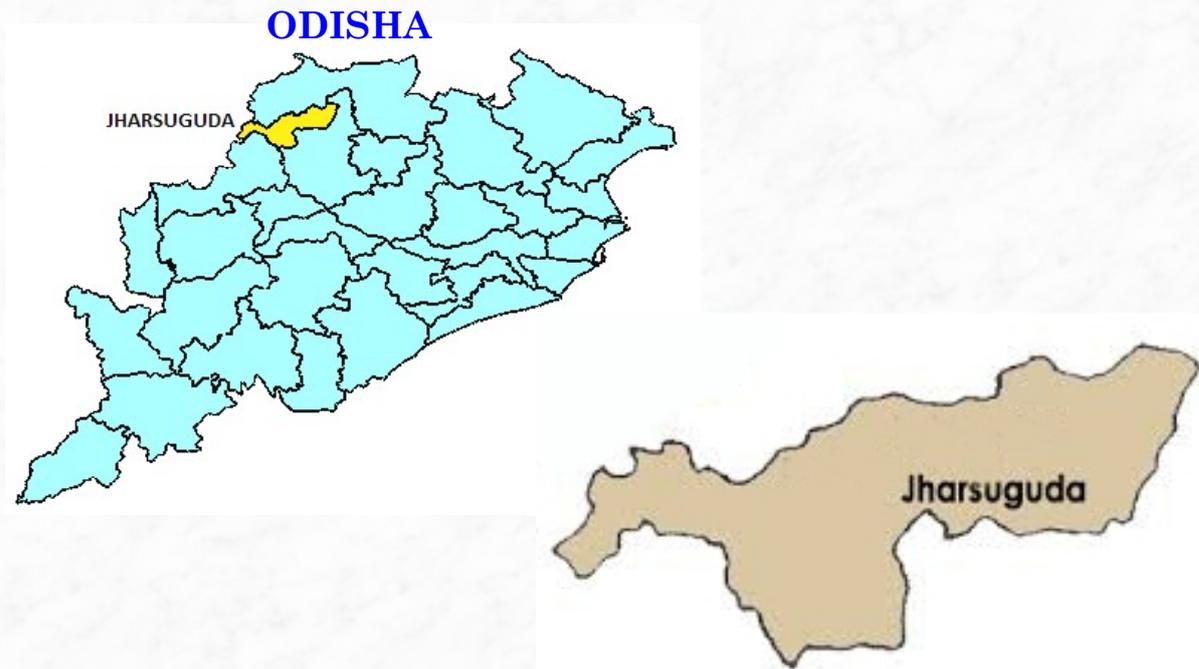




**DRAFT DISTRICT SURVEY REPORT (DSR)**  
**OF**  
**JHARSUGUDA DISTRICT, ODISHA**  
**FOR**  
**ROAD METAL / BUILDING STONE / BLACK STONE**

**(FOR PLANNING & EXPLOITING OF MINOR  
MINERAL RESOURCES)**



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

**COLLECTORATE, JHARSUGUDA**

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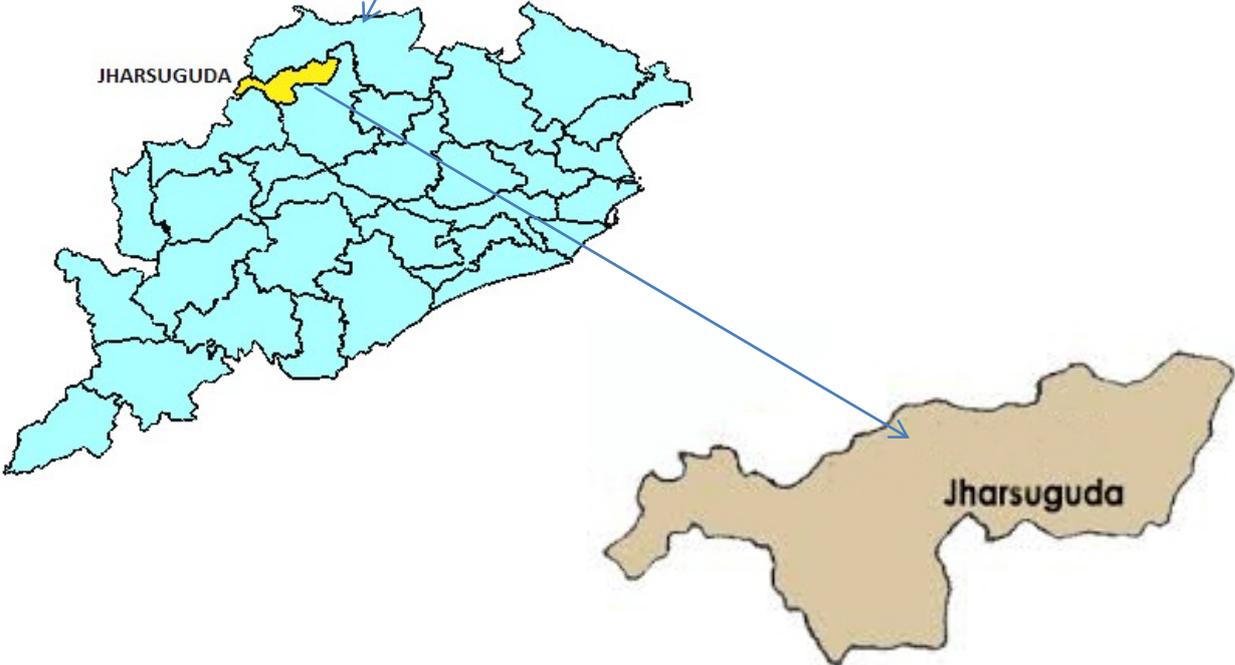
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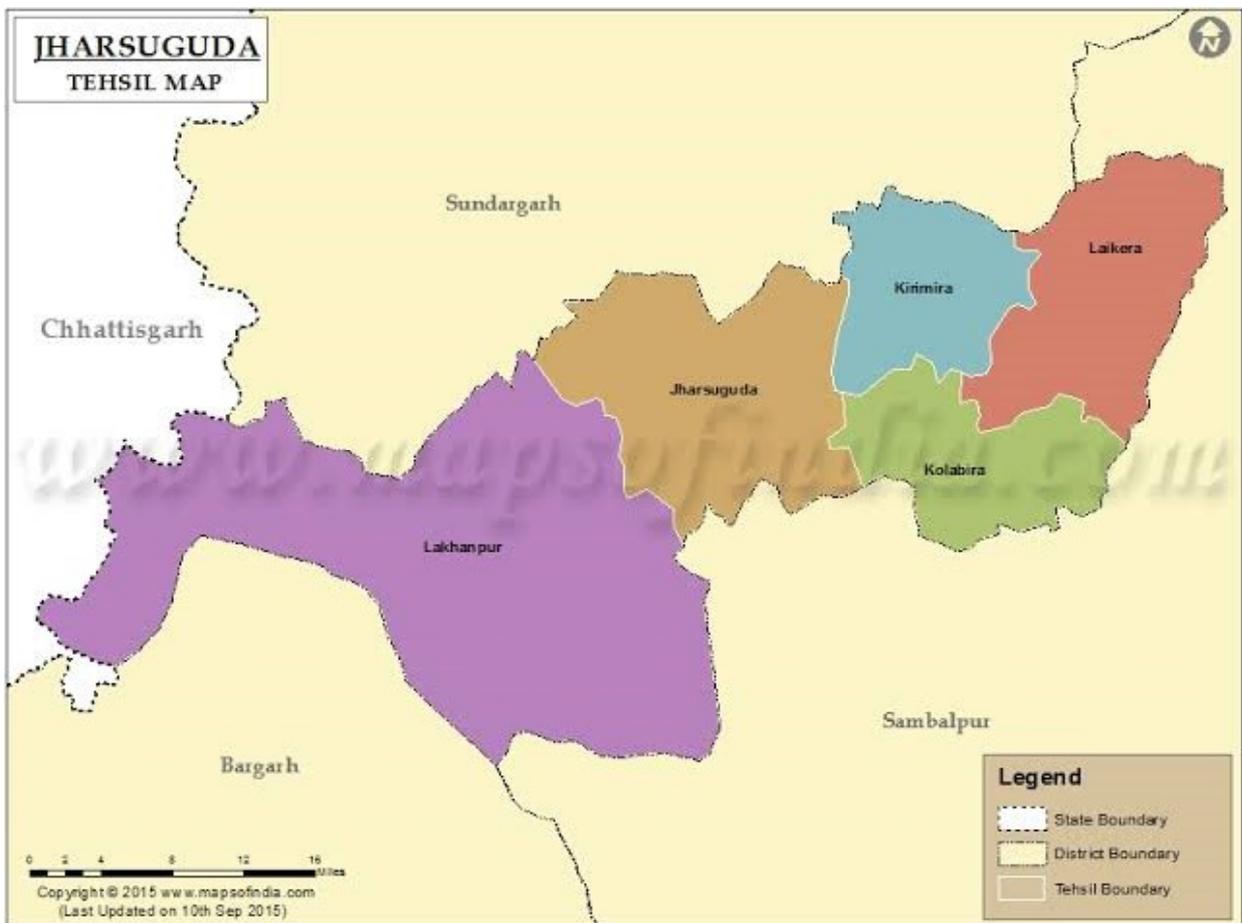
# INDEX MAP



