DISTRICT SURVEY REPORT

Of

GANJAM DISTRICT, ODISHA

For

RIVER SAND MINING

(For planning & Exploitation of Minor Mineral Resources)

As per Notification No. S.O. 3611(3), Dated 25th July 2018
of
Ministry of Environment, Forest & Climate Change , Govt of India, New Delhi

(APPROVED BY DEIAA, GANJAM ON 21.12.2019)

COLLECTORATE, GANJAM

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PREFACE

On 25th July 2018, Ministry of Environment, Forest and Climate Change, Government of India issued a Notification vide Notification No. S.O. 3611 (E), New Delhi the District Survey Report of the River Bed Mining of Sand has to be prepared in accordance with the Clause II of Appendix – X of the Notification. Every effort has been made to cover the River Bed Sand mining locations, future potential areas and overview of Sand mining activates in the District with all relevant features pertaining to Geology and Mineral Wealth. This report will act as a compendium of available mineral resources, Geological set up, Environmental and Ecological set up of the District and based on data of various departments like Revenue, Water Resources, Forest, Geology & Mining in the District as well as Statistical data uploaded by various State Government Department for preparation of District Survey Report. The main purpose of the preparation of District Survey Report is to identify the mineral resources and developing the mining activities along with other relevant data of the District. District Survey Report (DSR) has been prepared in every district for each minor mineral. The District Survey Report will guide systematic and scientific utilisation of natural resources, so that present and future generation may be benefitted at large. The purpose of District Survey Report (DSR) "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". The District Survey Report (DSR) will contain mainly data published and endorsed by various departments and websites about Geology of the area, Mineral wealth details of rivers, details of Lease and Mining activity in the District along with Sand mining and revenue of minerals. This report also contains details of Forest, Rivers, Soil, Agriculture, Road, Transportation and climate etc.

The District Ganjam is rich in occurrence of natural mineral like Road Ballast, Bajri, Boulder, sand and Moorum etc. By the side of major river Rushikulya, Bahuda & Ghadahada sand is available in abundance, which is a basic raw material for any civil construction work. The area is mostly covered by alluvium with exposures of weathered Granitic Gneisses.

Collector & District Magistrate,
Ganjam

APPROVED BY

DISTRICT ENVIRONMENT IMPACT ASSESSMENT AUTHORITY (DEIAA), GANJAM ON 21.12.2019

Sub-Collector, Chatrapur-cum-Member Secretary, DEIAA, Ganjam	Prof. Kali Charan Patnaik, Department of Marine Science Berhampur University, Bhanja Vihar, Expert Member, DEIAA, Ganjam	Divisional Forest Officer, Berhampur-cum-Member, DEIAA, Ganjam	Collector & District Magistrate-cum- Chairperson, DEIAA, Ganjam

DISCLAIMER

The data may vary due to flood, heavy rain and other natural calamities with its intensity which will experience by this District. Therefore, it is recommended that District Level Appraisal Committee (DEAC), Ganjam / State Expert Appraisal Committee (SEAC), Odisha may take into consideration all its relevant aspects / data while scrutinizing and recommending the application for EC to the concerned Authority.

PLATE NO. 01 : *Administrative Map of Ganjam District*

D.E.I.A. APPROVED GANJAM

(1) INTRODUCTION :

Ganjamis derived from the old port-township which is situated on the northern bank and near the mouth of river Rushikulya. It was also the headquarters of the District during early British administration up to 1815. The name of the town Ganjam or locally pronounced Ganjam, has probably been derived from the word "Gunj" of Iranian (Persian) origin which means the granary. There is also another meaning of this word i.e. "The Market". As an important port of bygone days, Ganjam must be handling paddy, rice and other food grains of the region. It was also a great trade centre. The Ganjam district lies in the southern part of Odisha, bounded by North Latitude 19° 0' and 20° 17', and East Longitude 84°09' and 85°11'. It is bordered on the north by the district of Nayagarh on the south by Gajapati District of Odisha and Srikakulam district of the state of Andhra Pradesh, on the west by Kandhamal District and on the east by Khurdha and Puri districts and the Bay of Bengal. In the year 1992, Paralakhemundi Sub-Division was separated from Ganjam and became a new district. The Ganjam district with its 3 Sub-Divisions i.e. Chatrapur, Berhampur and Bhanjanagar remained with an area of 8,206 sq.km. As per census 2011, the urban area of the district now comprises of 359.68.49 sq.km with 7,68,001 population and the rural area covers 7,846.32 sq.km with 27,61,030 rural population by making a total of 35,29,031. The district stands at fifth position in respect of area and first in respect of population of the state.

(2) OVERVIEW OF MINING ACTIVITY IN THE DISTRICT

Over the year the mining activities of the district is multiplying keeping in view of population pressure, different developmental activities and scientific requirement of the society. The mining activities of the district may be broadly divided into 3 categories, viz : (1) Atomic Mineral Exploration and Processing. (2) Extraction and Processing of Specified Minor Mineral (Decorative Stone) and (3) Extraction of Minor mineral other than specified minor mineral such as ordinary soil, sand, moorum, stone, pebbles etc. The Atomic Mineral Exploration and Processing is being done by the Indian Rare Earth Limited (OSCOM), Matikhalo under ChatrapurTahasil. There are 38 Nos. of specified minor mineral (Decorative Stone) sources available in the

District, out of which 13 Nos. of sources are in operation and Letter of Intent has been issued in respect of 4 sources. Similarly, there are 461sairat sources available in the district, out of which 284 sources arein operation and settled with different lessees. Out of total 461 sources, 117 are sand sairat sources, 339 are stone sairat sources and 5are moorumsairat sources and out of these sairat sources 78 sand sairat sources, 204 stone sairat sources and 3moorum sources are operationalised with the lessees in 5 year long term lease basis. In all these sources extraction of Minor Minerals are being done as per the approved Mining Plan. All mining activity in the district are open cast working and carried out either manually or semi-mechanised manner. However, for river sand mining, the major river system and streams flowing in the district namely Rushikulya, Ghodahada, Bahuda, BEDanadi, Sananadi etc. have good sand deposition and are being utilised for the developmental activities of the district.

(3) THE LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY :

Detail List given at Annexure – I

(4) THE DETAILS OF ROYALTY OF REVENUE RECEIVED IN LAST THREE YEARS

The following amount of Royalties are being collected by different Tahasildars of the District from Sand Mining is given below.

Sl. No.	Name of the Tahasil	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
1	2	3	4	5	6	7
1	Chatrapur	1306556	1024019	1838567	2447355	1039842
2	Kodala	0	0	0	0	0
3	Khallikote	0	0	0	0	0
4	Purushottampur	2669296	2904165	2589440	380432	3130925
5	Hinjilicut	155000	549673	1963970	1954655	1503552
6	Ganjam	820316	0	1463600	1537300	1756800
7	Kabisuryanagar	891750	0	0	0	0
8	Polasara	441844	112558	232724	0	0
9	Berhampur	0	0	0	0	
10	Kukudakhandi	0	0	0	0	0
11	Digapahandi	212700	553058	561035	683802	1568339
12	Konisi	0	0	0	0	0
13	Patrapur	502600	181854	272145	913684	399566

Sl. No.	Name of the Tahasil	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
1	2	3	4	5	6	7
14	Chikiti	337100	1144983	1301486	1280013	1861236
15	Sanakhemundi	0	0	0	1174519	1359138
16	Bhanjanagar	0	464370	989088	1471214	1595795
17	Aska	413589	2676586	3745734	4182668	3021175
18	Buguda	292800	0	0	0	49238
19	Surada	143060	0	552693	446777	446777
20	Sheragada	0	0	572029	871525	0
21	Bellaguntha	509300	305726	505964	827061	1534252
22	Jagannathprasad	0	0	0	1291242	1291242
23	Dharakote	0	168000	637350	855257	899669
TOTAL		8695911	10084992	17225825	20317504	21457546

(5) DETAILS OF PRODUCTION OF SAND OR BAJRI OR MINOR MINERAL IN LAST THREE YEARS :

The following quantities of Sand are being lifted by the Lessees of different Sand Sairat Sources of the district.

Sl. No.	Name of the Tahasil	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
1	2	3	4	5	6	7
1	Chatrapur	46662	54327	32804	38358	39013
2	Kodala	0	0	0	0	0
3	Khallikote	0	0	0	0	0
4	Purushottampur	0	0	23625	32175	44678
5	Hinjilicut	3250	877	2274	1608	2268
6	Ganjam	32400	0	37792	39950	35620
7	Kabisuryanagar	12559	0	0	0	0
8	Polasara	0	2500	2500	0	0
9	Berhampur	0	0	0	0	0
10	Kukudakhandi	0	0	0	0	0
11	Digapahandi	2451	6900	6000	5550	4950
12	Konisi	0	0	0	0	0
13	Patrapur	8917	8567	8677	8687	8787
14	Chikiti	4567	31487	31637	31787	34547
15	Sanakhemundi	0	0	0	7150	10520
16	Bhanjanagar	0	10730	12270	12423	13010
17	Aska	26000	52284	55887	58253	44149
18	Buguda	9908	0	0	0	2000
19	Surada	4768	0	4298	1620	1620
20	Sheragada	0	0	1008	1008	1109
21	Bellaguntha	18190	3800	8814	12634	17446
22	Jagannathprasad	0	0	0	11010	11010
23	Dharakote	0	6000	11311	17204	18084
TOTAL		169672	177472	238897	279417	288811

From the above table it is revealed that over the years there is increase of demand and production of Sand Minor Mineral in the district accordingly every care has been taken in the District Survey Report to meet the demand of Sand Minor Mineral of the District.

(6) PROCESS OF DEPOSITION OF SEDIMENTS IN THE RIVERS OF THE DISTRICT

Deposition is the Geological process in which sediments, Soil and rocks are added to a land fall or land mass.Wind, water and gravity transport previously weathered surface material, which at the loss of enough kinetic energy in the fluid, is deposited, building of layers of sediments. Deposition occurs when forces responsible for sediment transportation are no longer sufficient to overcome the forces of gravity and friction, creating a resistance to motion. Rivers and streams deposit sediment where the speed of the water current decreases. In rivers, deposition of occurs along the inside bank of the river bend, while erosion occurs along the outside bank of the bend, where the water flows a lot faster.

Sediment transport is critical to understanding how rivers work because it is the set of processes that mediates between the flowing water and the channel boundary. Erosion involves removal and transport of sediment (mainly from the boundary) and deposition involves the transport and placement of sediment on the boundary. Erosion and deposition are what form the channel of any alluvial river as well as the floodplain through which it moves. The amount and size of sediment moving through a river channel are determined by three fundamental controls: competence, capacity and sediment supply. Competence refers to the largest size (diameter) of sediment particle or grain that the flow is capable of moving; it is a hydraulic limitation. If a river is sluggish and moving very slowly it simply may not have the power to mobilize and transport sediment of a given size even though such sediment is available to transport. So a river may be competent or incompetent with respect to a given grain size. If it is incompetent it will not transport sediment of the given size. If it is competent it may transport sediment of that size if such sediment is available (that is, the river is not supply-limited). Capacity refers to the maximum amount of sediment of a given size that a stream can transport in traction as bedload. Given a

supply of sediment, capacity depends on channel gradient, discharge and the calibre of the load (the presence of fines may increase fluid density and increase capacity; the presence of large particles may obstruct the flow and reduce capacity). Capacity transport is the competence-limited sediment transport (mass per unit time) predicted by all sediment-transport equations, examples of which we will examine below. Capacity transport only occurs when sediment supply is abundant (non-limiting). Sediment supply refers to the amount and size of sediment available for sediment transport. Capacity transport for a given grain size is only achieved if the supply of that caliber of sediment is not limiting (that is, the maximum amount of sediment a stream is capable of transporting is actually available). Because of these two different potential constraints (hydraulics and sediment supply) distinction is often made between supply-limited and capacity-limited transport. Most rivers probably function in a sediment-supply limited condition although we often assume that this is not the case. Much of the material supplied to a stream is so fine (silt and clay) that, provided it can be carried in suspension, almost any flow will transport it. Although there must be an upper limit to the capacity of the stream to transport such fines, it is probably never reached in natural channels and the amount moved is limited by supply. In contrast, transport of coarser material (say, coarser than fine sand) is largely capacity limited.

Modes of Sediment Transport

The sediment load of a river is transported in various ways although these distinctions are to some extent arbitrary and not always very practical in the sense that not all of the components can be separated in practice:

1. Dissolved load
2. Suspended load
3. Intermittent suspension (saltation) load
4. Wash load
5. Bed load

Sediment Transport in Rivers/ Water Stream

The loose boundary (consisting of movable material) of an alluvial channel deforms under the action of flowing water and the deformed bed with its changing roughness (bed forms) interacts with the flow. A dynamic equilibrium state of the boundary may be expected when a steady and uniform flow has developed(Nalluri& Featherstone, 2001). The resulting movement of the bed material (sediment) in the direction of flow is called sediment transport and a critical bed shear stress (t) must be exceeded to start the particle movement. Such acritical shear stress is referred as incipient (threshold) motion condition, below which the particles will be at rest and the flow is similar to that on a rigid boundary.

Sediment Influx Rate

Sediment influx in Ephemeral streams is generally confined to the beginning of the rainy season as velocity of the water washes down medium to fine sand and silt depending on the velocity and gradient of land. Cobbles, pebbles and boulders will be transported but only over short distance. Boulders are normally 256 mm and above are normally transported either by dragging action or by siltation.

Recharge is in two forms, one general deposition of coarse, medium and fine sand when the velocity of the river water decreases below the carrying capacity.

However, flash floods due to heavy rains in the upper reaches often causes rapid transportation of boulder, sand etc., along with silt which can never deposit.

Recharge Rate:

It is dependent upon the following 4 factors :

1. Velocity of the water and change of velocity
2. Size of particles
3. Temporary increase in density of carrying media due to presence of silt load.
4. Artificial or natural barriers being encountered within the river course, where due to the sudden check in velocity, materials are deposited.

The numerical sedimentation rate varies from 50cm medium sand to as much as 3m of medium and fine sand where the slope of the river bed is less than 10° slope per season. For silt and clay, these only be deposited in the flood area and normally varies between 1-5m over 6 months period.

Flow Chart for volume estimation

Estimation of Sedimentation

The sedimentation rate in India is estimated using empirical formula, actual observed data and reservoir sedimentation survey. The recommended BIS (12182 - 1987) method have been widely used for reservoir planning. In addition the sediment data is also collected by the state governments on river systems in their respective territories. Thus there is enough data to estimate both the average annual sediment yield and also the distribution of annual sediment yields. There are also situations where the gauging stations provide nested systems of catchments. In these situations data can be used to identify the contribution to the total sediment yield from individual sub-catchments. Though this data is extremely useful and is

recommended to be fully used for estimation of sediment rate, the data need to be interpreted with care. The sediment measurements are, in general, based on bottle sample taken from near the water surface. In general, the suspended sediment concentration varies with depth, with the sediment concentration being greatest at the lower levels. This means that the measurement may under estimate the suspended sediment concentrations. The data provides an excellent resource for estimating sediment yield directly. The sediment yield depends on catchment area, the average catchment slope, the lithology of the catchment, the land use, the drainage density, the annual/seasonal precipitation and storm events etc. There are a number of empirical methods developed in USA and still used worldwide to assess sediment erosion, including the Universal Soil Loss Equation (USLE), MUSLE, Revised Universal Soil Loss Equation (RUSLE). Some work has been done in India and certain empirical relations have been developed linking annual sediment yield with some of these parameters (CWC, 2010).

Estimation of sediment yield from the catchment area above the reservoir is usually made using river sediment observation data or more commonly from the experience of sedimentation of existing reservoirs with similar characteristics. On adopting the first procedure, it is usually necessary (though often not complied within practice) to evolve proper sediment water discharge rating curve and combine it with flow duration (or stage duration curve) based on uniformly spaced daily or shorter time units in case of smaller river basins. Where observed stage/flow data is available for only shorter periods, these have to be suitably extended with the help of longer data on rainfall to eliminate, as far as possible, the sampling errors due to shortness of records. The sediment discharge rating curves may also be prepared from hydraulic considerations using sediment load formulae, that is, modified Einstein's procedure but this has not yet become popular. It is also necessary to account for the bed load which may not have been measured. While bed load measurement is preferable; when it is not possible, it is often estimated as a percentage generally ranging from 5 to 20 percent of the suspended load. However, practical means of measuring bed load of sediment needs to be undertaken particularly in cases where high bed loads

are anticipated. To assess the volume of sediment that would deposit in the reservoir, it is further necessary to make estimates of average trap efficiency for the reservoir in question and the likely unit weight of sediment deposits, time averaged over the period selected. The trap efficiency would depend mainly on the capacity inflow ratio but would also vary with location of controlling outlets and reservoir operating procedures. The density of deposited sediment would vary with the composition of the deposits, the location of the deposit within the reservoir, the flocculation characteristics of clay and water, and the age of the deposit. For coarse material(0.0625 mm and above), variation of density with location and age may be unimportant. For silt and clay, this may be significant. Normally, a time and space average density of these fractions, applicable for the period under study is required for finding the overall volume of deposits. For this purpose, the trapped sediment for the period under study would have to be classified in fractions by corrections in inflow estimates of the fractions by trap efficiency. Most of the sediment removed from the reservoir should be from the silt and clay fraction. In some special cases, local estimates of densities at a point in the reservoir may be required instead of average density over the reservoir. Estimates of annual sediment yield/sedimentation rate assessed from past data are further required to be suitably interpreted and where necessary, the unit rates which would apply to the future period are computed by analyzing data for trends or by making subjective adjustments for the likely future changes. Where the contributing drainage area is likely to be reduced by upstream future storages, only such of the projects as are under construction or which have the same priority of being taken up and completed as the project in question are considered for assessing the total sediment yield. Sediment observation data (see IS : 18QO-1968*) is necessary if the yield is being assessed from hydrometric data. If observational methods are inadequate, the possibility of large errors should be considered. For drawing conclusions from reservoir re-surveys, it is important that reduction of at least 10 percent or more has been observed in the capacities of the two successive surveys; if this is not done, inaccuracies in the successive surveys will distort the estimation of the capacity reduction between the surveys. If the loss of

capacity is small, useful conclusions may not be forthcoming, and in such cases, river sediment measurements with its large observational errors may still provide a better estimate. It is essential to make a proper assessment of sediment yield for reservoir under study taking relevant factors into account (BIS: 12182-1987).

A proper assessment of the effects of sediment transport and of the measures that may be necessary for its control requires a knowledge of the processes of sediment erosion, transportation, and deposition, and of their interaction with the hydrological processes in the catchment.

Erosion of Catchments

The most significant agent for eroding sediments from land is running water. Other agents of land erosion include wind and gravity. The processes by which water degrades the soil are complicated and depend upon the rainfall properties, soil properties, land slope, vegetation, agricultural methods, and urbanization process. The last two factors account for the most important effects of man's activities on erosion. Empirical equations have been developed for the determination of soil loss (sheet erosion) from agricultural lands. One of them, developed by Musgrave for conditions prevailing in the United States , is given as an example: E = IRS 1.35 10.35 pl .75 (59.1) where E is the mean annual soil loss, in millimeters, I is the inherent erodibility of the soil, in millimeters, R is a land-cover factor, S is the land slope, in per cent, 1 is the length of the slope, in meters, and p is the 30-minute, two-year rainfall depth, in millimeters. The values of the parameters I and R are determined empirically from regional studies.

Channel Erosion

Channel erosion is caused by the forces of the concentrated flow of water. Its rate depends on the hydraulic characteristics of channel flow and on the inherent erodibility of channel materials. In non-cohesive materials, the resistance to erosion is affected by the size, shape, and specific gravity of the particles and by the slope of the bed. In cohesive materials it also depends on the bonding agents. The relationships between the hydraulic variables and the parameters influencing the erodibility of

channels are not fully understood and are often expressed by empirical formulae. Stream- and river-control works may have a serious local influence on accelerating channel erosion if they cause an increase in channel depth, flow velocity, change the direction of the flow, or reduce the natural sediment load. The latter effect occurs frequently below dams and may persist for many kilometers downstream. Bare land and BEDlands may develop gullies with rates of advance that can be computed by empirical formulae containing such parameters as the drainage area of the gully, slope of the approach channel, depth of rainfall, and clay content of the eroding soil.

Transportation of sediments in channels :

Fine (suspended) sediments transported in rivers originate mainly from the topsoil of the catchment and from the banks of the channels. However, fine sediments also originate from sewage and other return flows. A large portion of the transported material comes to rest on flood plains especially upstream from hydraulic structures. The settled material undergoes compaction and other physical and chemical changes that can sometimes prevent its re-erosion by flows that would have carried it previously. A decrease is usually found in the mean annual sediment transported per unit area of the catchment as the area of the catchment increases. The concentration of suspended sediment in runoff is described by formulae such as [2, 5]: $\log cs = C \log Q + B$ (59.2) in which cs is the concentration expressed in weight per unit volume of water, Q is the water discharge, C is a dimensionless coefficient, and B is a function of the rainfall depth, of the antecedent discharge, or of other meteorological and hydrological variables. The concentration of suspended sediment varies within the channel cross-section. It is relatively high in the lower portion and may also be non-uniform laterally so that its sampling at several points or along several verticals of the cross-section is often necessary for obtaining its mean. The mean concentration should be evaluated to yield the total sediment weight per unit time when multiplied by the water discharge. The graph of suspended sediment against time usually has a peak that does not occur simultaneously with the peak discharge. This lag is a result of the specific conditions in a watershed, and no

generalization has yet been formulated for the evaluation of this difference.Bed-load transport Coarse sediments (bed load) move by sliding, rolling, and bouncing along channels and are concentrated at or near the channel bed. The variables that govern transport are the size and shape of the particles and the hydraulic properties of the flow. As a consequence of the interaction between the hydraulic forces and the coarse sediment, the channel bed assumes different configurations known as plane, ripples, dunes, flat, standing waves, and anti-dunes. They exert resistance to the flow of water that varies within a wide range and assumes a maximum value for the dune configuration.

Sedimentation

When approaching its mouth, the flow velocity of a river decreases along with its ability to carry sediment. Coarse sediments deposit first, then interfere with the channel conveyance, and may cause additional river meanders and distributaries. The area of the flowing water expands, the depth decreases, the velocity is reduced, and eventually even fine sediments begin to deposit. As a result, deltas may be formed in the upper portion of reservoirs. The deposited material may later be moved to deeper portions of the reservoir by hydraulic processes within the water body. Sediments are deposited in accordancewith their settling velocity. A significant concentration of suspended sediments may remain in the water column for several days after its arrival in a reservoir. This may interfere with the use of the stored water for certain purposes, e.g., for water supply or recreation. It should be emphasized that not all of the sediment deposits in a reservoir. A large portion of it remains in the upper zones of the watershed, some is deposited upstream from reservoirs, and some is carried downstream by the released water. The sediment-trapping efficiency in a reservoir depends upon the hydraulic properties of the reservoir, the nature of the sediment, and the hydraulic properties of the outlet. The density of newly deposited sediments is relatively low but increases with time. The organic component in the sediment may undergo changes that may reduce its volume and enhance biochemical processes in the stored water(WMO, 1994). Some of the famous sediment transport equations are:-

1. Dandy - Bolton Equation
2. Modified Universal Soil Loss Equation (MUSLE) developed byWilliams and Berndt (1977).
3. Yang Equations
4. Engelund-Hansen Equation

Dandy - Bolton formula is often used to calculate the sedimentation yield because

- The formula uses catchment area and mean annual runoff as key determinants
- It does not differentiate in basin wide smaller streams and their characteristics.
- Dandy and Bolton equation calculates all types of sediment yield i.e. Sheet and rill Erosion, gully Erosion, channel Bed and bank erosion and mass movement etc.

Dandy - Bolton Equation

1. Dandy Bolton formula is often used to calculate the sedimentation yield.
2. However Computed sediment yields normally would be low for highly erosive areas and high for well stabilized drainage basins with high plant density because the equations are derived from average values.
3. The equations express the general relationships between sediment yield, run off, and drainage area.
4. Many variables influence sediment yield from a drainage basin. They include climate, drainage area, soils, geology, topography, vegetation and land use.
5. The effect of any of these variables may vary greatly from one geographic location to another, and the relative importance of controlling factors often varies within a given land resource area.
6. The accuracy of the sedimentation surveys varied, ranging from reconnaissance type measurements of sediment deposits to detailed surveys consisting of closely spaced cross-sections or contours.

Sediment Yield vs. Drainage Area

On the average, sediment yield is inversely proportional to the 0.16 power of drainage area between 1 and 30,000 square miles.

Sediment Yield vs. Runoff:

Sediment yield increased sharply to about 1,860 tons per square mile per year as run-off increased from 0 to about 2 inches. As runoff increased from 2 to about 50 inches, sediment yield decreased exponentially. Because sediment yield must approach zero as runoff approaches zero, a curve through the plotted points must begin at the origin. The abrupt change in slope of a curve through the data points at Q equals 2 inches precluded the development of a continuous function that would adequately define this relationship. Thus, there are two equations derived for when Q was less than 2 inches and when Q was greater than 2 inches (Dandy&Bolton, 1976).

Method of Mining

Extracting gravel from an excavation that does not penetrate the water table and is located away from an active stream channel should cause little or no change to the natural hydrologic processes unless the stream captures the pit during periods of flooding. The exception is that changes in evapotranspiration, recharge, and runoff may create minor changes to the ground-water system, which may in turn affect stream flow.

a) Limiting extraction of material in floodplains to an elevation above the water table generally disturbs more surface area than allowing extraction of material below the water table.

b) In-stream extraction of gravel from below the water level of a stream generally causes more changes to the natural hydrologic processes than limiting extraction to a reference point above the water level.

c) In-stream extraction of gravel below the deepest part of the channel (the thalweg) generally causes more changes to the natural hydrologic processes than limiting extraction to a reference point above the thalweg.

d) Excavating sand and gravel from a small straight channel with a narrow floodplain generally will have a greater impact on the natural hydrologic processes than excavations on a braided channel with a wide floodplain.

e) Extracting sand and gravel from a large river or stream will generally create less impact than extracting the same amount of material from a smaller river or stream.

