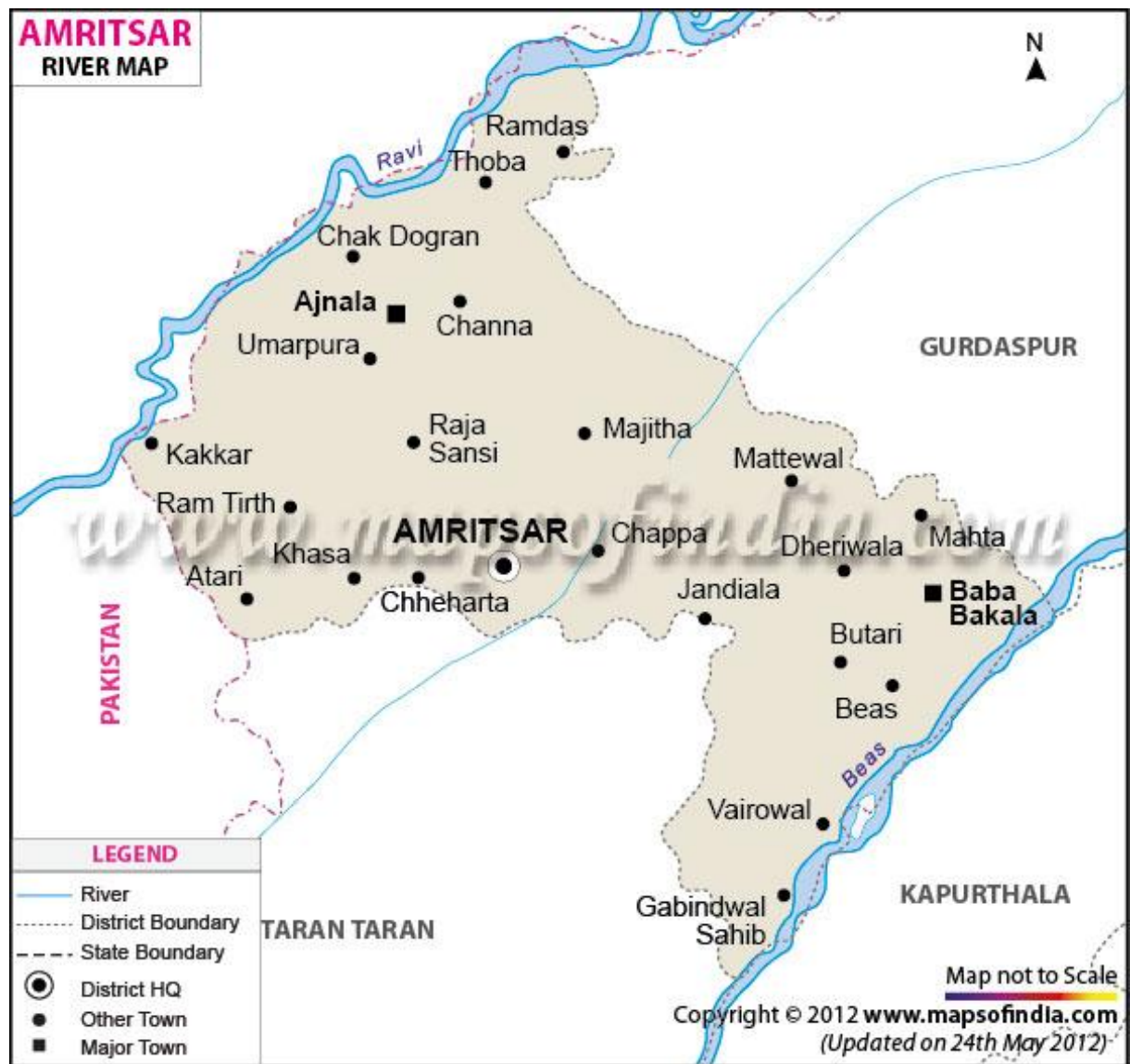
SR.NO	YEAR	SAND (IN MT)
1	2013	36462 M.T.
2	2014	1051.380 M.T.
3	2015	40582.400 M.T.

11) 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 1.00 meter 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.