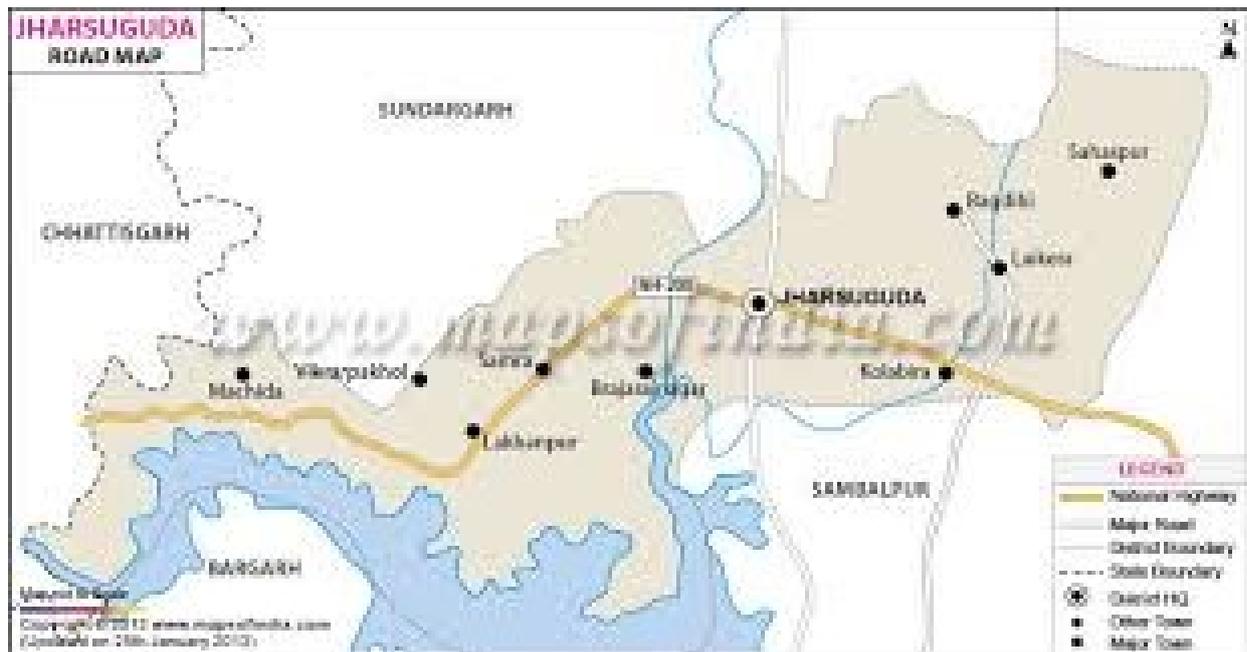
## ODISHA



### MAP SHOWING THE TAHASILS OF JHARSUGUDA DISTRICT



### MAP SHOWING THE MAJOR ROADS OF JHARSUGUDA DISTRICT



## 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 the 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

**Jharsuguda** is a district in [Odisha, India](#) with [Jharsuguda](#) town as its headquarters. Mineral rich District, Jharsuguda is one of the most industrially developed District of Odisha. Jharsuguda District was established on 1st January, 1994, before which it was a part of Sambalpur District. It was created by amalgamation of the erstwhile Jamindars of Rampur, Kolabira, Padampur and Kudabaga. The district is surrounded by Sundargarh District in the North, Sambalpur district in the East, Bargarh District in the South and Chattisgarh state in the West. Jharsuguda District is situated at a distance of 515 km from Kolkata, 616 km from Nagpur, 48 km from Sambalpur and 372 km from state capital Bhubaneswar. Jharsuguda district covers a total area of 2, 081 sq km. The district once had an [airport](#) during [World War II](#). This region is rich in coal and other mineral reserves. Of late, many small and medium scale iron and steel units have been set up in the vicinity of Jharsuguda town, giving impetus to the industrial growth of the district.

### 2. OVERVIEW OF MINING ACTIVITIES IN THE DISTRICT.

**Coal** : Coal, the major mineral resources of the district is confined to Ib-river coal field which was brought to light towards the later part of the last century and now it is supposed to be one of the major coal fields in India. Both Barakar and Karharbari

formations of this coal field are major coal bearing horizons. Surface and sub-surface data reveal one coal seam in Karharbari and four coal seams in Barakar with a number of local seams. The coal seams are highly interbanded with high moisture and ash contents. A total reserve of 9361.26 million tonnes of power grade coal has been estimated for the district.

**Fire Clay:** Several occurrences of fire clay have been encountered within the Kamthi and Barakar formations of Ib-river coal field associated with coal seams. The important occurrences are located around Belpahar, Jurabag, Darliapali, Lakhanpur and Bholamal. The fire clay is very hard, fine grained with good plasticity, dirty white in colour and when burnt it neither cracks nor fuses at 1400°C. The fusion point varies from 1600° to 1640°C. A total reserve of 0.674 million tonnes of fire clay has been estimated for the district. Tata Refractories Ltd. (TRL) is a major refractory plant in the state which thrives on the produce of the Belpahar fireclay mine. Other occurrences are reported in the village Chandli, Soldia, Ganga, Belout, Bhatlaida, Bonaroi, Khinda & Talabira.

**Quartz & Quartzite:** The quartz deposit of Bhatlaira, Bonereai & quartzite of Kanjhaharan are amongst the notable ones. Besides, refractory / glass grade quartz occurs around Laikera, Pandrimal, Jhargaon – Kadamghat, Kolabira, Jangapera, Bhikhampur, Beldungri & Harpidungri.

**Red Oxide / Red Ochre:** An important deposit of red oxide occurring within Gondwanas is located in Patrapali – Malda and is under active exploitation.

**Gemstone:** Gem quality green tourmaline occurrences in the zoned pegmatites have been encountered within porphyritic granite gneiss, amphibolite & schists around Bagdihi. Incidences of semitransparent aquamarines have been reported from colluvial zone of the pegmatite body, located east of Pandrimal.

**Dolomite:** The river Sapai, flowing along the boundary of Sundargarh and Jharsuguda districts exposes sporadic occurrences of dolomite. These occurrences appear to be extension of limestone and dolomite deposits of Gangpur Synclinerium. The estimated reserve of dolomite along the Sapai river section in both Jharsuguda and Sundergarh district is 5.4 million tonnes.

**Other Minerals:** Minor occurrences of minerals like kyanite of Titheimal, sillimanite of Bhuliadihi, opaque beryl of Pandrimal and Kolabira, tourmaline of Kolabira, columbite –tantalite of Kolabira, feldspar of Bhatlaira and the Pyroxene granulites of Pandrimal area for dimension stone have also been reported.