D E I A APPROVED GANJAM

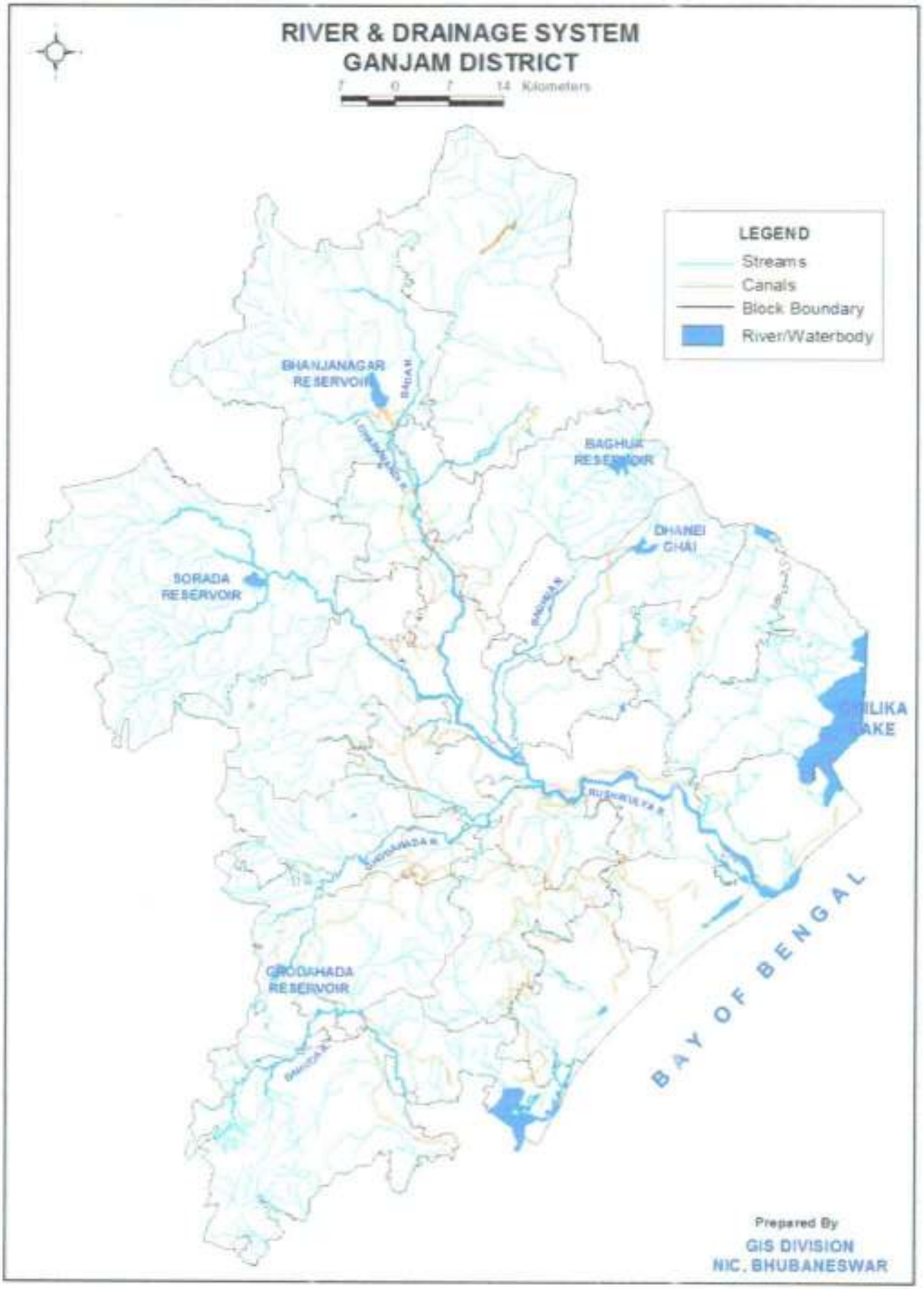

PLATE NO. 02 : *Map Showing Rivers, Streams and Water Reservoirs of Ganjam District*

Table shows the Volume of Sand deposited in different river or stream in last 4 years.

Sl. No.	Name of the River / Stream	Process of Deposition of Sediments	Volume of Sand deposited in Last 4 years (In CUM)
1	2	3	4
1	Ghodahada	Moderate	139143
2	Bahuda	Moderate	109262
3	Dhanei	Moderate	0
4	BEDanadi	Moderate	22493467
5	Rushikluya	Moderate	59565000
6	Baghua	Moderate	3249000
7	Sananadi	Moderate	924160
8	Bodanadi	Moderate	1316928
9	Kokolaba	Moderate	1290581
10	Loharakhandi	Moderate	602604
11	Nandini	Moderate	461358
12	Jorou	Moderate	363888
13	Padma	Moderate	0

(7) GENERAL PROFILE OF THE DISTRICT :

(a) Administrative Setup

The district of Ganjam now consists of three Sub-Divisions. namely Brahmapur, Chhatrapur and Ghumusar(Bhanjanagar) and Twenty three Tahasils. There are 38 police-stations in the district including three Energy police stations and one Mahila police station. The number of urban areas in the district is 18 which is a record in the state. Out of three Sub-Divisions of the District, Ghumusar(Bhanjanagar) is the biggest and Chhatrapur is the smallest. Chhatrapur Sub-Division occupies mostly the eastern part of the district. It constitutes eight Tahasils and twelve police stations including one marine and one energy police station. "Chhatrapur" is the headquarters of the district and is situated in this Sub-Division. Brahmapur Sub-Division lies in the south-eastern part of the district and is situated in between the Sub-Divisions of Chhatrapur and Gajapati district. The Sub-Division comprises seven Tahasils and fourteen police-stations including one marine, one mahila and one energy police station. Ghumusar (Bhanjanagar) Sub-Division occupies mostly the northern part of the district. It is divided into eight Tahasils. There are twelve police-stations in this Sub-Division. All the Sub-Divisions (except Ghumusar) are named after their respective headquarters town.

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Table shows the Nos. of Tahasils& Police Stations of the District and its Geographical Area &Population

Sub-Divisions	Tahasils	Area in sq.km.	Population	Police Stations
1	2	3	4	5
Brahmapur	Brahmapur	79.8	356598	BrahmapurSadar ,Brahmapur Town, BEDabazar, GosaniNuagan, Baidyanathpur,
	Chikiti	212.34	116217	K.Nuagan , Golanthara ,
	Digapahandi	447.43	161674	Jarada,Marine Pattapur , K.Nuagan , Digapahandi
	Kanisi	226.48	168593	BrahmapurSadar, Golanthara, GosaniNuagan,Gopalpur
	Patrapur	364.43	128711	Jarada, K. Nuagam
	Sanakhemundi	279.5	163138	Pattapur, Hinjili, Digapahandi, BrahmapurSadar
	Kukudakhandi	249.52	147313	Digapahandi, Golanthara,
Chatrapur	Chhatrapur	241.85	157778	BrahmapurSadar, HinjiliChhatrapur, Ganjam,Chamakhandi,Marine
	Kodala	223.37	148058	Kodala , Purusottampur , Khallikote, Kabisuryanagar
	Khallikote	434.87	194304	Rambha , Kodala , Khallikote,
	Purusottampur	265.17	158522	Purusottampur , Hinjili,Kabisuryanagar
	Ganjam	224.80	100917	Ganjam, Rambha, Chatrapur
	Hinjili	167.27	134548	Hinjili, Purusottampur, BrahmapurSadar
	Polasara	225.73	156505	Polasara, Kabisuryanagar
	Kabisuryanagar	166.40	131784	Kabisuryanagar, Purusottampur
Ghumusar (Bhanjanagar)	Aska	237.43	165560	Aska, Gangapur
	Ghumusar (Bhanjanagar)	293.30	159256	Bhanjanagar ,Tarasingi
	Sorada	384.57	158304	BEDagad , Gangapur , Sorada
	Buguda	300.68	129448	Buguda
	JagannathPrasad	429.50	131326	Jagannathprasad, Tarsing,Bhanjanagar, Buguda
	Belaguntha	201.12	124733	Gangapur, Bhanjanagar, Buguda
	Sheragada	174.66	127807	Sheragarh, BEDagada, Hinjili, Aska,BrahmapurSadar,Dharakote
	Dharakote	266.97	107946	Dharakote, BEDagada, Aska, Gangapur

(b) Demography of the District

According to the 2011 census enumeration,Ganjam district has a population of 35,20,151 roughly equal to the nation of Lithuania or the US state of Connecticut. This gives it a ranking of 83rd in India (out of a total of 640 district). The district has a population density of 429 inhabitants per square kilometre (1,110/sq mile). Its population growth rate over the decade 2001–2011 was 11.37%. Ganjam has a sex ratio of 983 females for every 1000 males and a literacy rate of 71.88%. The district is the most populous one in the state and scored fifth in area. However, some of the key statistics of the District are given below:

KEY STATISTIC (As per Census, 2011)

Population	35,29,031
Population Density	430
Literacy Rate (Total)	71.09%
Literacy Rate (Male)	80.99%
Literacy Rate (Female)	61.13%
Population Growth Rate	11.66%(Decennial)
Sex Ratio (No. of female for every 100 males)	983 persons
Area (in Sq Km)	8206Sqkm.

(c) Flora and Fauna :

The district has a good variety of Flora found in its forests. However, the following species are ordinarily found in the forests of Ganjam District such asAchu(Morindatinctoria), Acula (AntidesmaGheesoembilla), Ambata (Bauhinia recemosa), Ambo (Mangifera Indica), Amla (Emblica officinalis), Ankulo (AlangiumLemarckii), -Arjuna (Terminalia arjuna), Ashadua (Capparis horrid), Bahada (Terminalia belerica), Bailo(Pterospermumacerifolium), Barada (Bauhinia purpurea), BalliBaincho (Fiacourtiaindica), Kuruda (Gardenia turgida), Guruda (G. Gummifira), Bandhano (Ougeiniadalbergiades), Bonia (Hibiscus tiiliaceus), Bulo (Mimosopselangi), Khar Khari (Clerodendramserratum), Bhadalia (Olax scandens), Bhailia (Semicarpus anacardium), Bhuidimiri (Ficushispida), Bhenta (Limoniaaccidissima), Bheru

(Chlorixylonswietenia), Bichhuati (Tragiainvolucrata), Bodaka (Hymonodictyonorixensis), Baincha (FlacourtiaCataphvacta), Banabilli (Cipadesafruticosa), Bonamolli (Jasminurnarborescens), Bonarago (Gelohlumlane colatum), Boro (Ficusbengalensis), Borokoli (Zizyphusjujuba), Buro (Bombax malabericum),Paldua (Erythrina suberosa), Chandano (Santalum album), Charo (Buchananialatifolta), Chona (Sataria glauca), gilo (Coesalphiniasepiari), Danturi (Acacia pinnata), Devakondudia (Combretum ovalifolium), Dhalasinga (Gauthiumdi dymum), Dhamana (Greviatiliacfolia), Dhau (Anogeissuslatifolia), Dhobi (Dalbergia paniculata), Dimiri (Ficus glomerate), Denkari (Mallotussropandus), Dudukarvain (Wringtistinctoria), Dusarakendu (Diospyros embryopteris), Gojpippoli (Scindaspus officinalis), Gambhari (Gmelina arborea), Gondopolsoso (Miliusetomentosa), Gondhan (Premnalatifolia), Goppumamum (Cryplolepiabuchaunai), Gopa-gombari (Gmeliaasiatica), Gotto (Ziziphosxylocorpus), Goufyedoin (Gloriosa superba), Guachipa (Ehretiacanavesis), Guharia (Acacia leucophloea), Gulichi (Plumeria acufifolia), Katrang or Jhuntia (Gardenia latifolia), Haudiamohi (Garugapinnata), Hanmiroho (Glycosmis pentaphylla), Hancirooho (Toddaliaaculeata), Harital (Capparis sopiaria), Hattianchuso (Pisonia aculeata), Hingolo (Barringioniac utangulata), Holondo (Adina Coordifolia), Holondomohi (Garugapinnata), Harida (Terminalia chebula), Jamo (EueniaJambolona), Jatti (Eugenia bracleata), Jhattiko (Woodforciafruticosa), Jhoko-jhoko (Weberacory mbosa), Jiridi (Caescaria tomentosa), Jojangi (Phyllanthus raticulatus), Kaluchia (Diospyroasylvaticos), Kamoco (Derris scandns), Kania (Flueggiamicrocara), Karuda (Cleistantihuscollinus), Kattapandu (pavettaindica, pavetta, Tomentosa, Colastruspaniculotus), Kattanarangi (Atalantiamonophylla), Kstoparakhia (Erycibepaniculata),Kendu (Diospysos melonoxylon), Kherua (Potro-kerwaHolarrhen aantidy senterica), Khirokali (Mimusop shexandra), Khaira (Acacia catechu, Acacia sundra), Khajuri (Phoneixsylvestria), Kilakerwa (Ixora parviflora), Kodalo (sterouliaurens), Koia (Tamarindusindica), Koitha or Koito (Feronia elephantum), Kokundia (Calycopteris floribunda), Kolandrmuli (Cuscutareflexa), Koniary (Ochanasuarrosa), Kanicho (AbrusPrecatorius), Kontaikoli (ZizyphusOenoplia), KontaBamso (Bambusaarundinacea), Kopasia (Kydiacalycina), Kora (Strychnosnux- vomica), Korandus (Carissa carandas), Koranjo(Pongamiaglobra), Korasano (Ficusparasitica), Kosi (Brideliaretusa), Kossa (Diospyros chloroxlon),

Kossakoli (Diospyros montana), Kotokol (StrychnosPotatorim), Kotobhongonoi (Vitistomentosa), Kujjipano (Fheretiabuxifolia), Kulo (Grewiapilosa), Kukundia (calyoopteris floribunda). Kumbhi (Careyaarborea), Kuradia (polyatheasuberosa), Kuradia (Dichrostachyacinelea), Kusumo (Schleicheraoleosa). Limbo (Melia audirachta), Lankasidds (Euphorbia nivulia), Mahajol (Asparagus racemosus), Mahalimbo (Cedrelatoona), Mendu (Tylophoraesthmatica,) mirsingapatra (Murrayakoenigii), Mohi (Lanneagrandis). Mo hula (Madhucalatifolia), Malabha ngonoi (Vitiscarrnosa), Morda, (Argyreiaspeciosa), Muktamanji (Sapindustrifoltus), Mundimundi (Mitragyna parviflora), Munika, (Moringa terygosperma), Hurimuri (Helicteresisora), Muthuri (Smilixspp), Naringi (Citrus acerantium, Cirtusauranli umnobilis), Niraso (Memecylonedule), Nobunisora (Polyathiacersioides), Nolasidds (SarcostBravisligmao), Nuniari (Antidesmaghaesembilla), Odibhongo (Azimatatra cantha), Orugana (Cycas circinalis), Palaso (Bateamonospeoma), Palasomoi (Butea superba), Panijambo (Homoniaribaria), Pasi (Anogeissusacuminata), Pattuli (Stereosper-mum susveolens), Pendro (Ardibiabumilis), PholancokrytiCrotencaudatus), Piasal(Pterocarpusmarsupium), Piribi (Randiamalaberica), Pilchuli (Dalbergiavolubilis), Pittapotala (Trichosanthesc ucurnenina). Poboso-konieri (Cochlospevnumgoseypium), Phan phania (Oroxy lumindicum), Potua (Randiadumetorum), Rai (Dilleniapent agyna). Rakhto-Chandan (Piterocarpussantalinus), Ronobilli (Ciphadesa fruticose), Saguani (Tectonagrandis), Sahada (Strablus asper), Sahaja (Terminalia tomentossa, Terminalia Alata), Saliabamso (Dendrocalamusstriotus), Sal or Salua (Shorearobusta), Shiali (Bauhinia vahlii), Shika (Acacia concinna), Sidha (Lagotstroernia/ praviflora), Simanonkakhollo (Jatropha glandulifera), Sirisi (Albizizlebbek. AlbizzaOdoreatissima), Sisua (Delbergialatifolia), Sitaphala, (Annona squamosa), Solopo (Caryotaurena), Soma (Somi) (Soymidaf abrifuga), Sarupotrimahi (Bursera serrata), Sukhalamadevi (Heptaplerurum venuloasum), Suginodi (Hemidesmusindicae), Sunaurogundi (Mallotusphiilipinensis), Sunnari (Cassia fistula), Sundi (premnatomontosa), Tangin (xyliaxylocarpa), Tasliunia (Allophyluscobbe), Taqua (Vitislatifolia), Tuthuddi (Ganthiumparvifolium), Uruko (Orkillo), Ustho (Ficusreligiousa), Ottruli (pergulariadaima) and Virinchi (canthihiumangustifolium) ation.

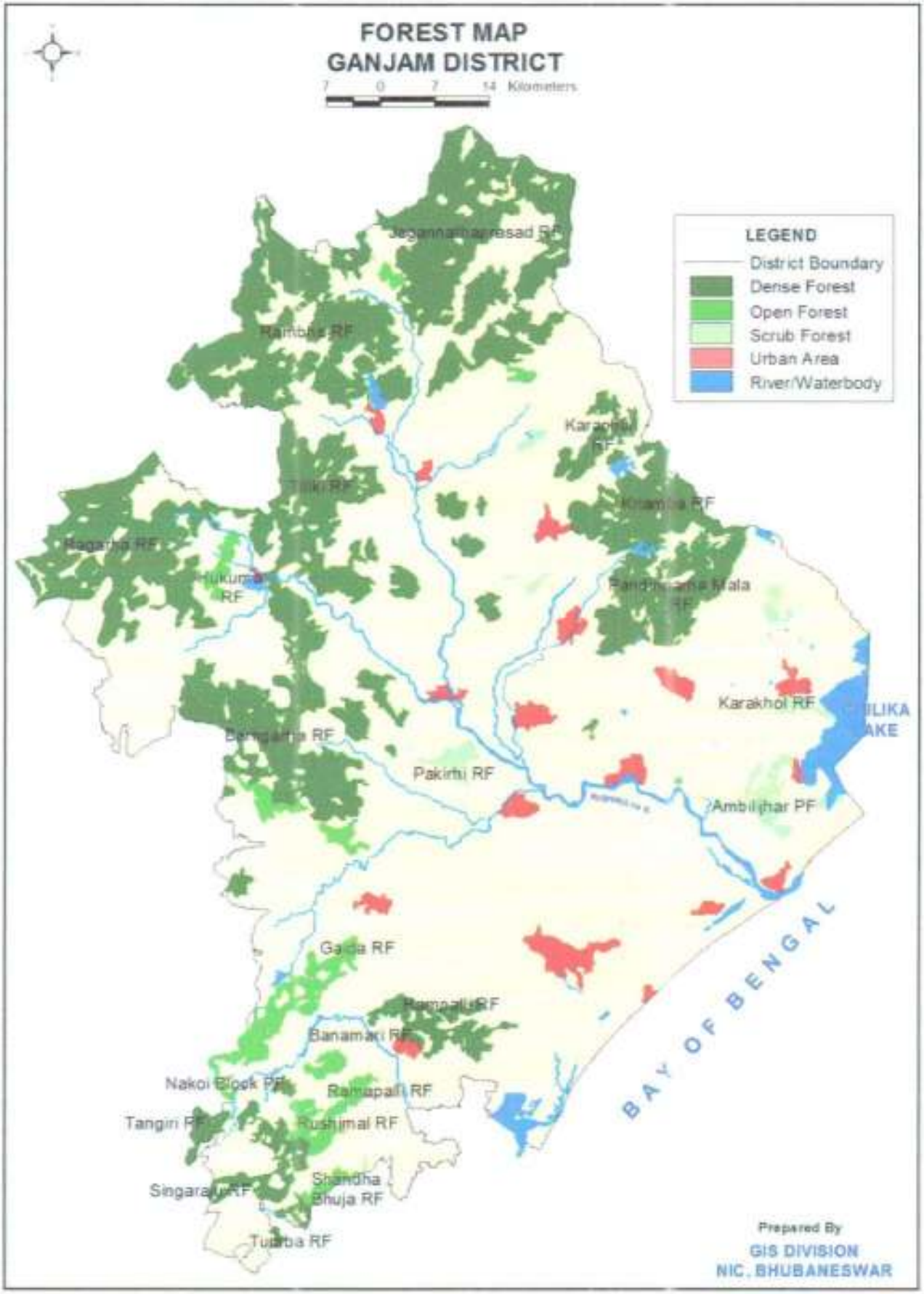

PLATE NO. 03 : Map Showing the Forest areas of Ganjam District

Fauna

The outstretching deep woods of the district form the ideal abode for many big game and wild lives. The dense forests of Ghumusar forest divisions South and North are rich with wild lives.

A good number of elephants (Eophas maximus indicus) are found in the forests of Ghumusar South and North Division. Tigers (Panther-tigers), panthers, black panthers and leopards are seen throughout the district, but chiefly in the hilly parts of Ghumusar and along the lines of the hills. The tiger population of the district was 7 (seven) in Ghumusar South Forest Division as per the Census of 1984. The Census in 1979 revealed that there were two tigers in the Ghumusar North Forest Division. Generally, in the hills and about the foot are found the leopards (Panthera pardus). Wolves are not uncommon.

The jackal (Canis aureus) and the fox (Vulpsesbengalensis) are very often met in the shrub jungle near the villages throughout the district. Normally, they are not found in the deep forests. Jackals are seen in the bushy areas of the villages. Jungle cat and fishing cat are noticed in the whole of the district. The black bear (Melursus ursinus) is noticed in small as well as big forests of the district. Of the deer type, Sambar (Carvus unicolour olgar Blainville, muntjak) spotted deer (Axis axis) and barking deer (Muntiacus) are noticeable in the forests. Nilgai (Boselaphustra gocamelus) found in the slopes of the hills and antelope (Tetracerusquadricornis) in the plain are rarely seen nowadays. Deer are found in large number in the Taptapani reserved forests and forests of Tumba Agency in ChikitiTahasil. Bison (BibosGaurus) are also found in the forests of the district. The blackbucks (Antilope cervicapra) abound in the forest areas of Kodala, Asika and Buguda. The Sambar is seen in the thick forests and the spotted deer and the barking deer mostly inhabit in the forest border where they get crop plants. Among other smaller mammals mention may be made of wild pigs, hares which are noticed in the small forests.

Mammals like mongoose are seen even in the bushy regions of villages and towns. The black-faced monkey (Presbytes entellus) and the red-faced monkey (Macaca mulatta) inhabit innumbers in the forest as well as in the rural and urban areas. There are also hyaena, fox, Malbar squirrel, rat and porcupineand G. Gutter seen in different jungles. Besides, there are varieties of other mammals in the district.

Birds of heterogeneous type with their beautiful plumage are noticeable around the district. The game birds found in the forests include peafowl, peacock, red jungle fowl (Gallus gallus), red spurfowl (Galloperdixspacicea), patridges, black patridge (Francolinusfrancolinus), grey patridge (Francoloinuspondi-cerianus), quail (Coturnix). The hill Myna (Gracula religiosa) and the bhimraj famous for their talking and whistling powers are met within the hills.

A good variety of migratory and other birds add beauty to the Chilika lake. The flamingoes, pelican and aquatic birds of all types make good their resort to the Chilika lake and the —Tampra (Coastal inland water body).

Among other birds common in the district are the striated weaver bird (Ploceusmanngar), shikra (Accipiter BEDius), little egret (Egrettagrazetta), roseringed parakeet (Psittaculakramer), common house swift (Apus offinis), common pariah kite (Milvus migrains), white-breasted water hen (Amaurornisphoeni-curus), blacknecked stork (Xenorhyanchusasiaticus), common green pigeon (Treronphoenicoptera), golden oriole (Orioluseoriolus), racket-tailed drongo (Dicrurusparadisecs), Malbar pied horn-bill (Anthracoceroscoronatus), koel (Eudyanaysscolopacia), house crow (corvuss plendens), jungle crow (corvusmacrorhynchos), coucal (centropussinensis), brown headed stork billed kingfisher (PelargopsisCapensis), Panikua or the little cormirant (Phalacrocorax-niger. Most of these birds are found near rivers and reservoirs. Birds like owls and doves are found all over the district.

Snakes belonging to different species are found in the district. Poisonous snakes are not very few. Ahiraja or king cobra (Najahannah) is one of the most poisonous snakes. It occurs in hill tracts. In addition to this a good number of other poisonous snakes are found in the district.

Among the non-poisonous snakes of the district mention may be made of the Ajagar (Phythonmolurus), the Dhamana (Ptyasmucosus), Kandanala (Natrixstolata), Dhanda (Natrix piscator), Domundi (Eryxconicus), the TeliaSape (Typhlopsbrahminus) etc. The Ajagars are normally seen in the forests and hills. Other reptiles like tortoise and crab occur in the sea and the Chilika lake.

(d) Mining &Industry

The contribution of the mineral to the economy of the district is insignificant. A huge amount of minerals are available in the district such as granite, limestone, soap stone, fire clay, china clay, quartz manganese etc. Basing on the above resources and infrastructure large number of SSI and large and medium sale unity are coming up through out the district. So far only one mine atMatikhalo is being operated by Indian Rare Earth Limited (IREL) to exploit sand deposits containing monazite, zircon, rutile, illuminate etc. The IREL is established in the year 1984 at Arjyapalli. It is also going to establish a thorium, monazite processing unit and titanium pigment in near future. However, the mining activities of the district has been discussed in previous paragraph of the report.

Similarly, another large scale unit i.e. M/s. Jayashree Chemicals Pvt. Ltd. (at present M/s. Grasim Industry Ltd.) was established in the year 1962 which started production in 1967 and it producing caustic soda, chlorine and Hydrochloric acid and sulphur dioxide Gas. Similarly, 2 medium scale enterprises namely M/s. Sudhakar PVC products Pvt. Ltd. and M/s. United Spirits Ltd. at Pitapalli under ChikitiTahasil and Narayanpur under KonisiTahasils are existing respectively. Apart from these, different industrial units will come up in the TATA Steel SEZ Ltd. relating to food and beverage,chemical and chemical product, fabrication metal product, electrical and electronics, construction and mineral products etc.

(e) Transport &Communication

The District is well connected by roads, rail, air and water ways. Most of the villages and towns are connected through motorable good roads. The district is served by roads of different categories like National Highways, State Highways, Major District Roads, Other District Roads and classified village roads. the length of each type of roads in the district upto the year 2014-2015 is given below.

Sl. No.	Category of the Road	Length in Km.
1	National Highways	396 Kms
2	State Highways	630 Kms
3	Major District Roads	217 Kms
4	Other District Roads	867 Kms
TOTAL		2150 Kms

PLATE NO. 04 : *Map Showing Road & Railways Network of Ganjam District*

a) National Highways

N.H. 16	:	Puintola near Ganjam to Girisola – 85 Kms
N.H. 516	:	Connects N.H. 16 with Gopalpur Port - 5.35 Kms
N.H. 57	:	Connects Bhanjanagar, Aska& Berhampur - 62 Kms
N.H. 326	:	Connects Aska, Sheragada&Taptapani - 53 Kms
N.H. 59	:	Connects Berhampur, Surada&GajalaBEDi- 191 Kms

b) State Highways

S.H. 7	:	Berhampur to Phulbani – 105 Kms
S.H. 17	:	Berhampur, Digapahandi, Gobindapur, Luhagudi& Raipananga - 51 Kms
S.H. 21	:	Nayagada, Jagannath Prasad &Bhanjanagar -44 Kms
S.H. 22	:	Berhampur, Tamana, Chikiti, Surangi& Mandarada-48 Kms
S.H. 26	:	Chatrapur, Ganjam- 11 Kms
S.H. 29	:	Chikit, Digapahandi&Aska - 57 Kms
S.H. 30	:	Khallikote, Kabisuryanagar, Aska, Balipadar& Bellaguntha- 54 Kms
S.H. 31	:	Humma, Kabisuryanagar – 39.2 Kms
S.H. 32	:	Jagannathpur&Purushottampur – 24.7 Kms.
S.H. 33	:	Balipadar, Korasingi – 32.6 Kms
S.H. 36	:	BEDasankha, Tarini, Hinjilicut, Sheragada& Surada – 96 Kms
S.H. 37	:	Bhanjanagar, Tilisingi, Tarasingi&Dasapalla – 48 Kms.

Apart from these N.Hs. and S.Hs., Measure District Road No. 18, 62, 65, 71, 72, 95, 96, 97 are connecting nooks and corners of the District and gives a good connectivity.

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Rail Link

The East Coast Railways passes through the District of Ganjam. It enters in Khallikote Station in the North and Surala Road Station in the South. The total Railway route length is 79 Kms.Further, a rail line also connects the mainline of East Coast Railway with IREL (India) Ltd., Matikhalo as well as to the Gopalpur Port.

Air Link

There is one small airstrip exist at Rangeilunda with 900 mtr length. There is proposal to increase the length to 1800 mtrs to achieve the better connectivity to the district. Now it is being mostly use by Ministry of Defence for air transport purpose.

Water Way

There is one Minor Port exist at Gopalpur. Now it has been developed and goods are being imported and exported through Gopalpur Port by ships.

