DISTRICT SURVEY REPORT (DSR)

OF

ANGUL DISTRICT, ODISHA

FOR

LATERITE SLABS

(FOR PLANNING & EXPLOITING OF MINOR MINERAL RESOURCES)

As per Notification No. S.O. 3611(E) New Delhi, 25th July, 2018

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE (MoEF & CC)

COLLECTORATE, ANGUL

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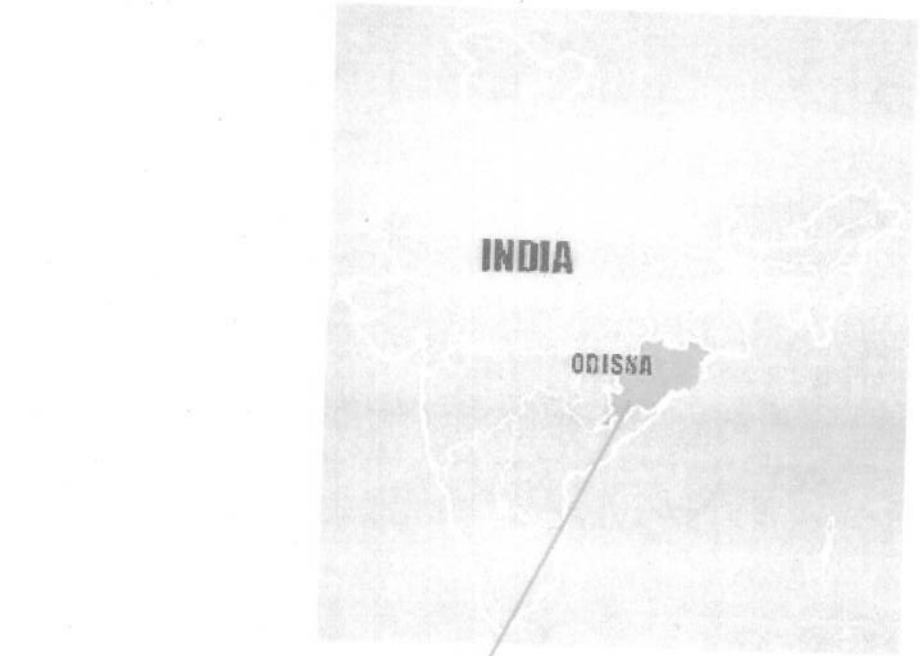

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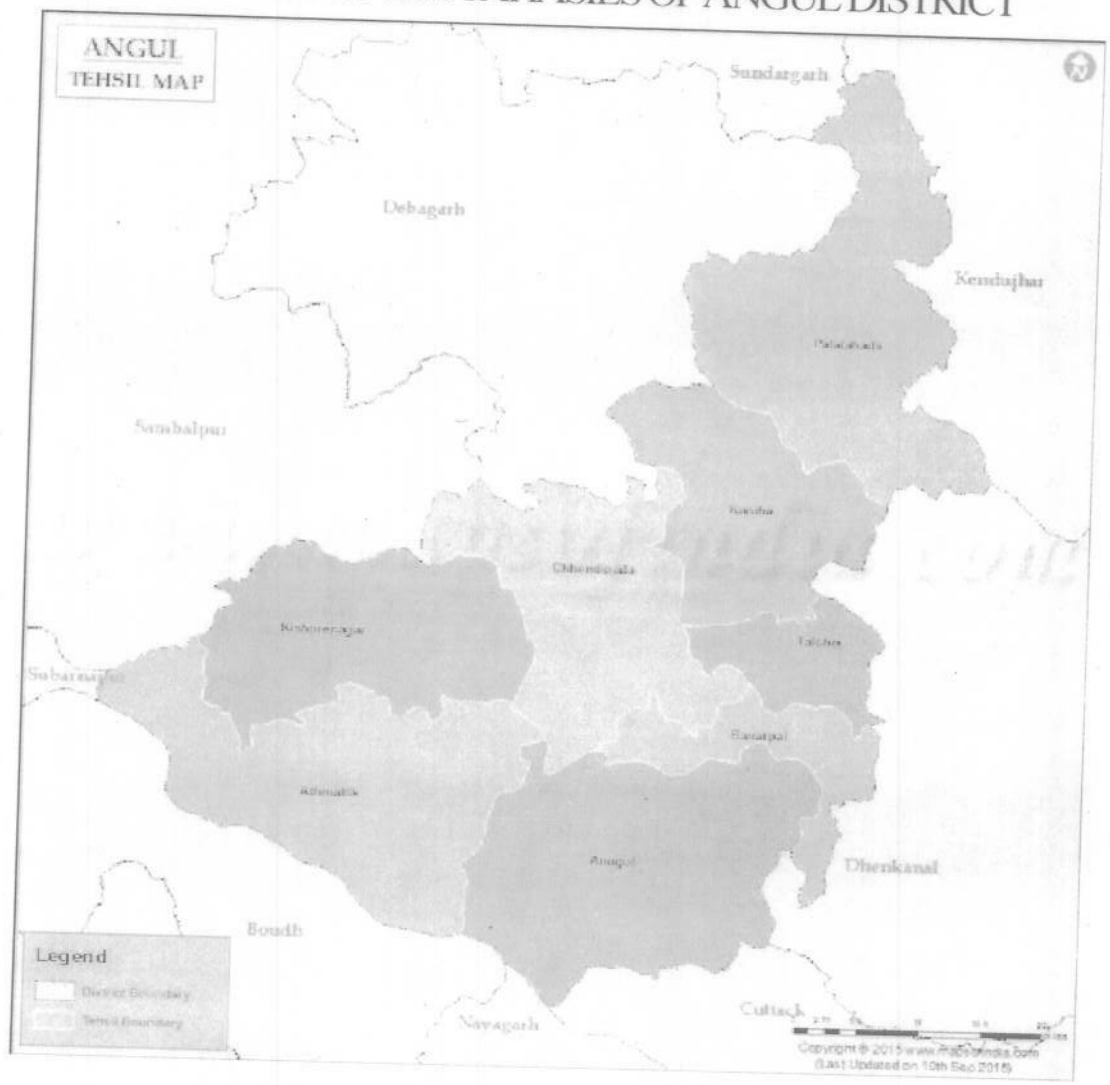

