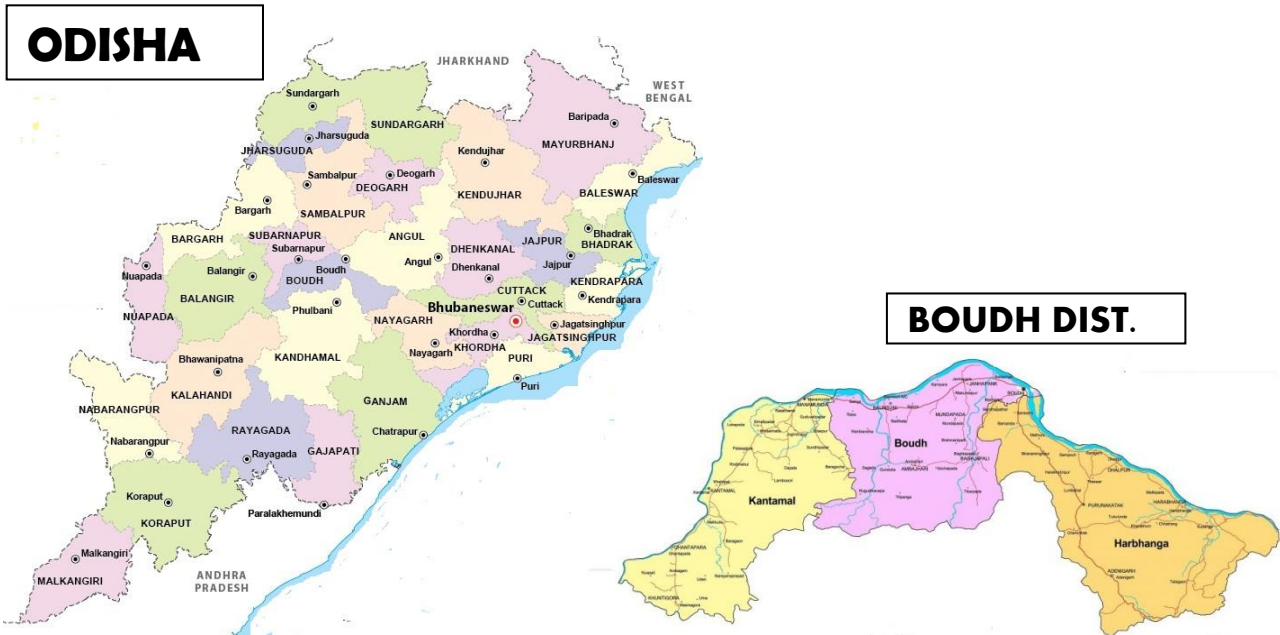




DISTRICT SURVEY REPORT (DSR)
OF
BOUDH DISTRICT, ODISHA
FOR
Road Metal/ Black Stone/White Stone



As per Notification No. S.O. 3611(E) New Delhi, 25th July, 2018 MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE (MoEF & CC)

Prepared by
COLLECTORATE, BOUDH

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PREFACE

In compliance to the notification issued by the ministry of environment and forest and Climate Change Notification no. S.O.3611 (E) New Delhi dated 25.07.2018, the preparation of district survey report of road metal/ building stone mining has been prepared in accordance with Clause II of Appendix X of notification. Every effort has been made to cover road metal/ building stone mining locations, future potential areas and overview of road metal mining activities in the district with all its 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 is based on data of various departments like Revenue, water Resources, Forest, Geology and Mining in the district as well as statistical data uploaded by various state Government departments. The main purpose of preparation of District Survey Report is to identify the mineral resources and developing the mining activities along with other relevant data of the District.

1. INTRODUCTION

Boudh is a district in central position of Odisha, a state in India. The District is bounded by River Mahanadi and Angul District to the north, Kandhamal District to the south, Nayagarh District to the east and River and Subarnapur District to the west. Covering a geographical area of 3098 sq km, the District lies 20 degree 22' to 20 degree 50' North Latitude and 83 degree 34' to 84 degree 49' East Longitude. Its district headquarter located at the town of boudh.

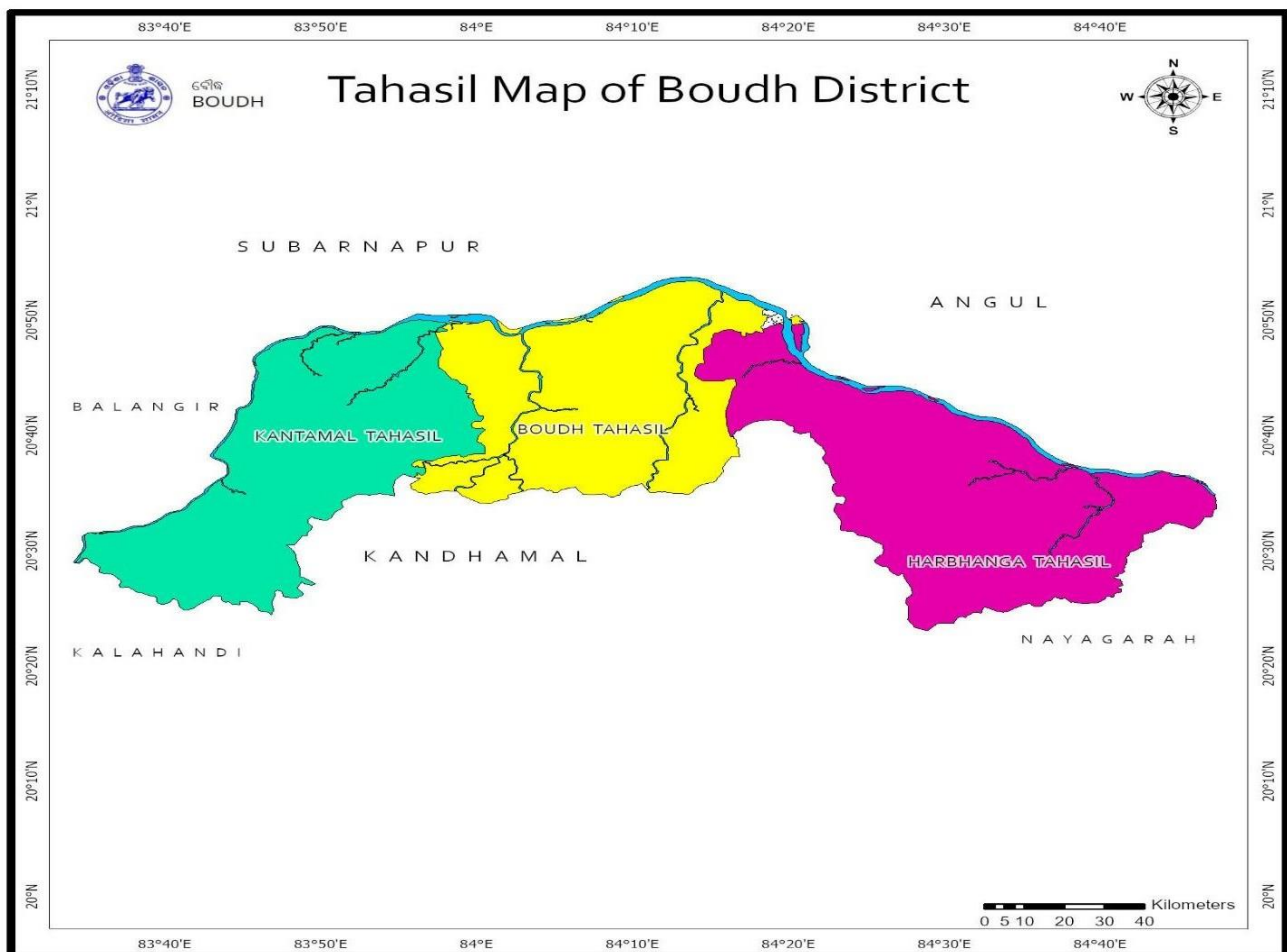
Administration is concerned, there is one sub division namely Boudh, 3 Tahasils, 3 Blocks, 1186 Villages and 69 Gram Panchayats functioning in the District.

The climatic condition of Boudh is much varied. The district comes under the ambit of Western Central Table Land characterized by hot and moist sub-humid climate. It has mainly 4 seasons. The summer season is from March to Mid-June, the period from Mid-June to September is the Rainy season, October and November constitute the post monsoon season and winter is from December to February. The best time to visit this district is during winter. There is a meteorological observatory in the district. The data of this observatory may be taken as representative of the meteorological condition of the whole district. The month of May as the hottest month reach to a daily maximum

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temperature of 44 degree Celsius. In association with the passage of western disturbances across north India during winter months, short spells of cold occur and the temperature drops down to 10 degree Celsius. The average annual rainfall of the district is 1510.33 mm. However, there is a great variation of rainfall from year to year.