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.

### 3. GENERAL PROFILE

#### a. Administrative set up:

SI No	Item	Unit	Magnitude
1	Location		
	Longitude	Degree	84 <sup>0</sup> 01' East
	Latitude	Degree	21 <sup>0</sup> 82' North
2	Geographical area	Sq.Km.	2114
3	Sub-division	Numbers	1
4	Tahasils	Numbers	5
5	C D Blocks	Numbers	5
6	Municipalities	Numbers	3
7	NACs	Numbers	-
8	Police Stations	Numbers	11
9	Gram Panchayats	Numbers	78
10	Villages	Numbers	351
	Inhabited	Numbers	347
	Uninhabited	Numbers	4
11	Assembly constituencies	Numbers	2

#### b. Area and Population:

Jharsuguda district covers a total area of 2, 081 sq km. The district lies between 21.82 degree north latitude and 84.1 degree east longitude.

Total population of the District is 579505 consisting of 351 villages. Urban Population is 231165 and rural population is 348340. Total male population of the District is 296690 and female population is 282815. The District consists of total 104620 SC population and 176758 ST population. The total literacy rate of the District is 78.86% comprising 86.61% male literacy rate and 70.73% female literacy rate.

**c. Climate :**

The district of Jharsuguda is characterized by a hot dry summer. The temperature in the month of May is 42 degree at the maximum. The average rainfall of the District is 1500 millimeter. From April to August the wind blows from south and southwest whereas from September onwards wind blows from North West.

**d. Economy:**

The economy of the Jharsuguda district can be judged through its natural resources. The District is rich in minerals like coals, quartzite and fire clay. Besides deposit of limestone, granite, white sand stone and laterite stone are also found in several places of Jharsuguda district that add to economy of the District. Several industrial units like Vendanta Alumina, Bhusan Steel and Power, TATA Refractories are operating in the district those contribute to the economic growth of the district. There are also some major forest products like Kendu leaves, wood, rice and leather that also contribute significantly to the economy of Jharsuguda district.

**e. Industry:**

No. of MSME units set up	Investment (In Rs. crores)	Employment Generated				Employment of women
		SC	ST	General	Total	
1517	12335.47	463	466	2921	3850	151

**f. Agriculture:**

During the year 2017-18 the net area sown was 60 thousand hectares against 5356 thousand hectares of the state. The production of was as below:

Name	Padd	Whea	Maize	Mung	Biri	Kulthi	Tiil	Groun	Mustard	Potatoe	Jute	Sugar
------	------	------	-------	------	------	--------	------	-------	---------	---------	------	-------

	<b>y</b>	<b>t</b>						<b>dnut</b>		<b>s</b>		<b>cane</b>
Production in 000 MT	116.52	0.15	2.87	0.69	0.39	1.37	1.22	1.00	1.24	0.00	4.80	27.04

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	3372	1401	722	5495	67.27

#### **g. Power:**

Consumption of electricity in the district during the year covers 82 million units per month and villages so far electrified as on 30.08.2019 is 333 which constitutes almost 95% to the total villages of the district.

#### **h. Transport & Communication:**

Railway route length (14-15) km	66.62
No of Rly stations and PH(14-15)	9
Forest road (17-18) km	23.00
National Highway (16-17) km	105.60
State Highway (17-18) km	106.16
Major district road (17-18) km	40.37
Other dist road (17-18) km	942.75
Rural road(17-18) km	323.41
Inter village road (16-17) km	1024.64
Intra village road (16-17) km	1025.57

#### **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	2 No
Beds facilities	234 No
Homoeopathic dispensaries	9 No
Ayurvedic dispensaries	8 No

**j. Tourist places:**

Jharsuguda is one of the popular tourist destinations. The district is decorated with many tourist places. Koilighughar waterfall (Lakhanpur) and Adyaswambhu are the picnic spots that attract lots of tourists every year. Likewise there are several places of historical importance like ruins of Hill Forts of Ulapgarh, rock painting and lithography of Bikramkhol, Ushakothi cave and Kolabira Fort. The district has number of temples namely Padmasini Temple of Padampur, Ancient Shiva Shrine of Jhadeswar Temple, Ramchandi, an ancient Shaktipitha, Shree Pahadeswar Temple, Shiva Shrine of Mahadebpali.

**k. Forest areas:**

Category of forest	Area in sq km
Reserve Forest	35.53
Unclassified Forest	0.04
Demarcated Protected Forest (DRF)	109.97
Undemarcated Protected Forest	0
Other forest under Revenue Dept	56.9
<b>Total</b>	<b>202.44</b>

**l. Education:**

Primary School (2017-18)	No. of Schools	393
	Enrolment (No)	47042
	Pupil Teacher Ratio	20.50
Upper Primary School 2017-18	No. of Schools	323
	Enrolment (No)	28349
	Pupil Teacher Ratio	14.52
General College 2017-18	Junior	21
	Degree	10
Secondary School	No. of Schools	137
	Enrolment (No)	15858
	Pupil Teacher Ratio	21.60
Literacy Rate, 2011	Male	86.6
	Female	70.7
	Total	78.9

**m. Culture & Heritage:**

Jharsuguda district is very much rich in its cultural heritage. Various fairs and festivals are celebrated round the year that indicates its richness in culture and religion. There are many common fairs and festivals that are celebrated in the state. But there are few distinct and special festivals that are celebrated in the District like Ranjta Festival, Ratha Jatra of Kukurjunga, Famous Gokulastami Jatra of Rajpur and Makar Ratha Jatra of Belpahar.

The District is a beautiful diaspora of different origins of people from across India which makes it unique & different from other cities in Odisha. Sambalpuri is the mother tongue of the district. Besides some ethnic groups have their own languages like Agrias, Lairias, Mundas, Kishans, Khadis and Turis.

#### **4. GEOLOGY**

The district exposes a wide spectrum of rock types. The Peninsular Gneiss comprising augen gneiss and migmatite represent the oldest rocks of Archaean to Lower Proterozoic age in the area. They occupy a gently undulating terrain east of Jharsuguda. A small body of massive granite, the Tamparkola granite, of Lower Proterozoic age occurs as an isolated exposure near Dulesra. A narrow linear strip of metasedimentary rocks consisting of quartzite, quartz-sericite schist, phyllite and mica schist occurring near Laikera belongs to Upper Bonai Group of Lower Proterozoic age. Well consolidated, soft and foliated rocks of Gangpur Group of Lower Proterozoic age comprising phyllite and mica schist are well exposed here. An unmetamorphosed sedimentary sequence of rocks occur near the western corner of the district. This sedimentary sequence can be broadly divisible into a sequence of shale, calcareous shale and quartzite forming the Raipur Group and coarse sandstone and quartzite forming the Chandarpur Group of the Chattisgarh Super Group. The Gondwana Super Group of sedimentary rocks are confined to fault bounded basin and occur in the central part of the district around Belpahar, Brajarajnagar areas. Among Talchir and Barakar Formations of Lower Gondwanas, the latter is the store house of 'bituminous coal' in the region. Kamthi Formation consisting of conglomerate, sandstone, shale, red clay etc. represents the Upper Gondwanas in the area. Soil, alluvium and laterite are the younger formations in the area. Laterite occurs in small, isolated, irregular outcrops, spread almost all over the above rock types. The unclassified soil/alluvium of the Quaternaries occupies large area in the Mahanadi river valley and over the gneissic country, east of Jharsuguda.