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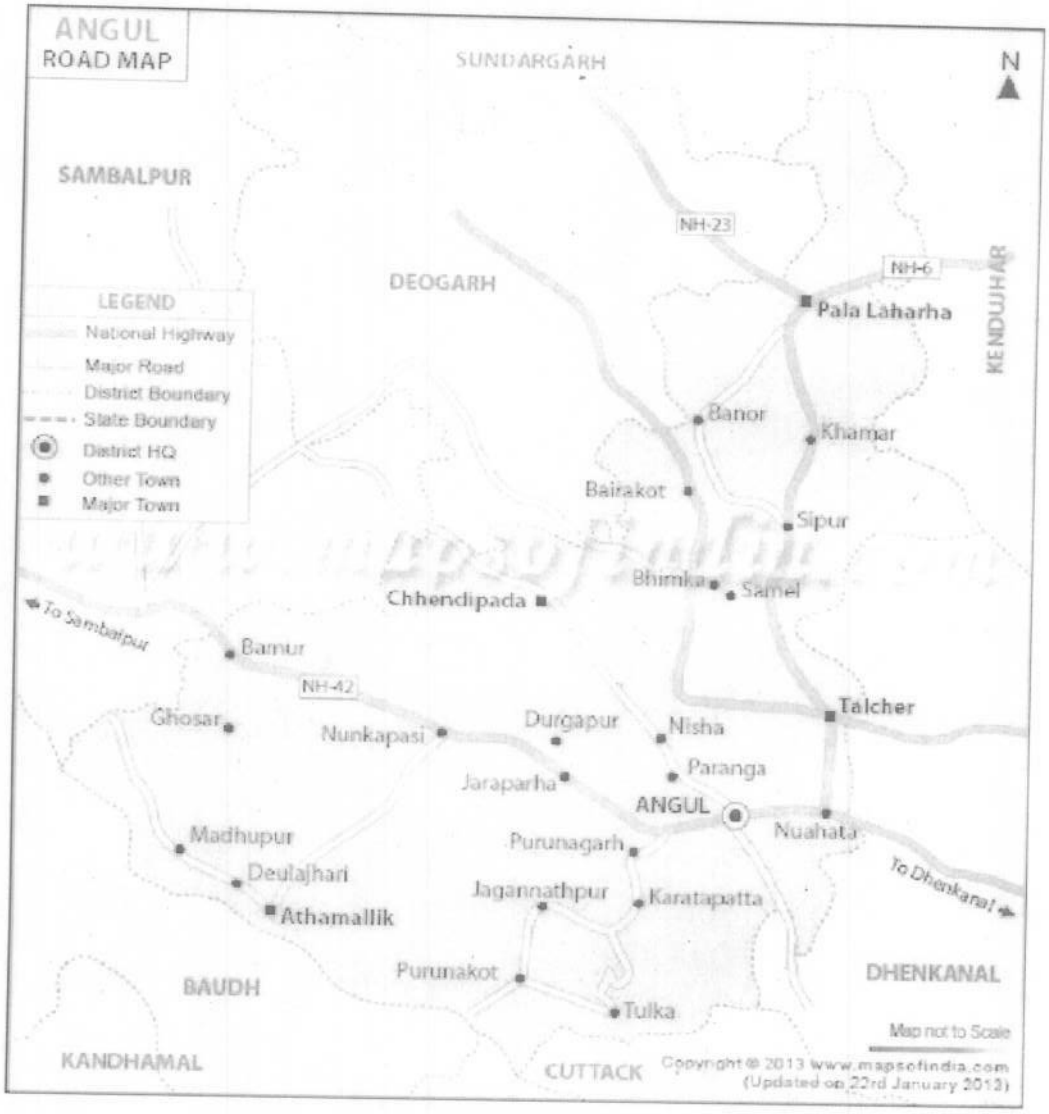