(f) Health :

The medical facilities are provided by different agencies like Government, Private individuals and voluntary organisations in the district. Till the end of 2015, the following Nos. of Health institutions are available in the district.

1.	Nos. of District Head Quarters Hospital	:	01
2.	Nos. of Sub-Divisional Hospital	:	02
3.	Nos. of Community Health Centre	:	30
4.	Nos. of Public Health Centre (New)	:	90
5.	Nos. of Zonal Dispensary	:	01
6.	Nos. of Sub Centres	:	460
7.	Nos. of Ayurvedic Dispensary	:	48
8.	Nos. of Homeopathic Dispensary	:	43
9.	Nos. of Medical Colleges	:	03
10.	Nos. of Blood Bank	:	02
11.	Blood Storage Unit	:	09

(g) Tourist Places :

Ganjam is one of the prominent Districts of Odisha. Ganjam is situated on the Bay of Bengal and hence is Characterised by numerous exotic beaches which boost its tourism all round the year. Embellished with green vegetation, punctuated with mighty mountains and mystic rivers, this beautiful place is rich in ancient remnants as well. Ganjam cam ideally be describe as a nature's play being empowered by the valeof Gods. Ganjam tourism boasts of its exotic beaches, verdant valleys, gigantic hills and their mysterious caves and then the graceful temples. Some scenic and sandy beaches like, Arjyapalli, Humma-Kantiagada can be compared to no other in the world.Girisola can be rightly defined as the gateway of the odisha from Andhra Pradesh. It is close to the PatiSonepur Beach and the Bhairabee Temple which makes Girisola a favourite destination for visitor. On the way to Buguda from Aska, Bhetanai is a place to be stopped at to take an ever cherishing view of the Black Buck. Ganjam is dotted with several ancient temples making it a spiritually blissful destination. Athagadapatna enshrines the ancient and magnificent temple of Lord Jagannath. Mahurikalua Temple is must visit place for each and every visitor to Berhampur and Ganjam. In Nirmalajhara, one can marvel at the unbelievable sight of a stream emerging out of the feet of a Vishnu image. Other temples at Panchama and Ujalleswar are among those rare temples where the deities are worshipped amidstthe natural bliss. The Ashokan Rock edicts at Jaugada attract a huge number of tourists all year round. Apart from these, there are many other important tourist places exist in the district which attracts the tourist through out the year.

(h) Climate

The climate of the district is pleasant and is characterised by an equable temperature all the year round particularly in the coastal regions and high humidity. The cold season from December to February, which is very pleasant, is followed by the hot season from March to May. During the rains, which last from June to November, it is stingy but the heat is tempered 21 by the rains. The period from June to September is the south-west monsoon season, October and November constitute the post-monsoon transition period.

(i) Temperature :

In the district there is only one meteorological observatory located at Gopalpur with records extending over a large number of years. On the basis of the records available from this observatory it is inferred that in the inland hilly tracts of the district temperature may be higher in the hot months and lower in winter by a few degrees. The period from March to May is one of continuous increase of temperature and June is the hottest month with the mean daily maximum temperature at 32.2°C and the mean daily minimum at 26.9°C. With the advent of monsoon by about the second week of June, day temperature decreases a little while night temperature continues to be as in summer. After the end of September, when the south-west monsoon withdraws, temperature decreases progressively, the drop in night temperature being more rapid. December is the coldest month with the mean daily minimum temperature at 16.6°C and mean daily maximum at 27.5°C. The highest maximum temperature recorded at Gopalpur was 44.90C on the 4th August 1972 and the lowest minimum temperature was 9.6°C on the 30th November 1970.

(j) Humidity

Relative humidities high about 75 per cent throughout the year especially in the coastal region while in the interior of the district these may be slightly lower, particularly in the afternoons in the non-monsoon months.

(k) Cloudiness

In the cold season sky is clear or lightly clouded. Clouding is moderate in the summer months. Heavily clouded to overcast skies prevail during the south-west monsoon season. Thereafter cloudiness decreases.

(l) Winds

Winds are fairly strong particularly in the coastal region in the summer and monsoon months. In the rest of the year they are generally moderate. In the post-monsoon and cold seasons, winds blow from a northerly or north westerly direction in the mornings. In the afternoons, winds are from directions between north-east and south-east in the months of October, November and December while changing to directions between east and south in January, and between east and south-west in February. In the summer and south-west monsoon months winds mainly blow from southerly or south-westerly directions.

(8) LAND UTILISATION PATTERN IN THE DISTRICT : Forest, Agriculture, Horticulture, Mining Etc.

Agriculture is the main stay of majority of the populace and thus holds the key to socio- economic development of the district. Growth of agricultural sector is important not only for ensuing food security and reduction of poverty in rural areas but also sustaining growth of rest of economy. Growth of two nonfarm sectors viz. secondary and tertiary sectors can be sustained only when the agricultural sector continues to grow and provide adequate demand for goods and services along with market for the farm produce. Share of Agricultural sector (Agriculture, Animal resources, Forestry and Fishery) in the district i.e. gross domestic product (GDP) has been declining over the years. Still this sector continues to be vital for the district's economy as 80% population of the district draws its sustenance fully or partially from Agriculture sector.

Broadly, physiography of the district can be divided into two distinct parts i.e (a) coastal plains in the east (b) hill and table land in the west. While the former is fertile and close to irrigation sources, the latter is rocky and lacks irrigation facilities. The plains lie between the Eastern Ghats and the Bay of Bengal but are narrow because of the absence of big rivers. Since the hills are close to sea, the rivers flowing from hills are not very long and are subject to sudden floods. A large area of the district is covered with irregular deposits of laterites at various altitudes. The coastal tracks contain deposits of alluvium and recent alluvium of clay and fine sand. Towards the centre and South it is hilly with beautiful well watered valley. The south eastern portion is fertile. The extreme north east is occupied by a portion of the famous Chilika lake.

The district is covered under two Agro Climatic zones i.e., (a) East and South Eastern coastal plain zone and (b) North Eastern Ghats zone. The climate of the district coming under the ambit of east and south eastern coastal plain zone is sub-tropical, hot and humid whereas the climate of the blocks covered by North Eastern Ghats Zone is hot, moist and sub-humid.

Based on variation in topography, soil type, rainfall, irrigation availability and cropping pattern, each Agro-climatic zone has been further divided into several agro ecological situations or farming situations.

The district is coming under two Agro-Climatic zone, namely East and South eastern coastal plain zone and North Eastern Ghatzone. There are five agro ecological situation exists under East and south eastern Coastal plain zone i.e. Coastal alluvial command, Coastal alluvial non command, Coastal alluvial saline, Rainfed laterite and Rainfed, red and Laterite. Parts of Kabisurya Nagar, Sanakhemundi, Digapahandi, Polasara and whole area of Chikiti, Rangeilunda, Chatrapur, PatrapurGanjam, Khallikote, Kukudakhnadi, Hinjilicut, Patrapur, and Kodala are coming under East and south eastern coastal plain zone. Similarly, three agro ecological situations exists under North eastern ghat zone, i.e. Medium rainfall block irrigated, Low rainfall alliuvial irrigated and Moderate rain laterite soil irrigated. Parts of Kabisuryanagar, Sanakhemundi, Digapahandi, Polasara block and whole area of Bellagunatha, Aska, Sheragada, Dharakote, J.N. Prasad, Buguda and Sorada are coming under this Agro climatic zone.

The District has alluvial soil in the eastern part, red- laterite soil in the west and black cotton soil at the centre. Majority of areas of the district are hilly and undulated with, perennial stream, steep slope.

Similarly, the land use pattern for mining activity in the district may be district into two category.

(i) Land use for mining activity for Atomic Mineral Exploration (Major Mineral)area of 2464.054 Ha.

(ii) Land used for decorative stone (specified minor mineral) over an area of 469.295 Ha.which includes the mining lease area for working, non-working lease and over the area on which Letter of Intent has been issued.

(iii) Land used for minor mineral over an area of 2396.2 Ha. which includes all the minor mineral sairat sources, out of which some of the sources have been leased out to the lessees on long term lease and some of these could not be settled due to non-participation of interested bidders in the auction process. The land utilisation pattern of the district is given in the table below.

Land Utilisation Pattern

SL. NO.	INFORMATION PARTICULAR	GANJAM DISTRICT (Are in Ha.)
1	Geographical Area (ha)	8.21,000
2	Forest area (ha)	3.15,000
3	Permanent Pasture (ha)	20,000
4	Misc. Trees and Grooves (ha)	22,000
5	Culturable Waste (ha)	11,000
6	Land put to Non-Agril. use (ha)	21,000
7	Barren and Uncultivable waste (ha)	20,000
8	Current Fallow (Ha)	25,000
9	Other Fallow (ha)	6,000
10	Net Area sown (ha)	3.81,000
11	Cultivated Area (ha)	4.06,000
a	High	1.90,000
b	Medium	1.13,000
c	Low	1.03,000
12	Paddy area (Ha.)	2.23,500
a	High land (Ha.)	19,400
b	Medium land (Ha.)	1.01,275
c	Low land (Ha.)	1.02,825
13	Mining (Ha.)	5329.549

(9) PHYSIOGRAPHY OF THE DISTRICT :

The district of Ganjam is one of the most beautiful districts in the state of Odisha. The Eastern Ghats is running on the western side of the district. Physiographically the district is divisible into the eastern coastal plains and the western table lands. The north and west frontiers of the district are wild and filled with thick forest. Nearly half of the area is covered with fine sal trees. The centre and south is hilly with beautiful well-watered and fertile valleys running towards the sea. The south-eastern portion is fertile and contains extensive multi-cropped areas, well served by many major and minor irrigation projects. The extreme north-east is occupied by a portion of the Chilika Lake, its immediate vicinity being good for fishery and salt manufacture, though not so good for cultivation. The table-land of the western sector of the district is a continuation of the great line of Eastern Ghats mountain range. The

northern plateau lies between the hill ranges of Baligudain the north and R. Udayagiri in the south, covering over an area of 2,590 Sq.km (1,000 Sq. miles) and containing hills ranging from 609.6 meters (2000') to 1,364.28 meteres (4476') in height. The Mohini or the Kerandi Hills which rise to a height of 762 metres lie at a distance of 12 km. from Brahmapur. Some of the isolated hill locks like Valleri hill range 364 m. and TariniHill 225 m. have religious importance. Since the hills of the district are close to the sea, the rivers flowing from the hills are not very large and so they are subject to the sudden flood. The main rivers of the district are the Rushikulya and Bahuda.Tributaries of these two main rivers are the Ghodahada and BEDanadi. Rushikulya is the largest river in the district being 146 km. long. It originates from Rushimal hills of DaringiBEDi area in Baliguda Sub-Division of Kandhamal district at an elevation of about 1000 meter at North Latitude 19° 59' and East Longitude 84° 13' and flows in a generally south-easterly direction to drain into the Bay of Bengal near Ganjam. The river, which may be called as the life-line of the district, passes through narrow strips of cultivable lands and then emerges into the plains below the South-Eastern railway line. The Dhanei, the Baghua, the BEDanadi in the left and the Jorou, the Ghodahada on the right are the major tributaries. Maximum flood discharge of the river is 3,962 cusecs at the bridge site near Ganjam town prior to November 1990. The river is not navigable except during rains when it may be used for navigation below Aska. However, before introduction of road transport, wood rafts were floated down the river during monsoon period. The river Bahuda rises near Ramagiri village in the district of Ganjam at an elevation of 600 meter at North Latitude 15° 3' and East Longitude 84° 20'and runs first in a north-easterly and then in a south-easterly direction for a total length of 73 km. to join the Bay of Bengal near Sonepur of the district. Similarly some small streams also flowing in the district. Out of six small streams between the BEDanadi and the Rushikulya draining into the Chilika lake the fifth stream (counted from north) rises east of Sumandal village in Ganjam district at an elevation of 100 meter at North Latitude 19° 42'and East Longitude 85° 6' and flows for a total length of 10km. The sixth stream rises west of Rambha in the district at an elevation of 100 meter and North Latitude 19 32' and East Longitude 85° 3' for a short distance in a generally south-easterly direction and drains into the lake. A small stream rises south-west of Brahmapur in the district at an elevation of 300

meter at North Latitude 19° 15'and East Longitude 84° 40' and flows for a total distance of 24 km. in a south-easterly direction to join the Bay of Bengal. The Chilika lake belongs to Khordha, Puriand Ganjam districts. It is about 72 km. long (North to South) of which the northern half has a mean breadth of 32 km. while the southern half tapers into an irregularly carved point barely averaging 8 km. in width. It is shallow, seldom exceeding 1.8 metres in depth. The water is brackish. There is very slight tide at the southern end. The sea runs into it at Manikapatna in Puri district. This keeps the lake distinctly salty during the dry months from December to June. The mouth of the lake is being silted up preventing free migration of fish into and out of the lake. During rains the rivers come pouring down upon its northern extremity, the sea water is gradually driven out and its water becomes fresh. The unparallel scenic beauty of the Chilika has caught the eyes of many poets, philosophers and naturalists from remote past. In the winter season, the lake becomes an abode of birds of different species from every direction of the world, even from the distant Siberia. A Naval Boys Training Centre has been established under the administrative control of the Indian Navy.

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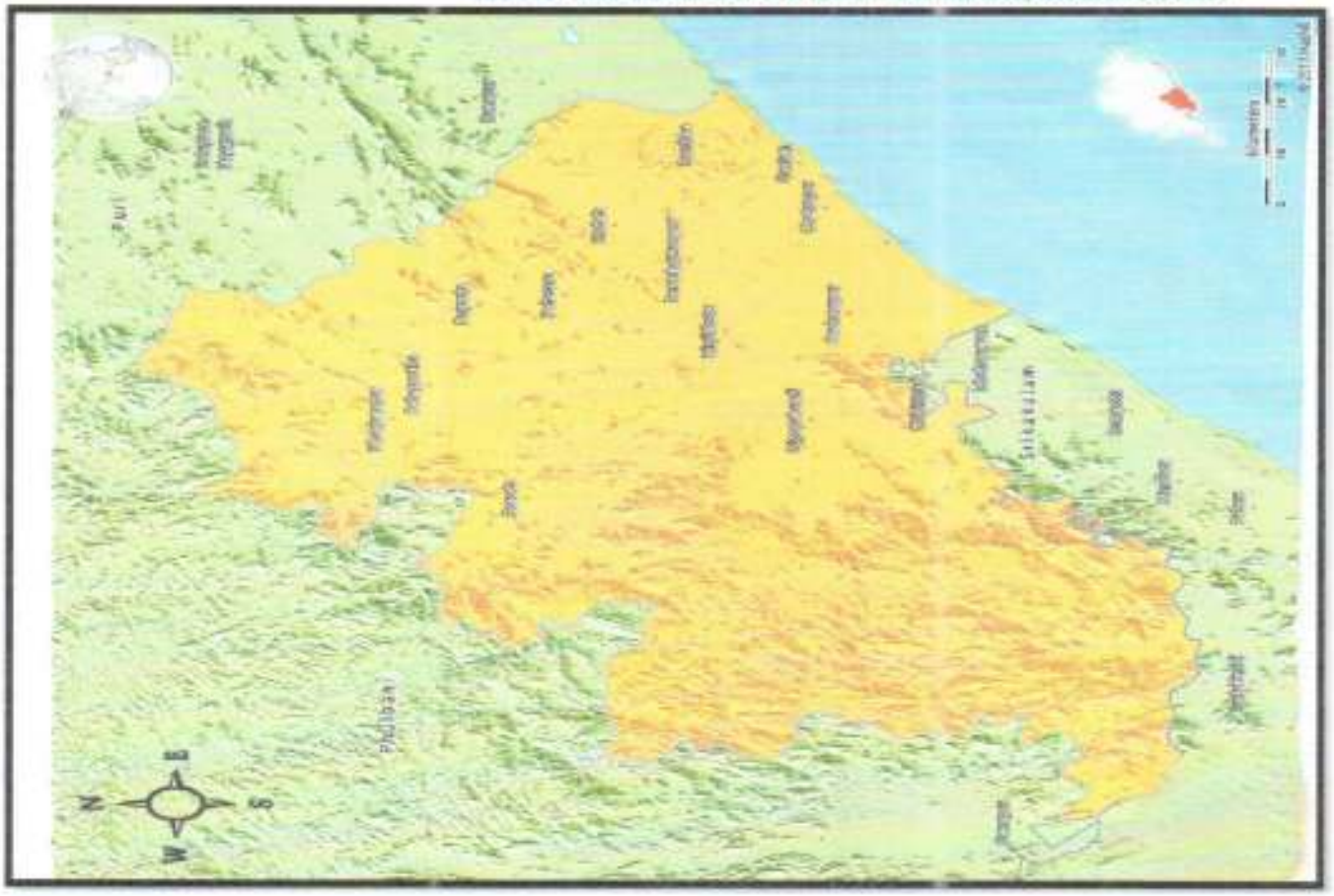

PLATE NO. 05 : Physiographical Map of Ganjam District

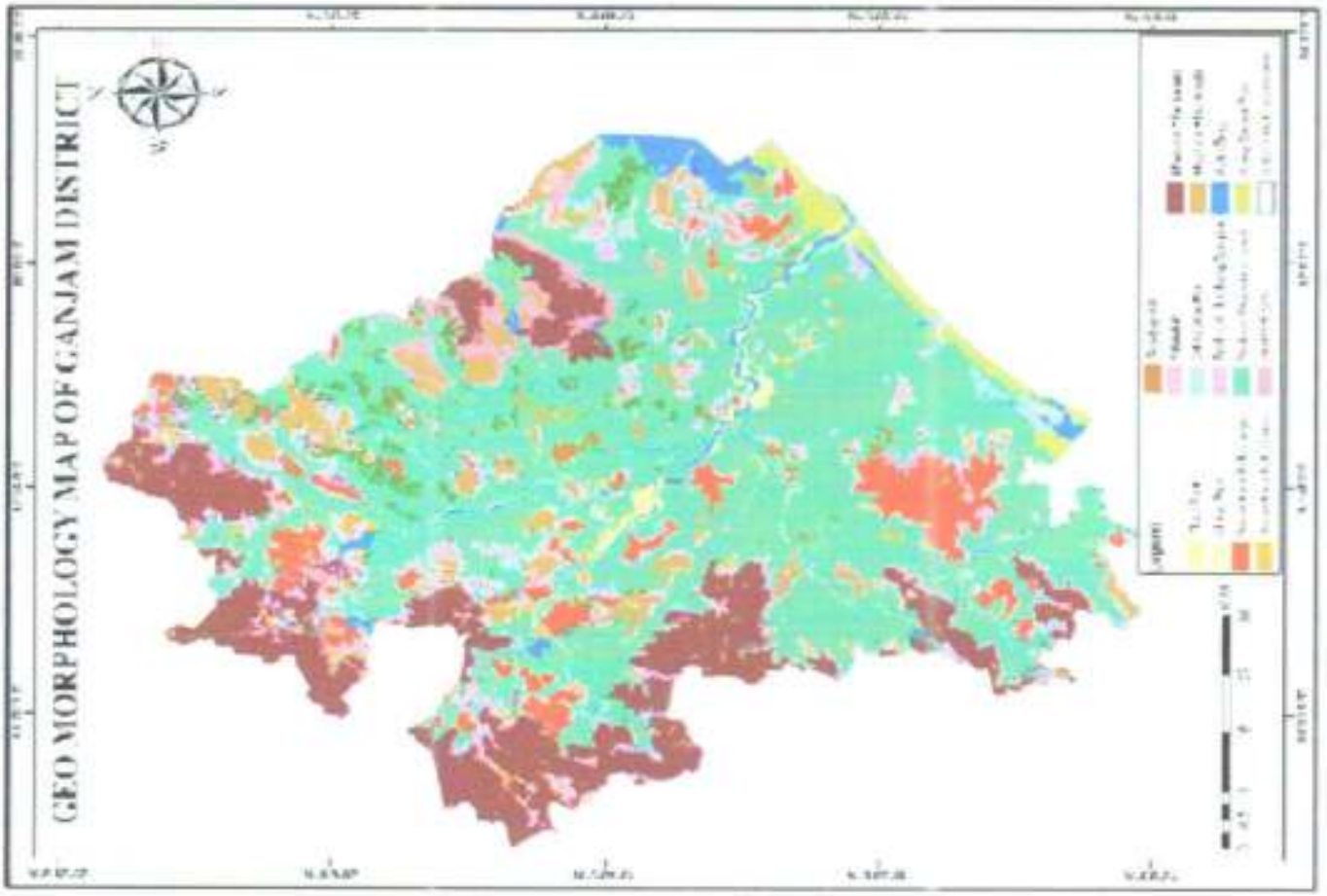

PLATE NO. 06 : Geo-Morphology Map of Ganjam District

(10) RAINFALL

Records of rainfall in the district are made available for 22 Numbers of rain-gauge stations. The average annual rainfall in the district figures at 1295.6 mm. The rainfall generally increases from the coast towards the interior hilly areas of the district. Gopalpur on the coast receives only 1148.6mm. of average rainfall ina year. The south-west monsoon commences in the district by about the second week of June and withdraws early in October. About 80 per cent of the annual rainfall is received during the south-west monsoon season. There is heavy rainfall in the July-August. The variation in the rainfall from year to year is not much. During the first half of this century the highest annual rainfall in the district (amounting to 147 per cent of the normal) occurred in 1919. The lowest annual rainfall was 68 per cent of the normal occurred in 1935. Taking into account the district as a whole there were only three years in which the rainfall was less than 80 per cent of the normal. Two consecutive years with the rainfall less than 80 per cent of the normal occurred at a few stations once in a period of fifty years. On an average there are 65 rainy days a year in the district. A month wise and year wise data of rainfall for the last five years is given below.

Year wise Rainfall report for the year 2014 to 2019 of Ganjam District (Rainfall in mm.)

ANNUAL (NORMAL) RAINFALL OF THE DISTRICT : 1276.20mm

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
2014	0	11.17	55.47	13.04	113.4	84.16	370.32	276.46	295.15	175.28	0	5.93	1400.38
2015	53.22	3.41	14.59	59.36	15.43	253.62	182.04	187.97	300.42	37.24	32.32	30.16	1169.78
2016	1.47	14.58	14.8	19.79	157.9	189.26	158.43	182.9	270.67	122.81	18.21	0	1150.82
2017	0	0	49.28	31.04	40.82	212.7	296.76	264.05	180.38	209.32	76.2	2.22	1362.77
2018	0	0	0.22	68.74	61.16	101.36	363.08	282.47	217.82	230.19	0.09	48.02	1373.15
2019	0.32	1.82	19.28	40.31	137.93	112.35	225.09	302.45	426.9	300.30	7.76	0.03	1574.63

(11) GEOLOGY & MINERAL WEALTH OF THE DISTRICT :

(i) Stratigraphy

Age	Super group	Group	Lithology
Holocene			Beach sand and sand dunes Soil cover
Cenozoic			Laterite
Proterozoic			Quartzvein and pegmatite
			Anorthosite
Archaen to Proterozoic	Eastern ghat Supergroups	Magmatite Group	Granetiferousgniss
		Charnockite Group	Basic Charnockite
		Khondalite Group	Acid charnockite
			Kodurite Calc-silicate rock
			Quarzite
			Quartz-garnet-sillimanate schist.

The rock formations in the district include khondalite, basic pyroxene granulites, amphibolites, porphyroblastic and non-porphyroblastic granite gneiss, garnetiferous granite gneiss, granodiorite, ptynite, pegmatite and quartz veins. All those rocks, khondalite suites of rocks are considered to be the oldest from the available field relations. Pyroxene granulite, and its metavariants and granite constitute the charnockite group, the definite or absolute statigraphic position of which is not yet established. But for the present, they are considered to be younger in age than the khondalite group of rocks.

(ii) Geological Formation

From the available information the following stratigraphical sequence has been arrived at.

(a) Khondalite Group

The khondalite forms a very conspicuous feature of the geology of Ganjam and the khondalite group of rocks consists of quartz-graphitesillimanite schists and gneisses, quartz-garnet rock, garnetiferous quartzite and calc-silicate rocks. These occur as conformable bands and inclusion within the granite gneiss and hypersthenes granite. In length, these may vary from a few meters to several kilometeres. Quartz-Silliminite rock with or without graphite is best developed arming the khondalite group of rocks; garnetiferrous quartzite is the transition between this and quartzite.

Quartz-Silliminite (+ graphite) rock in hand specimen is fawn to buff coloured, medium to fine grained contains lots of garnet and flakes of graphite, at places garnets are surrounded by clusters of fibrous silliminite. Quartz garnet rock and garnetiferous quartzite are of same mineralogical composition and vary in colour from grayish to brown. The calc-silicate rocks are white to grey coloured, extremely fine grained and compact and consists of pyroxene, feldspar, scapolite, garnet spene and sometimes spinel. The plagioclase-composition varies from albote to aligoclase. K-feldspar occurs as irregular grains with perthitic intergrowth.

(b) Charnockite Group

Charnockite group comprises pyroxene granulite and its metavariants (amphibolites) and hypersthene granulites (Acid charnockite). Pyroxene granulite occurs as bands, lantfclet and patches within acid charnockite. It is dark coloured, hard and compact equigranular and consists of pyrozene, feldspar, biotite and garnet.

Amphibolite occurs as inclusions within the garnetiferousurafiiis gneiss. The rock is dark coloured medium grained with faint schistosity. Amphibole is of dark green variety here and is formed probably from pyrogene by retrogression.

(c) Acid Charnckite (Hypersthene Granulite)

The rock is medium to fine grained. Light greasy green to greasy grey in colour, hard compact non-fissile, massive of ferrosillite with spheroidal weathering and sometimes displays a crude foliation. It is composed essentially of hypersthenes, plagioclase, orthoclase and sometimes diopside, biotite, garnet, microcline are rare. Apatite and zircon constitute the accessories.

(d) Leptynite

Leptynite is medium to coarse grained rock composed of feldspars associated with quartz which are speared and elongated with granoblastic texture. Besides quartz, it contains biotite, garnet, k-feldspar, plagioclase, sillimanite, magnetite, apatite and zircon.

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(e) Garnetiferous Granite Gneiss

The rock is leucocratic with minor coarse grained, porphyroblastic, with feldspar porphyroblasts garnets evenly distributed and biotite arranged in linear fashion giving a gneissese structure.

(f) Laterite

Latorite occurs as capping over granite gneiss and charnockite at many places. It is highly cavernous and ferruginous. The thickness of the laterite profile varies from 3 m. to 15 m.

MINERAL RESOURCES

(g) Clay

Pockets of kaoline derived from the weathering of gneisses have been noticed near Samtarpalli (19° 42': 84° 51") and Jillinda (19°42': 84° 571"). The occurrence of clay at Samtarpalli is slightly gritty and is whitish grey in colour. The linear shrinkage is roughly about 12.5 per cent and it turns to yellowish grey.

(h) Monazite, Illuminite, etc. (Sand Concentrates)

Large numbers of small deposits of natural black sand concentrates consisting of Rutile Monazite, imonite, zircon, sillimanite, garnet and rutile have been reported between the Rushikulya river mouth (Agasthi-Nuagan) to Gopalpur spreading in 2,887.76 hectares. The Indian Rare Earth (I) Ltd., Matikhalo, Chatrapur (a Central Government PSU) was granted mining lease (Odisha Sands Complex) in March-1979 for a period of 20 years from 21.03.1979 to 20.03.1999 over an area of 2877.760 hectares. Subsequently, the mining lease was renewed for another 20 years from 21.03.1999 to 20.03.2019 over an area of 2464.054 hectares for mining of beach sand minerals and producing minerals Rutile Monazite, Imonite, Zircon, Sillimanite, Garnet and Rutile. Further the lease has been extended upto 31.03.2047 for beach sand mining of atomic minerals like RutileMonazite, Imonite, Zircon, Sillimanite, Garnet and Rutile.