**STRATIGRAPHY:**

The geological succession in the district is as follows:

AGE	GEOLOGICAL UNIT	LITHOLOGY
Pleistocene to Recent	Quaternary	Soil and alluvium
Cainozoic		Laterite
Permian to Triassic	Gondwana Super Group	Kamthi Formation Conglomerate, sandstone shale, red clay
Permian		Barakar Formation Sandstone, shale with coal seams
Carboniferous (?) Permian		Talchir Formation Green sandstone, needle shale, boulder bed
Upper Proterozoic		Gangpur granite
Middle to Upper Proterozoic Lower Proterozoic	Chattisgarh Super Group	Raipur Group Shale, calcareous shale, quartzite
		Chandarpur Group Coarse quartzite, sandstone
		Gangpur Group Phyllite, mica schist
Lower Proterozoic		Tamparkola granite
	Upper Bonai Group	Shale, phyllite, mica schist Quartzite, quartz-sericite schist
Archaean to Lower Proterozoic	Peninsular Gneiss (Younger phase) Peninsular Gneiss (Older phase)	Lower Bonai Group Metabasics
Archaean		Augen gneiss and migmatite Medium grained biotite granite gneiss

**5. DRAINAGE AND IRRIGATION PATTERN.**

The drainage of the district is mainly controlled by rivers like IB & Beden. Detail of the river system is narrated below.

Sl.no	Name of the River	Place of origin	Altitude at origin	Total length in the district (in km)	Area drained (sq km)	% area drained in the district	Process on deposition of sediments	Volume of sand deposited in last four years( Year wise)	Any important note related to leasing of sand quarry within the river
A	B	C	D	E	F	G	H	I	J
1	River IB	Pandarapat Raigarh	21°51'N 83°56'E	52Km	12447sq km	14Km	Flood water enter and become sedimentation	35,00,000 Cum(Approx.)	Approaching road for leasing sand quarry
2	River Beden	Bamara	21°46'7" N 84°14' 40"E	50Km	2120 sq km	50Km	Flood water enter and become sedimentation	50,00,000 Cum(Approx.)	Approaching road for leasing sand quarry

## 6. LANDUSE PATTERN

SI No	Landuse	Area in '000Ha
1	Forest Area	20
2	Misc. trees & Grooves	6
3	Permanent Pasture	20
4	Culturable Waste	15
5	Land put to Non Agril Use	19
6	Barren & Unculturable Land	17
7	Current Fallow	28
8	Other Fallow	3
9	Net Area Sown	60
10	Mining	20
	Geographical Area	208

## 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:

<b>Depth of water level (mbgl)/ Period</b>	<b>April</b>	<b>August</b>	<b>November</b>	<b>January</b>
Minimum	2.25	0.85	1.35	2.2
Maximum	7.75	6.35	5.85	8.2

## **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 46°C in the summer and up to 7<sup>o</sup>-8<sup>o</sup> C during peak winter.

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

<b>Year/ Month</b>	<b>APRIL</b>	<b>MAY</b>	<b>JUNE</b>	<b>JULY</b>	<b>AUGUST</b>	<b>SEPT</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>JAN</b>	<b>FEB</b>	<b>MARCH</b>	<b>TOTAL</b>
15-16	40.86	7.4	199.1	480.9	441.9	271.78	7.04	0	26.32	0	24.06	16.26	<b>1515.66</b>
16-17	0	22.44	85.72	259.2	406.1	253.24	43.88	0	0	7.5	0	4.69	<b>1082.75</b>
17-18	1	64.48	228.4	442.3	300.8	245.84	94.06	0	0	0	0	1.64	<b>1378.6</b>
18-19	27.94	113.8	176.1	421.2	399.5	122.26	6.6	0	90.54	0	44.04	13.9	<b>1415.96</b>
<b>AVG</b>	<b>17.45</b>	<b>52.03</b>	<b>172.3</b>	<b>400.9</b>	<b>387.1</b>	<b>223.28</b>	<b>37.895</b>	<b>0</b>	<b>29.22</b>	<b>1.875</b>	<b>17.03</b>	<b>9.1225</b>	<b>1348.24</b>

## **9. DETAILS OF MINING LEASES OF ROAD METAL**

Attached vide Annexure I

## **10. DETAILS OF ROYALTY COLLECTED (Rs)**

<b>Sl.No</b>	<b>Name Of Tahasil</b>	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>
--------------	------------------------	----------------	----------------	----------------	----------------

1	Jharsuguda	342000	1253000	1937000	1978000
2	Kirmira	0	0	0	0
3	Kolabira	0	36000	95000	105000
4	Laikera	0	22000	68000	35000
5	Lakhanpur	2479384	6659863	7033354	7184188
<b>TOTAL</b>		<b>2821384</b>	<b>7970863</b>	<b>9133354</b>	<b>9302188</b>

## 11. DETAILS OF PRODUCTION OF MINOR MINERAL

### Yearwise Production of Road metal in cum

Sl.No	Name of Tahasil	2015-16	2016-17	2017-18	2018-19
1	Jharsuguda	5880	10216	10240	10454
2	Kirmira	0	0	0	0
3	Kolabira	585	585	650	715
4	Laikera	0	320	340	360
5	Lakhanpur	0	24964	30494	42868.4
<b>TOTAL</b>		<b>6465</b>	<b>36085</b>	<b>41724</b>	<b>54397.4</b>

## 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 road metal/buildingstone/blackstone/white stone is 51,29,849 cum which may increase after detail investigation.

Details of the potential areas submitted as Annexure III.

## 15. QUALITY/GRADE OF MINERAL

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

## 16. USE OF MINERAL

Road metal/building metal 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 tahasils of the district and adjoining districts of Sundargad and Sambal pur.

## **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**

Not applicable

## **20. DETAILS OF ECO-SENSITIVE AREA**

Part of Eco-Sensitive Zone of Debrigad wildlife Sanctuary is located within the district.

## **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 drilling machines, blasting and 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:

- 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 are to be covered with tarpaulin.
- The mine pit water 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.
- Retaining walls with weep hole are to be constructed around the mine boundaries to arrest silt wash off.
- The mined out pits shall 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.

- 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 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, 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 retaining 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 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 ported equipments such as helmet, safety goggles, earplugs, earmuffs

ets 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 RNTCP KHORDHA**

YEAR	No of Tuberculosis patients
15-16	763
16-17	796
17-18	715
18-19	831
Upto June 2019	370

There is no case of Silicosis found in Jharsuguda 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

## Annexure I

## ROAD METAL/ BLACKSTONE/WHITESTONE SAIRATS ALREADY LEASED OUT AND EXECUTED

Sl. No.	Name Of Tahasil	Name of 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/Temporary working for de patch)	Captive or Non-captive	Lt No & date of grant of EC	Location of Resource (GPS co-ordinates or Khata & Plot No)	Length of area leased for mineral concession (in km)	Average width of area leased for mineral concession (in km)	Area leased for mineral concession (in sq m)	Mineable mineral potential as per approved mining plan (in cum)
							From	To									
A	B	C									D	E	F	G	H	I	
1	Jharsuguda	Stone	Chandnimal SQ A 23.08.2016	Nrupendra Ku Sai	Goudmal, Jharsuguda	2191, dt. 16.07.2017	2015-16	2019-20	23.08.2016	Working		663, dt. 30.01.2016	Khata No. 122 Plot No. 44 46	0.604	0.163	98338.61	889720
2	Jharsuguda	Stone	Chandnimal SQ B 27.08.2016	Sangram Sai	Bagharachaka Jharsuguda	2191, dt. 16.07.2017	2015-16	2019-20	27.08.2016	Working		665, dt. 30.01.2016	Khata No. 122 Plot No. 55 59	0.604	0.272	163897.69	1255297.5
3	Jharsuguda	Stone	Chandnimal SQ C 27.08.2016	Geetanjali Sai	Bagharachaka Jharsuguda	2191, dt. 16.07.2017	2015-16	2019-20	27.08.2016	Working		1604, dt. 18.06.2016	Khata No. 122 Plot No. 207 208 50	1.207	0.062	75271.53	658017