PREFACE

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 laterite slab mining has been prepared in accordance with Clause II of Appendix X of the notification. Every effort has been made to cover laterite slab mining locations, future potential areas and overview of laterite slab 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

The district of Angul situated at the heart of Odisha was a part of Undivided Dhenkanal district till early March 1993, but for the administrative convenience, Dhenkanal District was divided into two parts i.e. Dhenkanal and Angul vide State Government Notification No. DRC-44/93/14218/R. dated 27 March 1993. Angul District came into existence as a separate district on April 1, 1993. The district is surrounded by Cuttack & Dhenkanal on the east, Sambalpur & Deogarh on the west, Sundargarh & Keonjhar on the north and Phulbani on the south. Covering an area of 6232 sq.km, Angul District is located at Latitude 20^0 31' to $21^0$41' North to $84^0$16' to $85^0$23'East Longitude. The altitude of this place is 564 to 1187 mt. The district is abundant with natural resources. Angul, The district headquarters is about 150 kilometres (93 mi) from the state capital Bhubaneswar.

2. OVERVIEW OF MINING ACTIVITIES IN THE DISTRICT.

Angul district is enriched with many valuable economic minerals like coal, Kyanite, graphite, fireclay, china clay, precious and semi-precious stones, dimension and decorative stones etc.

Coal:

Angul district occupies a significant position in the mineral map of India beause of its vast resources of coal in the Talcher coalfield. A total reserve of 50,406 million

tonnes of coal of all categories has been estimated in the district in Talcher coalfield. The Karaharbari and Barakar formations belonging to Damuda series are coal bearing. Coal produced in this area is mostly used for power generation purpose.

Fireclay:

Fireclay occurs sporadically within a stretch of 15 sq. km area in and around Badaganduri, Kansamunda and Telisinga villages of Kaniha Block, Angul district. In Talcher Lower Gondwana basin, the fireclay beds usually overly the coal seams.

Fireclay also occurs in Handapa area around Kakarpani, Ichhapur villages. The total fireclay resource of the district has been estimated at 1.22 million tonnes. This fireclay contains Lower Gondwana plant fossils like Glossopteris and Gangompteris.

Kyanite:

Kyanite occurrences are reported around Magarmuhan and Bankoli villages of Pallahara sub-division. In Magarmuhan, Kyanite occurs in association with quartzite-kyanite-schist and quartz-chlorite-kyanite schist extending over a length 1.5 km with an average width of 5 m. A reserve of 6000 tonnes of Kyanite has been inferred upto a depth of 1.5 m with Al_2O_3 content varying from 19.02% to 53.81% and silica content varying from 32.84% to 54.07%.

Graphite:

Incidence of graphite are recorded in the khondalite suite of rocks within a 25 km long and 10 km wide belt extending in NW-SE direction between Dondatopa and Patharkupa of Athmallik sub-division. The graphite occurs as flakes and disseminations. The important locations are Kamalpur, Dandatopa, Bhuasuninali, Adeswar, Girida, Akharkata, Sanrohila, Lanchi, Govindapur, Polamahal, Siariamalia, Cherkhandi, Karadagadia, Dhauragoth, Brahmanidei and Padmapokhari. Graphite occurrence near Dandatopa is high grade and pocket type where the F.C. content varies between 54% to 77%. In the remaining areas, graphite occurs as disseminations and flakes in khondalites with F.C. content ranging from 5% to 15%. Besides the above, occurrences of graphite are reported around Badakantakul, Kanja and Talisara in Angul sub-division.

China clay:

China clay occurs is Panduripathar area of Athmallik sub-division. It extends over a strike length of 250 m with an average width of 150 m.

Precious and Semi-Precious Stones:

Garnet (pink, violet, red and honey yellow varieties), red corundum, moonstone, blue Kyanite etc. have been reported in Nuagaon, Parhang, Burubura, Kulad, Karanpal area of the district.