(i) Rock Crystals

Rock crystals are found in the plane area, about 1.6 km. Coast of Turubudi where these are scattered over an area about 25 metres long and 21 metres wide. The crystals are of small size and range from 1.2cm. to 5 cm. in length and are up to 6mm.across. These are transparent to translucent but not very useful for radio oscillator.

(j) Building Materials

All rock types occurring are used for building purposes in this district. Khondolites are used for building purposes whereas quartzite's and charnockites are used for the construction of bridge, road and railway ballast and notable resources of mineable quantities of commercially exploitable minor mineral (decorative stone-granite) found in this district.

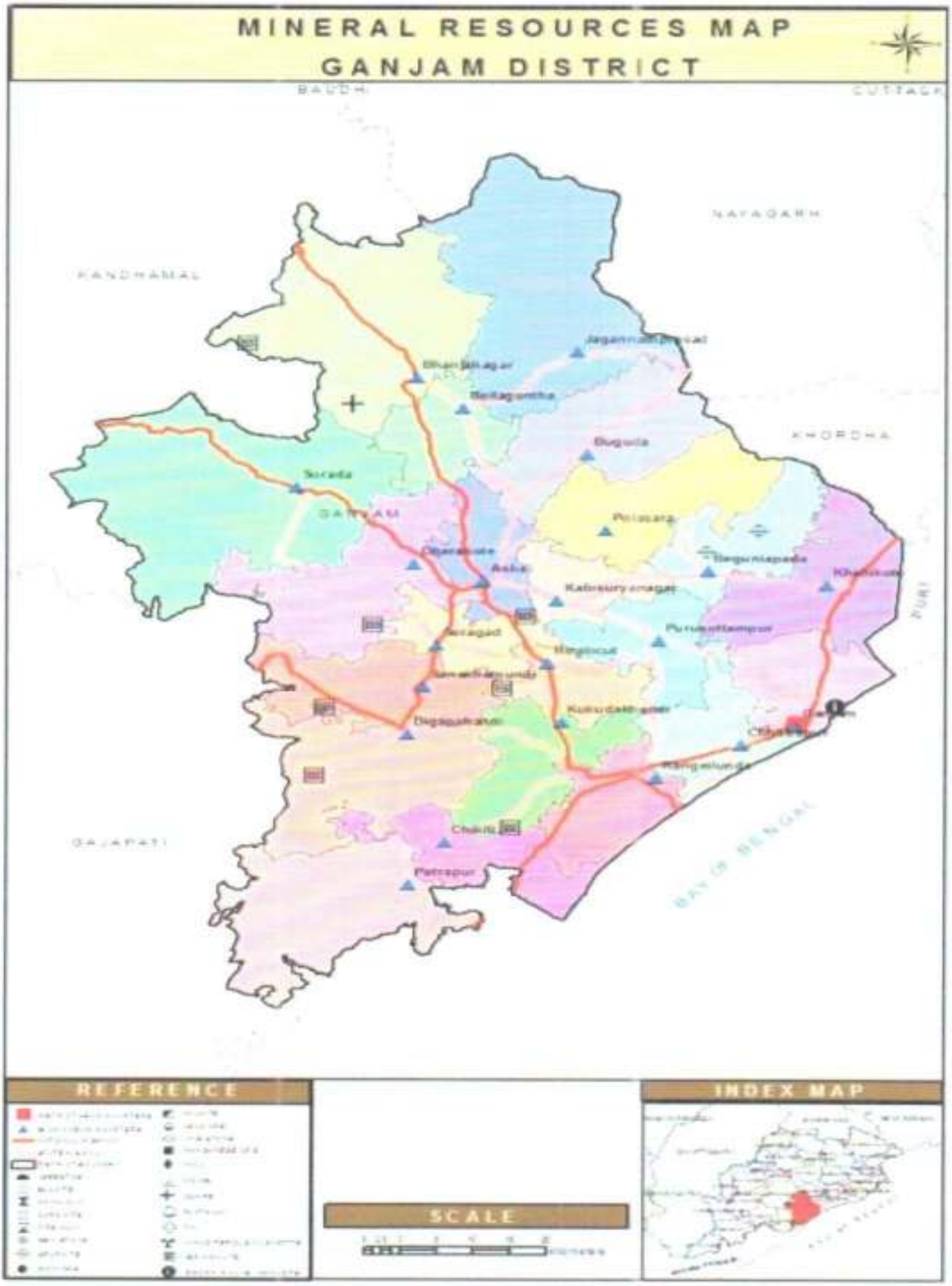

PLATE NO. 07 : Mineral Resources Map of Ganjam District

(a) Details of Hill, River & Stream System:

The district of Ganjam is one of the most beautiful districts in the state of Odisha. The Eastern Ghats is running on the western side of the district. Physiographically the district is divisible into the eastern coastal plains and the western tablelands.

The north and west frontiers of the district are wild and filled with thick forest. Nearly half of the area is covered with fine sal trees. The centre and south is hilly with beautiful well-watered and fertile valleys running towards the sea. The south-eastern portion is fertile and contains extensive multi cropped areas, well served by many major and minor irrigation projects. The extreme north-east is occupied by a portion of the Chilika Lake, its immediate vicinity being good for fishery and salt manufacture, though not so good for cultivation.

The table-land of the western sector of the district is a continuation of the great line of Eastern Ghats mountain range. The northern plateau lies between the hill ranges of Baliguda in the north and R. Udayagiri in the south, covering over an area of 2,590 Sq.km (1,000 Sq. miles) and containing hills ranging from 609.6 meters (2000') to 1,364.28 meteres (4476') in height. The southern plateau which lies betweenRamagiriUdayagiri and Parlakhemundi plains is higher in elevation and contains some of the noted mountains stretching eastwards from the boundary of Andhra Pradesh. Some of the highest hillranges in the district are Singaraju Parbat1515.57m.(4973').Mahendragiri1500.53m.(4923').Debagiri 1381.96 m. (4534'), Chandragiri 1269 m., Tangiri Parbat 1155 m., Dandamera Parbat 1103 m., GindaBEDi 1036 m. Khundabala 949m., Raigarha 881 m. The two plateaus are chiefly inhabited by many tribes, the Khonds predominating in the north and the Savaras in the south. The Mohini or the Kerandi Hills which rise to aheight of 762 metres lie at a distance of 12 km. from Brahmapur. Some of the isolated hillrockslike Valleri hill range 364 m. and TariniHill 225 m. have religious importance.

Rivers

Since the hills of the district are close to the sea, the rivers flowing from the hills are not very large and so they are subject to the sudden flood/flash flood. The main rivers of the district are the Rushikulya and Bahuda. Tributaries of river Rushikulya are the Ghodahada and BEDanadi.

Rushikulya

This is the largest river in the district being 146 KM long. It originates from Rushimal hills of DaringiBEDi area in Baliguda Sub-Division of Kandhamal district at an elevation of about 1000 m. at north latitude 19° 59' and east longitude 84° 13' and flows in a generally south-easterly direction to drain into the Bay of Bengal near Ganjam. The river, which may be called as the life-line of the district, passes through narrow strips of cultivable lands and then emerges into the plains below the South-Eastern railway line. The Dhanei, the Baghua, the BEDanadi in the left and the Jorou, the Ghodahada on the right are the major tributaries. Maximum flood discharge of the river is 3,962 Cusec at the bridge site near Ganjam town prior to November 1990. During 1979, a medium flood in the river BEDanadi caused damage to properties in Belaguntha, Jagannathprasad, Madhaborida, Buguda, Balipadar and Aska areas. Again after a decade during the month of November 1990 the river Rushikulya experienced a heavy flood of 4,085 Cusec at the bridge site near Ganjam town. This flood caused much devastation to life and properties in Sorada, Asika, Dharakot, Seragada, Purusottampur, Ganjam, Hinjili, and Kabisuryanagar Community Development Blocks. On 12th October 2013 a devastated cyclone named "Phailin" damaged the plants property and animals of the district. The speed of the wind reaches 200 to 250 K.Ms. per hour. After the severe cyclonic storm Phailin accompanied with incessant rain, an unprecedented flood damaged the crops. Similarly in recent past in the year 2018 a flood has been experienced in Rushikulya river system due to incessant rain in the severe cyclonic storm "Titli". The river is not navigable except during rains when it may be used for navigation below Aska.However, before introduction of road transport, wood rafts were floated down the river during monsoon period.

Bahuda

The river Bahuda rises near Ramagiri village in the district of Ganjam at an elevation of 600m at north latitude 15° 3' and east longitude 84° 20'and runs first in a north-easterly and then in a south-easterly direction for a total length of 73 km to join the Bay of Bengal near Sonepur of the district.

Other Small Streams

Out of six small streams between the BEDanadi and the Rushikulya draining into the Chilika lake the fifth stream (counted from north) rises east of Sumandal village in Ganjam district at an elevation of 100 meter at North Latitude 19° 42'and East Longitude 85° 6' and flows for a total length of 10km. The sixth stream rises west of Rambha in the district at an elevation of 100 meter and North Latitude 19° 32' and East Longitude 85°3' for a short distance in a generally south-easterly direction and drains into the lake.

A small stream rises south-west of Brahmapur in the district at an elevation of 300 meter at North Latitude 19° 15'and East Longitude 84° 40' and flows for a total distance of 24 km in a south-easterly direction to join the Bay of Bengal.

Chilika Lake

It is believed that the Chilika Lake might have formed by an inrush of the sea. However, it is probable that the lake was a part of the Bay of Bengal. In course of time it was separated from the sea by formation ofsand ridges. The lake belongs to Puri and Ganjam districts. It is about 72 km. long (north to south) of which the northern half has a mean breadth of 32 km. while the southern half tapers into an irregularly carved point barely averaging 8 km. in width. It is shallow, seldom exceeding 1.8 metres in depth. The water is brackish. There is very slight tide at the southern end. The sea runs into it at Manikapatna in Puri district. This keeps the lake distinctly salty during the dry months from December to June. The mouth of the lake is being silted up preventing free migration of fish into and out of the lake. During rains the rivers come pouring down upon its northern extremity, the sea water is gradually driven out and its water becomesfresh.

The unparallel scenic beauty of the Chilika has caught the eyes of many poets, philosophers and naturalists from remote past. In the winter season, the lake becomes an abode of birds of different species from every direction of the world, even from the distant Siberia. A Naval Boys Training Centre has been established under the administrative control of the Indian Navy. A boat race is being conducted here every year.

Tanks

There are tanks in almost all the villages and towns of the district. These tanks are used for bathing as well as for drinking purposes. Many of the tanks are also utilised for physciculture and irrigation.

Springs

About 40 km. from Brahmapur on the road to Lohagudi there is a celebrated spring called Taptapani (19°29':84°04') from which spouts a copious and constant flow of hot water in temperature about 115° F. It evolves sulphurousvapour but no incrustation of sulphur is noted. It is the headwaters of the Taptapani river in porphyro-blastic granitic-gneiss. There isalso a perennial spring called "Nirmal Jhar" at Khallikote and a waterfall at Budhakhol hill near Buguda.

Waterways

As mentioned earlier, the rivers in the district do not have a perennial flow and thus are not navigable. However, wood rafts are floated down in river Rushikulya. Sometimes there is boat traffic on it. Traders of Ganjam with their heavy loads of bamboo, rice, Ragi and other commodities go to the neighbouring districts Khurda and Puri through the Chilika Lake.

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(a) DRAINAGE SYSTEM WITH DESCRIPTION OF MAIN RIVERS

Sl. No	Name of the River	Area drained (Sq. Km)	% Area drained in the District
1	Ghodahada	138.00	100%
2	Bahuda	456.87	100%
3	Dhanei	106.00	100%
4	BEDanadi	15.58	100%
5	Rushikluya	41.25	100%
6	Baghua	4.5	100%
7	Sananadi	1.792	100%
8	Bodanadi	1.824	100%
9	Kokolaba	3.575	100%
10	Loharakhandi	1.762	100%
11	Nandini	0.639	100%
12	Jorou	0.504	100%
13	Padma	13.50	100%

SALIENT FEATURES OF IMORTANT RIVERS AND STREAMS

Sl. No	Name of the River or Stream	Total Length in the District (in Km)	Place of Origin	Altitude at Origin (in mtr)
1	Ghodahada	60.55	Ramagiri Hills, Gajapati	103.85 mtr
2	Bahuda	73.00	Ramagiri Hills, Gajapati	72.01 mtr
3	Dhanei	39.00	Dhanei Dam, Ganjam	84.58 mtr
4	BEDanadi	129.81	Chakapad, Kandhamal	30.00 mtr
5	Rushikluya	165.00	DaringiBEDi, Kandhamal	1000 mtr
6	Baghua	45.05	Banchapur, Kurala, Nayagada	199.0 mtr
7	Sananadi	12.80	Kupati, Ganjam	191.0 mtr
8	Bodanadi	30.40	Alasu, Ganjam	130.0 mtr
9	Kokolaba	27.50	Rudhapadar, Ganjam	171.0 mtr
10	Loharakhandi	35.25	Andharakothi, Kalinga, Kandhamal	443.0 mtr
11	Nandini	21.30	Jali, Surada, Ganjam	124.0 mtr
12	Jorou	08.40	Govindpur, Ganjam	273.0 mtr
13	Padma	45.00	Harabhangi, Gajapati	364.81 mtr

(b) AVAILABILITY OF SAND OR GRAVEL OR AGGRIGATE RESOURCES

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 mtrs)	Area recommended for mineral concession (in Sqmtr)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)
Ghodahada	60.55	32	38542	10985
Bahuda	73.00	24	30265	8626
Dhanei	39.00	0	0	0
BEDanadi	12.98	50	649000	1775800
Rushikluya	16.50	100	1650000	4702500
Baghua	4.50	40	180000	256500
Sananadi	1.28	60	76800	72960
Bodanadi	3.04	30	91200	103968
Kokolaba	1.38	50	69000	101888
Loharakhandi	3.52	20	70400	47574
Nandini	2.13	15	31950	36423
Jorou	0.84	25	21000	28728
Padma	45.00	0	0	0

Mineral Potential

Name of the River	Boulder (MT)	Bajari (MT)	Sand (MT)	Total Mineable Mineral Potential (MT)
Ghodahada	0	0	18308.4	10985
Bahuda	0	0	14375.4	8626
Dhanei	0	0	0	0
BEDanadi	0	0	7399170	1775800
Rushikluya	0	0	19593750	4702500
Baghua	0	0	1068750	256500
Sananadi	0	0	304000	72960
Bodanadi	0	0	433200	103968
Kokolaba	0	0	849062.5	101888
Loharakhandi	0	0	418475	47574
Nandini	0	0	151762.5	36423
Jorou	0	0	119700	28728
Padma	0	0	0	0

D.E.I.A.A APPROVED GANJAM

ANNUAL DEPOSITION

Name of the River	Boulder (MT)	Bajari (MT)	Sand (MT)	Total Mineable Mineral Potential (MT)
Ghodahada	0	0	18308.4	10985
Bahuda	0	0	14375.4	8626
Dhanei	0	0	0	0
BEDanadi	0	0	7399170	1775800
Rushikluya	0	0	19593750	4702500
Baghua	0	0	1068750	256500
Sananadi	0	0	304000	72960
Bodanadi	0	0	433200	103968
Kokolaba	0	0	849062.5	101888
Loharakhandi	0	0	418475	47574
Nandini	0	0	151762.5	36423
Jorou	0	0	119700	28728
Padma	0	0	0	0

(c) DETAIL OF EXISTING MINING LEASES OF SAND AND AGGREGATES

Sl. 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 mtrs)	Area recommended for mineral concession (in Sqmtr)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)
		Name of the Source	Portion recommended for Sand Quarry Lease (GPS-coordinate / Khata No. / Plot No.)				
1	Ghodahada	Balarampur/Balarampur Sand Quarry	Latitude N 19° 27' 21.15" to N 19° 27' 14.18" Longitude E 84° 42' 33.38" to E 84° 42' 17.57"	0.820	0.070	57923	83988
		Burupada/Burupada Sand Quarry	Latitude N 19° 30' 05.65" to N 19° 30' 04.62" Longitude E 84° 44' 33.40" to E 84° 44' 34.65"	0.481	0.159	467392	677719
		Phasiguda / Phasiguda Sand Quarry	latitude 19 23'33.6"N to 19.23'23"N longitude 84 30'40.5"E to 84 30'15.8"E	0.547	95.4	51970	75356
		Jakamari / Jakamari Sand Quarry	Jakamari Plot No 1737 K.N 403	0.202	162.5	32881	47677
		Jalaripalli / Jalaripalli Sand Quarry	Jalaripalli Plot No.1488 K.No 327	0.87	121.9	88776	128725
		Sundhipalli/Sundhipalli Sand Quarry	Latitude-19°24' 54.33"N to 19°24'43.59"N & Longitude-84°33' 02.06"E to 84°33'11.66"E	0.4	70	25730	37308
		Kholadi/Kholadi Sand Quarry	Latitude-19°225' 00.7"N to 19°25' 12.8"N & Longitude-84°31'56.9"E to 84°32'24.8"E	1.12	130	105129	152438
		Dharmaraipur/ Dharmaraipur Sand Quarry	Latitude-19°27' 22.59"N to 19°27' 10.50"N & Longitude-84°36' 04.70"E to 84°36'35.66"E	1.8	200	137666	199616
		Khallingi/ KhallingiSand Quarry	Latitude-19°26' 17.82"N to 19°26' 35.69"N & Longitude-84°39'20.51"E to 84°39'32.27"E	0.6	80	71658	103904
		Palasapur /Palasapur Sand Quarry	Latitude-19°26' 01.90"N to 19°26' 16.20"N & Longitude-84°34' 38.80"E to 84°34'45.10"E	0.098	170	50104	72651
		Moulabhanja/ Moulabhanja Sand Quarry	K.No.1505 Plot.No.4156	0.8	60	38174	55352
		Karakhandi/Karakhandi Sand Quarry	Latitude-19°27' 04.85"N to 19°26' 28.86"N & Longitude-84°40'39.11"E to 84°40'24.07"E	1.22	70	79917	115880
		Ambagaon /Ambagaon Sand Quarry	Latitude-19°25'55.62"N to 19°24' 43.59"N & Longitude-84°33'15.73"E to 84°33'11.66"E	1.26	60	142963	207297
		Jalamara/ Jalamara Sand Quarry	Latitude-19°25' 56.28"N to 19°25' 38.00"N & Longitude-84°33'73.60"E to 84°33'45.26"E	1.02	60	48959	70990
		Luninathi/Luninathi Sand Quarry	Latitude-19°25' 36.09"N to 19°25' 38.81"N & Longitude-84°32' 55.39"E to 84°33'20.46"E	0.68	50	34390	49866

Sl. 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 mtrs)	Area recommended for mineral concession (in Sqmtr)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)
		Name of the Source	Portion recommended for Sand Quarry Lease (GPS-coordinate / Khata No. / Plot No.)				
1	Ghodahada	Erendra /Erendra Sand Quarry	Latitude-19°24' 10.6"N to 19°24' 17.0"N & Longitude-84°35' 02.7"E to 84°34'59.1"E	0.78	120	10388	15063
		Biswanathpur /Biswanathpur Sand Quarry	Latitude-19°27' 18.8"N to 19°24' 16.0"N & Longitude-84°37' 10.5"E to 84°37'10.1"E	0.38	80	27579	39990
		Bhaliajhola/Bhaliajhola Sand Quarry	K.No.527 Plot.No.3588	0.46	120	50857	73742
		Laxmipur/ Laxmipur Sand Bed	Khata No.198, Plot No.1 & 398	0.32	90	25030	36293
TOTAL				**13.858**	**1740**	**1547487**	**2243856**
2	Bahuda	Kalingadola/Kalingadola Sand quarry	19 19'53.7"N to 1920'10.8"N latitude &84 38' 15.1"E to 84 38'34.1"E longitude	0.545	121.92	66449	96352
		Tentua Pada -B /Tentua Pada -B Sand Quarry	19 14'08.2"Nto 19 14'16.1"N latitude &84 32'25.9"E to 84 32'41.1"E longitude	0.453	125	59841	86769
		Bajraguama /Bajraguama Sand Quarry	19 11' 32.9" N to 19 11'49.5"N latiturde&84 28'27.8"E to 84 28' 41.6"E longitude	0.427	263.95	112296	162830
		Goudagoa/Goudagoan Sand Quarry	19 13' 22.9"N to 19 13'36.6"N latitude &84 29'00.9"E to 84 29'14.0"E	0.615	533	63613	92238
		Ch.Nimakhandi / Ch.Nimakhandi Sand Quarry	Ch.N.Kpentho Plot No 1535 & 1427 , K.no 1004	1.647	160.32	130677	189482
		ChTikarapada /ChTikarapada Sand Quarry	Ch.Tikarapada Plot No 3149 K.No 587	0.249	131.9	32877	47671
		Dhanarasi / Dhanarasi Sand Quarry	Dhanarasi Plot No 1 & 28 K.No. 276	0.242	213.4	51622	74852
		Tentuapada /Tentuapada Sand Quarry	Tentuapada Plot no - 1603,1665,166 K.no 324	0.488	116.1	56656	82151
		Chaitanyaprasad / Chaitanyaprasad Sand Quarry	latitude 19 14'25.3"N to 19 14'37.9"N &longoitude 84 32'41.4"E to84 32' 45.1"E	0.357	60.9	21764	31558
		Nandigam/Nandigam Sand Bed	520, Plot No. 682 & 684	0.8	70	55774	80872
		Kolihala /Kolihala Sand Bed	530 Plot No. 1444, Ara 27.312	0.7	107	12141	17604
		Chaitanya Chandrapur Sasan/Ch.Ch.PurSasan Sand Bed	K.No. 114Plot No. 1034 Ac. 1.600	0.4	103	73220	106169
		Kharinipada/ Kharinipada Sand Bed	K.No.777, Plot No. 1098 Ac 1.000	0.4	170	0	0
		BEDabaranga-B/ BEDabaranga – B Sand Bed	19 09 21.1" N to 19 09'35.0"N Latitude 84 35; 30.0" E to 84 35'52.5" E Longitude	0.84	60	50578	73338
		BEDabaranga – A / BEDabaranga – A Sand Bed	19 09'00.9" N to 19 09'28.5" N Latitude & 84 35'51.6"E to 84 35'59.3"E Longitude	0.79	72	57299	83084
		Parasama/ Parasama Sand Bed	19 9'28.9"N TO 19 9'30.2"n Latitude & 84 35'41.7"E to 84 35'47.3"E Longitude.	0.85	72	61589	89304

Sl. 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 mtrs)	Area recommended for mineral concession (in Sqmtr)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)
		Name of the Source	Portion recommended for Sand Quarry Lease (GPS-coordinate / Khata No. / Plot No.)				
2	Bahuda	Bholasingi / Bholasingi Sand Bed	N 19 11'25.1"to 19 11'31.9"Latitude & E 84 35'07.8"to 84 35'31.4" Longitude	0.56	114	64369	93336
		Chadhiapada / Chadhiapada Sand Bed	19 14 00.3"N to 19 14'17.8"N Latitude & 84 31'06.9"E to 84 31'14.0"E Logitude	0.84	60	50298	72933
		Sundarada / Sundarada Sand Bed	19 14'11.1"N to 19 14'18.0 "N Latitude & 84 30'05.9"E to 84 30'30.3"E Logitude	0.89	82	73220	106169
		Chiladi / Chiladi Sand Bed	N19 10'54.3"N TO 19 11'09.2" Latitude & E 84 35'31.2"E to 84 35'40.3"Longitude	0.38	132	50298	72933
		KalaBEDa–A / KalaBEDa –A Sand Bed	N 19 09'32.6"to 19 09'49.8"Latitude & E 84 35'28.3" to 84 35'43 .5" Longitude	1.10	46	50618	73396
		KalaBEDa-B/ KalaBEDa-B Sand Bed	19 8'48.3"n to 19 9'26.0"N Latitude & 84 36'12.4"E to 84 35'33.0 E Longitude	1.10	53	58550	84897
		Chiladi 1 / Chiladi 1 Sand Bed	Khata No. 462 Plot No. 2369, 2958 & 2179	0.77	65	50177	72757
		K Nuagam / K Nuagam Sand Bed	Khata No. 401, Plot No. 4, 531, 1371, & 2206	0.90	90	60703	88019
		Siripur / Siripur Sand Bed	Khata No. 115, Plot No. 130/830, 134/831 & 197/832	1.335	82	109597	158916
TOTAL				**17.678**	**3104.49**	**1474226**	**2137630**
3	Dhanei	**Not feasible for Sand Mining**					
4	BEDanadi	Bhereda/ Bhereda Sand Bed	19° 56' 06.2" N to 19° 54' 42.7"N Latitude& 84° 36' 24.6" E to 84° 36' 50.9"E Longitude	1.470	34	51092	74083
		Baruda /Baruda Sand Bed	19° 59' 30.2" to 20° 00' 16.3" Latitude & 84° 37' 48.6" to 84° 38' 07.4" Longitude	0.081	80	64608	93682
		Kullada /Kullada Sand Bed	19° 58' 16.8" N to 19° 58' 30.4"N Latitude & 84° 37' 55.2" E to 84° 38'02.1"E Longitude	0.347	164	56656	82151
		Makundapur / Makundapur Sand Bed	Latitude N 19'36'18.29" to N 19'36'32.50" LongitudeE 84'40'19.75" to E 84'40'34.02"	0.480	0.125	60169	87245
		K.Nuagam / K.Nuagam Sand Bed	Latitude N 19'37'43.2" to N 19'37'56.6" LongitudeE 84'39'39.7" to E 84'39'47.6"	0.400	0.150	60096	87139
		Dhanija / Dhanija Sand Bed	Latitude N 19'42'39.3" to N 19'42'29.3" LongitudeE 84'40'59.2" to E 84'40'50.1"	0.300	0.160	50586	73349
		Bangarad/ Bangarada Sand	Latitude N 19'45'49.7" to N 19'46'16.8" LongitudeE 84'39'23.2" to E 84'39'48.4"	1.000	0.120	121568	176273
		Gahangu / Gahangu Sand Bed	Latitude N 19'44'50.5" to N 19'45'6.2" LongitudeE 84'40'12.0" to E 84'40'22.0"	0.460	0.160	75555	109555
		Jagadalpur / Jagadalpur Sand bed (Plt No.337 & 194)	Latitude N 19'40'23.30" to N 1940'43.78" Longitude 84'39'13.80" to E 84'39'22.42"	0.470	0.120	65397	94826
		Jagadalpur / Jagadalpur Sand Bed (Plot No.1)	Latitude N 19'35'52.32" to N 19'36'26.17" Longitude 84'40'23.26" to E 84'40'48.71"	0.480	0.125	0	0