There are two rivers Ravi and Beas in Distt. Amritsar .



Amritsar lies amidst River Beas (to the east) separating Amritsar from Kapurthala and River Ravi (to the west). It is located in the lower part of Upper Bari Doab. It is very interesting that river Beas joins Satluj River at the confluence of Lahore (Pakistan), Ferozpur, Amritsar and Kapurthala.

1.RIVER RAVI



The Ravi is a trans boundary river crossing Northwestern India and Eastern Pakistan. It is one of six rivers of the Indus System in Punjab region (Punjab means "Five Rivers"). The waters of Ravi are allocated to India under Indus Water Treaty.

The main Ravi River flows through the base of Dalhousie hill, past the Chamba town. It is at an elevation of 856 meters (2,807 ft) (where a long wooden bridge existed to cross the Ravi River). It flows into the south-west, near Dalhousie, and then cuts a gorge in the Dhauladhar Range, before entering the Punjab plain near Madhopur and Pathankot. It then flows along the Indo–Pak border for 80 kilometers (50 mi) before entering Pakistan and joining the Chenab River. The total length of the river is about 725 kilometers (450 mi).

Ujh River is another major tributary of the Ravi River. Its source is in the Kailash mountains at an elevation of 4,300 meters (14,100 ft), close to the Bholderwah Mountains in Jammu district. After flowing for 100 kilometres (62 mi), it joins Ravi at Nainkot in Pakistan.

**NAME OF VILLAGES ADJOINING RAVI RIVER WHERE SAND
MAY BE AVAILABLE IN THE DISTRICT:
REPLENISHABLE**

Sr. No.	Name of Village	Had Bast No.
1	KAMALPURA	72
2	KASSOWAL	76
3	GHONEWAL	78
4	SAHARAN	74
5	NISOKE	71
6	SINGHKO	70
7	GAGARH	66
8	PANJ GHARAI	65
9	RUREWAL	92
10	GHUMRAI	64
11	MALIKPUR	62
12	DUJOWAL	60
13	KOT RAZADA	59
14	ARJI KOT	58
15	KOTLI BARWALA	56
16	CHAHARPUR	106
17	DADDIYAN	55
18	BAL LABHE DARIYA	49
19	DARIYA MANSOOR	51
20	KAMIRPURA	50

21	VADHAI CHEEMA	53
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NON - REPLENISHABLE

1	GULGARH	32
2	NIYAMATABAD	30
3	HASHAMPUR	154
4	AWAN VASAU	28
5	GHOOGHA	27
6	BHINDI AULAKH	22
7	BHINDI NAIN	20
8	BHINDI BURJ	19
9	VARAH	156
10	KAKKAR	160
11	TAREEN	161
12	SAORIYAN	162
13	TALLAH	153
14	KOT SIDHU	152
15	BHINDI SAIDAN	24
16	BHAGUPUR UTTARH	9
17	KARYAAL	201
18	MIADI KALAN	144
19	SAHOWAL	45
20	RAIPUR	38
21	SARANGDEV	126
22	KHUSUPURA	155

2.RIVER BEAS



The Beas River rises north of the Kullu Valley, and passing through the Kangra District (Himachal Pradesh), and between Gurdaspur and Hoshiarpur districts, enters the sandy valley which divides the Amritsar District from the Kapurthala District. Here, its bank on the right, i.e., the Amritsar side, is an abrupt cliff, the upper stratum of which is hard clay mixed with *kankar* and the lower usually, though not always, is fine river sand. The left bank is uniformly low, and on the Kapurthala side there is a stretch of moist alluvial land running back for several kilometers into the interior, which is fertile, well-wooded and liable to inundation. The waters of the Beas and Sutlej rivers are allocated to India under the Indus Waters Treaty between India and Pakistan. The Beas touches the Amritsar District in the vicinity of the village of Sheron – Bagha . It is adjoined by

an abruptly rising bluff to its right throughout its course in the Amritsar and Tarn Taran . It is joined by the River Satluj at Harike in the Patti Tehsil of District Tarn taran.