Manganese Ore:

Floats of Pyrolusite and psillomelane are strewn over the ground near Teleipathar, Pathartaila and Akharkata village

Decorative and Dimension stone:

Granite, granite-gneiss, porphyritic granite gneiss and charnockites exposed between Boinda and Athmallik along the roadside are suitable for decorative and dimension stone. 4800 cu. m of decorative and dimension stone has been estimated in Govinda Panasahi and Durgapur Panasahi.

Other than the above mentioned minerals, minor minerals such as river sand, laterite slabs, building stone/black stone/road metals, morrum, brick earth etc. are also available in the district.

In the district of Angul, there are ten working mines and two non-working coal mines. Besides, one sand and one quartz mines are also operating in this district. Detailed of the working/non-working mines are given below.

Sl. No.	Name of working mines	Mineral	Area (in sq. km)
1	Talcher Colliery	Coal	11.4
2	Nandira Colliery	Coal	3.70
3	Jagannath Colliery	Coal	5.12
4	Bharatpur OCP	Coal	17.67
5	Anata OCP	Coal	14.19
6	Lingaraj ocp	Coal	14.93
7	Balaram OCP	Coal	11.17
8	Hingula OCP	Coal	18.95
9	Kaniha OCP	Coal	18.80
10	Bhubaneswari	Coal	6.88
11	Mandapal Sand mine for stowing	Sand	0.18

Name of the non-working Mines:

1. Deulabera Colliery — Coal
2. Handidhua Colliery — Coal

3.	Chhendipada Colliery	Coal
4.	Kakudi & Kishoripal Sand Mines	Sand
5.	Bilinga/Bikser Sand Mines	Sand

3. GENERAL PROFILE

a. Administrative set up:

Sl No	Item	Unit	Magnitude
1	Location		
	Longitude	Degree	84°16' to 85°23'East
	Latitude	Degree	20° 31' to 21°41' North
2	Geographical area	Sq.Km.	6375
3	Sub-division	Numbers	4
4	Tahasils	Numbers	8
5	C D Blocks	Numbers	8
6	Municipalities	Numbers	2
7	NACs	Numbers	1
8	Police Stations	Numbers	23
9	Gram Panchayats	Numbers	225
10	Villages	Numbers	1871
	Inhabited	Numbers	1654
	Uninhabited	Numbers	217
11	Assembly constituencies	Numbers	5

b. Area and Population:

The district has an area of 6375 sq. kms and 12.74 lakhs of population as per 2011 census. The district accounts for 4.09 percent of the states territory and shares 3.03 percent of the state's population. The density population of the district is 200 per sq. km as against 270 person per sq. km. of the state. It has 1871 villages (including 217 un-inhabited villages) covering 8 blocks, 8 Tahasils and 4 Subdivisions. As per 2011 census the schedule caste population is 239552 (18.8.%) and schedule tribe population is 179603 (14.1.%). The literacy percentage of the district constitutes 77.53 against 72.9 of the state.

c. Climate :

The climate condition of the district is generally hot and high humidity during April to May and cold during November to December The monsoon generally breaks during the month of July, Average annual rainfall of the

district was 1147.52 mm during last four years, which is less than the normal rainfall 1401.9 m.m.

d. Economy:

Agriculture occupies a vital place in the economy of Angul District, as it provides direct and indirect employment to around 70 % of its total work force, as per the 2001 census. The total cultivable area of this District is 2, 16,403 hectares, covering 32.7 % of its total geographical area. The major crops of the Kharif season are paddy, maize, ragi, oilseeds, pulses, small millets and vegetables etc. Paddy, wheat, maize, field pea, sunflower, garlic, ginger, potato, onion, tobacco, sugarcane and coriander etc are the major Rabi crops.

The last decade has witnessed a tremendous improvement in the industrial scenario of Angul District. Many public sector undertakings have setup up plants and offices here, like National Aluminium Company Limited (NALCO), Mahanadi Coal Fields Limited (MCL), National Thermal Power Corporation (NTPC) and Talcher Thermal Power Station (TTPS). One of the major coalfields is the Talcher coalfield, which contains huge reserves of power grade non-coking coal. Engineering Units, Rice Mills, Hotels, Fly Ash Brick units, Stone Crushers, Service Units, Bleaching units, Bread and Bakery units, Tyre Retreading units, Flour Mills and Spices Grinding units etc. are some of the small scale industries functioning here.