4	Jharsu guda	Stone	Chand nimal SQ D dt. 07.02.2017	Arun Ku Mundra	Lamtib ahal Jharsu guda	3829, dt. 16.11.2016	2016-17	2020-21	07.02.2017	Working			Khata No. 122 Plot No. 988	0.312	0.080	25090.51	158704
5	Jharsu guda	Stone	Kanda kuda SQ A 25.08.16	Nrupendra Ku Sai	Goud mal, Jharsu guda	2191, dt. 16.07.2017	2015-16	2019-20	25.08.2016	Working	685, dt. 30.01.2016		Khata No. 21 Plot No. 6 8 23 29 31 35	0.543	0.101	54632.56	136124
6	Jharsu guda	Stone	Kechh obahal SQ B dt.19.06.2017	Ragula l Sai	Kechh hobahal Jharsu guda	3827, dt. 16.11.2016	2016-17	2020-21	19.06.17	Working			Khata No. 110 Plot No. 944	0.191	0.111	21144.82	109209
7	Jharsu guda	Stone	Ghush uramu nda SQ B 07.02.2017	Arun Ku Mundra	Lamtib ahal Jharsu guda	3828, dt.16.11.2016	2016-17	2020-21	07.02.2017	Non - Working			Khata No. 40 Plot No. 520	0.111	0.070	7790.20	12432
8	Jharsu guda	Stone	Kechh obahal SQ A				2016-17	2020-21		Non - Working			Khata No. 110 Plot No. 784 786	0.221	0.141	31160.79	180810
9	Jharsu guda	Stone	Goud mal S/Q A				2016-17	2020-21		Non - Working			Khata No. 74 Plot No. 402	0.080	0.060	4856.23	

10	Kolabira	Stone	Bhograpali Stone Quarry	Sri Sushil Kumar Agrawal Director of M/s Shree Balajis Engicons Pvt. Ltd. At/PO-Belpahar, Dist-Jharsuguda								Bhograpali <u>Latitude</u> 21°45'15.7''N to 21°45'19.5''N <u>Longitude</u> 84°11'41.0''E to 84°11'48.8''E Khata No. 82 Plot No. 638	0.18	0.05	11493.07	12935	
11	Laikera	Road Metrol	Nandamunda, 27-03-2017	Manil Patel	At-Nandamunda	379/15-02-2016	2016-17	2020-21	27-03-2017		Non-captive	6861/26-07-2016	Khata-42 Plot-283	0.283	0.04	12019.162	49650
12	Lakhanpur	Stone	Dhulunda I	Shree Balajee Engicons Pvt	Belpahar Mob No. 9937090719	725 dtd. 09.09.2016	10.09.2016	09.09.2021	10.09.2016	Working	Non-captive	6861/26.7.2016	295,583(p) AC2.00, Latitudes of 21°43'11.5" N to 21°43'14.2" N And Longitudes of 83°29'28.2" E to 83°29'32.4"E.	100M <sup>+</sup>	80M <sup>+</sup>	8000SqM	15,680
13	Lakhanpur	Stone	Dhulunda III	Shree Balajee Engicons Pvt	Belpahar Mob No. 9937090719	727. dtd. 09.09.2016	10.09.2016	09.09.2021	10.09.2016	Working	Non-captive	6861/26.7.2016	295,583(p) AC3.00, Latitudes of 21°43'18.5" N to 21°43'22.2" N And Longitudes of 83°29'37.0" E to 83°29'41.0"E.	100M <sup>+</sup>	120M <sup>+</sup>	12000SqM	27,495

14	Lakhanpur	Stone	Dhulunaiv	Shree Balajee Engicons Pvt	Belpahar Mob No. 993709 0719	726 dtd. 09.09. 2016	10.0 9.20 16	09.0 9.20 21	10.0 9.20 16	Working	Non-captive	6861 /26.7 .2016	295,583(p) AC3.00, Latitudes of 21°43'25.4" N to 21°43'30.3" N And Longitudes of 83°29'25.4" E to 83°29'30.3"E.	100Mt	80Mt	12000sqM	35,695
15	Lakhanpur	Stone	Bartap	Shree Balajee Engicons Pvt	Belpahar Mob No. 993709 0719	705 dtd. 09.09. 2016	10.0 9.20 16	09.0 9.20 21	10.0 9.20 16	Working	Non-captive	6861 /26.7 .2016	10150(p),Ac4.50, , Latitudes of 21°.49'44.8" N to 21°49'51.4" N And Longitudes of 83°47'46.4" E to 83°47'49.8"E.	95mt	190mt	18,050sqM	18,240
16	Lakhanpur	Stone	Kadamghat	Radharaman Stone crusher	Belpahar Mob No. 993709 0719	912 dtd. 17.10. 2016`	18.1 0.20 16	17.1 0.20 21	18.1 0.20 16	Working	Non-captive	6861 /26.7 .2016	10150(p),Ac4.50, , Latitudes of 21°.48'2.2" N to 21°48'06.0" N And Longitudes of 83°32'32.8" E to 83°32'36.2"E.	66mt	60mt	3960 Sqmt	15741
17	Lakhanpur	Stone	Rampella	Sanjaya Pradhan	Belpahar Mob No. 943725 6520	691 dtd. 09.09. 2016``	10.0 9.20 16	09.0 9.20 21	10.0 9.20 16	Working	Non-captive	6861 /26.7 .2016	468,1240,1242 Ac0.20 &0.91,, Latitudes of 21°.40'08.5" N to 21°40'06.0" N And Longitudes of 83°56'27.1" E to 83°56'31.3"E.	55mt	30mt	1650 SQmt	12160
18	Lakhanpur	Stone	Giroplali	Radharaman Stone crusher	Belpahar Mob No. 993709 0719	911 dtd. 17.10. 2016	18.1 0.20 16	17.1 0.20 21	18.1 0.20 16	Working	Non-captive	6861 /26.7 .2016	75,612,615,Ac90 32 &924, Latitudes of 21°.48'26.1" N to 21°48'32.1" N And Longitudes of 83°32'51.0" E to 83°33'11.0"E.	68Mt	548mt	37,224 SQm	1,24,852
19	Lakhanpur	Stone	Gobindpur I	Balaji Corpor		880 dtd.	22.1 0.20	21.1 0.20	22.1 0.20	Working	Non-	8985 /06.1	67, 437, 0.74 Latitudes of	72Mt	30Mt	2160 SQm	6853 cum

				ation Prop. Prasant Singh		21.10.2016	16	21	16	g	Ca ptiv e	0.2016	21°46.88" N to 21°45'49.91" N And Langitudes of 83°41'02.64" E to 83°41'04.78"E.				
20	Lakha npur	Ston e	Gobin dpur 2	Biswan ath Agrawal	Belpah ar Mob. No. 943705 9927	1081 dtd. 09.11.2016	10.1 1.20 16	09.1 1.20 21	10.1 1.20 16	Wor kin g	No n- Ca ptiv e	6861 /26.7 .2016	67, 694, 696, 697, 698, 0.58,0.13, 0.61, 0.21 Latitudes of 21°45'26.89" N to 21°45'32.30" N And Langitudes of 83°41'11.10" E to 83°41'14.05"E.	180 Mt	62 Mt	11160 SQm	20427 cum
21	Lakha npur	Ston e	Ramel a 2	Singh Enterpr ises	Belpah ar Mob. No. 993868 7903	882 dtd. 21.10.2016	22.1 0.20 16	21.1 0.20 21	22.1 0.20 16	Wor kin g	No n- Ca ptiv e	8985 /06.1 0.2016	331, 1048(P), AC.2.24 Latitudes of 21°36'31.75" N to 21°36'34.97" N And Langitudes of 83°54'45.56" E to 83°54'50.12"E.	80 Mt	112 Mt	8960 SQm	30868.2 0 cum
22	Lakha npur	Ston e	Dhulun da 2	Rabind ra Behera	Belpah ar Mob. No. 993868 7903	190 dtd. 07.03.2018	08.0 3.20 18	07.0 3.20 23	08.0 3.20 18	Wor kin g	No n- Ca ptiv e	5287 /21.0 6.2017	295, 583(P), Ac.2.00 Latitudes of 21°43'13.1" N to 21°43'16.2" N And Langitudes of 83°29'37.7" E to 83°29'41.0"E.	72 Mt	112 Mt	8064 SQm	33744 cum
23	Lakha npur	Moru m	Pithind a	Shree Balaje ee Engico ns Pvt	Belpah ar Mob No. 993709 0719	728 dtd. 09.09.2016	10.0 9.20 16	09.0 9.20 21	10.0 9.20 16	Wor kin g	No n- ca ptiv e	6861 /26.7 .2016	247, 29, Ac.2.06 Latitudes of 21°43'30.4" N to 21°43'33.7" N And Langitudes of 83°29'57.1" E to 83°30'00.2"E.	70 mt	112 mt	7840 SQM	17094 cum
24	Lakha npur	Moru m	Piplima l	Shree Balaje ee Engico	Belpah ar Mob No. 993709	724 dtd. 09.09.2016	10.0 9.20 16	09.0 9.20 21	10.0 9.20 16	Wor kin g	No n- ca ptiv	6861 /26.7 .2016	205, 854, Ac 4.00 Latitudes of 21°49'25.8" N to 21°49'29.6" N	100 mt	160 mt	16000 SQM	67322 cum