**NAME OF VILLAGES ADJOINING BEAS RIVER WHERE SAND
MAY BE AVAILABLE IN THE DISTRICT:**

REPLENISHABLE

Sr. No.	Name of Village	Had Bast No.
1	SHERO N BAGHE	1
2	SHERON NIGAH	2
3	KHANPUR	3
4	WARAICH	8
5	BUDHA THEH	9
6	WAZIR BHULLAR	10
7	KOT MEHTAB	12

NON - REPLENISHABLE : NIL

DRAINAGE SYSTEM WITH DESCRIPTION OF MAIN RIVERS

SR.NO	NAME OF THE RIVER	AREA DRAINED (Sq.Km)	% AREA DRAINED IN THE DISTRICT
1	RAVI	11700	87 %
2	BEAS	350	13%

SALIENT FEATURES OF IMPORTANT RIVERS AND STREAMS.

S. No	Name of the River or Stream	Total Length in the District (in Km.)	Place of origin	Altitude at origin
1	RAVI	67.00	CHAMBA	305 TO 381
2	BEAS	14	BEAS KUND	305 TO 381

FOR RIVER RAVI

Portion of the River or Stream Recommended for Mineral	Length of area recommended for mineral concession (in kilometer)	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)
67KM	50	400	25	6,50,10,033

MINERAL POTENTIAL

Boulder (MT)	RIVER BED BAJRI (MT))	SAND(MT)	Total Mineable Mineral Potential (MT)
NIL	NIL	6,50,10,033	6,50,10,033

FOR RIVER BEAS

Portion of the River or Stream Recommended for Mineral	Length of area recommended for mineral concession (in kilometer)	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)
14 KM	5	140	2	54,33,674

MINERAL POTENTIAL

Boulder (MT)	RIVER BED BAJRI (MT)	SAND(MT)	Total Mineable Mineral Potential (MT)
NIL	NIL	54,33,674	54,33,674

TOTAL MINERAL POTENTIAL FOR THE DISTRICT :

a) MINERAL POTENTIAL FOR REPLENISHABLE AREA :

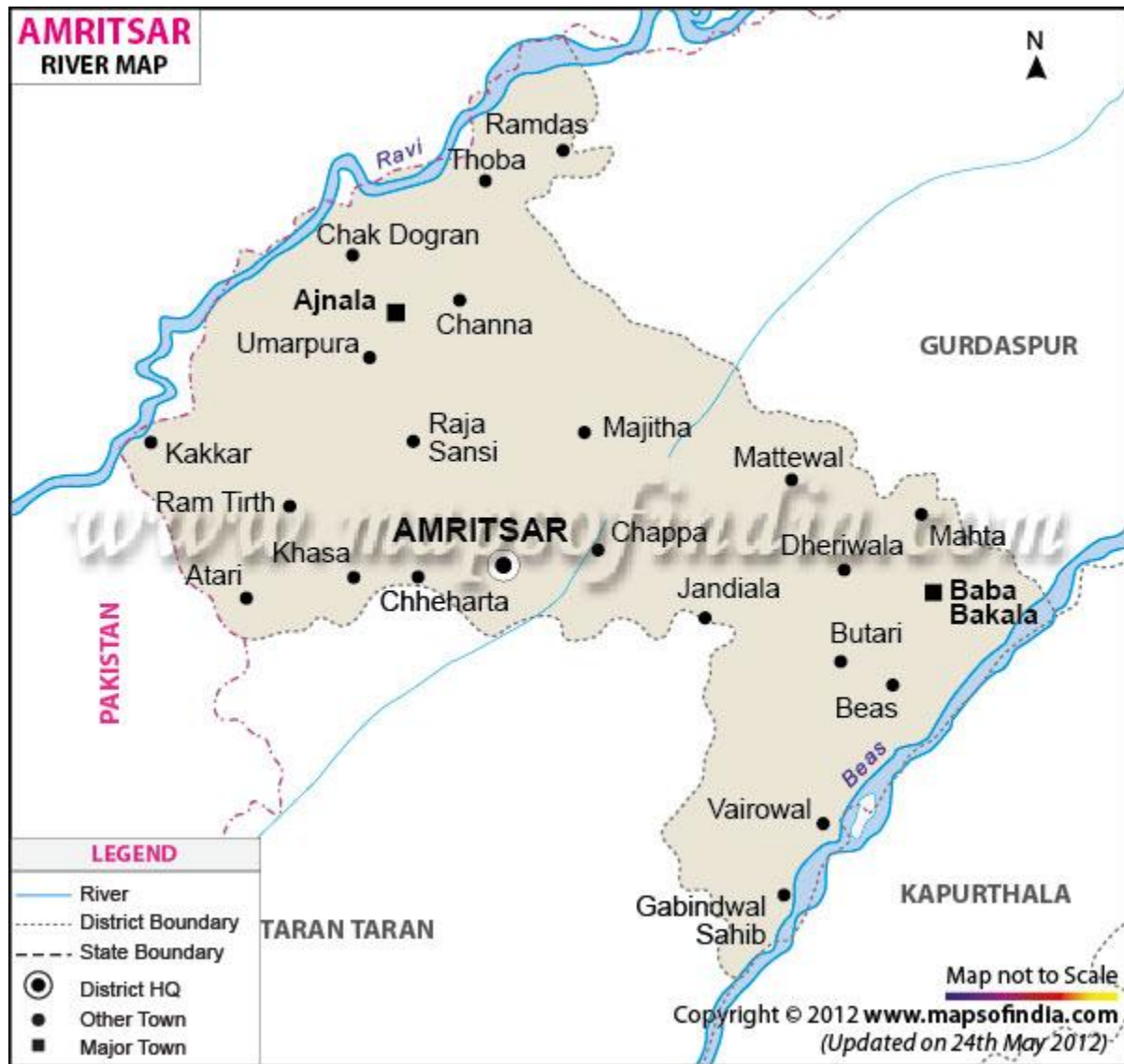
Sr. No.	Name of River	Portion of the River or Stream Recommended for Mineral (in kilometer)	Length of area recommended for mineral concession (in kilometer)	Average width of area recommended for mineral concession (in meters)	recommended for mineral concession (in square meter)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)
1.	RAVI	67	50	400	25	6,50,10,033
2.	BEAS	14	5	140	2	54,33,674
	TOTAL	81	55	540	27	7,04,43,707