Dhokra casting works, Terracotta works, Wood carvings, Art textiles and Soft toys etc are some examples of the crafts that have been generating revenues for this District. The District Industries Center functioning in the District promotes its various industrial activities.

e. Industry:

The locational advantage and abundant stock of manpower and raw materials have played an important role in the industrial development of the district. The important PSUS of the district are the NALCO, the MCL. Besides, during the year 2014-15,1011 nos of Micro Small and Medium Enterprises have been Established with total capital investment of about Rs 68386.94 lakhs with 7447 nos of Employment generated in Angul district. Apart from this a good number of Thermal power plants and sponge plants have been established within the district including NTPC and various private companies due to abundant availability of thermal grade coal. Besides various kinds of handicraft

works like dhocra casting, bell metals, textile products have been developed by the skilled workers and artisans of the district.

No. of MSME units set up	Investment (In Rs. crores)	Employment Generated				Employment of women
		SC	ST	General	Total	
2325	20936.67	2337	704	4175	7216	405

f. Agriculture:

During the year 2017-18 the net area sown was 197 thousand hectares against 5356 thousand hectares of the state. The production of was as below:

Name	Paddy	Wheat	Maize	Mung	Biri	Kulthi	TilL	Groundnut	Mustard	Potatoes	Jute	Sugarcane
Production in 000 MT	188.63	0.09	14.86	15.95	17.36	4.35	14.84	20.72	1.72	0.00	18.00	4.55

During 2017-18, the total fertilizers used in the district was about

Type of fertiliser	Nitrogenous	Phosphatic	Pottasic	Total	Consumption per Ha
Quantity in MT	4354	2025	853	7232	25.45

g. Power:

Consumption of electricity in Angul district during the year 2013-14 covers 1167.05 million units and villages so far electrified as on 31.03.2014 is 1618 revenue villages which constitutes 97.8% to the total inhabited revenue villages of the district.

h. Transport & Communication:

Railway route length (14-15) km	105.51
No of Rly stations and PH(14-15)	12
Forest road (17-18) km	449.54
National Highway (16-17) km	235.93
State Highway (17-18) km	186.13
Major district road (17-18) km	64.42
Other dist road (17-18) km	739.03
Rural road(17-18) km	1391.83
Inter village road (16-17) km	2093.93
Intra village road (16-17) km	2298.06

i. Health:

The medical facilities are provided by different agencies like Govt., Private individuals and voluntary organizations in the district.

Sub divisional hospitals including mobile	4 No
Beds facilities	392 No
Homoeopathic dispensaries	16 No
Ayurvedic dispensaries	19 No

j. Tourist places:

There are 13 nos. of tourist center such as Angul, Banarpal, Bhimkand, Binikei, Bulajhar, Deulajhari, Tikarapada, Talchar, Handapa patrapada, Hingulapitha, khuladi, Rengali and Derjanga as identified by Department of Tourism and culture, Odisha. During 2015 the number of Domestic tourists were 758273 and foreign tourists were 241 who visited the tourists sports of the district.

k. Forest areas:

Category of forest	Area in sq km
Reserve Forest	1760.76
Unclassified Forest	1.15
Demarcated Protected Forest (DRF)	273.21
Undemarcated Protected Forest	11.99
Other forest under Revenue Dept	669.71
Total	2716.82

l. Education:

Primary School (2017-18)	No. of Schools	1004
	Enrolment (No)	111635
	Pupil Teacher Ratio	21.41
Upper Primary School 2017-18	No. of Schools	680
	Enrolment (No)	63888
	Pupil Teacher Ratio	19.82
Gerneral College 2017-18	Junior	43
	Degree	23
Secondary School	No. of Schools	282
	Enrolment (No)	36666
	Pupil Teacher Ratio	25.71
Literacy Rate. 2011	Male	86.0
	Female	68.6

	Total	77.5

m. Culture & Heritage:

Angul district is very much rich in its fairs and festivals. Laxmi Puja is celebrated in the city of Angul. The celebration starts from Kumar Purnima and continues for long 11 days. Ganesh Puja of Talcher is one of the most famous festivals celebrated in the District. Amb Nua (fresh mango eating), Raja, Gammha Purnima, and Push Punei are functions celebrated by the people with much enthusiasm. The number of fairs and festivals observed in the district showcase its varied culture vividly.

4. GEOLOGY

The district can be broadly divided into five sectors such as central, northern, southern, eastern and north-central sectors. The Eastern Ghat Super-group of rocks occur in the southern sector, whereas the rocks of Gondwana Supergroup, Gorumahasani and Lower Bonai Groups occur in the central, north-central and northernmost sectors respectively. The Quaternary sediments overlie the above groups of rocks and occur in the south, central and eastern parts of the district. The rocks of Eastern Ghat Supergroup, Gorumahasani Group and Lower Bonai Group are overlain by laterites (both in-situ and transported). The Eastern Ghat Super-group of rocks mainly comprises quartz - feldspar -garnet - sillimanite - graphite schist /gneiss, garnetiferous quartzite, charnockite, pyroxene granulite, leptynite and augen gneiss. The metasedimentaries of Gorumahasani Group constitute quartzite, gritty quartzite, quartz - mica schist. fuchsite quartzite, quartz - chlorite schist, hornblende schist, and metabasics. The Lower Bonai Group constitutes biotite gneiss, biotite-hornblende granite gneiss and granodiorite. Metasedimentaries of Lower Bonai Group consist of ferruginous shale, cherty shale, phyllite, sandstone and conglomerate. The Gondwana Supergroup consists of sandstone, shale, conglomerate and fire clay. The Quaternary sediments mainly consist of sandy clay with calacareous concretions, coarse to fine sand, silt and clay.