				ns Pvt	0719						e		And Langitudes of 83°49'52.8" E to 83°49'59.0"E.				
25	Lakhanpur	Stone	Kumar	Ritika Engg. Prop. Sanju Agrawal	Belpahar Mob. No. 9938687903	899 dtd. 24.10.2016	25.10.2016	24.10.2016	25.10.2016	Working	Non-captive	8985/06.10.2016	180, 285(P), Ac 1.00 Latitudes of 21°49'07.20" N to 21°49'10.30" N And Langitudes of 83°35'25.80" E to 83°35'26.75"E.	48 mt	116 mt	5568 SQM	10827 cum
26	Lakhanpur	Stone	Sarandamal III	Balaji Stone Crusher Prp. Sunita Agrawal	Belpahar Mob No. 9937090719	737 dtd. 09.09.2016	10.09.2016	09.09.2016	10.09.2016	Working	Non-captive	6861/26.7.2016	235, 2520, Ac 3.80 Latitudes of 21°43'58.5" N to 21°44'04.2" N And Langitudes of 83°53'53.2" E to 83°53'59.5"E.	100 mt	40 mt	4000 SQM	46020 cum
27	Lakhanpur	Stone	Ramela-1	Balaji Stone Crusher Prp. Sunita Agrawal	Belpahar Mob No. 9937090719	729 dtd. 09.09.2016	10.09.2016	09.09.2016	10.09.2016	Working	Non-captive	6861/26.7.2016	331, 1048(P), Ac 2.24 Latitudes of 21°36'35.2" N to 21°48'32.1" N And Langitudes of 83°54'45.8" E to 83°54'50"	112 mt	52 mt	5824 SQM	28626 cum
28	Lakhanpur	Amapali	Amapali- Stone Quarry Area: Ha. 8.36	Balaji Stone Crusher Prp. Sunita Agrawal	Belpahar Mob No. 9937090719	739 dtd. 05.10.2016	2016-17	2020-21	06.10.2016	Working	Non Captive	1377 dtd. 04.05.2016	Latitudes of 21°44'07.2" N to 21°44'23.8" N And Langitudes of 83°30'01.3" E to 83°30'59.4"E.	200 mtr	180mtr	36000 sqm	24964 cum
29	Lakhanpur	Sarandamal	Sarandamal-1 Stone Quarry Area: Ha. 0.70	Omega enterprises partner Ramya Singh	Belpahar Mob. No. 9938687903	383 dtd. 18.05.2018	19.05.2018	18.05.2018	19.05.2018	Working	Non captive	3324 dtd. 12.04.2018	Latitudes of 21°44'46.44" N to 21°44'49.55" N And Langitudes of 83°53'08.51" E to 83°53'12.63"E.	88mtr	80mtr	7040 sqm	65071.20 cum

30	Lakhanpur	Sarandamal	Sarandamal-2 Stone Quarry Area: Ha. 0.56	Jaganath Naik	Baliput Mob. 9777658509	77 dtd. 28.01.2019	29.0 1.20 19	28.0 1.	29.0 1.20 19	Working	Non Captive	3324 dtd. 12.04.2018	Latitudes of 21°45'15.22" N to 21°45'17.38" N And Longitudes of 83°53'54.91" E to 83°53'57.85"E.	44 mtr	64 mtr	2816 sqm	35715.25 cum
31	Lakhanpur	Dalgaoan	Dalgaoan- Stone Quarry Area: Ha. 1.40	Sanjay Kumar Pradhan	Banadhbahal Mob: 9437256520	122 dtd. 27.01.2017	28.0 1.20 17	27.0 1.20 22	27.0 1.20 17	Working	Non Captive	202 dtd. 10.01.2017	Latitudes of 21°43'43.40" N to 21°43'52.30" N And Longitudes of 83°53'02.70" E to 83°53'07.20"E.	196 mtr	60 mtr	11760 sqm	46620 cum
32	Lakhanpur	Semliana	Semliana- Stone Quarry Area: Ha. 3.13	SHiv Shakti Stone Crusher Partner Sunil Ku. Swaragi	Jharsuguda Mob: 9938465547	161 dtd. 07.03.2018	08.0 3.20 18	07.0 3.20 23	07.0 3.20 18	Working	Non Captive	1722 dtd. 27.02.2018	Latitudes of 21°41'02.40" N to 21°41'10.50" N And Longitudes of 83°27'00.80" E to 83°27'13.80"E.	232 mtr	187 mtr	43384 sqm	122280 cum

## Annexure II

## POTENTIAL SOURCES OF ROAD METAL/ BLACKSTONE IN THE DISTRICT

Sl. No.	Name Of Tahasil	Name of village	Name of Minor Mineral and Area of Sairat (Ha)	Location of the Source (Total Hillock) recommended for mineral concession (GPS co-ordinates or Khata & Plot No) (Sketch map to be attached)	Area of the mineral potential patch (in sq m)	Mineable mineral potential (in cum)
A	B	C	D	E	F	G
1	Jharsuguda	Chandnimal	Stone	Khata No. 122 Plot No. 44 46	98338.61	889720
2	Jharsuguda	Chandnimal	Stone	Khata No. 122 Plot No. 55 59	163897.69	1255297.5
3	Jharsuguda	Chandnimal	Stone	Khata No. 122 Plot No. 207 208 50	75271.53	658017
4	Jharsuguda	Chandnimal	Stone	Khata No. 122 Plot No. 988	25090.51	158704
5	Jharsuguda	Kandakuda	Stone	Khata No. 21 Plot No. 6, 8, 23, 29, 31, 35	54632.56	136124
6	Jharsuguda	Kechhobahal	Stone	Khata No. 110 Plot No. 944	21144.82	109209
7	Jharsuguda	Ghushuramunda	Stone	Khata No. 40 Plot No. 520	7790.20	12432
8	Jharsuguda	Kechhobahal	Stone	Khata No. 110 Plot No. 784 786	31160.79	180810
9	Jharsuguda	Goudmal	Stone	Khata No. 74 Plot No. 402	4856.23	
10	Kolabira	Bhograpali	Stone	Bhograpali Latitude 21°45'15.7''N to 21°45'19.5''N	11493.07	12935

				Longitude 84°11'41.0"E to 84°11'48.8"E Khata No. 82 Plot No. 638		
11	Laikera	Nandamunda	Metal 1.20	21°99'09.79 " " " 84°38'03.32"	12019.162	49650
12	Lakhanpur	Dhulunda	Dhulunda Stone Quarry - 1 Area: Ha. 0.80	Latitudes of 21°43'11.5" N to 21°43'14.2" N And Langitudes of 83°29'28.2" E to 83°29'32.4"E.	8000 sq m.	15,680 cum.
13	Lakhanpur	Dhulunda	Dhulunda Stone Quarry - 3 Area: Ha. 1.20	Latitudes of 21°43'18.5" N to 21°43'22.2" N And Langitudes of 83°29'37.0" E to 83°29'41.0"E.	12000 sq m	27495 cum
14	Lakhanpur	Dhulunda	Dhulunda Stone Quarry - 4 Area: Ha. 1.20	Latitudes of 21°43'25.4" N to 21°43'30.3" N And Langitudes of 83°29'25.4" E to 83°29'30.3"E.	12000 sqm	35695 cum
15	Lakhanpur	Bartap	Bartap Stone Quarry Area: Ha. 1.80	Latitudes of 21°.49'44.8" N to 21°49'51.4" N And Langitudes of 83°47'46.4" E to 83°47'49.8"E.	18050 sqm	18240 cum
16	Lakhanpur	Kadamghat	Kadamghat Stone Quarry Area: Ha. 0.39	Latitudes of 21°.48'2.2" N to 21°48'06.0" N And Langitudes of 83°32'32.8" E to 83°32'36.2"E.	3960 sqm	15741 cum
17	Lakhanpur	Rampella	Rampella Stone Quarry Area: Ha. 0.16	Latitudes of 21°.40'08.5" N to 21°40'06.0" N And Langitudes of	1650 sqm	###