b) MINERAL POTENTIAL FOR NON- REPLENISHABLE AREA :

Quantity for non- replenishable area could not be ascertained due to non-willingness of land owners for excavation of minor minerals from their own lands . However, it is recommended that on receipt of request of land owner , a Sub Divisional Level Committee may visit the site quarry to ascertain the viability of mineral potential i.e. Area and mineral quantity for recommending the case to the concerned Authority for approval.

ANNUAL DEPOSITION

SHOWING BEAS / RAVI RIVER CATCHMENT IN DISTT. AMRITSAR



The sudden increase hydraulic radius, the carrying capacity of the river decreases as a result of which all the load carrying by the river is deposited.

This stream has developed a high flood plain near the confluence of rivers as during flood season the velocity of this stream is checked by the water of rivers and most of sand sediments load is deposited near the confluence point.

The annual replenishment in the river is depend upon the velocity of the river. Annual replenishment is depend upon the period of rainy season and rainfall at different places of the flow of River. To calculate the replenishment data at this stage is very difficult. It is suggested that before considering the report for environment clearance Joint inspection Team report must be collected as per Punjab Minor Mineral rules 2013 because the regular demand of sand stone and bajri for the development activities in this respective areas. Before approval of the quarries is is suggested that joint inspection committee report may be demanded as per Punjab Minor Mineral rules 2013.

GENERAL RECOMMENDATIONS/CONCLUSIONS:

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 per Punjab Minor Mineral Rules 2013 .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. Abandoned stream channels or terrace and inactive floodplains may be preferred rather than active channels and their deltas and

floodplains.

2. Stream should not be diverted to form inactive channel.
3. Mining below subterranean water level should be avoided as a safeguard against environmental contamination and over exploitation of resources.
4. Large rivers and streams whose periodic sediment replenishment capacities are larger, may be preferred than smaller rivers.
5. 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.
6. Mining at the concave 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.
7. 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.

8. Mining area should be demarcated on the ground with Pucca pillars so as to avoid illegal unscientific mining.
9. 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.