The geological succession in the district is as follows:

STRATIGRAPHY:

AGE	GROUP/SUPER GROUP	FORMATION	LITHOLOGY
Holocene	Quaternaries	Brahmani / Mahanadi formation	Alluvium
Upper Pleistocene to Holocene		Kaimundi formation	Gray sandy clay with calcareous concretions
Pleistocene	Tertiaries		Laterite / Latosol (in situ)
Permian to Triassic		Mahadeva Formation	Sandstone. shale
Permian	Gondwana Supergroup	Barakar, Barren Measures. Raniganj & Damuda Formations (Unclassified)	Conglomerate. sandstone, shale, coal
Carboniferous (?) to Permian		Talchir Formation	Sandstone. shale, tillite
Archaean to Palaeoproterozoic		Lower Bonai Group	Gabbro Metavolcanics Granite, biotite gneiss, biotite - hornblende granite gneiss, granodiorite
		Gorumahisani Group	Ferruginous shale, cherty shale with ash IBT and tuts, mangarfilerous shale/ phyllite Gritty sandstone, orthoquartzite, conglomerate Metabasics Quartzite, sericite schist, quartz schist, quartz - mica schist, mica schist, micaceous quartzite
Archaean	Eastern Ghat Supergroup	Granitoids	Actinolite quartzite, tremolite - actinolite schist Augen gneiss, garnetiferous gneiss, biotite gneiss, migmatised khondalite Leptynite
		Charnockite Group	Acid and intermediate charnockite Basic charnockite, pyroxene granulite
		Khondalite Group	Quartz-feldspar-garnet- sillimanite graphite schist/ gneiss Coarse crystalline quartzite, quartz-sillimanite schist. garnetiferous quartzite

5. DRAINAGE AND IRRIGATION PATTERN.

The drainage of the district is mainly controlled by rivers like Mahanadi, Brahamani, Tikira and their tributaries.

Major part of the district is irrigated through canal irrigation from Rengali dam on river Brahmani.

6. LANDUSE PATTERN

Sl No	Landuse	Area in '000Ha
1	Forest Area	272
2	Misc. trees & Grooves	23
3	Permanent Pasture	36
4	Culturable Waste	19
5	Land put to Non Agril Use	28
6	Barren & Unculturable Land	17
7	Current Fallow	19
8	Other Fallow	17
9	Net Area Sown	197
10	Mining	10
	Geographical	638

7. SURFACE WATER & GROUND WATER SCENARIO

The drainage systems i.e. rivers of the district gets filled with water during the monsoon and the gradually it decreases from the month of January to June of each year. In the summer season all rivers become almost dry excepting narrow flow of water within the basin.

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

Depth of water level (mbgl)/ Period	April	August	November	January
Minimum	2.55	0.30	0.60	2.10
Maximum	18.8	9.70	15.30	18.10

8. RAINFALL & CLIMATIC CONDITION

The district is generally hot with high humidity during April and May and cold during December and January. The monsoon generally breaks during the month of July and continues till end of October. The temperature goes as high as up to 45^0C in the summer and up to 7^0-8^0 C during peak winter.

The rainfall statistics of the district for last four years is given below:

Year/ Month	April	May	June	July	August	Sept	Oct	Nov	Dec	Jan	Feb	March	Total
15-16	37.04	39.93	218.86	343.29	224.64	142.20	16.38	0.23	31.85	0.63	24.98	42.59	1122.62
16-17	1.93	44.25	126.63	267.16	389.86	143.23	98.26	4.90	NIL	8.43	NIL	22.44	1107.09
17-18	1.23	35.76	201.05	213.38	213.05	143.69	109.87	16.90	NIL	NIL	NIL	0.10	935.03
18-19	74.34	80.10	123.42	333.20	299.31	295.03	114.29	2.70	50.95	0.40	27.00	24.60	1425.34
Avg.	28.63	50.01	167.49	289.25	281.72	181.04	84.70	6.18	20.70	2.36	13.00	22.43	1147.52

9. DETAILS OF MINING LEASES

Attached as Annexure I

10. DETAILS OF ROYALTY COLLECTED

Year-wise Calculation of Royalty (Rs) from Laterite QLs

Sl.No	Name Of Tahasil	2015-16	2016-17	2017-18	2018-19
1	Pallahara	0	23793	34575	70645
TOTAL		**0**	**23793**	**34575**	**70645**

11. DETAILS OF PRODUCTION OF MINOR MINERAL

Yearwise Production of Laterite in cum

Sl.No	Name Of Tahasil	2015-16	2016-17	2017-18	2018-19
1	Pallahara	216	225	252	270
TOTAL					

12. MINERAL MAP OF THE DISTRICT

Attached as Plate No 4.