Majority of the land area of Boudh district is under gross crop area i.e. 1,36,000 hectares (as per Statistical records 2012) and forest area covers 94,952.11 hectares. The district is well connected with other districts. The bounties of nature has endowed the district with rich forest abound in Sal, Sisal, Bija, Asana, Mahua flower trees etc. Forest produce of economic importance of the district mainly consists of Kendu Leaf, Tamarind, Mahua Flower and Seeds, Sal Seeds etc. tigers, elephants and spotted dears are the wild animal species residing in Boudh district. Collection of minor forest produce is the major source of livelihood of the people in the district. There is a crocodile sanctuary namely Satkosia Ganda at Tikarpada that attracts tourists from far places.



2. Overviewing mining activity

Out of the 44 sairats sources present in the district, 20 have been leased out and the operationalized while 24 sources (17 sand and 7 stone quarries) remain non-operationalized. Steps are being taken to lease out the remaining Sairat sources so as to add to Govt. revenue and prevent illegal theft of minor minerals.

There are very few mineral deposits in the district. They are Lime Stone, Graphite and Quartz, which are found in Harabhanga and Boudh Blocks. But the commercial Production/exploitation of these minerals are not Viable.

3. GENERAL PROFILE

a. Administrative setup:

| SI No | Item | Unit | Magnitude |
|-------|-------------------------|---------|--|
| 1 | Location | | |
| | Longitude | Degree | 83 ^o 34' to 84 ^o 49' East |
| | Latitude | Degree | 20 ^o 22' to 20 ^o 50' North |
| 2 | Geographical area | Sq.Km. | 3098 |
| 3 | Sub-division | Numbers | 1 |
| 4 | Tahasils | Numbers | 3 |
| 5 | Blocks | Numbers | 3 |
| 6 | NACs | Numbers | 1 |
| 7 | Police Station | Numbers | 6 |
| 8 | Gram Panchayats | Numbers | 69 |
| 9 | Villages | Numbers | 1182 |
| 10 | Assembly Constituencies | Numbers | 2 |

b. Area and Population:

The district has an area of 3098sq.kms,per the demography is concerned, the District has got total population of 441162 people with sex ratio 991 Females per 1000 Males (2011 Census),including total 221625 male population and 219537 female population. It ranks Boudh is 22nd in size and 29th in population among the thirty districts of Odisha. Total SC population of the District is 104934 and ST population is 55364 as per 2011 census.

temperature drops down to 10 degree Celsius. The average annual rainfall of the district is 1510.33 mm. However there is a great variation of rainfall from year to year.

d. Economy:

The economy of Boudh district is supported both by agriculture and small-scale industries.

Economy of Boudh district is primarily agrarian in nature. Fisheries and animal husbandry also contribute greatly to the economy. Small scales industries are also a booming sector in the economic scenario of Boudh district especially the textiles and mining industries. Paddy is the principle crop and is grown in about 75% of the total cultivated land area. The different irrigation projects include Salki Medium Irrigation project, Minor Irrigation project, Lift Irrigation project, Diversion weir, Dug well and others.

Fisheries are a huge profit-making sector of Boudh district. Available water resources have helped to enhance the growth of pisciculture in the district. Boudh fish farm is one of the good breeding and rearing government farm of the state of Odisha, having 8.5 acre of water area comprising 4.80 acre of breeder tanks and 3.70 acre nursery tanks. FFDA (fish farmers development agency) has been set up at Boudh district to popularize fish culture as an alternative way of employment generation and eradication of poverty. The institution provides training to the selected beneficiaries, assists in construction and renovation water resources, arrange credit from nationalized banks. The most important gain from FFDA is that aquaculture as a commercially gainful activity has been fully established.

Animal husbandry is an indispensable part of Boudh district's economic system. The prime objective of this sector is to boost the production of milk, egg and meat by adopting modern scientific method. To improve the socio-economic condition by providing self-employment opportunities to unemployed youth and to raise the family income is

also an important part of their agenda. More than 75% of the rural households' own livestock and earn their supplementary income. Livestock production is an essential part of the rural livelihood systems. Livestock production takes place in millions of small holders, scattered throughout Boudh District. Improvement in livestock production is an important alley for increasing the income of marginal and small farmers and landless laborer's, for the uncertainties of crop production. Animal health care service, breeding service, feed and fodder development, and marketing facilities are among the services provided by this sector.

e. Industry:

Industries are an upcoming sector to boost the economy of Boudh district. Small scale industries of boudh district include food-based industries, chemical based industries, engineering based industries, textile-based industries, forest-based industries and metallurgical based industries. The mining industry is quite a profit-making industry.

f. Agriculture:

Boudh district is situated at the central parts of the state. The main stay of the people of the district is agriculture and this continues to be practiced in a traditional method. The yield rate of the district is not also encouraging like any other districts of the state. As most of the people are depending on agriculture and the productivity in agriculture and allied sector is very low, the per capita income is very low. Paddy is the major crop of the district. Besides, vegetables, pulses, cereals and oilseeds are also grown in most parts of the district. The cash crop of the district is onion, groundnut, potato, tomato and sugarcane. Due to continuous drought and uneven rain fall, there has been no significant improvement in crop production, despite the sincere effort of all promotional agencies in the district. The district is situated on the Bank of River Mahanadi and Tel. Many factors are responsible for the industrial backwardness of the district, which needs special attention. The climate of the district is soft tropical and hut-dry in summer, cold-dry in winter and humid during raining season. Though, primary activity of the people is cultivation, many of the people depend upon collection of minor forest produce as well

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g. Power:

There is one electrical division operating in the district of Boudh to maintain power supply system. Boudh has jurisdiction over Boudh, Kantamal and Harbhanga. This electrical division encompasses 2 subdivisions; Boudh and Manamunda under Kantamal Block.

Details of different category of consumers are presented below.

| Sl.No. | Consumer category | No.of consumers |
|--------|-------------------|-----------------|
| 01. | DOM | 21864 |
| 02. | KTJ | 50215 |
| 03. | GP(LT) | 1619 |
| 04. | PUB.LTG | 20 |
| 05. | PLI | 1245 |
| 06. | OLI | 59 |
| 07. | PWW | 129 |
| 08. | LTIND(S) | 170 |
| 09. | HTIND(M) | 8 |
| 10. | SPP | 366 |
| 11. | LIND | 16 |

Power Supply:

Boudh district gets power supply through SOUTHCO from 132/33KV grid Sub- Station Boudh.

Sub transmission and distribution system:

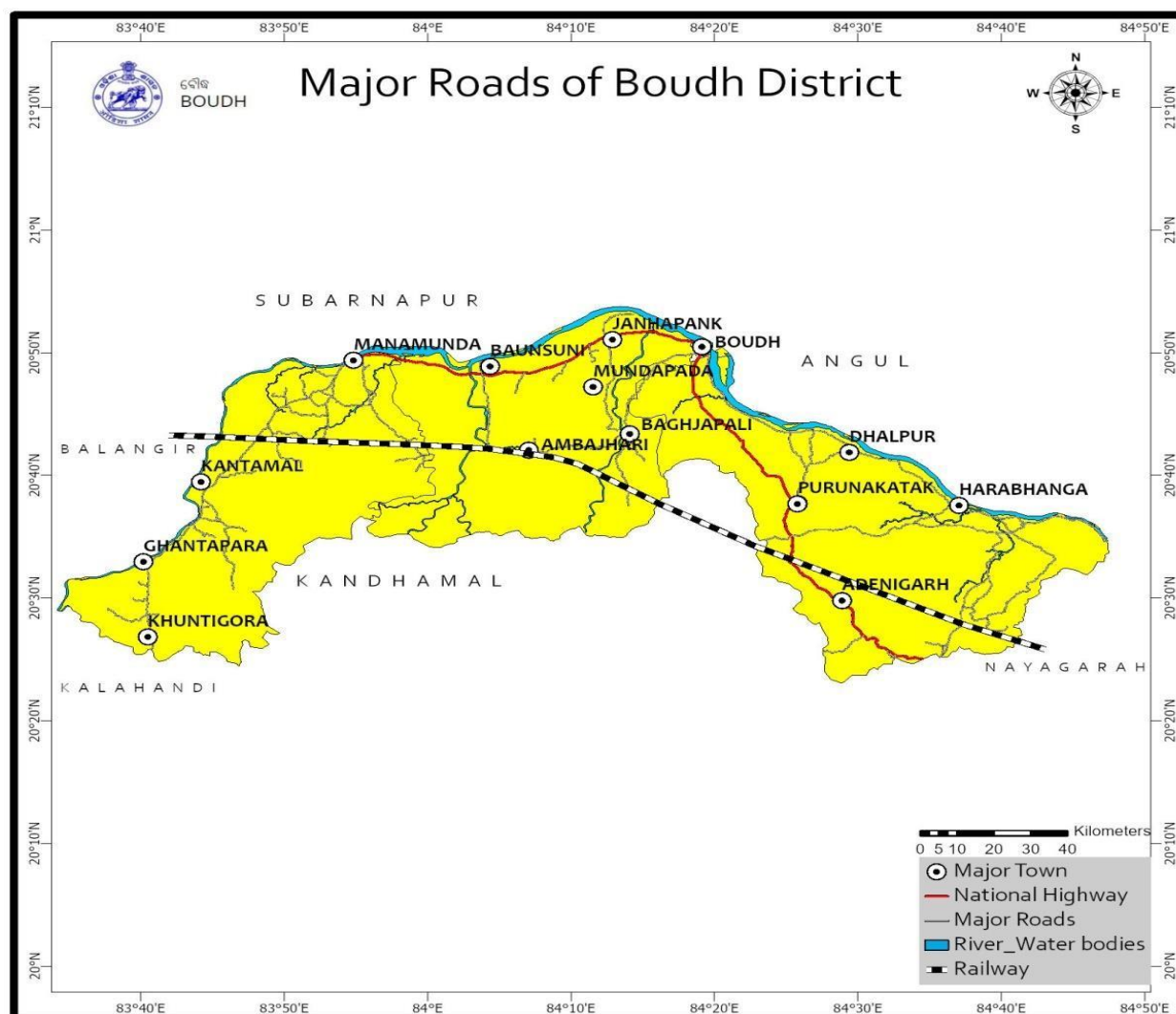
There are 2 number of 132/33 KV substations with 88 KV capacity and 23 distribution transformers. There are 23 numbers of 11KV feeder lines of 1042.92

h. Transport & Communication:

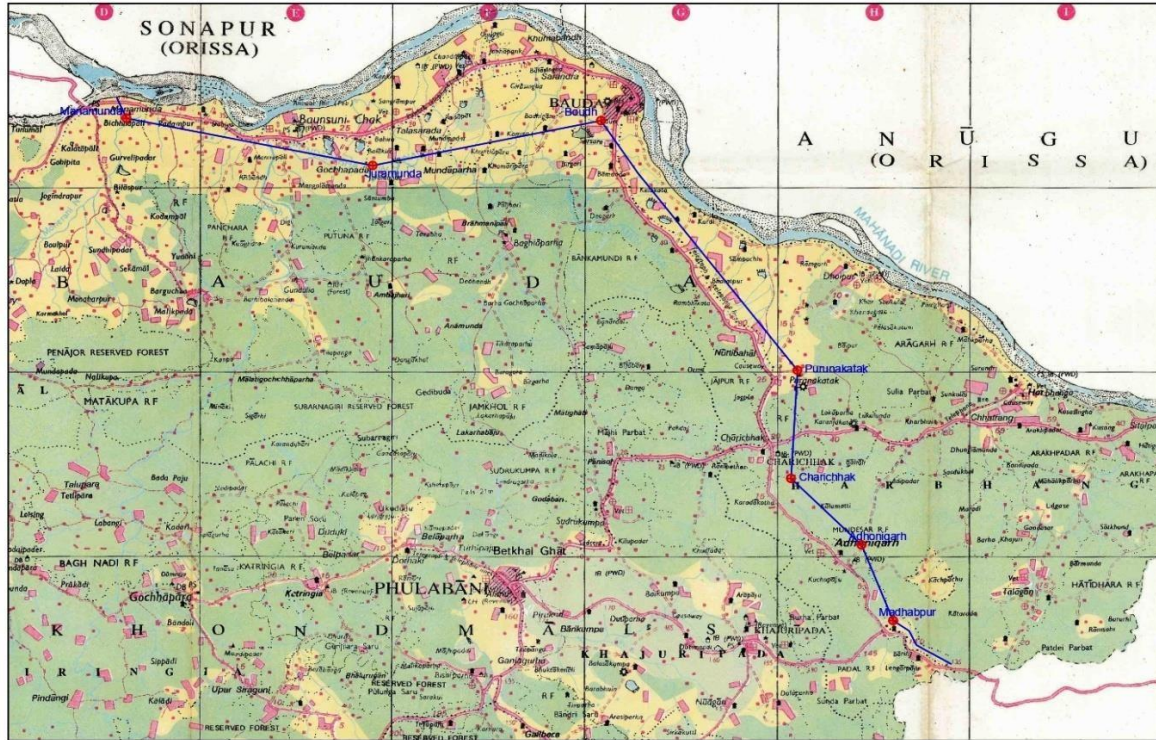
| Road Name | Distance in Km |
|---------------------|----------------|
| Forest road | 245 |
| National Highway | 109 |
| State Highway | 64 |
| Major district road | 53 |
| Other dist road | 34 |
| Rural road | 480 |
| Inter village road | 4494 |
| Intra village road | 208 |

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Boudh is well connected with road and rail with other district headquarter and the state capital Bhubaneswar. The distance of Boudh from Bhubaneswar is 240 Km. One can come to Boudh via National Highway No.224 (Khurdha-Balangir) via Nayagarh and Charichhak or can come by National Highway No. 42. via- Angul. Regular train services are available from Bhubaneswar viz. Bhubaneswar to Sambalpur Intercity Express,Hirakud Express etc. To reach Boudh one has to get down at Rairakhole station. From here one has to travel around 27 Km. either by Bus or taxi to reach Boudh. The nearest Airport is at Bhubaneswar.