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		Name of the Source	Portion recommended for Sand Quarry Lease (GPS-coordinate / Khata No. / Plot No.)				
4	BEDanadi	Bishnuchakra/ Bishnuchakra Sand Bed	Khata 913, Plot No. 3035 19 0 45'27.41N to 19 0 45'29.85"N Latitude 85°40'08.30"E to 85040'10.50"E Longitude	0.137	98	13395	19423
		Nuagam / Nuagam Sand Bed	Khata No.969, Plot No. 187, 190, 291 Area - Ac 14.850 19°55'26.08N to 19°54'54.5"N Latitude 84°36'03.1"E to 84°35'57.7"E Longitude	1.72	35	60096	87139
		Benipalli / Benipalli Sand Bed	Khata No.859, Plot No. 210, 211 Area - Ac 15.525 19°51'05.9N to 19°51'50.7"N Latitude 84°37'32.7"E to 84°37'38.0"E Longitude	1.26	50	62828	91100
		Banka / Banka Sand Bed	Khata No.852, Plot No. 2047 Area - Ac 12.800 19°49'26.15N to 19°49'43.40"N Latitude 84°37'28.85"E to 84°37'35.68"E Longitude	1.75	30	51800	75110
		Suramani / Suramani Sand Bed	Khata No.232, Plot No. 659, 1/1725 Area - Ac 12.450 19°48'59.59N to 19°48'36.00"N Latitude 84°37'50.15"E to 84°37'50.59"E Longitude	1.70	30	50383	73056
		Girisola / Girisola Sand Bed	Khata No.970, Plot No. 1 Area - Ac 15.400	2.315	27	10198	14787
		Gayaganda / Gayaganda, Sand Bed	Khata No 700 plot 1183, 1270 latitude 20 10'06.43"N to 20 10'00.10"N anLongituted 84 44'52.59"E to 84 44'51.49"E	0.300	30	0	0
TOTAL				**14.67**	**578.96**	**854427**	**1238918**
5	Rushikluya	Kharida/Kharida Sand Quarry	Latitude N 19° 29' 53.60" to N 19° 30' 06.88" Longitude E 84° 46' 37.89" to E 84° 46' 39.05"	0.280	0.200	55996	81195
		Santoshpur / Santoshpur Sand Bed	Khata No.417, Plot No.45	0.158	333	78509	113838
		Pakidi/Pakidi Sand Bed	Khata No.507, Plot No.1	0.585	280	116226	168527
		Kalasandhpaur / Kalasandhpaur Sand Bed	Latitude N 19'36'13.59" to N 19'36'29.54" LongitudeE 84'39'53.20" to E 84'40'9.11"	0.560	0.110	60703	88019
		Cheramaria / Cheramaria Sand bed	Latitude N 19'33'47.85" to N 19'33'59.75" Longitude 84'41'41.90" to E 84'41'51.62"	0.150	0.320	49776	72176
		Sunamba / Sunamba Sand Bed	Latitude N 19'36'26.1" to N 19'36'32.3" Longitude 84'39'1.3" to E 84'39'57.2"	0.460	0.110	52002	75403
		Mangalapur/ Mangalapur Sand Bed (Plot No.3025 & 3348)	Khata No-1522, Plot No-3025 ,3348 Total AC 12.500	0.400	0.126	50586	73349
		BEDamadhpur / BEDamadhpur Sand Bed	Lat N 19 27, 41.6" to N 19 27' 55.2" Long E 84 58" 04.8" to E 84 58' 14.5"	0.385	118	60703	88019
		Hansapur / Hansapur Sand Bed	Lat N 19 24' 50.8" to N 19 25' 18.1" Long E 85 00' 03.0" to E 85 00' 48.0"	0.132	42	51092	74083

Sl. 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 mtrs)	Area recommended for mineral concession (in Sqmtr)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)
		Name of the Source	Portion recommended for Sand Quarry Lease (GPS-coordinate / Khata No. / Plot No.)				
5	Rushikluya	Potlampur / Pottlampur Sand	Lat N 19 26' 38.8" to N 19 26' 18.8" Long E 84 59' 36.3" to E 84 59' 16.4"	0.765	65	60703	88019
		Baranga / Baranga Sand	Lat N 19 26' 46.8" to N 19 26' 59.5" Long E 84 58' 07.9" to E 84 58' 14.8"	0.345	129	60703	88019
		Kanaka / Kanaka sand bed	19°26'18.45"N to 84°56'5.58"E	1.007	785	312106	452554
		Balia/ Balia sand bed	19°37'18.41"N to 84°51'5.54"E	1.028	650	52002	75403
		Tankachai / Tankachai Sand bed	19°34'18.40"N to 84°54'5.53"E	0.336	278	8094	11736
		Bhimpur / Bhimpur sand bed	19°34'18.49"N to 84°52'5.58"E	0.739	595	42189	61173
		Barapalli / Barapalli Sand Bed	Khata No. 569 Plot No. 1715 and 1716	0.230	120	50586	73349
		AlliaBED / AlliaBED Sand Bed	N20 026'48.8"TO N200 26'48.8" Latitude & E850 38"10.6" To 850 38'10.6 Longitude Khata No-610 Plot No-328/1310	0.05	224	50586	73349
		Sribana / Sribana Sand Bed	N19 024'57.3"TO N190 25'11.3" Latitude & E850 00"43.8" To 850 00'58.2 Longitude Khata No-175 Plot No-427	0.068	262	68797	99755
		Bahalapur / Bahalapur Sand Bed	N19 025'12.4"TO N190 25'22.8" Latitude & E850 00"30.0" To 850 00'42.8 Longitude Khata No-356 Plot No-946/1250	0.05	224	50586	73349
		Borada / Borada Sand Bed	N19 025'38.2"TO N190 25'52.4" Latitude & E840 00"5.6" To 850 00'58.7 Longitude Khata No-175 Plot No-427	0.05	224M	58878	85373
		Sribanbatimala / Sribanbatimala Sand Bed	N19 024'34.0"TO N190 24'47.0" Latitude & E850 01"29.8" To 850 01'45.9 Longitude Khata No-873 Plot No-554/2950	0.052	229M	52609	76283
		Jharapadar / Jharapadar Sand Bed	N19 024'4.01"TO N190 24'13.8" Latitude & E850 01"49.69" To 850 02'4.04 Longitude Khata No-138 Plot No 1/357	0.05	224	50586	73349
		Bajrokote-I / Bajrokote-I Sand Bed	N19 026'44.07"TO N190 26'51.5" Latitude & E840 59"09.02" To 840 59'20.9 Longitude Khata No-39 Plot No 9	0.05	224	50586	73349
		Bajrokote-II / Bajrokote-II Sand Bed	N19 026'21.07"TO N190 26'36.3" Latitude & E840 59"34.04" To 840 59'42.6 Longitude Khata No-39 Plot No 197	0.05	224	50586	73349
		Damodarpur / Damodarpur Sand Bed	N19 0 23'7.73 .01"TO N190 23'18.55" Latitude & E850 2'7 .90" to E850 2'17.57 Longitude Khata No-169 Plot No 263	0.05	224	61286	88884
		Suramani / Suramani Sand Bed	Latitude – N 19°43'23.02" to N 19°43'30.40" Longitude- E84°30'18.20" to E 84°30'48.95"	0.248	84	49954	72434
		G.P.Sasan / G.P.Sasan Sand Bed	Latitude – N 19°45'26.63" to N 19°45'33.42" Longitude- E84°26'58.10" to E 84°27'16.39"	0.223	86	60703	88019

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		Name of the Source	Portion recommended for Sand Quarry Lease (GPS-coordinate / Khata No. / Plot No.)				
5	Rushikluya	Sana Surada / Sana Surada Sand Bed	Latitude – N 19°45'15.50" to N 19°45'31.97" Longitude- E84°26'31.55" to E 84°26'47.42"	0.294	64	86542	125486
		Borada / Borada Sand Bed	Latitude – N 19°40'35.34" to N 19°40'49.85" Longitude- E84°21'03.85" to E 84°21'10.74"	0.157	60	58878	85373
		Kapilash/ Kapilash Sand Bed	Latitude: N 19°38'44.94" to N 19°38'57.67" Longitude: E 84°35'33.96" to E 84°35'55.74"K.No.201, P.No. 391	0.2349	71	55377	80297
		PankalaBEDi /PankalaBEDi-A Sand Bed	Latitude: N 19°36'27.00" to N 19°36'32.75"Longitude: E 84°43'38.09" to E 84°38'50.47"K.No.319, P.No.1837,2231	0.2266	101	51326	74423
		PankalaBEDi/PankalaBEDi-B Sand Bed	Latitude: N 19°36'24.24" to N 19°36'28.46"Longitude: E 84°38'32.86" to E 84°38'50.66"K.No.319, P.No.1837	0.2266	101	51326	74423
		Laxmipur /Laxmipur Sand Bed	Latitude: N 19°36'34.18" to N 19°36'49.55"Longitude: E 84°37'25.38" to E 84°37'34.69" / K.No.189, P.No.302,580	0.229	115	27417	39755
		Jahada / Jahada Sand Bed	Latitude: N 19°40'43.05" to N 19°40'58.04"Longitude: E 84°33'34.98" to E 84°33'49.65" / K.No.681, P.No.5680,5681	0.2758	93	76000	110200
		Mundamarai/ Mundamarai Sand	Latitude: N 19°38'27.27" to N 19°38'44.99"Longitude: E 84°36'2.01" to E 84°36'26.53"K.No.1176,P.No.1,304	0.2911	93	84903	123110
		A.D Palli / A.D Palli Sand Bed	Latitude: N 19°36'24.61" to N 19°36'31.11"Longitude: E 84°43'33.68" to E 84°39'56.00"K.No.450,P.No.689	0.2005	92	40218	58316
		Janibilli/ Jannibilli Sand Bed	Latitude: N 19°39'56.89" to N 19°40'14.18"Longitude: E 84°33'50.28" to E 84°34'16.81"K.No.413, P.No.613,617,618	0.3006	94	90374	131043
TOTAL				**10.9371**	**6056**	**2389494**	**3464761**
6	Baghua	Kumbhari Sand Bed (Plot No2111)	Khata No-1198, Plot No-2111	0.300	0.180	5382	7804
		JhitikaBEDi / JhitikaBEDi Sand Bed	Khata No. 411 Plot No. 2058, 2059	0.400	200	76376	110746
		Ghodapalan/ Ghodapalana Sand Bed	Khata No. 602 Plot No. 887, 858	0.400	200	75616	109643
		Dhoyakana / Dhoyakana Sand Bed	Khata No. 605 Plot No. 1537	0.300	200	54629	79211
		Budheisuni / Budheisuni Sand Bed	Khata No. 943 Plot No. 1	0.500	200	90638	131424
		B.PankalaBEDi / B.PankalaBEDi Sand Bed	Khata No. 782 Plot No. 2116, 4826	0.500	200	100285	145414
		Kuananda / Kuananda Sand Bed	Khata No. 535 Plot No. 1996	0.500	200	69400	100629
TOTAL				**2.9**	**1200**	**472326**	**684871**

Sl. 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 mtrs)	Area recommended for mineral concession (in Sqmtr)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)
		Name of the Source	Portion recommended for Sand Quarry Lease (GPS-coordinate / Khata No. / Plot No.)				
7	Sananadi	No sairat source exist on the river bed but feasible for sand mining		1.28	60	76800	72960
TOTAL				**1.28**	**60**	**76800**	**72960**
8	Bodanadi	Kokolunda / Kokolunda Sand Bed	Khata No.483, Plot No. 2141, 2158 Area - Ac 13.375 19°52'11.3N to 19°52'45.5"N Latitude 84°38'50.6"E to 84°39'18.1"E Longitude	1.84	30	54127	78484
		Ambapua / Ambapua Sand Bed	Khata No.694, Plot No.71/2179, 71, 1289, 1, Area -Ac 15.758 19°52'05.20"N to 19051'57.10"N Latitude 84°38'29.70"E to 84039'24.90"E Longitude	1.82	35	63770	92467
		Kandarasingi / Kandarasingi Sand Bed	Khata No 567, Plot no 3222,3119,3112,2794,2268 latitude 19 54'22.01"N to 19 54'36.46"N anLongituted 84 43'18.57"E to 84 43'42.15"E	0.800	0.035	121062	175540
		Sorisamuli / Sorisamuli, Sand Bed	Khata no- 283 Plot no- 633,973 latitude 19 53'30.07"N to 19 53'20.72"N anLongituted 84 42'07.19"E to 84 41'56.17"E	0.500	0.040	64466	93476
		Tentulia /Tentulia, Sand Bed	Khata No 344 Plot 2043 latitude 19 53'50.61"N to 19 53'55.44"N anLongituted 84 42'17.95"E to 84 42'48.93"E	0.500	0.050	83386	120909
		Nimapadar / Nimapadar, Sand Bed	Khata No 1472 Plot 744 latitude 19 52'54.37"N to 19 53'01.68"N anLongituted 84 41'01.90.0"E to 84 41'26.81"E	0.700	0.040	59185	85819
		Sarakumpa / Sarakumpa Sand Bed	Khata No 214, Plot No 922 latitude 19 55'46.12"N to 19 55'67.96"N anLongituted 84 44'22.46"E to 84 44'06.87"E	0.800	0.050	38648	56039
		Baradanda / Baradanda, Sand Bed	Khata No 452, Plot No 1306, 1518, 2073, 1889	0.500	0.025	54390	78865
TOTAL				**7.46**	**65.24**	**539034**	**781599**
9	Kokolaba	No sairat source exist on the river bed		1.38	50	69000	101888
TOTAL				**1.38**	**50**	**69000**	**101888**
10	Loharakhandi	BEDakodanda-I / BEDakodanda-I Sand Bed	19° 56' 12.03" N to 19° 56' 26.4"N Latitude & 84° 34' 06.9" E to 84° 34' 59.5"E Longitude	0.964	56	54046	78366
		Gamundi/Gamundi (Jamapalli) Sand Bed	19° 55' 06.01" N to 19° 55' 27.8"N Latitude & 84° 35' 00.2" E to 84° 35' 39.3"E Longitude	0.564	78	53358	77369
		BEDakodanda –II /BEDakodanda-II Sand Bed	19° 56' 3.5" N to 19° 56' 20"N Latitude & 84° 32' 28" E to 84° 33' 4"E Longitude	0.500	100	49979	72469
TOTAL				**2.028**	**234**	**157383**	**228204**

11	Nandini	No sairat source exist on the river bed	2.13	15	31950	36423
TOTAL			**2.13**	**15**	**31950**	**36423**
12	Jorou	No sairat source exist on the river bed	0.84	25	21000	28728
TOTAL			**0.84**	**25**	**21000**	**28728**
13	Padma	No sairat source exist on the river bed	45	0	0	0
TOTAL			**45**	**0**	**0**	**0**
GRAND TOTAL OF THE DISTRICT			**120.1611**	**13129**	**7633127**	**11019838**

ANNEXURE - I

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (CHATRAPUR TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Chatrapur	Rushikulya	DaringBEDI, Dist : Kandhamal	1000 mtr	165.00	41.25	100%	BEDamadhpur / BEDamadhpur Sand Quarry	Settled	Lat N 19 27' 41.6" to N 19 27' 55.2" Long E 84 58' 04.8" to E 84 58' 14.5"	0.39	118	60,700	21,806	2014 - 15	2018-19
2								Hansapur / Hansapur Sand Bed	Settled	Lat N 19 24' 50.8" to N 19 25' 18.1" Long E 85 00' 03.0" to E 85 00' 48.0"	0.13	42	51,090	49,896	2014 - 15	2018-19
3								Potlampur / Pottlampur Sand Bed	Settled	Lat N 19 26' 38.8" to N 19 26' 18.8" Long E 84 59' 36.3" to E 84 59' 16.4"	0.77	65	60,700	44,753	2014 - 15	2018-19
4								Baranga / Baranga Sand Bed	Settled	Lat N 19 26' 46.8" to N 19 26' 59.5" Long E 84 58' 07.9" to E 84 58' 14.8"	0.35	129	60,700	40,052	2014 - 15	2018-19

D.E.I.A.A. APPROVED GANJAM

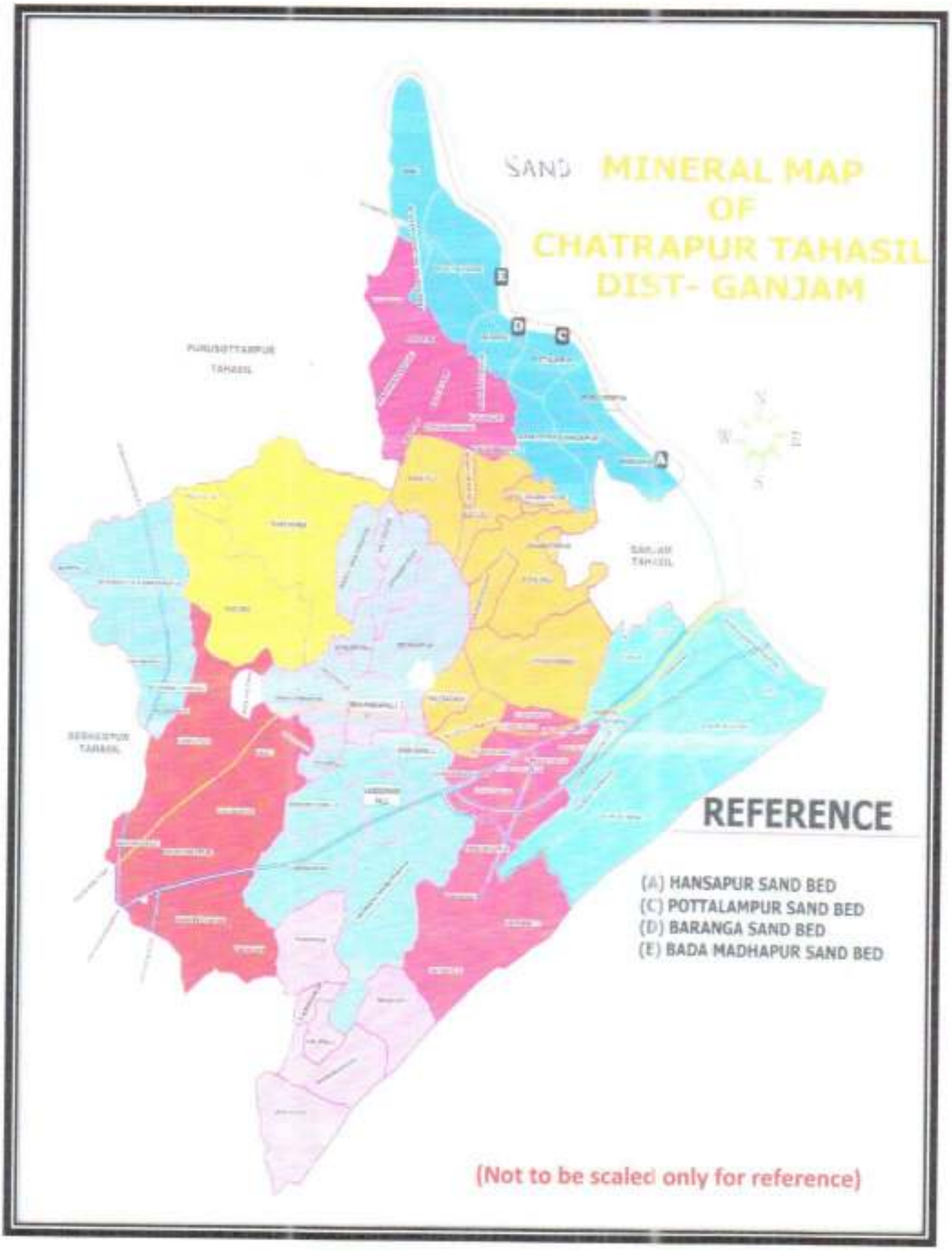


*PLATE NO. 08 : **River Sand Mining Map of Chatrapur Tahasil***

D.E.I.A. APPROVED GANJAM

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (PURUSHOTTAMPUR TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
5	Purushottampur	Rushikulya	DaringiBEDI, Kandhamal	1000 mtr	165	41.25	100%	Kanaka / Kanaka sand bed	Settled	N19°30'23.7",E84°52'01.5" N19°30'19.2",E84°51'55.5" N19°30'16.6",E84°51'59.9" N19°30'19.1",E84°52'04.7"	1.01	785	19,850	71,458	2014 - 15	2018-19
6								Balia/ Balia Sand Bed	Settled	N19°29'58.0",E84°56'33.3" N19°29'52.8",E84°56'33.1" N19°29'53.2",E84°56'43.8" N19°29'58.3",E84°56'43.7"	1.03	650	3,306	11,902	2014 - 15	2018-19
7								Tankachai / Tankachai Sand Bed	Non Settled	N19°32'12.3",E84°45'04.5" N19°32'10.3",E84°45'10.7" N19°32'08.9",E84°45'08.8" N19°32'09.9",E84°45'04.5"	0.34	278	1,279	9,603	2014 - 15	2018-19
8								Bhimpur / Bhimpur Sand Bed	Non Settled	N19°30'22.67",E84°50'69.32" N19°30'17.07",E84°50'59.34" N19°30'17.56",E84°51'07.55" N19°30'23.85",E84°51'06.69"	0.74	595	2,683	9,658	NA	NA
9								Burutulu/ Burutulu Sand Bed	Proposed	N19°30'24.65",E84°49'59.65" N19°30'25.41",E84°50'7.25" N19°30'18.44",E84°50'5.57" N19°30'18.69",E84°49'59.63"	0.70	580	2,574	25,500	NA	NA

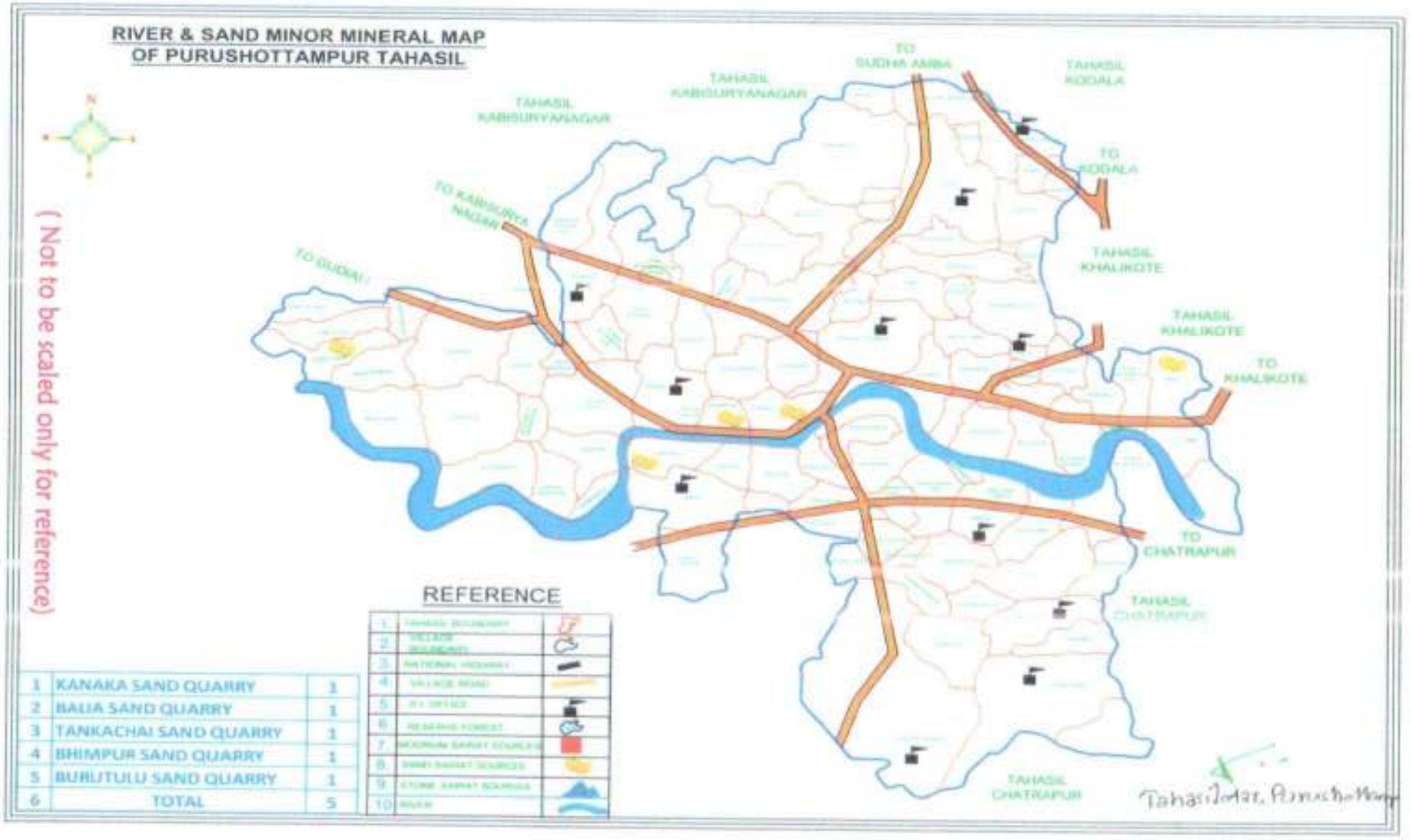


PLATE NO. 09 : River Sand Mining Map of Purushottampur Tahasil

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (HINJILI TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
10	Hinjili	Rushikulya	Daringibedi, Kandhamala	1000 mtr	165	41.25	100%	Kharida/Kharida Sand Quarry	Settled	Latitude N 19° 29' 53.60" to N 19° 30' 06.88" Longitude E 84° 46' 37.89" to E 84° 46' 39.05"	0.28	0	56,000	14,030	2015-16	2019-20
11		Ghodahada	Ramgiri Hills, Gajapati	103.85 mtr.	60.55	138	100%	Balarampur/Balarampur Sand Quarry	Settled	Latitude N 19° 27' 21.15" to N 19° 27' 14.18" Longitude E 84° 42' 33.38" to E 84° 42' 17.57"	0.82	0	57,906	13,650	2015-16	2019-20
12								Burupada/Burupada Sand Quarry	Non Settled	Latitude N 19° 30' 05.65" to N 19° 30' 04.62" Longitude E 84° 44' 33.40" to E 84° 44' 34.65"	0.48	0	76,479	5,919	NA	NA