				83°56'27.1" E to 83°56'31.3"E.		
18	Lakhanpur	Girolpali	Girolpali Stone Quarry Area: Ha. 3.72	Latitudes of 21°48'26.1" N to 21°48'32.1" N And Langitudes of 83°32'51.0" E to 83°33'11.0"E.	37224 sqm	124852 cum
19	Lakhanpur	Gobindpur	Gobindpur-1 Stone Quarry Area: Ha. 0.21	Latitudes of 21°.46.88" N to 21°45'49.91" N And Langitudes of 83°41'02.64" E to 83°41'04.78"E.	2160 sqm	6853 cum
20	Lakhanpur	Gobindpur	Gobindpur-2 Stone Quarry Area: Ha. 1.11	Latitudes of 21°.45'26.89" N to 21°45'32.30" N And Langitudes of 83°41'11.10" E to 83°41'14.05"E.	11160 sqm	20427 cum
21	Lakhanpur	Ramela	Ramela-2 Stone Quarry Area: Ha. 0.98	Latitudes of 21°.36'31.75" N to 21°36'34.97" N And Langitudes of 83°54'45.56" E to 83°54'50.12"E.	8960 sqm	30868.2 cum
22	Lakhanpur	Dhullunda	Dhulunda Stone Quarry - 2 Area: Ha. 0.80	Latitudes of 21°43'13.1" N to 21°43'16.2" N And Langitudes of 83°29'37.7" E to 83°29'41.0"E.	8064 sqm	33744 cum
23	Lakhanpur	Pithinda	Pithinda Muroom Quarry Area: Ha. 0.78	Latitudes of 21°.43'30.4" N to 21°43'33.7" N And Langitudes of 83°29'57.1" E to 83°30'00.2"E.	7840 sqm	17094 cum
24	Lakhanpur	Pipilimal	Pipilimal Muroom Quarry Area: Ha. 1.60	Latitudes of 21°.49'25.8" N to 21°49'29.6" N And Langitudes of 83°49'52.8" E to	16000 sqm	67322 cum

				83°49'59.0"E.		
25	Lakhanpur	Kumar	Kumar Stone Quarry Area: Ha. 0.55	Latitudes of 21°49'07.20" N to 21°49'10.30" N And Longitudes of 83°35'25.80" E to 83°35'26.75"E.	5568 sqm	10827 cum
26	Lakhanpur	Sarandamal	Sarandamal-III Stone Quarry Area: Ha. 0.40	Latitudes of 21°43'58.5" N to 21°44'04.2" N And Longitudes of 83°53'53.2" E to 83°53'59.5"E.	4000 sqm	46020 cum
27	Lakhanpur	Ramela	Ramela- 1 Stone Quarry Area: Ha. 0.58	Latitudes of 21°36'35.2" N to 21°48'32.1" N And Longitudes of 83°54'45.8" E to 83°54'50.5"E.	5824 sqm	28626 cum
28	Lakhanpur	Amapali	Amapali- Stone Quarry Area: Ha. 8.36	Latitudes of 21°44'07.2" N to 21°44'23.8" N And Longitudes of 83°30'01.3" E to 83°30'59.4"E.	83608 sqm	972174 cum
29	Lakhanpur	Sarandamal	Sarandamal- 1 Stone Quarry Area: Ha. 0.70	Latitudes of 21°44'46.44" N to 21°44'49.55" N And Longitudes of 83°53'08.51" E to 83°53'12.63"E.	7081 sqm	65071.20 cum
30	Lakhanpur	Sarandamal	Sarandamal- 2 Stone Quarry Area: Ha. 0.56	Latitudes of 21°45'15.22" N to 21°45'17.38" N And Longitudes of 83°53'54.91" E to 83°53'57.85"E.	5665 sqm	35715.25 cum
31	Lakhanpur	Dalgaon	Dalgaon- Stone Quarry Area: Ha. 1.40	Latitudes of 21°43'43.40" N to 21°43'52.30" N And Longitudes of 83°53'02.70" E to	14002 sqm	46620 cum

				83°53'07.20"E.		
32	Lakhanpur	Semlia	Semlia- Stone Quarry Area: Ha. 3.13	Latitudes of 21°41'02.40" N to 21°41'10.50" N And Langitudes of 83°27'00.80" E to 83°27'13.80"E.	31332 sqm	122280 cum
1	Jharsuguda	Kandakuda S/Q B	Stone 10.38	Khata No. 21 Plot No. 38 41 52 55	42491.99	600
2	Jharsuguda	Kandakuda S/Q C	Stone 15.17	Khata No. 21 Plot No. 65 67 70 82	61188.47	800
3	Jharsuguda	Goudmal S/Q B	Stone 2.06	Khata No. 74 Plot No.393	8376.993	1100
4	Jharsuguda	Naikdihi S/Q I	Stone 2.50	Khata No.25 Plot No.23	9995.735	800
5	Jharsuguda	Naikdihi S/Q II	Stone 2.50	Khata No. 25 Plot No.23	10359.95	960
6	Kolabira	Paikpada	Paikpada Stone Quarry	Khata No 117 Plot No 142, 426, 428, 431, 442, 1138, 1185, 1204, 119, 9 Plots	17280.08	
7	Lakhanpur	Kandheikela	Kandheikela Stone Quarry Area: Ha. 1.02	Latitudes of 21°41'28.57" N to 21°41'31.36" N And Langitudes of 83°27'21.57" E to 83°27'32.29"E.	10279 sqm	60016 cum