PROPOSED RAILWAY STATION IN BOUDH DISTRICT

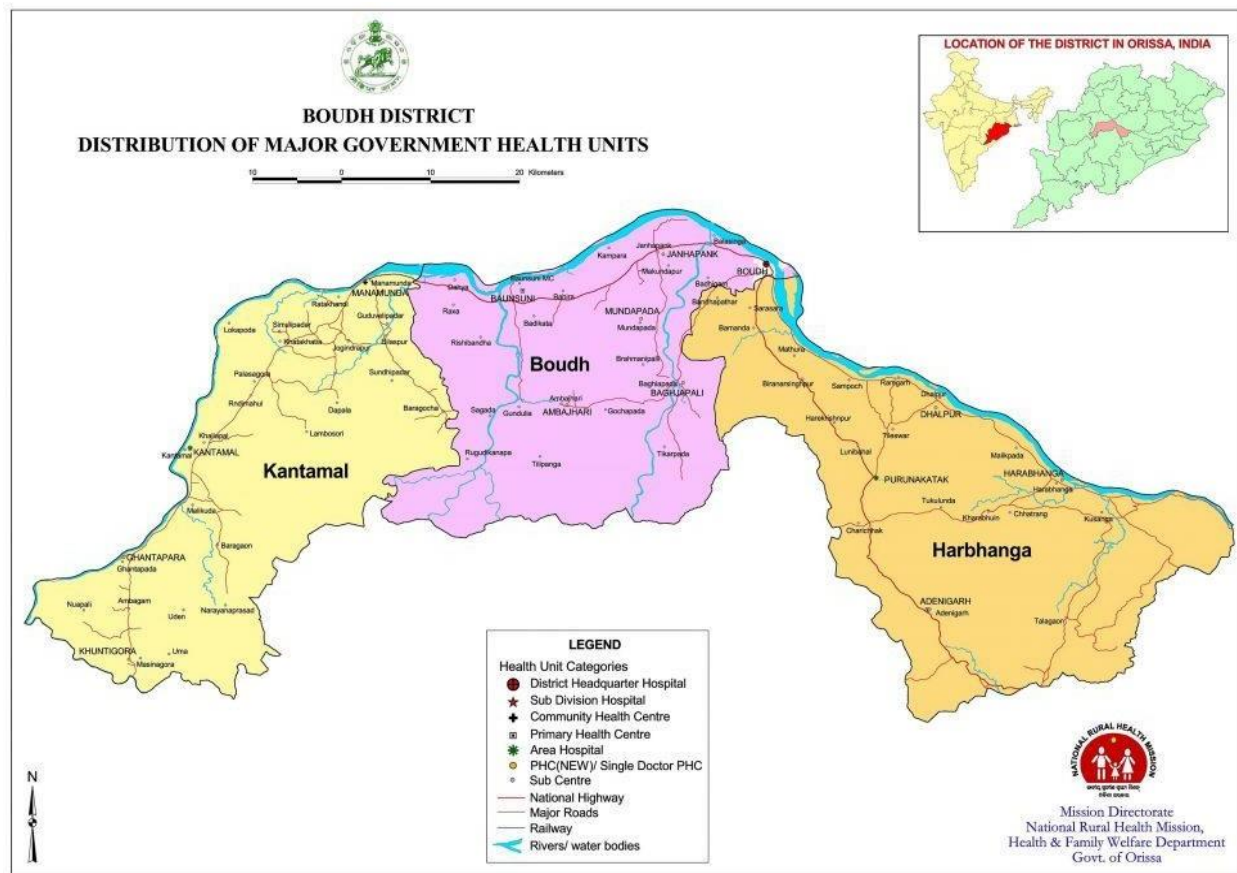


LEGEND

-  PROPOSED RAILWAY STATION
-  RAILWAY TRACK

i. Health

The medical facilities are provided by different agencies like Govt. Private Individuals and voluntary organizations in the district. There are mainly five community health centre such as CHC, Baunsuni, CHC Harabhanga, CHC Kantamal, CHC Manamunda and CHC Purunakatak with its DDH at Boudh.

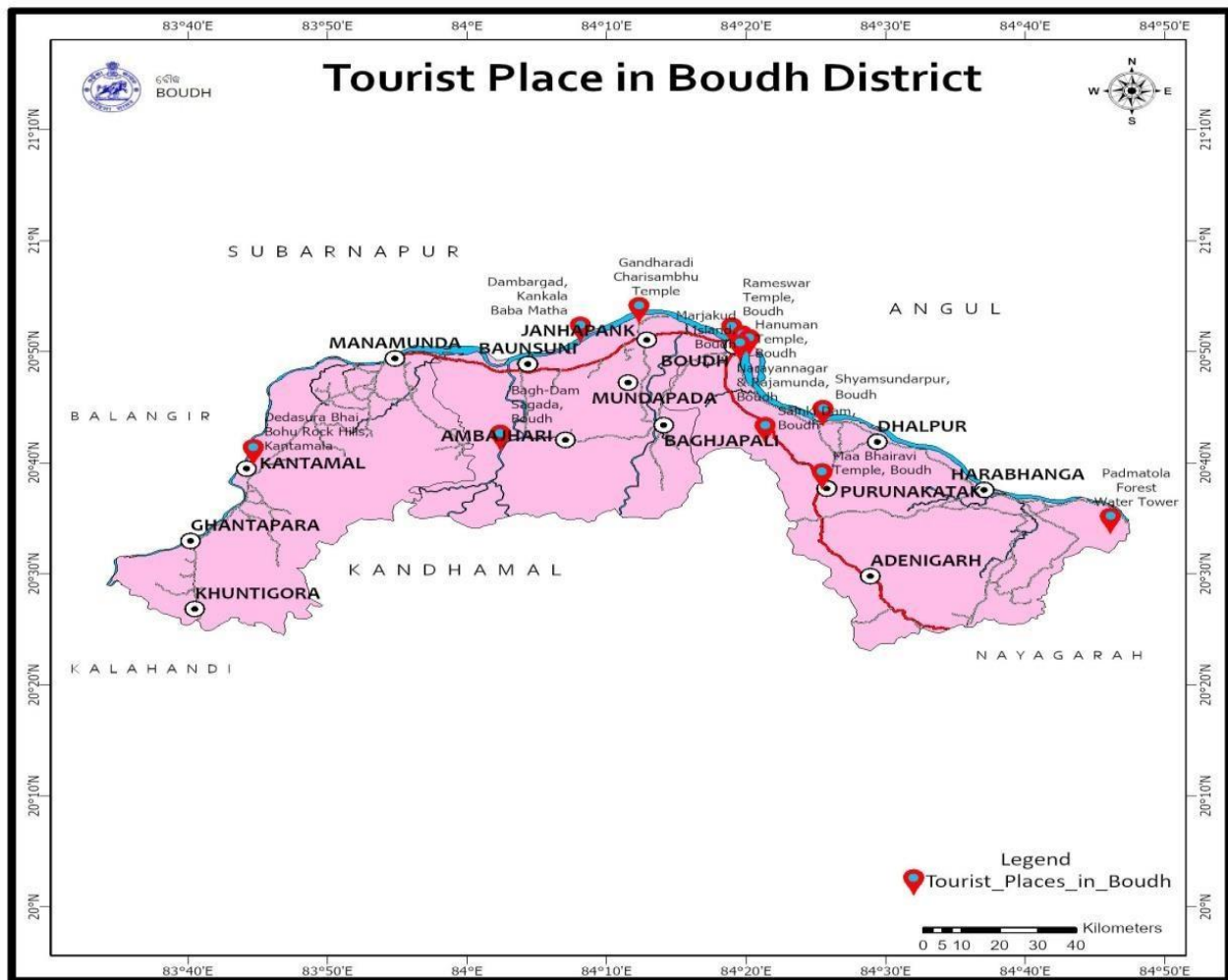


j. Tourist places:

Boudh is known for its century-old temples, ancient Buddha statues and caves. With the spread of saivism, Vaishnavism and numbers of other culture numerous shrines dedicated to various deities were found in this region. There are three remarkable Buddha statues in Boudh town and around, Ramnath Temple, Hanuman Temple, Madan Mohan Temple Jogindra villa places considered tourist places of district.

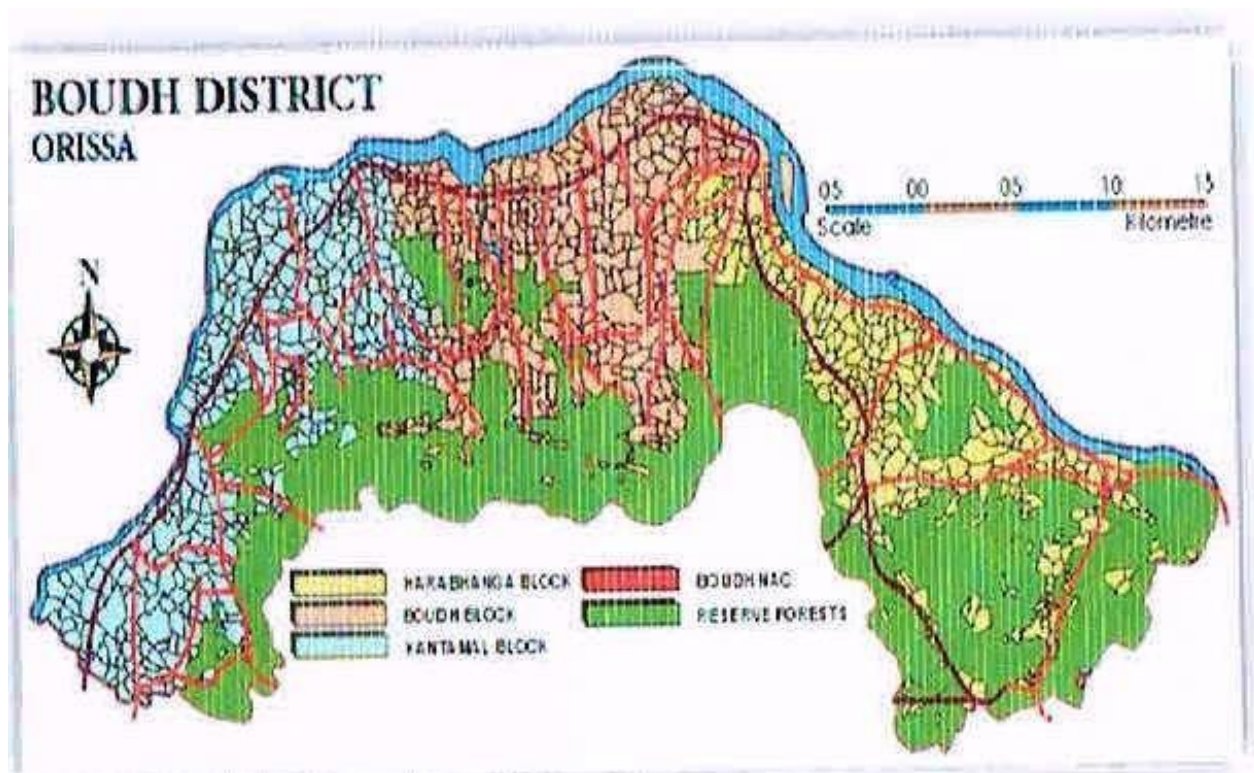
DISTRICT SURVEY REPORT (DSR) BOUDH, DISTRICT

- (i) Chari Sambhu Temple, Jagati
- (ii) Bhairabi Mandir, Purunakatak
- (iii) Marjakuda Island
- (iv) Shyamsundarpur
- (v) Bagha Dam, Sagada
- (vi) Salnki Dam
- (vii) Hanuman Temple
- (viii) Dambarugada
- (ix) Narayan Nagar & Rajamunda
- (x) Rameswar Temple
- (xi) Padmatola Forest watch Tower
- (xii) Dedhaswr Bhai Bohu Rock hills, Kantamal



k. Forest areas:

The total forest area of the district is 1277.17 Sq. kilometer which is 41.22% to total Forest area indicating more than the state average and ideal average i.e. 30% of the total geographical area of the district. The forest produce of economic importance in the district are Bamboo, Kendu Leaves, Mahua Flowers/Seeds, Siali Leaves, Timber, Fire wood, Myrabolam, Gendulingama and Tamarind. Over the years, forest suffered serious depletion due to relentless pressure arising forever increasing demand for fuel wood, fodder, and timber.



l. Education:

The District Education Office, Addl. District Education Officer, and the Block Education Officers Boudh looks after the General Administration of schools under school and Mass education Department in Boudh District. The DPC looks after the Elementary Education of Boudh District. A number of educational Institutions are established to impart education to the children of this District. The following figure shows the no. of Educational Institutions:

| | |
|--------------------------|-----|
| No .of elementary school | 767 |
| No of high school | 41 |
| No. of colleges | 22 |

4. GEOLOGY

Geologically the area forms part of the Eastern Ghats Super Group and is divided into khondalite group, Charnockite group and migmatite group. The alluvium is of Pleistocene to recent age. Khondalite group of rocks are of metasedimentary origin and represented by quartzgarnet-sillimanite schist and gneisses without graphite, sillimanite quartzite and quartzsillimanitesericite schist occurring as enclaves within granite. Occurrences of basic charnockite are very restricted as bands or lensoid patches within the granites. Intermediate or acid charnockite are common being distributed throughout the hilly area. Migmatite group comprising augengneiss, garnetiferous leucogranites are the most abundant rock types of the area. This constitutes high hill ranges at several places towards north and south and smooth rolling topography in the plains. Rocks of lower Gondwana group especially the Talchir formation is exposed in the northern part of the area. The contact between Talchir and older rocks is faulted at places. Pockets of laterites commonly found in khondalite bearing ridges mainly over the hill tops. The laterite exposed in the area is of Cainozoic age. The river beds of the area are covered by recent alluvium.

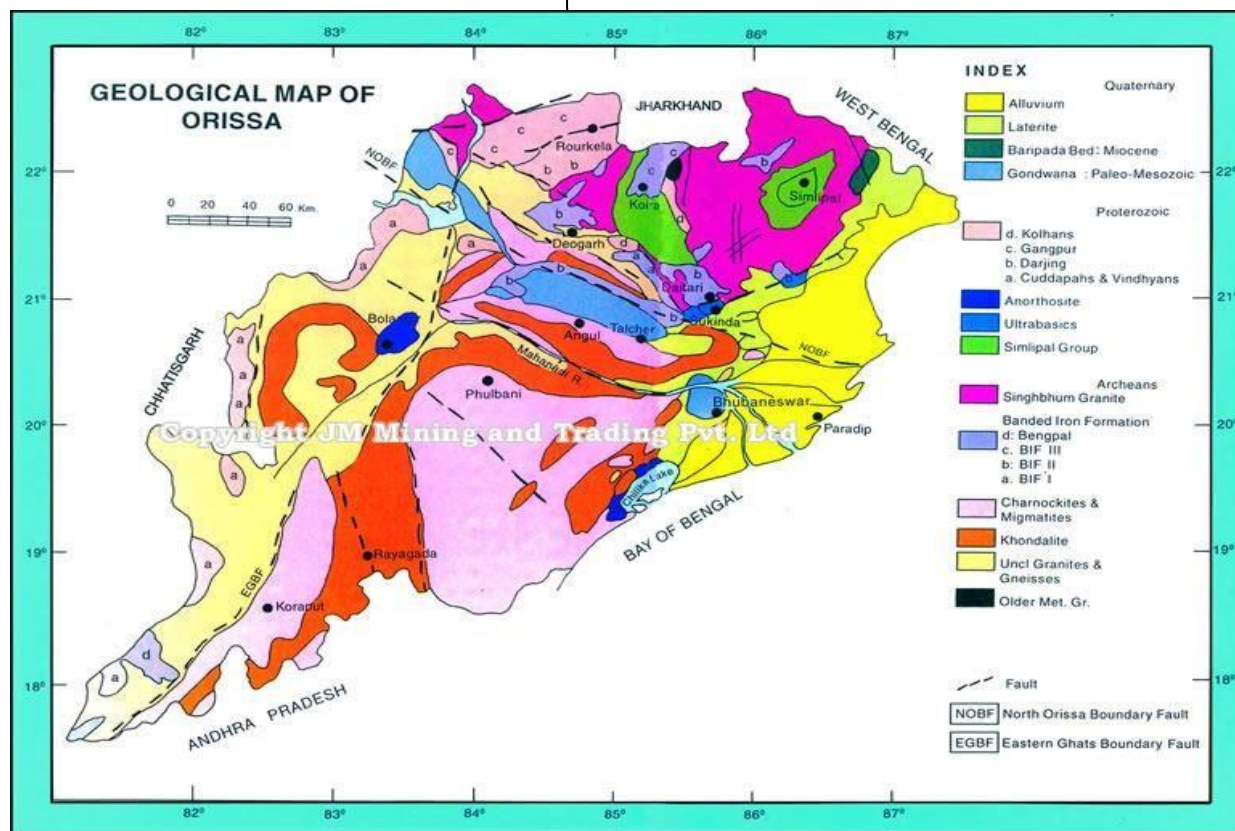
The general strike of the foliation is WNW-ESE to ENE-WSW through NE-SW and NS.

The amount of dip ranges between 50° to sub-vertical. There is one major shear zone near Ranipathar area. Mylonite and silicification occur along this zone at several places. Both vertical as well as inclined joint planes are observed. Numbers of fault planes occur in the area with varieties of strike direction. A number of lineaments are deciphered in this area from LANDSAT imagery. Two major sets of these lineaments are deciphered running along NW-SE to NNWSSE and NS directions.

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STRATIGRAPHY :

| Age | Super Group | Group | Lithology |
|---------------|-----------------------------|------------------------------------|---|
| Late Holocene | | Present day Flood plain deposit | soil / Alluvium |
| Cainozoic | | | Laterite / Lateritic bauxite Garnetiferous Granite gneiss Leptynite |
| Archaean | Eastern Ghat Super Group | Charnockite Group | Acid/intermediate Charnockite Basic Charnockite |
| | | Khondalite Group | Quartz-granet- Sillimanite Schist/ gneiss Quartzite Calc silicate |



5. DRAINAGE AND IRRIGATION PATTERN

| DRAINAGE SYSTEM WITH DESCRIPTION OF MAIN RIVER | | | | | | | | |
|--|-------------------|-----------------------------|---|--------------------------------------|-------------------------|--------------------------------|------------------------------------|--|
| Sl. No | Name of the River | Place of origin | Attitude of origin | Total length in the district (in km) | Area drained (sq km) | % Area drained in the district | Process of deposition of sediments | Volume of sand deposited in last 3yrs(year wise) |
| a | b | c | d | e | f | g | h | i |
| 1 | Salki | Baliguda | Lat 20.85 89.09/ Log. 84 24'30.78 | 83 | 209.17 /1767. 192 | 6.07% | 0 | 0 |
| 2 | Bagh | Eastern Ghat | Lat. 18 50 23.96/ Log. 83 00 03.86 | 78 | 108.74 /1106. 00 | 3.15% | 0 | 0 |
| 3 | Mahanadi | Nagri Town, Chhattisgarh | North | | | | | |
| 4 | Tel | | West | | | | | |

Boudh district is rich in water resources. A series of check dams have been constructed across various distinct nallahs for in-stream storage, ground water recharge, incidental irrigation during late kharif and Rabi by storing water at the end of monsoon mainly through lifting devices as well as canal flow, irrigation use of water flowing down drainage channels, and other uses like bathing, washing, recreation etc. By the end of July 2019, 861 nos. of Check Dams have been accorded administrative approval. Out of these, 789 nos. of check dams have been completed achieving an ayacut of 4973 Ha., 52 nos of Check Dams are in progress and 20 nos of Check dams are dropped due to various reasons.