13. LIST OF LOI HOLDERS ALONG WITH VALIDITY

Not applicable.

14. TOTAL MINERAL RESERVE AVAILABLE IN THE DISTRICT

Total mineral reserve of laterite is 4308 cum which may increase after detail investigation.

Details of the potential areas submitted as Annexure III.

15. QUALITY/GRADE OF MINERAL

Due to less content of alumina, the laterite slabs of the district is suitable for construction of walls related boundary or houses after manual sizing of the slabs.

16. USE OF MINERAL

Laterite of the district is used mainly for construction of walls related to boundary or houses after manual sizing of the slabs.

17. DEMAND & SUPPLY OF THE MINERAL

The tentative annual demand is to the tune of 25,000 cum and is mainly supplied from Pallahada tahasil of the district and adjoining districts like Dhenkanal and Keonjhar.

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

Attached as Plate No 5.

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

Nil

20. DETAILS OF ECO-SENSITIVE AREA

Not applicable.

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 pollutants 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 machines, movement of machineries/ vehicles produce NOx , SO2 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 it's diverse and dynamic characteristics.

Mining activities generally result in the deforestation, land degradation, water, air and 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:

- 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 are to be covered with tarpaulin.

- The mine pit water, if any can be utilized for dust suppression in and around mine area.
- Information on wind diction 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.
- 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 settling 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, if required.
- Retaining walls with weep hole are to be constructed around the mine boundaries to arrest silt wash off in case of big quarries.
- The mined out pits can be converted 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, if required.
- Domestic sewage from site office & urinals/latrines, if any 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.
- 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 are to be undertaken for big QL areas to assess efficacy of adopted control measures.

Biological Environment

- Development of green belt/gap filling saplings in the safety barrier left around the quarry area/ cluster area, if the safety zone areas are barren.
- 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, substantial 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 surface level. It is preferred to cordon the water reservoir either through 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 ore 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 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 savage 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 Manger 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 Manger 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 fulfil 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 ported equipments such as helmet, safety goggles, earplugs, earmuffs etc are to be provided to mine workers as per Mines Rules. All operators and mechanics are to be trained to handle fire fighting equipments.

TUBERCULOSIS DATA

YEAR	TOTAL
15-16	1125
16-17	1230
17-18	1176
18-19	1166

There is no case of Silicosis found in the district 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 sort 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

DFO (T)
Angul

Sub- Collector
Angul

Collector. Angul.