# MINERAL MAP OF JHARSUGUDA DISTRICT

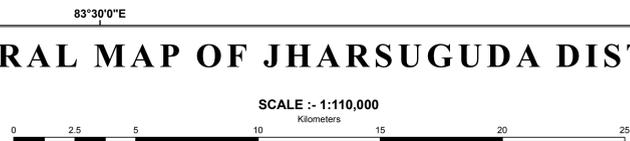
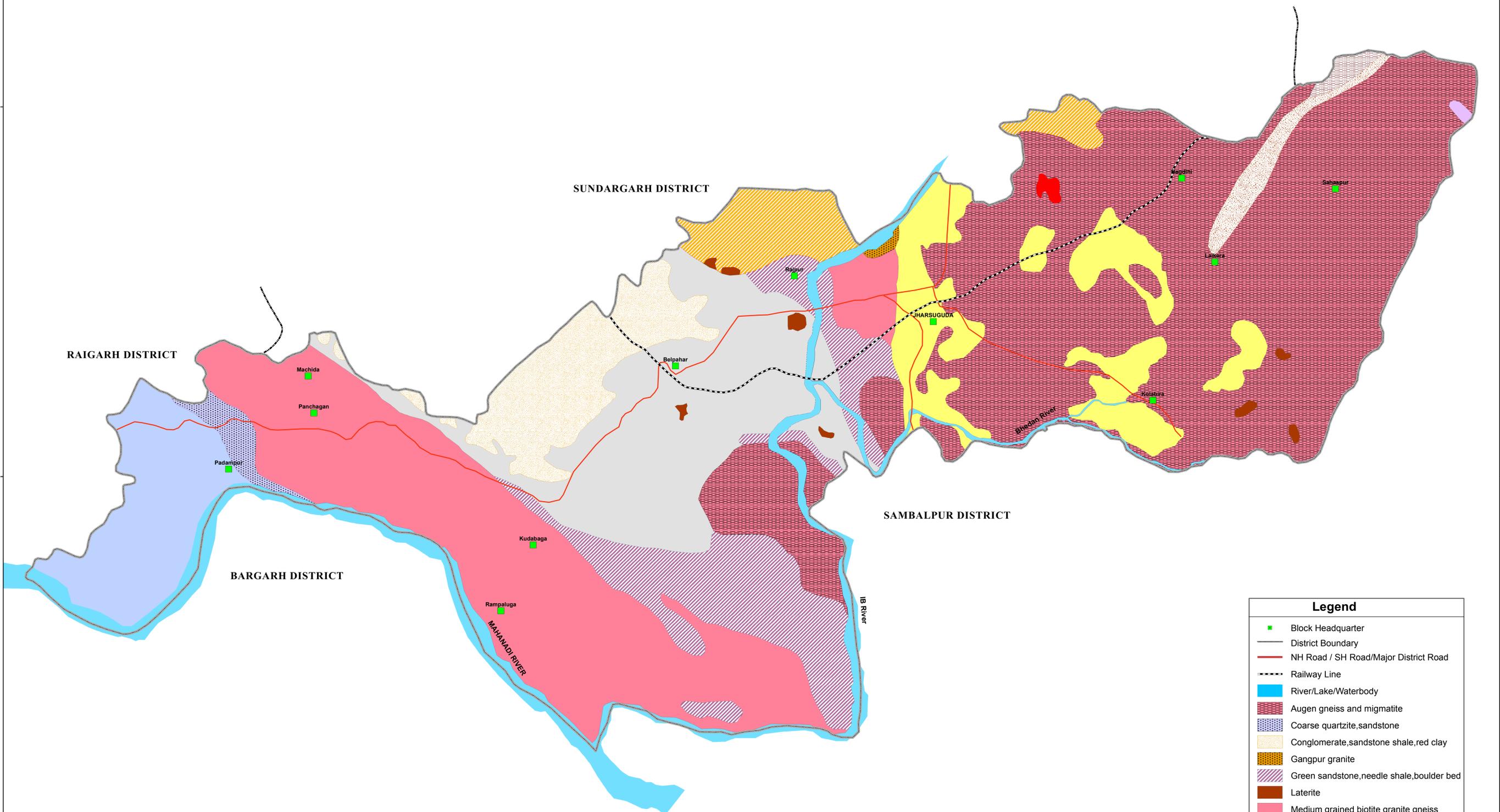


PLATE NO-4



Legend	
	Block Headquarter
	District Boundary
	NH Road / SH Road/Major District Road
	Railway Line
	River/Lake/Waterbody
	Augen gneiss and migmatite
	Coarse quartzite, sandstone
	Conglomerate, sandstone shale, red clay
	Gangpur granite
	Green sandstone, needle shale, boulder bed
	Laterite
	Medium grained biotite granite gneiss
	Metabasics
	Phyllite, mica schist
	Quartzite, quartz-sericite schist
	Sandstone, shale with coal seams
	Shale, calcareous shale, quartzite
	Shale, phyllite, mica schist
	Soil and alluvium
	Tamparkola granite

83°30'0"E 83°45'0"E 84°0'0"E 84°15'0"E

22°0'0"N  
21°45'0"N  
21°30'0"N

22°0'0"N  
21°45'0"N  
21°30'0"N

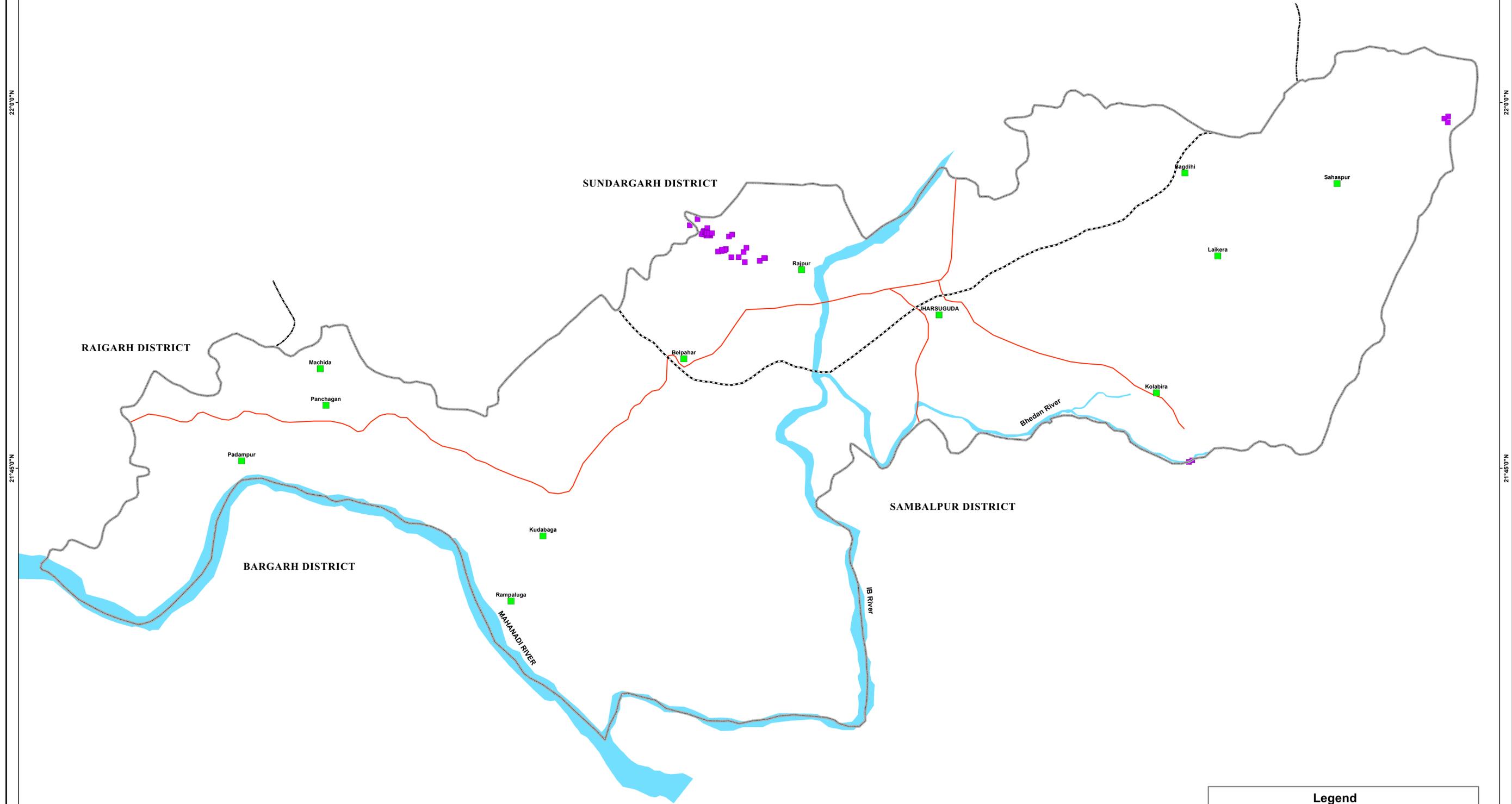
83°30'0"E 83°45'0"E 84°0'0"E 84°15'0"E

# LEASE/POTENTIAL MAP OF ROAD METAL/BUILDING STONE/BLACK STONE/WHITE STONE IN JHARSUGUDA DISTRICT

SCALE :- 1:1,10,000  
Kilometers 0 2.5 5 10 15 20 25



PLATE NO-5



Legend	
	Block Headquarter
	District Boundary
	NH Road
	SH Road/Major District Road
	Railway Line
	River/Lake/Waterbody
	Lease/Potential Area for Road Metal/Building Stone/Black Stone/White Stone

83°30'0"E 83°45'0"E 84°0'0"E 84°15'0"E