DRAINAGE MAP OF BOUDH DISTRICT



Figure 2 River system in Odisha

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The variation of ground water table in the district is as follows:

| Depth of Water level (mbgl)/ Period | April | August | November | January |
|-------------------------------------|-------|--------|----------|---------|
| Minimum | 2.15 | 0.80 | 1.1 | 1.65 |
| Maximum | 12.6 | 10.40 | 9.4 | 11.0 |

8. RAINFALL & CLIMATIC CONDITION

The climate of the district is typically to sub-tropical with three district seasons e.g. summer, winter and Monsoon. December is the coldest month with mean daily average temperature of 20-degreeCelsius which reaches 42 degree Celsius in May. The rain fall in the area is mostly from the South west monsoon lats from middle of June to October. The average annual rainfall varies varies from 1031.21 mm to 1569.50 mm.

| MONTH WISE RAINFALL (mm) DATE OF THE DISTRICT (Last 3 Years) (DISTRICT OFFICE) | | | | | | | | | | | | | |
|--|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|-------|-------|---------|
| F. Year /month | JAN | FEB | MAR | APRIL | MAY | JUNE | JULY | AUG | SEP | OCT | NOV | DEC | TOTAL |
| 2006 | 0 | 0 | 50.67 | 18 | 88.33 | 174.33 | 425.2 | 788.3 | 154.03 | 11 | 20.67 | 0 | 1730.53 |
| 2007 | 0 | 0 | 0 | 11.33 | 45 | 436.31 | 243.13 | 207.95 | 431.93 | 9 | 0 | 0 | 1384.65 |
| 2008 | 51.33 | 3 | 8.67 | 18.67 | 0 | 366.15 | 306.87 | 407.33 | 350.17 | 17 | 0.67 | 0 | 1529.86 |
| 2009 | 0 | 0 | 0 | 0 | 0 | 51.23 | 641.07 | 352 | 155.27 | 26.87 | 0 | 0 | 1226.44 |
| 2010 | 3 | 0 | 0 | 0 | 61.33 | 153.67 | 273.57 | 249.23 | 225.27 | 74.47 | 21.07 | 24.87 | 1086.48 |
| 2011 | 0 | 24.2 | 0 | 27.53 | 37.73 | 116.98 | 139.07 | 473.93 | 444.4 | 0 | 0 | 0 | 1263.84 |
| 2012 | 0 | 0 | 0 | 0 | 0 | 167.13 | 325.7 | 468.25 | 153.33 | 78.67 | 25.67 | 0 | 1218.75 |
| 2013 | 0 | 0 | 0 | 5 | 14.34 | 274.03 | 266.23 | 185.03 | 147.93 | 277.63 | 0 | 0 | 1170.19 |
| 2014 | 0 | 0 | 0 | 0 | 125.47 | 36.47 | 669.33 | 458.63 | 342.97 | 57.77 | 0 | 0 | 1690.64 |
| 2015 | 0.33 | 0 | 0.71 | 74 | 22.83 | 287.83 | 267.33 | 274.53 | 152.57 | 1.1 | 0 | 17.37 | 1098.6 |
| 2016 | 0 | 1.33 | 20 | 0 | 16.13 | 147.87 | 202.6 | 368.06 | 337.43 | 70.73 | 0 | 0 | 1164.15 |
| 2017 | 0 | 0 | 3.73 | 0 | 1.33 | 322.63 | 282 | 192.03 | 202.23 | 152.87 | 16 | 0 | 1172.82 |
| 2018 | 0 | 0 | 0 | 29.63 | 57.33 | 156.1 | 507.87 | 359.13 | 300.4 | 137.33 | 2 | 72.13 | 1621.92 |
| 2019 | 2.33 | 23.43 | 34.8 | 34.4 | 26.43 | 164.5 | 294.13 | 519.83 | 337.9 | 94.33 | 0 | | 1532.08 |

9. DETAILS OF MINING OF ROAD METAL

Attached vide Annexure- I

10. DETAILS OF ROYALTY COLLECTED (Rs)

| Sl. No | Name of Tahasil | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
|--------------|-----------------|-----------------|----------------|----------------|----------------|
| 1 | Boudh | 1458378 | 1458378 | 1458378 | 4232106 |
| 2 | Kantamal | 10311910 | 0 | 13163 | 409603 |
| 3 | Harabhanga | 1518838 | 1869450 | 2153450 | 2177630 |
| Total | | 13289126 | 3327828 | 3624991 | 6819339 |

15. QUALITY/ GRADE OF MINERAL

Road metal/building metals of the district are very much suitable for various construction purposes after its crushing. The in situ rocks are fractured making these unsuitable for decorative purpose.

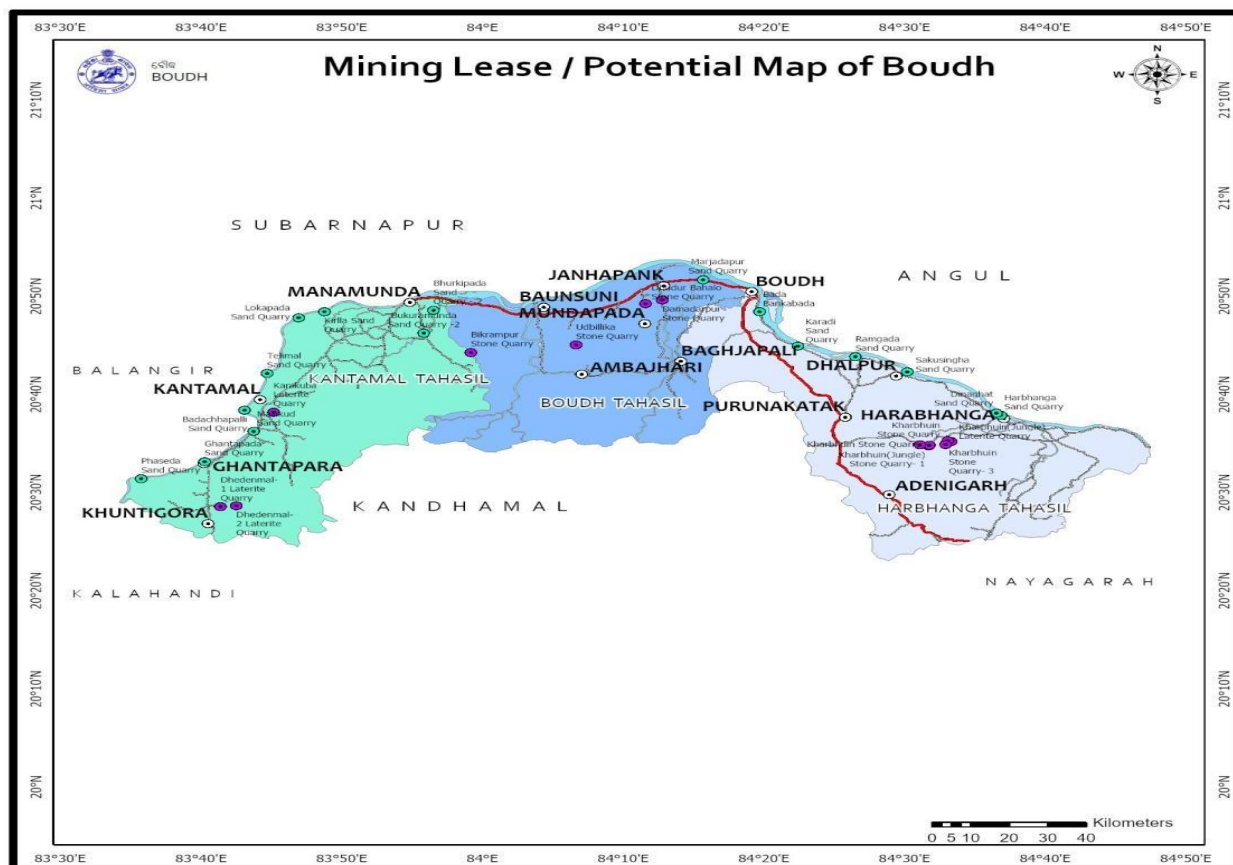
16. USE OF MINERAL

Road metal/building metals of the district are used mainly for various construction purposes like road making, concrete making, dams etc.