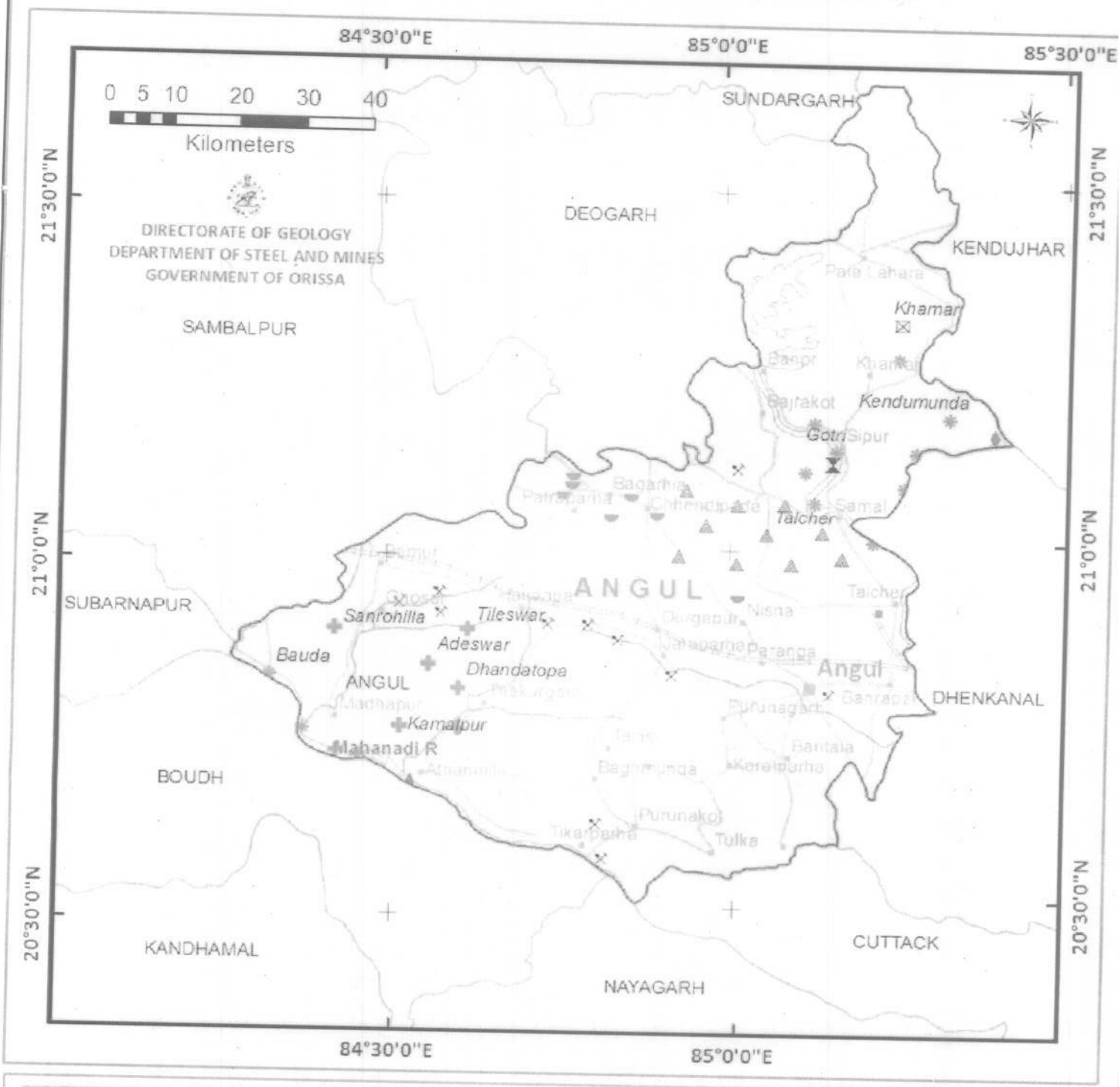
LATERITE SLAB SAIRATS ALREADY LEASED OUT AND EXECUTED

Sl. No.	Name of Tahasil	Name of Mine or Mineral	Name of village/ Date of registration of lease	Name of lessee	Address & contact No of lessee	Mining lease grant order No & date	Period of QL		Date of commencement of mining operation	Status (working/ non-working/Temp working for depatch)	Captive or Non-captive	Lt No & date of grant of EC	Location of Resource (GPS co-ordinates or Khata & Plot No) (Sketch map to be attached)	Longitude			Latitude			Method of mining	Area leased for mineral concession (in sq m)	Mineable mineral potential as per approved mining plan (in cum)	Production proposed in the mining plan (cum)				Actual production (cum)				Royalty (in Rs lakh) collected as Royalty			
							From	To						Degree	Minute	Second	Degree	Minute	Second				15-16	16-17	17-18	18-19	15-16	16-17	17-18	18-19	15-16	16-17	17-18	18-19
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1	Pallahara	Rohira Laterite Stone Quarry	Vill-RohiraDate of Regn-20.09.2016	Gopabandhu Sahoo	At/po-Odash, PS-Khamar Mob:8908380997	3126/Dt.21.09.15	2015-16	2019-20	20.09.2017	Working	non-captive	456/05.08.16	Khata No.83 Plot No.501(Sketch Map attached)	21	20	50.1	85	13	10.7	Opencast	2510	1287	2166	2255	2522	2700	2166	2255	2522	2700	--	23793	34575	706645

POTENTIAL OF LATERITE SLAB IN 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 (Khata & Plot No)	Longitude			Latitude			Area of the mineral potential patch (in sq m)	Mineable mineral potential (in cum)
						Degree	Minute	Second	Degree	Minute	Second		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Pallahara	Rohira	Running	Rohira Laterite Quarry	Khata No.83 Plot No.501(Sketch Map attached) 0.62Acre	21	20	50.1	85	13	10.7	2510	4308

MINERAL MAP OF ANGUL DISTRICT



Legend

- District Boundary
- Village/ Town
- District headquarter
- Drainage
- National Highway
- Major Road
- Minor Road
- Railway
- Waterbody

Mineral Occurrence

- Coal
- Dimension Stone
- Gemstone
- Gold
- Graphite
- Fireclay

LEASE/POTENTIAL MAP OF LATERITE IN ANGUL DISTRICT

SCALE :- 1:100,000

PLATE NO:6