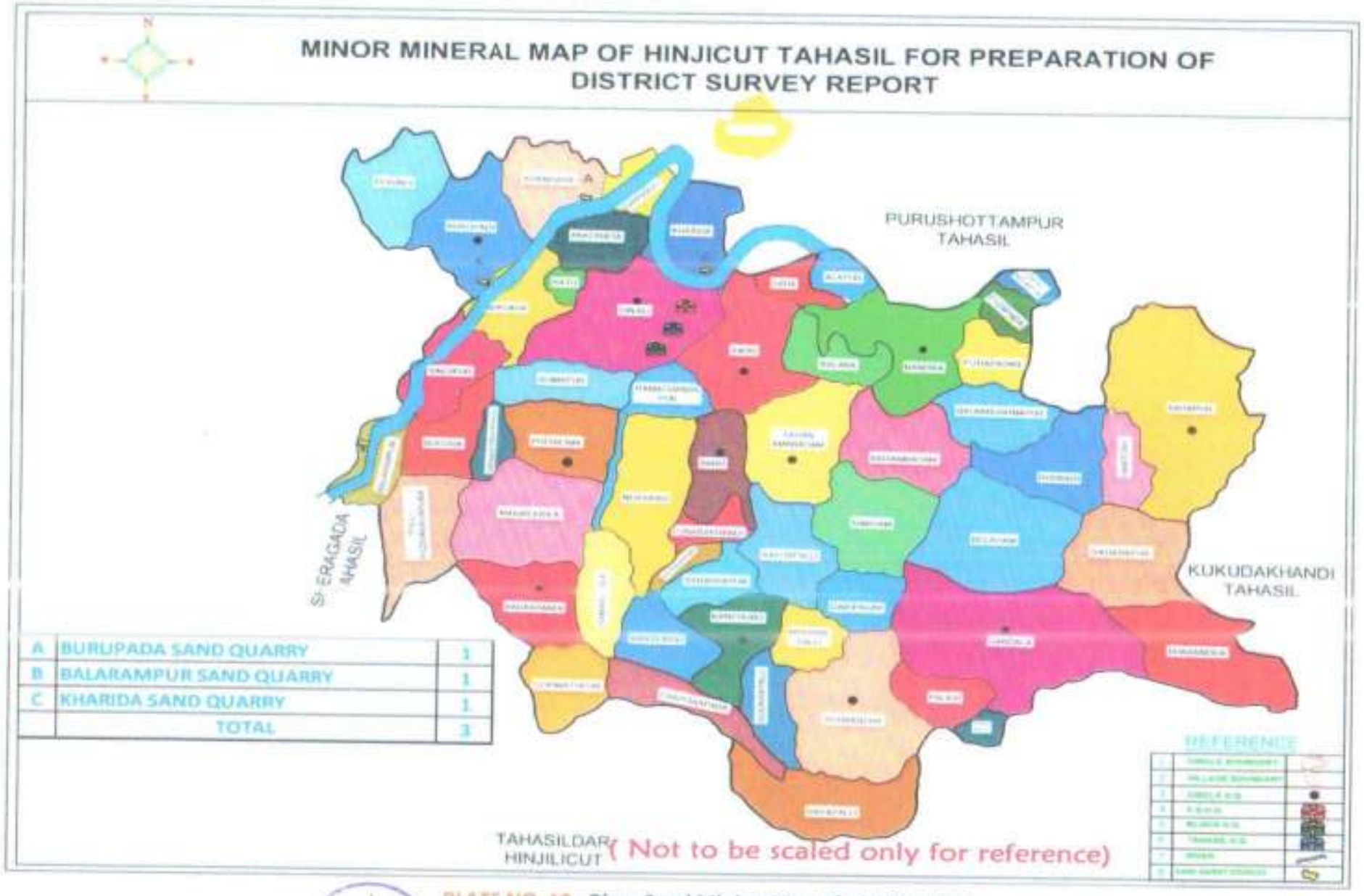


PLATE NO. 10 : River Sand Mining Map of Hinjili Tahasil

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (GANJAM TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
13	Ganjam	Rushikulya	Rushimala Parbat	1000 mtr	165	41.25	100%	AlliaBED / AlliaBED Sand Bed	Settled	N20 026'48.8"TO N200 26'48.8" Latitude & E850 38"10.6" To 850 38'10.6 Longitude Khata No-610 Plot No-328/1310	0.05	224	50,586	110,477	2014-15	2018-19
14								Sribana / Sribana Sand Bed	Settled	N19 024'57.3"TO N190 25'11.3" Latitude & E850 00'43.8" To 850 00'58.2 Longitude Khata No-175 Plot No-427	0.07	262	66,798	148,702	2014-15	2018-19
15								Bahalapur / Bahalapur Sand Bed	Settled	N19 025'12.4"TO N190 25'22.8" Latitude & E850 00'30.0" To 850 00'42.8 Longitude Khata No-356 Plot No-946/1250	0.05	224	50,586	110,477	2014-15	2018-19
16								Borada / Borada Sand Bed	Settled	N19 025'38.2"TO N190 25'52.4" Latitude & E840 00'5.6" To 850 00'58.7 Longitude Khata No-175 Plot No-427	0.05	224 M	50,586	110,477	2014-15	2018-19
17								Sribanbatimala / Sribanbatimala Sand Bed	Settled	N19 024'34.0"TO N190 24'47.0" Latitude & E850 01'29.8" To 850 01'45.9 Longitude Khata No-873 Plot No-554/2950	0.05	229 M	52,910	110,474	2014-15	2018-19
18								Jharapadar / Jharapadar Sand Bed	Settled	N19 024'4.01"TO N190 24'13.8" Latitude & E850 01'49.69" To 850 02'4.04 Longitude Khata No-138 Plot No 1/357	0.05	224	50,586	110,477	2015-16	2019-20
19								Bajrokote-I / Bajrokote-I Sand Bed	Settled	N19 026'44.07"TO N190 26'51.5" Latitude & E840 59'09.02" To 840 59'20.9 Longitude Khata No-39 Plot No 9	0.05	224	50,586	110,477	2015-16	2019-20
20								Bajrokote-II / Bajrokote-II Sand Bed	Settled	N19 028'21.07"TO N190 26'36.3" Latitude & E840 59'34.04" To 840 59'42.6 Longitude Khata No-39Plot No 197	0.05	224	50,586	110,477	2014-15	2018-19
21								Damodarpur / Damodarpur Sand Bed	Settled	N19 0 237.73 .01"TO N190 23'18.55" Latitude & E850 2'7 .90" to E850 2'17.57 Longitude Khata No-189 Plot No 263	0.05	224	50,586	110,477	2019-20	2023-24

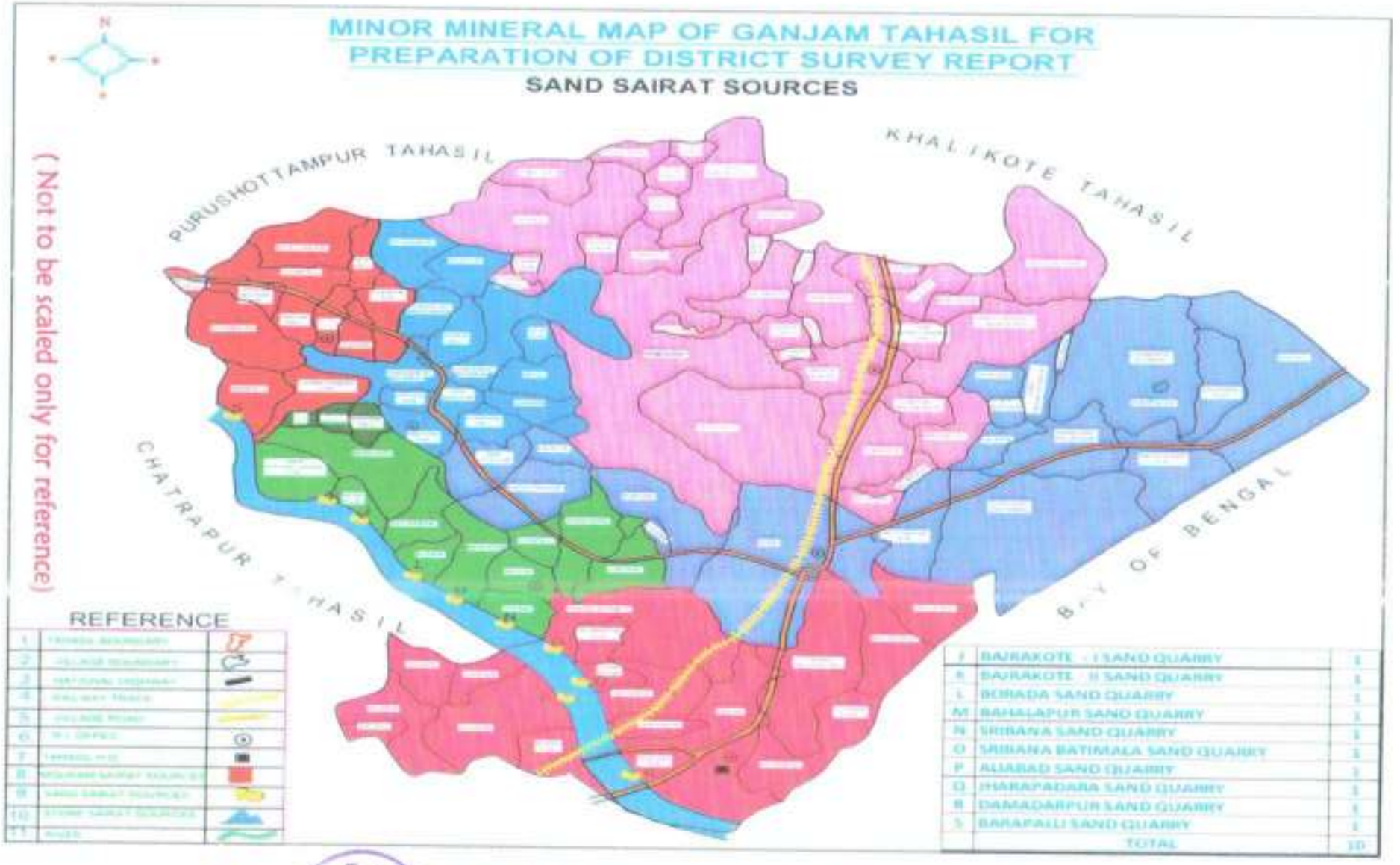


PLATE NO. 11 : River Sand Mining Map of Ganjam Tahasil

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (POLASARA TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
22	Polasara	Baghua	Banchpur, Kurula Nayagada	199.0mtr	45.5	4.5	100%	JhitikaBEDi / JhitikaBEDi Sand Bed	Settled	Khata No. 411, Plot No. 2058, 2059	0.40	200	76,380	152,760	2014-15	2018-19
23								Ghodapalana / Ghodapalana Sand Bed	Non Settled	Khata No. 602, Plot No. 887, 858	0.40	200	75,620	151,240	NA	NA
24								Dhoyakana / Dhoyakana Sand Bed	Non Settled	Khata No. 605, Plot No. 1537	0.30	200	54,630	109,260	NA	NA
25								Budheisuni / Budheisuni Sand Bed	Non Settled	Khata No. 943, Plot No. 1	0.50	200	90,640	181,280	NA	NA
26								B.PankalaBEDi / B.PankalaBEDi Sand Bed	Non Settled	Khata No. 782, Plot No. 2116, 4826	0.50	200	100,290	200,580	NA	NA
27								Kuananda / Kuananda Sand Bed	Non Settled	Khata No. 535, Plot No. 1996	0.50	200	69,402	138,804	NA	NA

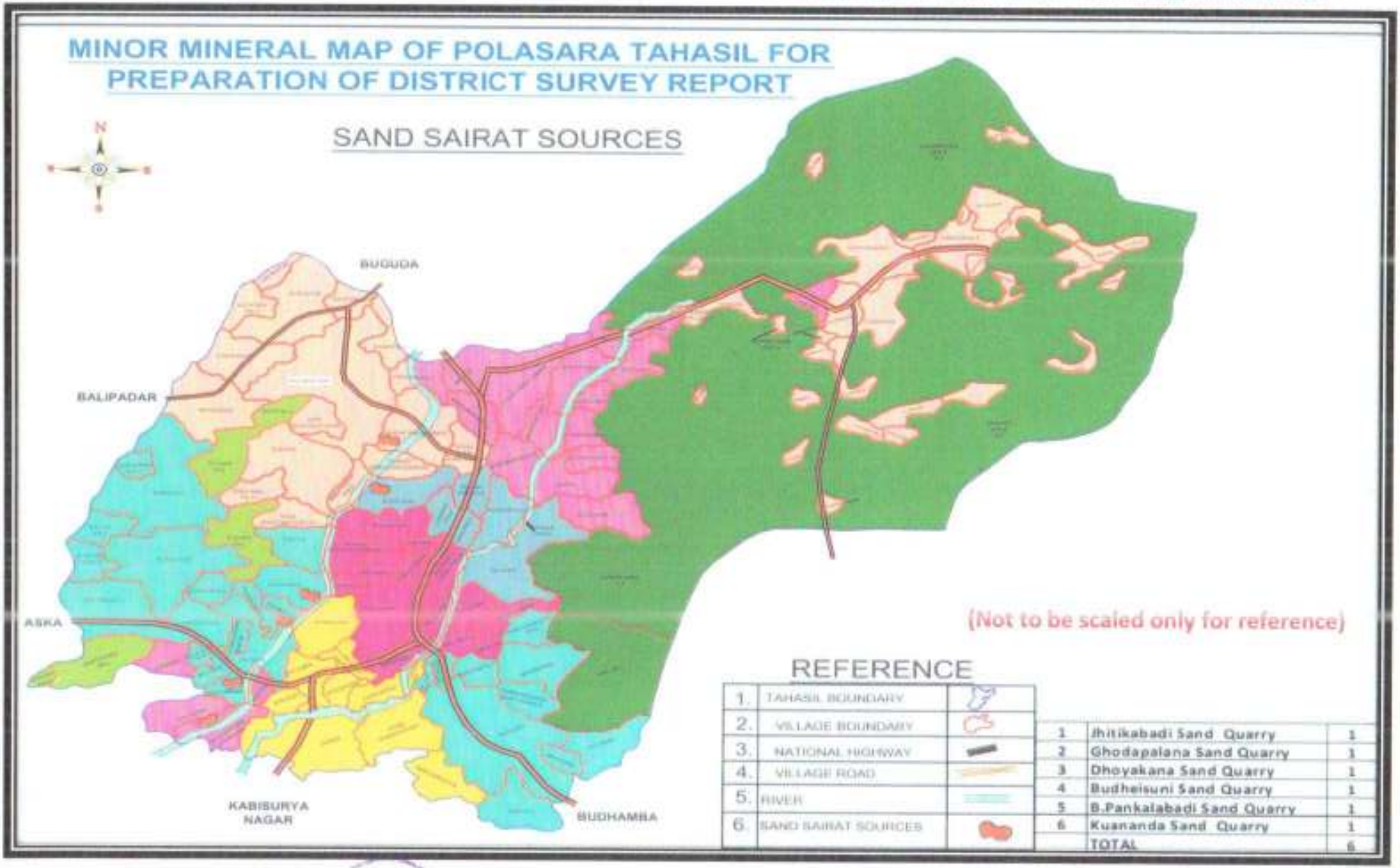


PLATE NO. 12 : River Sand Mining Map of Polasara Tahasil

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (DIGAPAHANDI TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
28	Digapahandi	Bahuda	Ramagiri Hills, Gajapati	72.01 mtr	73.00	456.87	100%	Kalingadola / Kalingadola Sand Quarry	Settled	19 19'53.7"N to 1920'10.8"N latitude &84 38' 15.1"E to 84 38'34.1"E longitude	0.55	122	66,451	24,985	2015-16	2019-20
29								Tentua Pada -B / Tentua Pada -B Sand Quarry	Settled	19 14'08.2"Nto 19 14'16.1"N latitude &84 32'25.9"E to 84 32'41.1"E longitude	0.45	125	56,660	25,500	2015-16	2019-20
30								Bajraguama / Bajraguama Sand Quarry	Settled	19 11' 32.9" N to 19 11'49.5"N latiturde&84 28'27.8"E to 84 28' 41.6"E longitude	0.43	264	112,478	7,250	2015-16	2019-20
31								Goudagoan/ Goudagoan Sand Quarry	Settled	19 13' 22.9"N to 19 13'36.6"N latitude &84 29'00.9"E to 84 29'14.0"E	0.62	533	99,690	4,500	2015-16	2019-20
32		Ghodahada	Ramagiri Hill, Gajapati	103.85 mtr.	50.55	138.00	100%	Phasiguda / Phasiguda Sand Quarry	Settled	latitude 19 23'33.6"N to 19.23'23"N longitude 84 30'40.5"E to 84 30'15.8"E	0.55	95	51,970	4,750	2015-16	2019-20
33								Jakamari / Jakamari Sand Quarry	Not Settled	Jakamari Plot No 1737 K.N 403	0.20	162	32,680	4,500	NA	NA
34								Jalaripalli / Jalaripalli Sand Quarry	Not Settled	Jalaripalli Plot No.1488 K.No 327	0.87	122	66,451	7,250	NA	NA
35		Bahuda	Ramagiri Hill, Gajapati	72.01 mtr	73.00	456.87	100%	Ch.Nimakhandi/ Ch.Nimakhandi Sand Quarry	Not Settled	Ch.N.K pentho Plot No 1535 & 1427 , K.no 1004	1.65	160	130,678	6,000	NA	NA
36								ChTikarapada Sand Quarry	Not Settled	Ch.Tikarapada Plot No 3149 K.No 587	0.25	132	32,881	4,750	NA	NA
37								Dhanarasi/ Dhanarasi Sand Quarry	Not Settled	Dhanarasi Plot No 1 & 28 K.No 276	0.24	213	51,622	14,000	NA	NA
38								Tentuapada / Tentuapada Sand Quarry	Not Settled	Tentuapada Plot no - 1603,1665,166 K.no 324	0.49	116	56,659	18,780	NA	NA
39								Chaitanyaprasad / Chaitanyaprasad Sand Quarry	Not Settled	latitude 19 14'25.3"N to 19 14'37.9"N & longoitude 84 32'41.4"E to84 32' 45.1"E	0.36	61	21,764	4,985	NA	NA

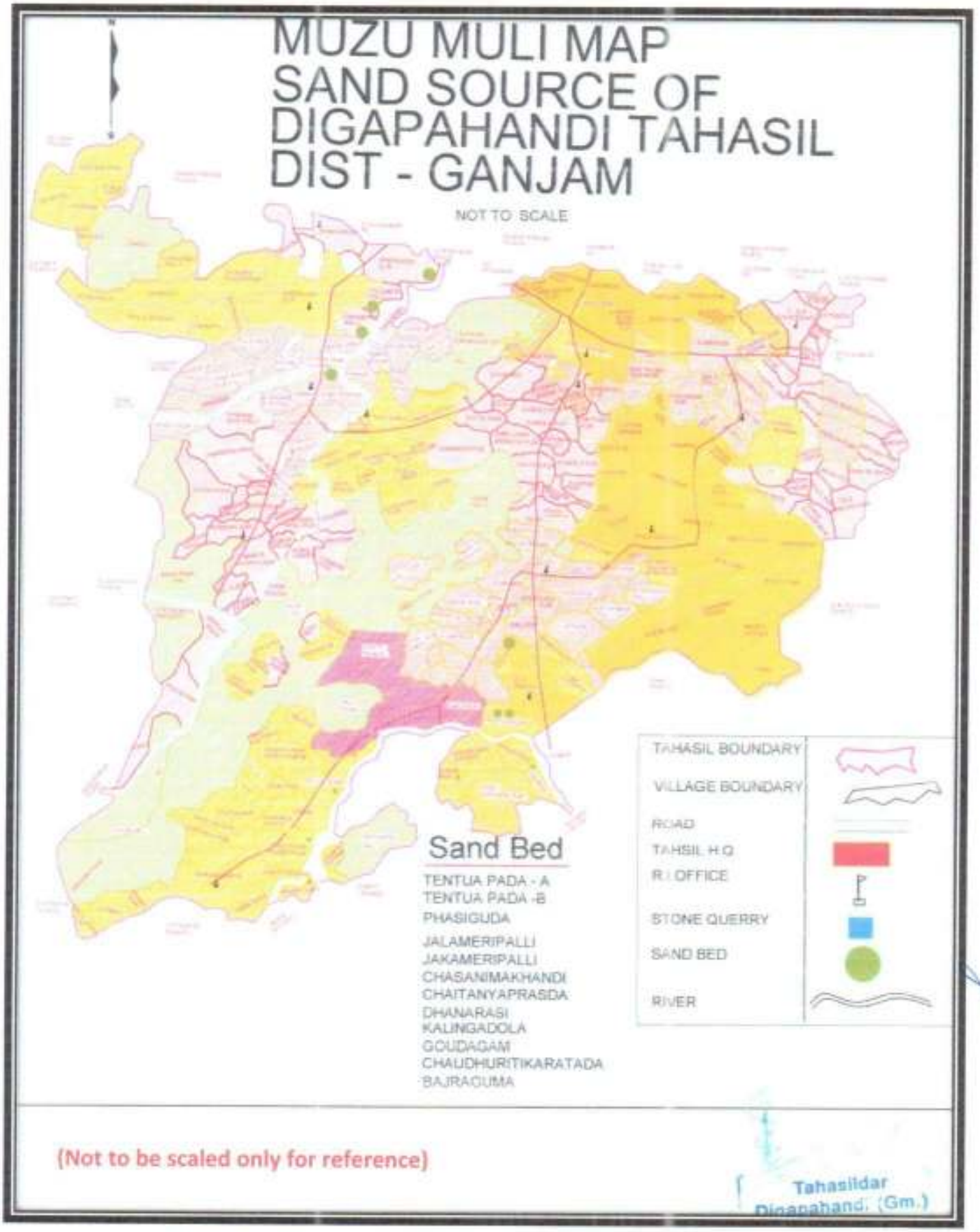


*PLATE NO. 13 : **River Sand Mining Map of Digapahandi Tahasil***

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (PATRAPUR TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
40	Patrapur	Bahuda	Ramagiri Hill Gajapati	72.01 mtr	73	456.87	100%	Nandigam/Nandigam Sand Bed	Settled	520, Plot No. 682 & 684	0.80	70	55,777	5,378	2015-16	2019-20
41								Kolihala /Kolihala Sand Bed	Settled	530 Plot No. 1444, Ara 27.312	0.70	107	60,700	5,117	2015-16	2019-20
42								Ch. Ch. Pur Sasan/ Ch.Ch. Pur Sasan Sand Bed	Non Settled	K.No. 114Plot No. 1034 Ac. 1.600	0.40	103	9,880	5,200	NA	NA
43								Kharinipada/Kharinipada Sand Bed	Non Settled	K.No.777, Plot No. 1098 Ac 1.000	0.40	170	10,100	4,830	NA	NA

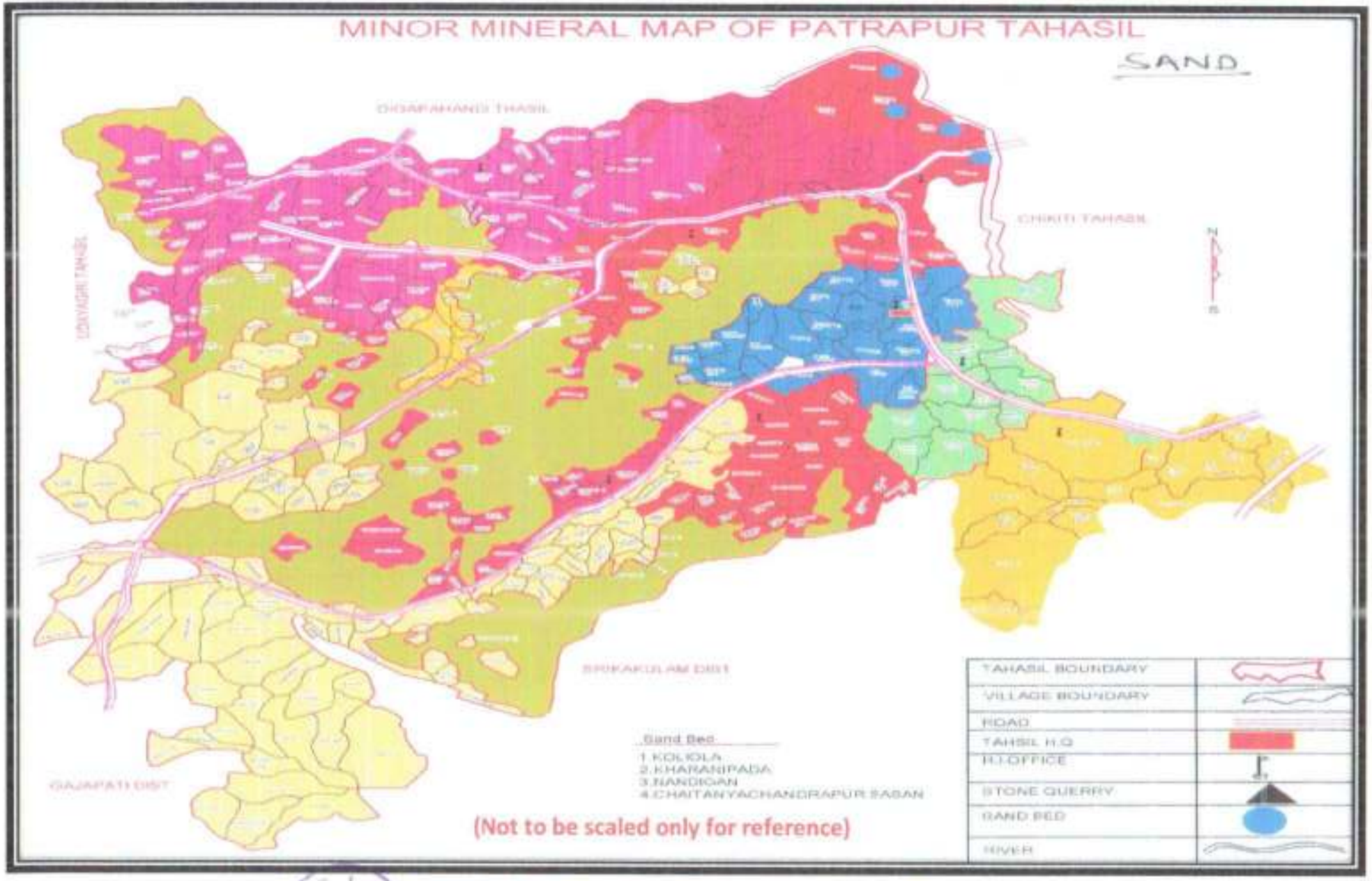


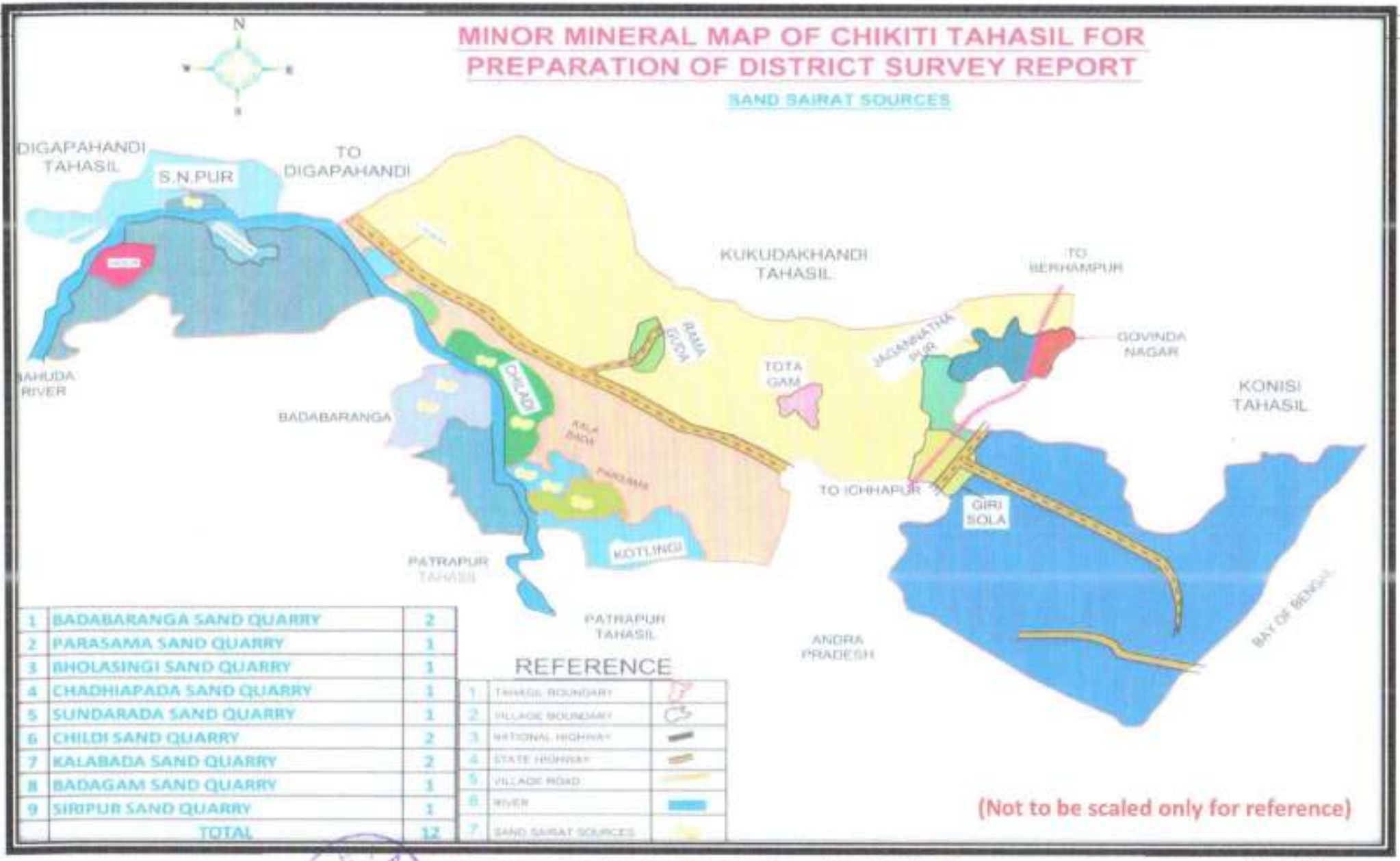
PLATE NO. 14 : River Sand Mining Map of Patrapur Tahasil