17. DEMAND & SUPPLY OF THE MINERAL

The tentative annual demand is to the tune of 5 lakh cum of road metal and is mainly supplied from different Tahasil of the district and adjoining districts of Koraput and Gajapati.

18. MINING LEASES MARKED ON THE MAP OF THE DISTRICT.



19. DETAILS OF AREA WHERE THERE IS A CLUSTER OF MINING LEASES

Not applicable

20. DETAILS OF ECO-SENSITIVE AREA

The Tikarpada Wild life Santury Borders Harabhanga Block of Boudh Odisha Eco Sensitive area.



21. IMPACT ON THE ENVIRONMENT (AIR, WATER, NOISE, SOIL FLORA & FAUNAL, LAND USE, AGRICULTURE, FOREST ETC.) DUE TO MINING

Activities attributed to Mining:-

Generally, the environment impact can be categorized as either primary or secondary. Primary Impacts are those, which are attributed directly by the project. Secondary impacts are those which are indirectly induced and

typically include the associated investment and changed pattern of social and economic activities by the proposed action.

The impact has been ascertained for the project assuming that the pollution due to mining activity has been completely spelled out under the base line environmental status for the entire ROM which is proposed to be exploited from the mines.

Impact on Ambient Air

Mining operation are carried out by opencast manual, semi mechanized/ mechanized methods generating dust particles due to various activities likes, excavation, loading, handling of mineral and transportation. The air quality in the mining areas depends upon the nature and concentration of emissions and meteorological conditions.

The major air pollutions due to mining activities include:-

- Particulate matter (dust) of various sizes.
- Gases, such as sulphur dioxide, oxides of nitrogen, carbon monoxide etc from machine & vehicular exhaust.

Dust is the single air pollutant observed in the open cast mines. Diesel operating drilling machines, blasting and movement of machineries/ vehicles produce No_x , SO_2 and CO emissions, usually at low levels. Dust can be of significant nuance surrounding land user and potential health risk in some circumstances.

Water Impact

Sometimes the mining operation leads to intersect the water table causing ground water depletion. Due to the interference with surface water sources like river, nallah etc drainage pattern of the area is altered.

Noise Impact

Noise pollution mainly due to operation of machineries and occasional plying of machineries. These actives will create noise pollution in the surrounding Area.

Impact on Land Environment

The topography of the area will change certain changes due to mining activity which may cause some alteration to the entire eco system.

Impact on Flora & Fauna

The impact on biodiversity is difficult to quantify because of its diverse and dynamic characteristics.

Mining activities generally result in the deforestation, land degradation, water, air noise pollution which directly or indirectly affect the faunal and flora status of the project area.

However, occurrence and magnitude of these impacts are entirely dependent upon the project location, mode of operation and technology involved.

22. REMEDIAL MEASURES TO MITIGATE THE IMPACT OF MINING ON THE ENVIRONMENT:-

Air

Mitigation measures suggested for air pollution controls are to be based on the baseline ambient air quality of the project/cluster area and would include measures such as:

- Dust generation shall be reduced by using sharp teeth of shovels.
- Wet drilling shall be carried out to contain the dust particles.
- Controlled blasting techniques shall be adopted.
- Water spraying on haul roads, service roads and overburden dumps will help in reducing considerable dust pollution.
- Proper and regular maintenance of mining equipment's have to be undertaken.
- Transport of materials in trucks to be covered with tarpaulin.
- The mine pit water can be utilized for dust suppression in and around mine area.
- Information on wind direction and meteorology are to be considered during planning, so that pollutants, which cannot be fully suppressed by engineering techniques, will be prevented from reaching the nearby agricultural land, if any.

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- Comprehensive greenbelt around overburden dumps and periphery of the mining projects/ clusters has to be carried out to reduce to fugitive dust transmission from the project area in order to create clean & healthy environment.

Water

- Construction of garland drains and setting tanks to divert surface run-off of the mining area to the natural drainage.
 - Construction of checks dams/ gully plugs at strategic places to arrest silt wash off from broken up area.
 - Retaining walls with weep hole are to be constructed around the mine boundaries to arrest silt wash off. The mined out pits shall be covered in to the water reservoir at the end of mine life. This will help in recharging ground water table by acting as a water harvesting structure.
 - Periodic analysis of mine pit water and ground water quality in nearby villages are to be undertaken.
 - Domestic sewage from site office & urinals/ latrines provided within ML/QL areas is to be discharged in septic tank followed by soak pits.

Noise

- Periodic maintenance of machineries, equipments shall be ensured to keep the noise generated within acceptable limit.
- Development of thick green belt around mining/cluster area, haul roads to reduce the noise.
- Provision of earplugs to workers to exposed to high noise generating activities like blasting, excavation site etc. Worker and operators at work sites will be provided with earmuffs.
- Conducting periodical medical checkup of all workers for any noise related health problems.
- Proper training to personnel to create awareness about adverse noise related effects.
- Periodic noise monitoring at locations within the mining area and nearby habitations to assess efficacy of adopted control measures.
- During blasting optimum spacing, burden and charging of holes will be made under the supervision of competent qualified mines foreman, mate etc.

Biological Environment

- Development of green belt/gap filling saplings in the safety barrier left around the quarry area/ cluster area.
- Carrying out thick greenbelt with local flora species predominantly with long canopy laves on the inactive mined out upper benches.
- Development of dense poly culture plantation using local floral species in the mining areas at conceptual stage if the mine is not continued much below the general ground level.
- Adoption of suitable air pollution control measures as suggested above. Transport of materials in trucks covered with tarpaulin.

23. RECLAMATION OF MINED OUT AREA (BEST PRACTICE ALREADY IMPLEMENTED IN THE DISTRICT, REQUIREMENT AS PER RULES AND REGULATION, PROPOSED RECLAMATION PLAN):-

As per statute all mines/quarries are to be properly reclaimed before final closure of the mine. Reclamation of exhausted mines are planned to be undertaken in below three possible means:

1. If, sunstantial amount of waste is there, the exhausted quarry can be fully or partly backfilled using the stored waste. The backfilled areas are to be brought under plantation of local species.
2. If the generation of waste is much less as in the case of minor mineral mining, the exhausted quarries can be reclaimed by
 - a. Plantation on the broken up surface if the depth of quarry is not much below the surrounding surface level.
 - b. Converted to water reservoir after stabilization of the slopes if the exhausted quarry continues much below the surrounding wire fencing or retaning wall with plantation from the safety point of view.

Most of the quarry/mining lease areas are yet to be exhausted from are point of view. Hence, reclamation would be taken up only after exhaustion of the ore/mineral content from these areas. The exhausted minor mineral quarries of the district have been converted to water reservoirs.

24. RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

The only risk involved related to mining of minor mineral excepting natural calamities is slope failure and probable accidents due to high and ill

maintained bench walls. This can only be addressed through making of regular benches and undertaking mining in benching pattern.

The disaster management plan (DMP) is supposed to be a dynamic, changing, document focusing on continual improvement of emergency response planning and arrangements.

The disaster management plan is to be aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of the disaster management plan, it should be widely circulated through rehearsal/induction conducted by the respective department from time to time.

General responsibilities of employees' during an emergency:

During an emergency, it becomes more enhanced and pronounced when an emergency warning is raised, the worker in charge, should adopt safe and emergency shut down and attend to any prescribed duty. If no such responsibility is assigned, the workers should adopt a safe course to assembly point and wait instructions. He should not resort to spread panic. On the other hand, he must assist emergency personnel towards objectives of DMP.

Co-ordination with local authorities:

The Mine Manager who is responsible for emergency will always keep a jeep ready at site. In case of any eventuality, the victim will be taken to the nearby hospitals after carrying out the first aid at the site. The manager should collect and have adequate information of the nearby hospitals, fire station, police station, village Panchayat heads, taxi stands, medical shops, district revenue authorities etc. and use them efficiently during the case of emergency.