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (CHIKITI TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
44	Chikiti	B/HUDA	Ramagiri Hill Gajapati	72.01 mtr	73	456.87	100%	BEDa Baranga - B / BEDa Baranga - B Sand Bed	Settled	19 09 21.1" N to 19 09'35.0"N Latitude 84 35; 30.0" E to 84 35'52.5" E Longitude	0.84	60	50,580	26,521	2015-16	2019-20
45								BEDa Baranga - A / BEDa Baranga - A Sand Bed	Settled	19 09'00.9" N to 19 09'28.5" N Latitude & 84 35'51.6"E to 84 35'59.3"E Longitude	0.79	72	57,300	33,316	2015-16	2019-20
46								Parasama /Parasama Sand Bed	Settled	19 9'28.9"N TO 19 9'30.2"n Latitude & 84 35'41.7"E to 84 35'47.3"E Longitude.	0.85	72	61,590	13,708	2015-16	2019-20
47								Bholasingi / Bholasingi Sand Bed	Settled	N 19 11'25.1"to 19 11'31.9"Latitude & E 84 35'07.8"to 84 35'31.4" Longitude	0.56	114	64,370	71,005	2015-16	2019-20
48								Chadhiapada / Chadiapada Sand Bed	Settled	19 14 00.3"N to 19 14'17.8"N Latitude & 84 31'06.9"E to 84 31'14.0"E Logitude	0.84	60	50,330	20,895	2015-16	2019-20
49								Sundarada / Sundarada Sand Bed	Settled	19 14'11.1"N to 19 14'18.0 "N Latitude & 84 30'05.9"E to 84 30'30.3"E Longitude	0.89	82	73,220	19,312	2015-16	2019-20
50								Chiladi / Chiladi - A Sand Bed	Settled	N19 10'54.3"N TO 19 11'09.2" Latitude & E 84 35'31.2"E to 84 35'40.3"Longitude	0.36	132	50,180	16,146	2015-16	2019-20
51								KalaBEDa / KalaBEDa - A Sand Bed	Settled	N 19 09'32.6"to 19 09'49.8"Latitude & E 84 35'28.3" to 84 35'43 .5" Longitude	1.10	46	50,620	12,724	2015-16	2019-20
52								KalaBEDa / KalaBEDa - B Sand Bed	Settled	19 8'48.3"n to 19 9'26.0"N Latitude & 84 36'12.4"E to 84 35'33.0 E Longitude	1.10	53	58,550	18,561	2015-16	2019-20
53								Chiladi / Chiladi - B Sand Bed	Settled	Khata No. 462 Plot No. 2369, 2958 & 2179	0.77	65	50,300	15,430	2015-16	2019-20
54								K. Nuagam / K.	Non	Khata No. 401, Plot No. 4, 531, 1371, &	0.90	90	81,848	24,300	NA	NA

MINOR MINERAL MAP OF CHIKITI TAHASIL FOR PREPARATION OF DISTRICT SURVEY REPORT

SAND SAIRAT SOURCES



1	BADABARANGA SAND QUARRY	2
2	PARASAMA SAND QUARRY	1
3	BHOLASINGI SAND QUARRY	1
4	CHADHIAPADA SAND QUARRY	1
5	SUNDARADA SAND QUARRY	1
6	CHILDI SAND QUARRY	2
7	KALABADA SAND QUARRY	2
8	BADAGAM SAND QUARRY	1
9	SIRIPUR SAND QUARRY	1
	TOTAL	12

REFERENCE

1	TAHASIL BOUNDARY
2	VILLAGE BOUNDARY
3	NATIONAL HIGHWAY
4	STATE HIGHWAY
5	VILLAGE ROAD
6	RIVER
7	SAND SAIRAT SOURCES

(Not to be scaled only for reference)

PLATE NO. 15 : River Sand Mining Map of ChikitiTahasil

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (SANAKHEMUNDI TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
55	Sanakhemundi	Ghodahada	Ramgiri Hills Gajapati	101.85 mtr.	60.55	138	100%	Sundhipalli/Sundhipalli Sand Quarry	Settled	Latitude-19°24' 54.33"N to 19°24'43.59"N & Longitude-84°33' 02.06"E to 84°33'11.66"E	0.40	70	25,729	7,517	2017-18	2021-22
56								Kholadi/Kholadi Sand Quarry	Settled	Latitude-19°225' 00.7"N to 19°25' 12.8"N & Longitude-84°31'56.9"E to 84°32'24.8"E	1.12	130	105,084	59,411	2015-16	2019-20
57								Dharmaraipur/Dharmaraipur Sand Quarry	Settled	Latitude-19°27' 22.59"N to 19°27' 10.50"N & Longitude-84°36' 04.70"E to 84°36'35.66"E	1.80	200	137,666	32,587	2017-18	2021-22
58								Khallingi/ Khallingi Sand Quarry	Settled	Latitude-19°26' 17.82"N to 19°26' 35.69"N & Longitude-84°39'20.51"E to 84°39'32.27"E	0.60	80	69,634	61,965	2015-16	2019-20
59								Palasapur /Palasapur Sand Quarry	Settled	Latitude-19°26' 01.90"N to 19°26' 16.20"N & Longitude-84°34' 38.80"E to 84°34'45.10"E	0.10	170	50,104	7,224	2015-16	2019-20
60								Moulabhanja/ Moulabhanja Sand Quarry	Settled	K.No.1505 Plot.No.4156	0.80	60	38,175	40,400	2015-16	2019-20
61								Karakhandi/Karakhandi Sand Quarry	Settled	Latitude-19°27' 04.85"N to 19°26' 28.86"N & Longitude-84°40'39.11"E to 84°40'24.07"E	1.22	70	79,925	67,778	2017-18	2021-22
62								Ambagaon /Ambagaon Sand Quarry	Settled	Latitude-19°26'55.62"N to 19°24' 43.59"N & Longitude-84°33'15.73"E to 84°33'11.66"E	1.26	60	142,975	44,669	2017-18	2021-22
63								Jalamara/ Jalamara Sand Quarry	Settled	Latitude-19°25' 56.28"N to 19°25' 38.00"N & Longitude-84°33'73.60"E to 84°33'45.26"E	1.02	60	48,959	13,102	2017-18	2021-22
64								Luninathi/Luninathi Sand Quarry	Settled	Latitude-19°25' 36.09"N to 19°25' 38.81"N & Longitude-84°32' 55.39"E to 84°33'20.46"E	0.68	50	34,398	10,274	NA	NA
65								Erendra /Erendra Sand Quarry	Settled	Latitude-19°24' 10.6"N to 19°24' 17.0"N & Longitude-84°35' 02.7"E to 84°34'59.1"E	0.78	120	41,966	17,647	2017-18	2021-22
66								Biswanathpur /Biswanathpur Sand Quarry	Settled	Latitude-19°27' 18.8"N to 19°24' 16.0"N & Longitude-84°37' 10.5"E to 84°37'10.1"E	0.35	80	27,579	6,500	2017-18	2021-22
67								Bhalia/hola/Bhalia/hola sand quarry	Non settled	K.No.527 Plot.No.3588	0.45	120	50,858	40,388	NA	NA

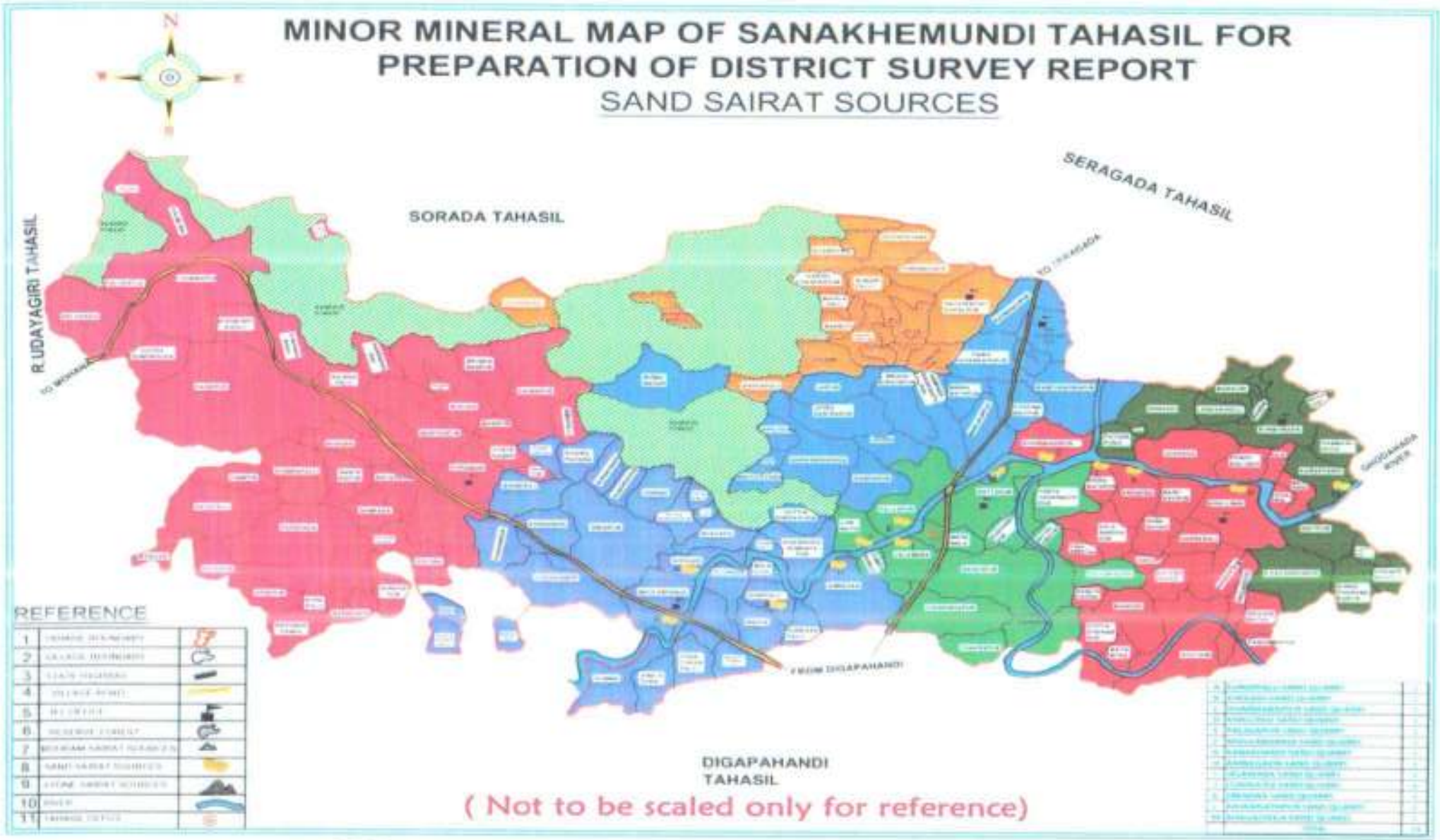


PLATE NO. 16 : River Sand Mining Map of Sanakhemundi Tahasil

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (BHANJANAGAR TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
68	Bhanjanagar	BEDANADI	Chakapada, Kandhamala	270 mtr	129.81	15.58	100%	Bhereda / Bhereda Sand Bed	Settled	19° 56' 06.2" N to 19° 54' 42.7"N Latitude& 84° 36' 24.6" E to 84° 36' 50.9"E Longitude	1.47	34	50,000	48,604	2015-16	2019-20
69								Baruda / Baruda Sand Bed	Settled	19° 59' 30.2" to 20° 00' 16.3" Latitude & 84° 37' 48.6" to 84° 38' 07.4" Longitude	0.08	80	65,000	117,792	2015-16	2019-20
70								Kullada / Kullada Sand Bed	Settled	19° 58' 16.8" N to 19° 56' 30.4"N Latitude & 84° 37' 55.2" E to 84° 38'02.1"E Longitude	0.35	164	57,000	19,360	2015-16	2019-20
71		LOHARAKHANDI	Andharakote, Kandhamala	443 mtr	35.25	1.762	100%	BEDakodanda / BEDakodanda -I Sand Bed	Settled	19° 56' 12.03" N to 19° 56' 26.4"N Latitude & 84° 34' 06.9" E to 84° 34' 59.5"E Longitude	0.96	56	54,000	15,532	2015-16	2019-20
72								Gamundi / Gamundi (Jamapalli) Sand Bed	Non Settled	19° 55' 06.01" N to 19° 55' 27.8"N Latitude & 84° 35' 00.2" E to 84° 35' 39.3"E Longitude	0.56	78	44,000	20,236	NA	NA
73								BEDakodanda / BEDakodanda -II Sand Bed	Settled	19° 56' 3.5" N to 19° 56' 20"N Latitude & 84° 32' 28" E to 84° 33' 4"E Longitude	0.50	100	50,000	11,610	2016-17	2020-21

D.E.I.A. APPROVED GANJAM

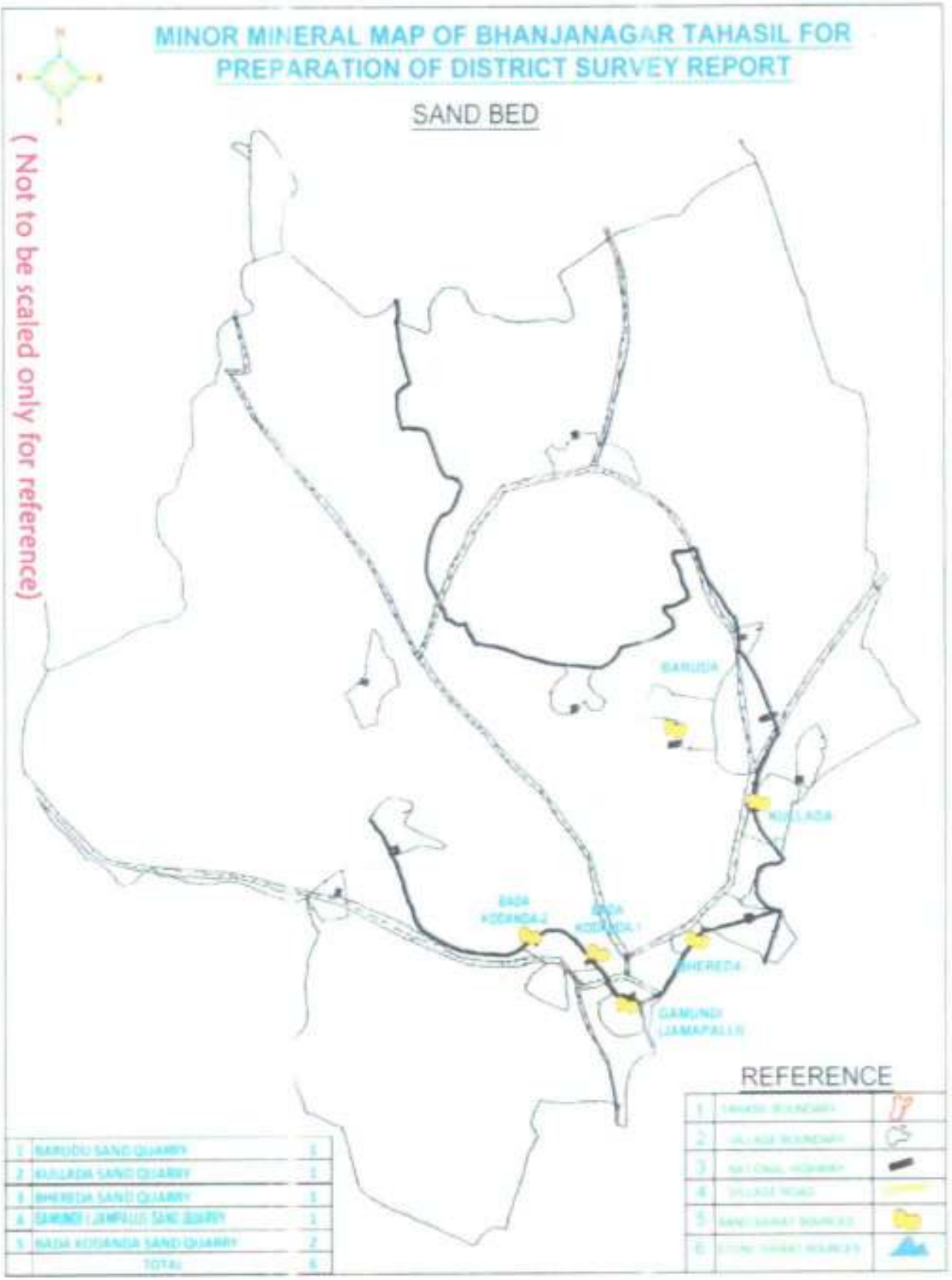
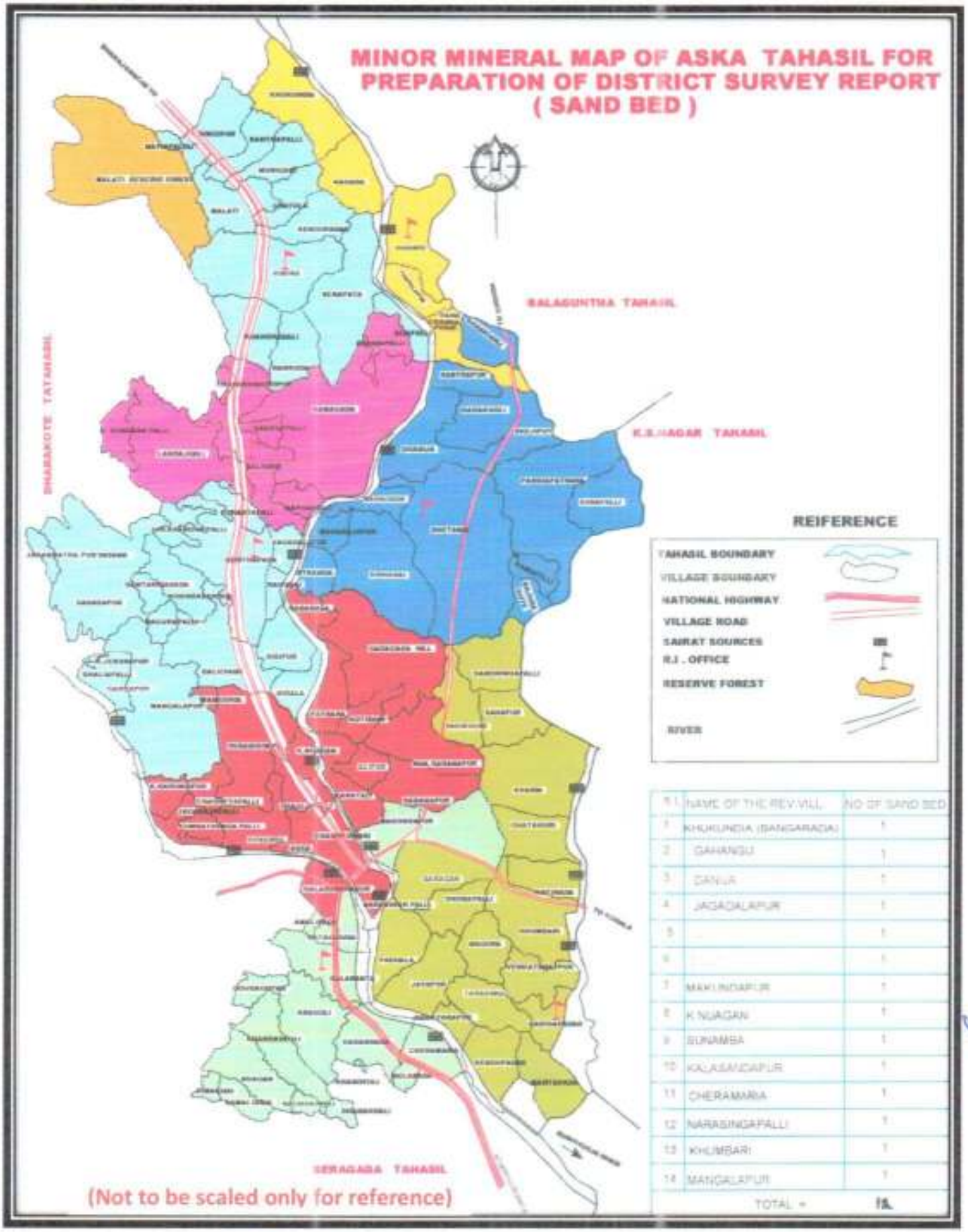


*PLATE NO. 17 : **River Sand Mining Map of Bhanjanagar Tahasil***

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (ASKA TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
74	Aska	BEDa Nadi	Chaka pada (Kandhamala)	270 mtr	129.81	15.58	100%	Makundapur / Makundapur Sand bed	Settled	Latitude N 19'36'18.29" to N 19'36'32.50" LongitudeE 84'40'19.75" to E 84'40'34.02"	0.46	0	60,135	74,878	2014-15	2018-19
75								K.Nuagam / K.Nuagam Sand bed	Settled	Latitude N 19'37'43.2" to N 19'37'56.6" LongitudeE 84'39'39.7" to E 84'39'47.6"	0.40	0	60,700	51,118	2015-16	2019-20
76								Dhanija / Dhanija Sand bed	Settled	Latitude N 19'42'39.3" to N 19'42'29.3" LongitudeE 84'40'59.2" to E 84'40'50.1"	0.30	0	50,600	66,406	2015-16	2019-20
77								Bangarada / Bangarada Sand Bed	Settled	Latitude N 19'45'49.7" to N 19'46'16.8" LongitudeE 84'39'23.2" to E 84'39'46.4"	1.00	0	121,567	48,465	2015-16	2019-20
78								Gahangu / Gahangu Sand Bed	Settled	Latitude N 19'44'50.5" to N 19'45'6.2" LongitudeE 84'40'12.0" to E 84'40'22.0"	0.46	0	75,538	18,350	2015-16	2019-20
79								Jagadalpur / Jagadalpur Sand Bed (Plt No.337 & 194)	Lease cancelled	Latitude N 19'40'23.30" to N 1940'43.78" Longitude 84'39'13.80" to E 84'39'22.42"	0.47	0	52,505	39,302	-	-
80								Narasingapalli / Narasingapalli Sand Bed (Plot No.1)	Non Settled	Latitude N 19'35'52.32" to N 19'36'26.17" Longitude 84'40'23.28" to E 84'40'48.71"	0.70	0	126,367	53,640	NA	NA
81		Rushikulya	Daringi BEDi (Kandhamala)	1000 mtr	165	41.25	100%	Kalasandhpaur / Kalasandhpaur Sand bed	Settled	Latitude N 19'36'13.59" to N 19'36'29.54" LongitudeE 84'39'53.20" to E 84'40'9.11"	0.56	0	60,705	78,232	2014-15	2018-19
82								Cheramaria / Cheramaria Sand Bed	Settled	Latitude N 19'33'47.85" to N 19'33'59.75" Longitude 84'41'41.90" to E 84'41'51.62"	0.15	0	49,800	66,187	2016-17	2020-21
83								Sunamba / Sunamba Sand Bed	Settled	Latitude N 19'36'26.1" to N 19'36'32.3" Longitude 84'39'1.3" to E 84'39'57.2"	0.46	0	52,000	42,000	2015-16	2019-20
84								Mangalapur / Mangalapur Sand Bed (Plot No.3025 & 3348)	Non Settled	Khata No-1522, Plot No-3025 ,3348 Tot al AC 12.500	0.40	0	50,587	43,480	NA	NA
85		Baghua Nadi	Banchapur, Nayagarh	199 mtr	45.05	4.5	100%	Kumbhari / Kumbhari Sand Bed (Plot No2111)	Non Settled	Khata No-1198, Plot No-2111	0.30	0	54,000	10,000	NA	NA



S.L	NAME OF THE REV.VILL	NO OF SAND BED
1	KHUKUNDIA (BANGARADA)	1
2	GAHANGU	1
3	DANUA	1
4	JAGADALAPUR	1
5		1
6		1
7	MANKUNDAPUR	1
8	K NUAGAN	1
9	SUNAMSA	1
10	KALASANDAPUR	1
11	CHERAMARA	1
12	NARASINGAPALLI	1
13	KHUMSARI	1
14	MANGALAPUR	1
	TOTAL =	14

PLATE NO. 18 : River Sand Mining Map of Aska Tahasil

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (BUGUDA TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Mineraible potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
86	Buguda	BEDANADI	Chakapada, Kandhamal	270 mtr	129.81	15.58	100%	Bishnuchakra / Bishnuchakra Sand Bed	Settled	Khata 913, Plot No. 3035 19 0 45'27.41N to 19 0 45'29.85"N Latitude 85040'08.30"E to 85040'10.50"E Longitude	0.14	98	13,426	8,000	2017-18	2021-22