25. DETAILS OF THE OCCUPATION HEALTH ISSUES IN THE DISTRICT. (LAST FIVE-YEAR DATA OF NUMBER OF PATIENTS OF SILICOSIS & TUBERCULOSIS IS ALSO NEEDS TO BE SUBMITTED):-

As per the guidelines of the Mine Rules 1995, occupational health safety has been stipulated by the ILO/WHO. The proponent's will take necessary precautions to fulfill the stipulations. Normal sanitary facilities have to be

provided within the lease area. The management will carry out periodic health checkup of workers.

Occupational hazards involved in mines are related to dust pollution, noise pollution, blasting and injuries from moving machineries & equipment and fall from high places. DGMS has given necessary guidelines for safety against these occupational hazards. The management has to strictly follow these guidelines.

All necessary first aid and medical facilities are to be provided to the workers. The mine shall be well equipped with personal protective equipment (PPE). Further, all the necessary protected equipments such as helmet, safety goggles, earplugs, earmuffs etc are to be trained to handle fire fighting equipments.

There is no case of Silicosis found in Sambalpur within the time frame mentioned above.

26. PLANTATION OF GREEN BELT DEVELOPMENT IN RESPECT OF LEASES ALREADY GRANTED IN THE DISTRICT

As most of the minor mineral mines/quarries of the district are yet to be exhausted of their mineral content no sport of reclamation measures including plantation has been undertaken excluding gap plantation of local species in the peripheral safety zones of the quarries/ clusters and in some of the haul roads.

27. ANY OTHER INFORMATION

Nil

ANNEXURE-I

**ROAD METAL/BLACK STONE/ WHITE STONE/ ALREADY
LEASED OUT AND EXECUTED**

| Sl. No. | Name of Tahasil | Name of Minor Mineral | Name of village | Name of lessee | Mining lease grant order No & date | Period of QL | | Date of commencement of minig operation | Status (working / non-working/ Temp working for depatch) | Captiv e or Non-captiv e | LtNo & date of grant of EC | Location of Resource (GPS co-ordinates or Khata & Plot No) (Sketch map to be attached) | Meth od of minin g | Area leased for minera l conce ssion (insq m) | Mineable mineral potential as per approved mining plan (in cum) |
|--|-----------------|-----------------------|-----------------|--------------------|------------------------------------|--------------|---------|---|---|--------------------------|----------------------------|--|--------------------|---|---|
| | | | | | | From | To | | | | | | | | |
| Stone Sources under Boudh Tahasil | | | | | | | | | | | | | | | |
| 1 | Boudh | Stone | Udubilka-I | Rameswara Agarwal | | 2020-21 | 2024-25 | - | Working | Non-captive | | K-121,P-757 & 752 | OC | 10117 | 16753 |
| 2 | Boudh | Stone | Udubilka-II | Srikanta Ku.Mishra | | 2020-21 | 2024-25 | - | Working | Non-captive | - | K-121,P-756 | OC | 8094 | 55818 |
| 3 | Boudh | Stone | Udubilka-III | Srinibash Mishra | | 2020-21 | 2024-25 | - | Working | Non-captive | - | K-121,P-753/A | OC | 8094 | 56268 |
| 4 | Boudh | Stone | Udubilka-IV | Santanu Ku.Thaty | | 2020-21 | 2024-25 | - | Working | | - | K-121,P-753/B | OC | 8094 | 59985 |

| | | | | | | | | | | | | | | | |
|---|--------------|-------|--------------------|-----------------------------------|----------------------|-------------|-----------------|---------|---------|---------------------|---|-------------------|----|-------|-------|
| 5 | Boudh | Stone | Udubilka -VI | | | | | | | | | | OC | | |
| 6 | Boudh | Stone | Damadar pur | | | | | - | | | - | | OC | | |
| 7 | Boudh | Stone | Palsadad ar-1 | | | | | - | | | - | | OC | | |
| 8 | Boudh | Stone | Palsadad ar-2 | | | | | | | | | | OC | | |
| 9 | Boudh | Stone | Palsadad ar-3 | | | | | | | | | | OC | | |
| 10 | Boudh | Stone | Dhundu bahalo | | | | | - | | | - | | OC | | |
| Stone Sources under Kantamal Tahasil | | | | | | | | | | | | | | | |
| 1 | Kanta mal | Stone | Dedhanm al-1 | Swad hin Ku Sahu | 560/ 25.0 1.17 | 2017 -18 | 202 1- 22 | 5.02.19 | Working | captiv e | - | K-195, P- 1723 | OC | 2428 | 6714 |
| 2 | Kanta mal | Stone | Dedhanm al-2 | | | | | - | | | | | | | |
| 3 | Kanta mal | Stone | Kanikupa -2 | Sriba nta Ku. Mishr a | 2023 /23. 7.14 | 201 5-16 | 2019 -20 | - | Working | Non- captiv e | - | K-55, P- 268 | OC | 16187 | 90096 |
| 4 | Kanta mal | Stone | Bikrampu r-1(A) | Santa nu Ku. Mishr a | | | | - | Working | | - | K-32, P-109 | OC | | |

| | | | | | | | | | | | | | | | | |
|---|------------|-------|----------------|--------------------|------------|---------|---------|----------|---------|----------|--------------|--------------|---------------|-------|--------|---|
| 5 | Kantamal | Stone | Bikrampur-1(B) | Santanu Ku. Mishra | | | | | - | Working | | - | K-32, P-109 | OC | | |
| 6 | Kantamal | Stone | Badpal - 2 | - | - | - | - | - | - | - | - | - | | OC | | |
| 7 | Kantamal | Stone | Sadanan dapur | - | - | - | - | - | - | - | - | - | | OC | - | - |
| 8 | Kantamal | Stone | Kanikupa | - | - | - | - | - | - | - | - | - | | OC | - | - |
| Stone Sources under Harabhanga Tahasil | | | | | | | | | | | | | | | | |
| 1 | Harabhanga | | Kharabhu in-2 | Budhi Sagar Mishra | 15 | - | - | - | - | - | - | - | K-193, P-1463 | OC | | |
| 2 | Harabhanga | Stone | Kharabhu in-3 | Dillip Ku. Mohanty | 846/2.4.15 | 2015-16 | 2019-20 | 02.04.15 | Working | captiv e | 4510/19.8.18 | K-194, P-275 | OC | 28328 | 164259 | |
| 3 | Harabhanga | Stone | Kharabhu in-1 | - | - | - | - | - | Working | | - | K-2, P-50 | OC | 20922 | | |
| 4 | Harabhanga | Stone | Kharabhu in-4 | - | - | - | - | - | Working | | - | K-2, P-1 | OC | 21570 | | |
| 5 | Harabhanga | Stone | Kharabhu in-5 | - | - | - | - | - | Working | | - | K-2, P-2 | OC | 21853 | | |
| 6 | Harabhanga | Stone | Baisipada | - | - | - | - | - | - | - | - | K-71, P-599 | OC | | | |

ANNEXURE III

POTENTIAL ROAD METAL/ BLACKSTONE/WHITESTONE OF THE DISTRICT

| Sl. No. | Name of Tahasil | Name of village | Status | Name of Minor Mineral | Location of the Source (Total Hillock) recommended for mineral concession (GPS coordinates or Khata & Plot No) (Sketch map to be attached) | | Area of the mineral potential patch (in sq m) | Average height of potential patch (in m) | Mineable mineral potential (in cum) |
|---------|-----------------|-----------------|--------|---------------------------|--|---|---|--|-------------------------------------|
| | | | | | Khata | Plot | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | | 7 | 8 | 9 |
| 1 | Boudh | Udubilika | New | Udubilika-6 Stone Quarry | | | - | - | - |
| 2 | Boudh | Damodarpur | New | Damodarpur Stone Quarry | 161 | 17,30,53,64,67,70,91,20,6,54,697,7,16,790 | - | - | - |
| 3 | Boudh | Palsadadar | New | Palsadadar-1 Stone Quarry | 1 | 1/C | 8093.71 | - | - |
| 4 | Boudh | Palsadadar | New | Palsadadar-2 Stone Quarry | | | - | - | - |
| 5 | Boudh | Palsadadar | New | Palsadadar-3 Stone Quarry | | | - | - | - |
| 6 | Boudh | Dhudurbahalo | New | Dhudurbahalo Stone Quarry | 222 | 1151,1153 | - | - | - |
| 7 | Kantamal | Dedhenmal-2 | New | Dedhenmal-2 Stone Quarry | 195 | 696 | 29825 | 29826 | 119305 |
| 8 | Harabhanga | Baisipada | New | Baisipada Stone Quarry | 71 | 599 | 24888 | 28167 | 112668 |