D.E.I.A. APPROVED GANJAM

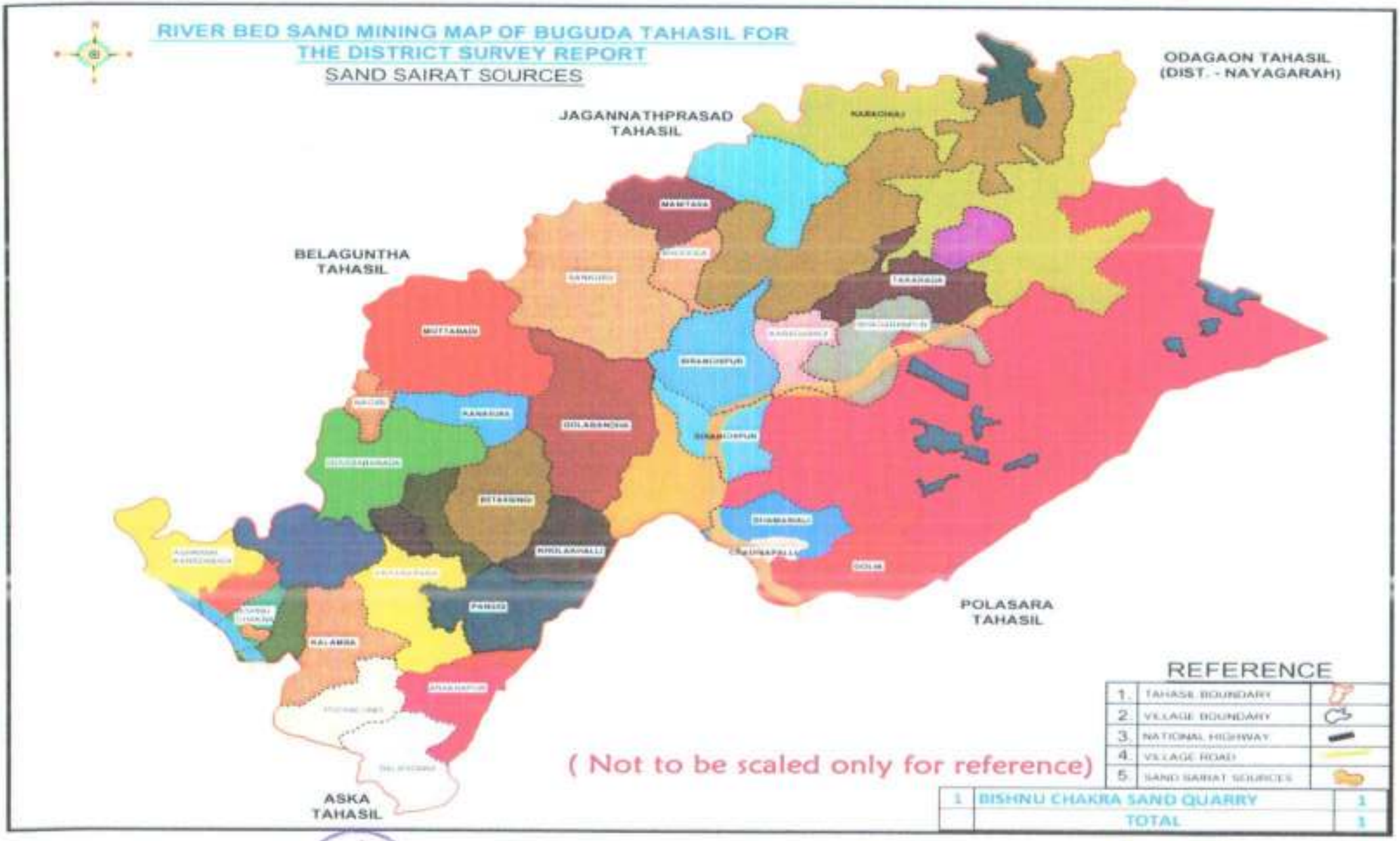
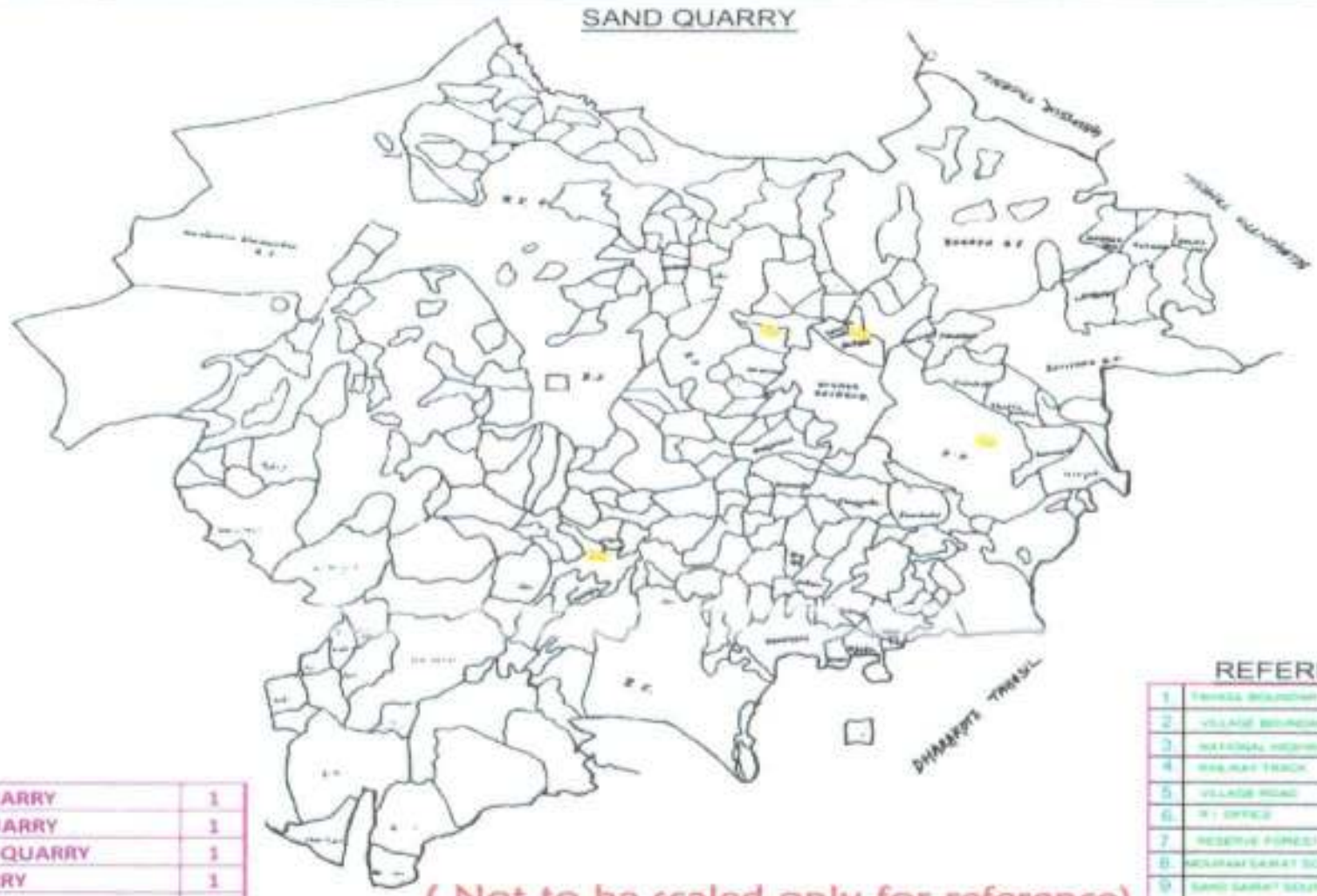


PLATE NO. 19 : River Sand Mining Map of Bugudai Tahasil

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (SURADA TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
87	Surada	Rushikulya	Daringi(BED) (Kandhamala)	1000 mtr	165	41.25	100%	Suramani / Suramani Sand Bed	Settled	Latitude – N 19°43'23.02" to N 19°43'30.40" Longitude- E84°30'18.20" to E 84°30'48.95"	0.25	84	61,285	88,055	2015-16	2019-20
88								G.P.Sasan / G.P.Sasan Sand Bed	Settled	Latitude – N 19°45'26.63" to N 19°45'33.42" Longitude- E84°26'58.10" to E 84°27'16.39"	0.22	86	49,945	46,328	2015-16	2019-20
89								Sana Surada / Sana Surada Sand Bed	Settled	Latitude – N 19°45'15.50" to N 19°45'31.97" Longitude- E84°26'31.55" to E 84°26'47.42"	0.29	64	86,542	135,060	2015-16	2019-20
90								Borada / Borada Sand Bed	Non Settled	Latitude – N 19°40'35.34" to N 19°40'49.85" Longitude- E84°21'03.85" to E 84°21'10.74"	0.16	60	24,661	14,249	NA	NA

MINOR MINERAL MAP OF SURADA TAHASIL FOR PREPARATION OF DISTRICT SURVEY REPORT



1	SURAMANI SAND QUARRY	1
2	G.P. SASAN SAND QUARRY	1
3	SANA SURADA SAND QUARRY	1
4	BORADA SAND QUARRY	1
	TOTAL	4

PLATE NO. 20 : River Sand Mining Map of Surada Tahasil

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (SHERAGADA TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
91	Sheragada	Rushikulya	DaringBEDI Dist. Kandhamala	1000 mtr	165	41.25	100%	Santoshpur / Santoshpur Sand Bed	Settled	Khata No.4.17, Plot No.45	0.16	333	78,509	65,694	2015-16	2019-20
92								Pakidi / Pakidi Sand Bed	Non-Settled	Khata No.507, Plot No.1	0.59	280	164,788	146,560	NA	NA
93		Ghoda Hada	Ramagiri Hill Dist. Gajapati	103.85 mtr.	60.55	138	100%	Laxmipur/ Laxmipur Sand Bed	Non-Settled	Khata No.198, Plot No.1 & 398	0.32	90	29,750	25,920	NA	NA

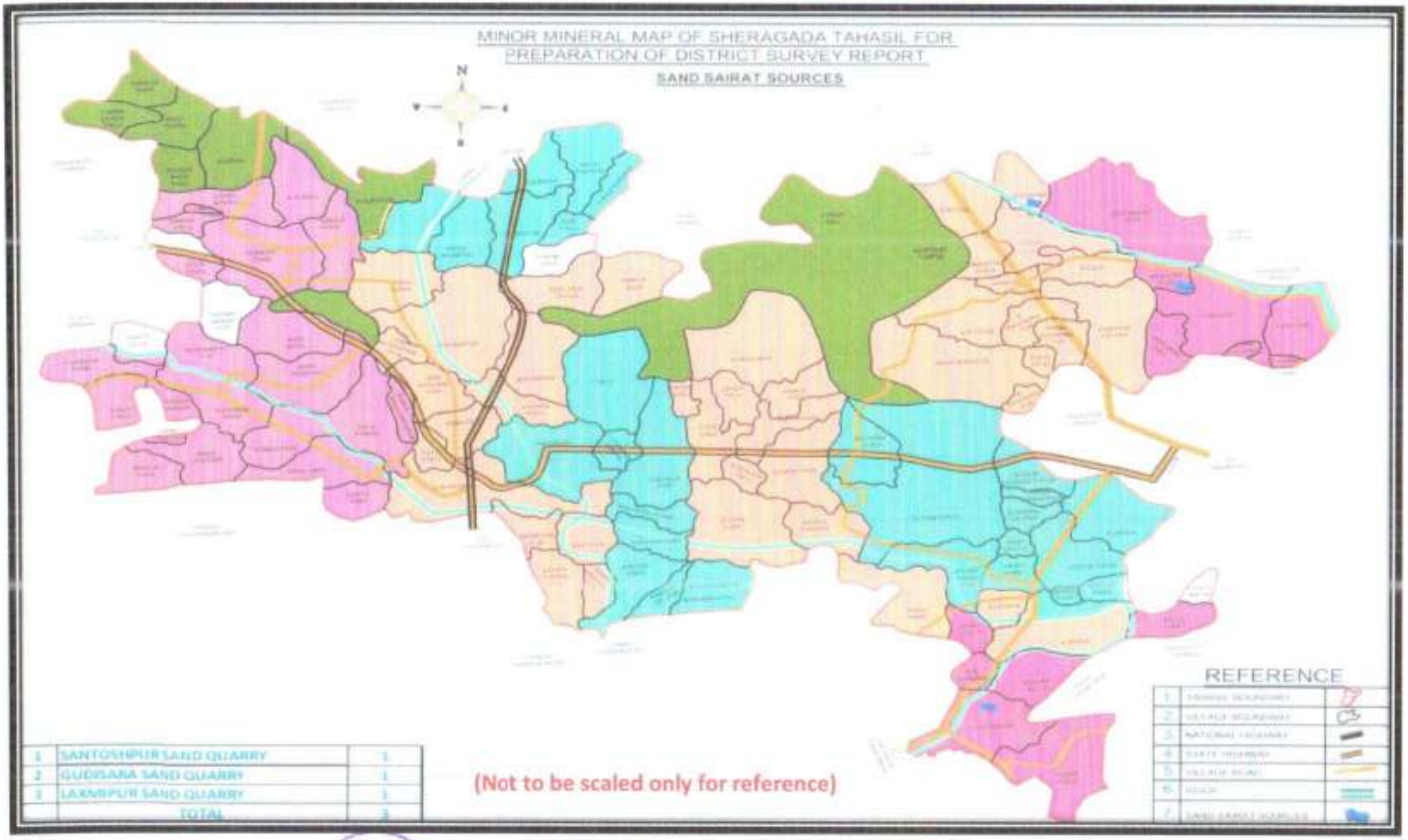


PLATE NO. 21 : River Sand Mining Map of Sheragda Tahasil

LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (BELLAGUNTHA TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
94	Bellaguntha	BEDANADI	Chakapada, Kandhamal	270 mtr	129.81	15.58	100%	Nuagam / Nuagam Sand Bed	Settled	Khata No.969, Plot No. 187, 190, 291 Area - Ac 14.850 19°55'26.08N to 19°54'54.5"N Latitude 84°36'03.1"E to 84°35'57.7"E Longitude	1.72 KM	35 m	60000 sqm	5110 cum	2015-16	2019-20
95								Benipalli / Benipalli Sand Bed	Settled	Khata No.859, Plot No. 210, 211 Area - Ac 15.525 19°51'05.9N to 19°51'50.7"N Latitude 84°37'32.7"E to 84°37'38.0"E Longitude	1.26 KM	50 m	63000 sqm	5000 cum	2015-16	2019-20
96								Banka / Banka Sand Bed	Settled	Khata No.852, Plot No. 2047 Area - Ac 12.800 19°49'26.15N to 19°49'43.40"N Latitude 84°37'28.85"E to 84°37'35.68"E Longitude	1.75 KM	30 m	52000 sqm	6,500	2015-16	2019-20
97								Suramani / Suramani Sand Bed	Settled	Khata No.232, Plot No. 659, 1/1725 Area - Ac 12.450 19°48'59.59N to 19°48'36.00"N Latitude 84°37'50.15"E to 84°37'50.59"E Longitude	1.70 KM	30 m	50000 sqm	45000 cum	2015-16	2019-20
98								Girisola / Girisola Sand Bed	Settled But Mining Plan not received	Khata No.970, Plot No. 1 Area - Ac 15.400	2.31 5 KM	27 m	62500 sqm	6,000	2019-20	2024-25
99			Alasi, Ganjam	130 mtr	30.4	1.824	100%	Kokolunda / Kokolunda Sand Bed	Settled	Khata No.483, Plot No. 2141, 2158 Area - Ac 13.375 19°52'11.3N to 19°52'45.5"N Latitude 84°38'50.6"E to 84°39'18.1"E Longitude	1.84 KM	30 m	55000 sqm	20,200	2015-16	2019-20
100								Ambapua / Ambapua Sand Bed	Settled E.C. PENDING	Khata No.694, Plot No.71/2179, 71, 1289, 1 Area - Ac 15.758 19052'05.20"N to 19051'57.10"N Latitude 84038'29.70"E to 84039'24.90"E Longitude	1.62 Km	35 m	64000 sqm	20,000	2018-19	2019-20

PLATE NO. 22 : *River Sand Mining Map of Bellaguntha Tahasil*

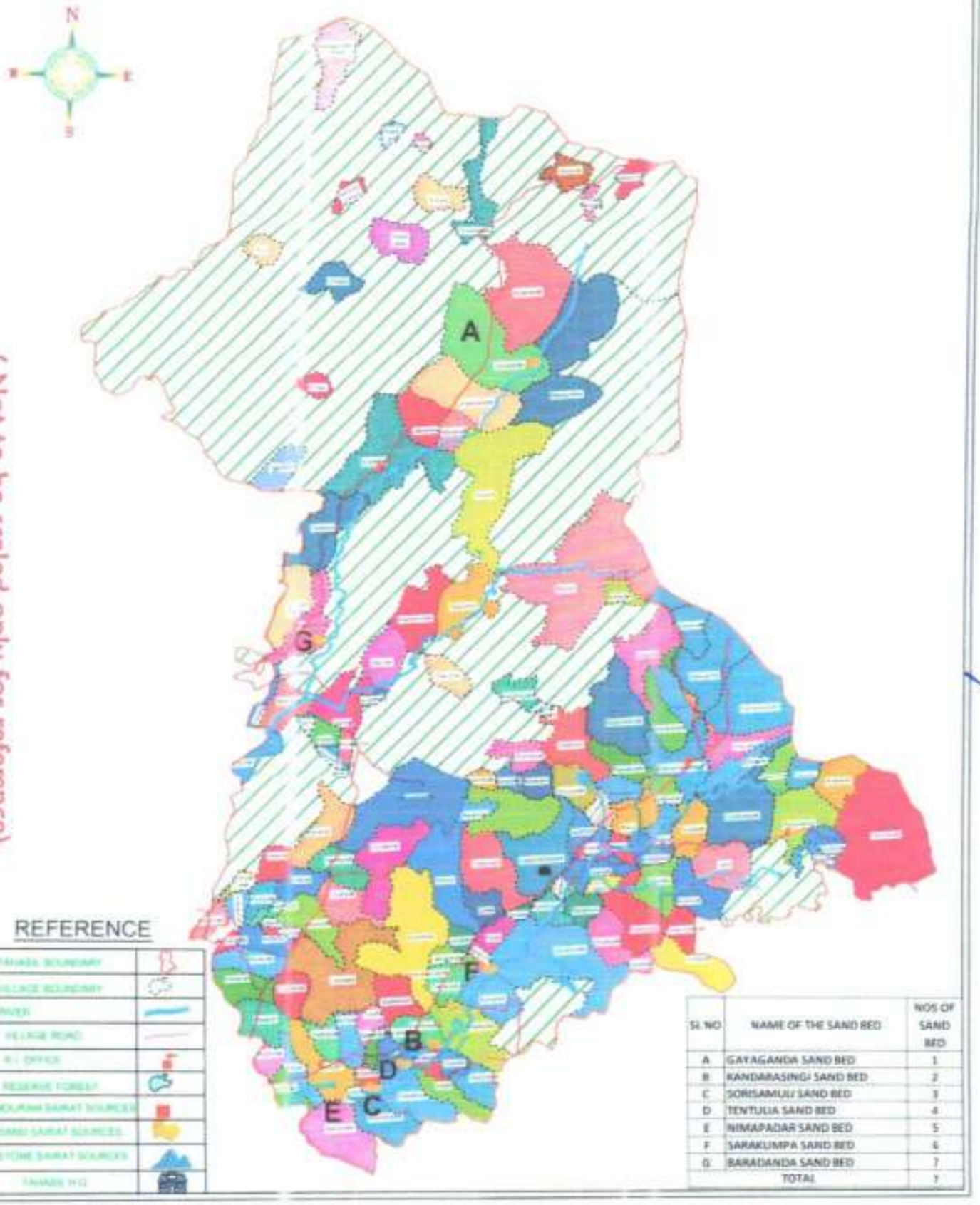
LIST OF SAND MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (JAGANNATH PRASAD TAHASIL)

Sl. No	Name of the Tahasil	Name of the River	Place of Origin	Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Preiod of Lease	
															From	To
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
101	Jagannathprasd	BEDa Nadi	Chakapada, Kandhamal	270 mtr	129.81	15.58	100%	Gayaganda / Gayaganda Sand Bed	Non Settled	Khata No 700 plot 1183, 1270 latitude 20 10'06.43"N to 20 10'00.10"N an Longituted 84 44'52.59"E to 84 44'51.49"E	0.30	0	4,079	19,580	-	-
102			Alasi, Ganjam	130 mtr	30.4	1,824	100%	Kandarasingi / Kandarasingi Sand Bed	Settled	Khata No 567, plot no 3222,3119,3112,2794,2268 latitude 19 54'22.01"N to 19 54'36.46"N an Longituted 84 43'18.57"E to 84 43'42.15"E	0.80	0	72,637	74,801	2017-18	2021-22
103								Sorisamuli / Sorisamuli Sand Bed	Settled	Khata no- 283 Plot no- 633,973 latitude 19 53'30.07"N to 19 53'20.72"N an Longituted 84 42'07.19"E to 84 41'56.17"E	0.50	0	38,680	26,981	2017-18	2021-22
104								Tentulia / Tentulia Sand Bed	Settled	Khata No 344 Plot 2043 latitude 19 53'50.61"N to 19 53'55.44"N an Longituted 84 42'17.95"E to 84 42'48.93"E	0.50	0	50,031	37,201	2017-18	2021-22
105								Nimapadar/ Nimapadar Sand Bed	Settled	Khata No 1472 Plot 744 latitude 19 52'54.37"N to 19 53'01.68"N an Longituted 84 41'01.90.0"E to 84 41'26.81"E	0.70	0	35,511	20,444	2017-18	2021-22
106								Sarakumpa / Sarakumpa, Sand Bed	non-Settled	Khata No 214, Plot No 922 latitude 19 55'46.12"N to 19 55'67.96"N an Longituted 84 44'22.46"E to 84 44'06.87"E	0.80	0	23,188	40,358	2017-18	2021-22
107								Baradanda / Baradanda, Sand Bed	New proposed source	Khata No 452, Plot No 1306, 1518, 2073, 1889	0.50	0	32,634	28,345	NA	NA

D.E.I.A.A. APPROVED GANJAM

MINOR MINERAL MAP OF JAGANNATH PRASAD TAHASIL FOR PREPARATION OF DISTRICT SURVEY REPORT

SAND SAIRAT SOURCES



Sl. NO	NAME OF THE SAND BED	NOS OF SAND BED
A	GAYAGANDA SAND BED	1
B	KANDARASINGI SAND BED	2
C	SORISAMULI SAND BED	3
D	TENTULIA SAND BED	4
E	NIMAPADAR SAND BED	5
F	SARAKUMPA SAND BED	6
G	BARADANDA SAND BED	7
	TOTAL	7

PLATE NO. 23 : River Sand Mining Map of Jagannath Prasad Tahasil

MINING LEASES IN THE DISTRICT WITH LOCATION, AREA AND PERIOD OF VALIDITY & DRAINAGE SYSTEM (DHARAKOTE TAHASIL)

Altitude of Origin	Total length in the district (in Km)	Area drained in the district	% age area drained in the district	Name of the village & Source	Status of the source (settled / unsettled / New)	Portion recommended for quarry lease (GPS coorinate / Khata No / Plot No.)	Length of area of quarry lease (in Km)	Average width of Quarry lease in Mtr)	Area of qiarry lease (in Sq M) m2	Minerable potention (Cum) m3	Period of Lease	
											From	To
5	6	7	8	9	10	11	12	13	14	15	16	17
1000 mtr	165	41.25	100%	Kapilash/ Kapilash Sand Bed	Setteled	Latitude: N 19°38'44.94" to N 19°38'57.67" Longitude: E 84°35'33.96" to E 84°35'55.74" K.No.201, P.No. 391	0.23	71	55,179	49,140	2016-17	2020-21
				PankalaBEDi / PankalaBEDi-A Sand Bed	Setteled	Latitude: N 19°36'27.00" to N 19°36'32.75" Longitude: E 84°43'38.09" to E 84°38'50.47" K.No.319, P.No.1837,2231	0.23	101	51,326	45,587	2017-18	2021-22
				PankalaBEDi/PankalaBEDi-B Sand Bed	Setteled	Latitude: N 19°36'24.24" to N 19°36'28.46" Longitude: E 84°38'32.86" to E 84°38'50.66" K.No.319, P.No.1837	0.23	101	51,326	37,175	2017-18	2021-22
				Laxmipur /Laxmipur Sand Bed	Setteled	Latitude: N 19°36'34.18" to N 19°36'49.55" Longitude: E 84°37'25.38" to E 84°37'34.69" K.No.189, P.No.302,580	0.23	115	52,447	46,454	2016-17	2020-21
				Jahada / Jahada Sand	Setteled	Latitude: N 19°40'43.05" to N 19°40'58.04" Longitude: E 84°33'34.96" to E 84°33'49.65" K.No.681, P.No.5680,5681	0.26	93	76,036	11,756	2016-17	2020-21
				Mundamarai/ Mundamarai Sand Bed	Setteled	Latitude: N 19°38'27.27" to N 19°38'44.99" Longitude: E 84°36'2.01" to E 84°36'26.53" K.No.1176,P.No.1,304	0.29	93	84,745	76,860	2016-17	2020-21
				A.D Palli / A.D Palli Sand Bed	Un-Setteled	Latitude: N 19°36'24.61" to N 19°36'31.11" Longitude: E 84°43'33.68" to E 84°39'56.00" K.No.450,P.No.689	0.20	92	40,218	17,329	NA	NA
				Janibilli/ Jannibilli Sand Bed	Setteled	Latitude: N 19°39'56.89" to N 19°40'14.18" Longitude: E 84°33'50.28" to E 84°34'16.81" K.No.413, P.No.613,617,618	0.30	94	90,366	15,799	2017-18	2021-22

D.E.I.A. APPROVED GANJAM

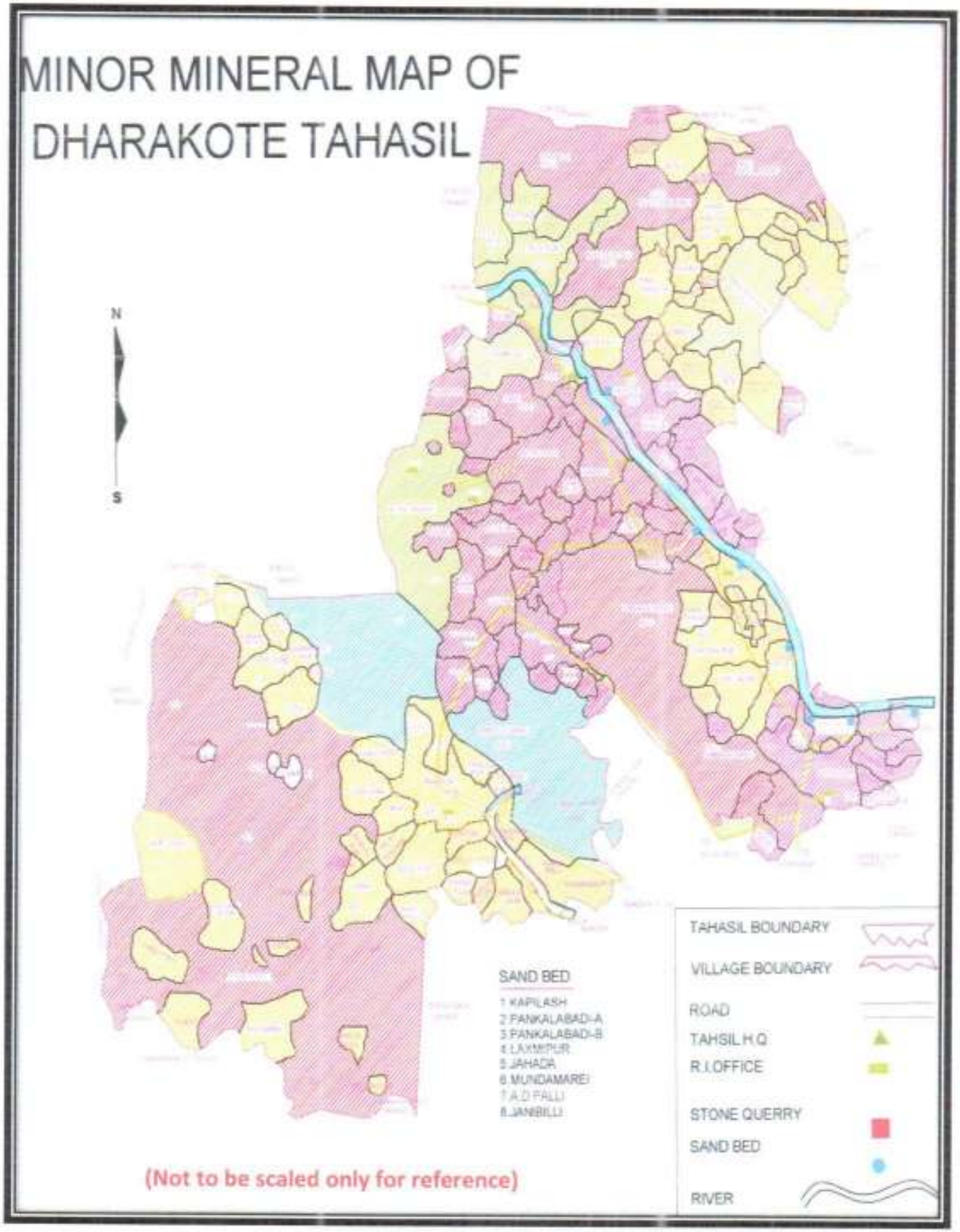


PLATE NO. 24 : River Sand Mining Map of Dharakote Tahasil