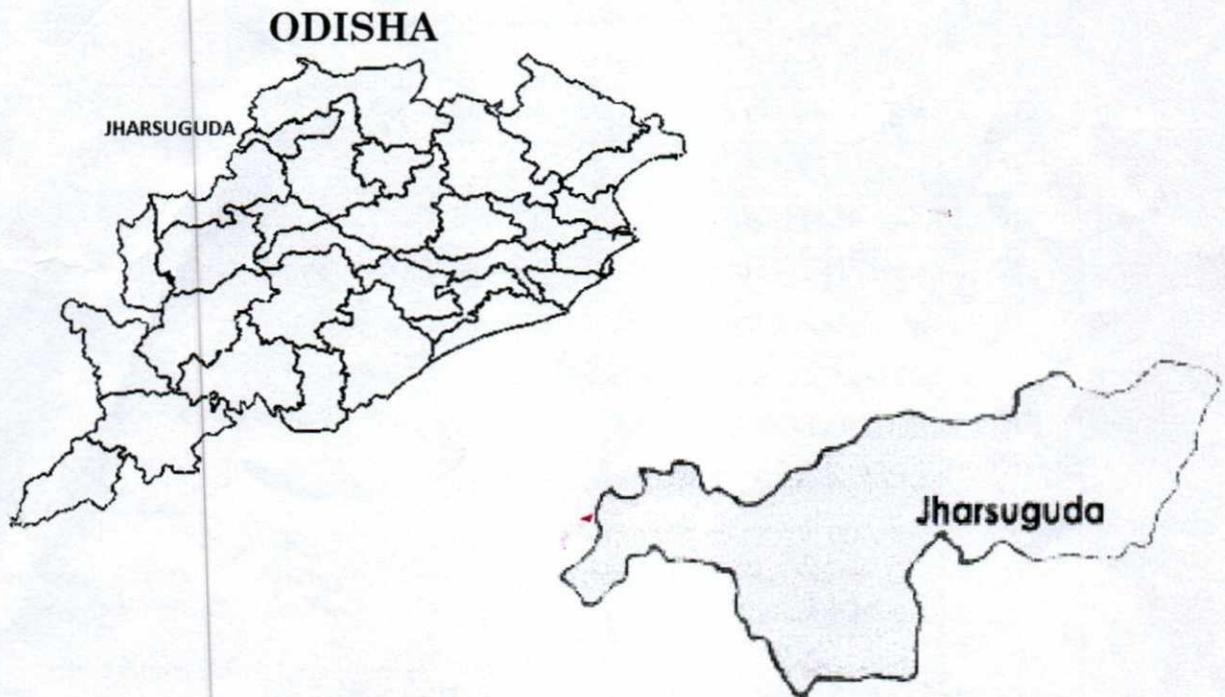




**DISTRICT SURVEY REPORT (DSR)  
OF  
JHARSUGUDA DISTRICT, ODISHA  
FOR  
ROAD METAL / BUILDING STONE / BLACK STONE**

**(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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DFO, Jharsuguda(T)  
Member DEIAA  
Jharsuguda Forest Division

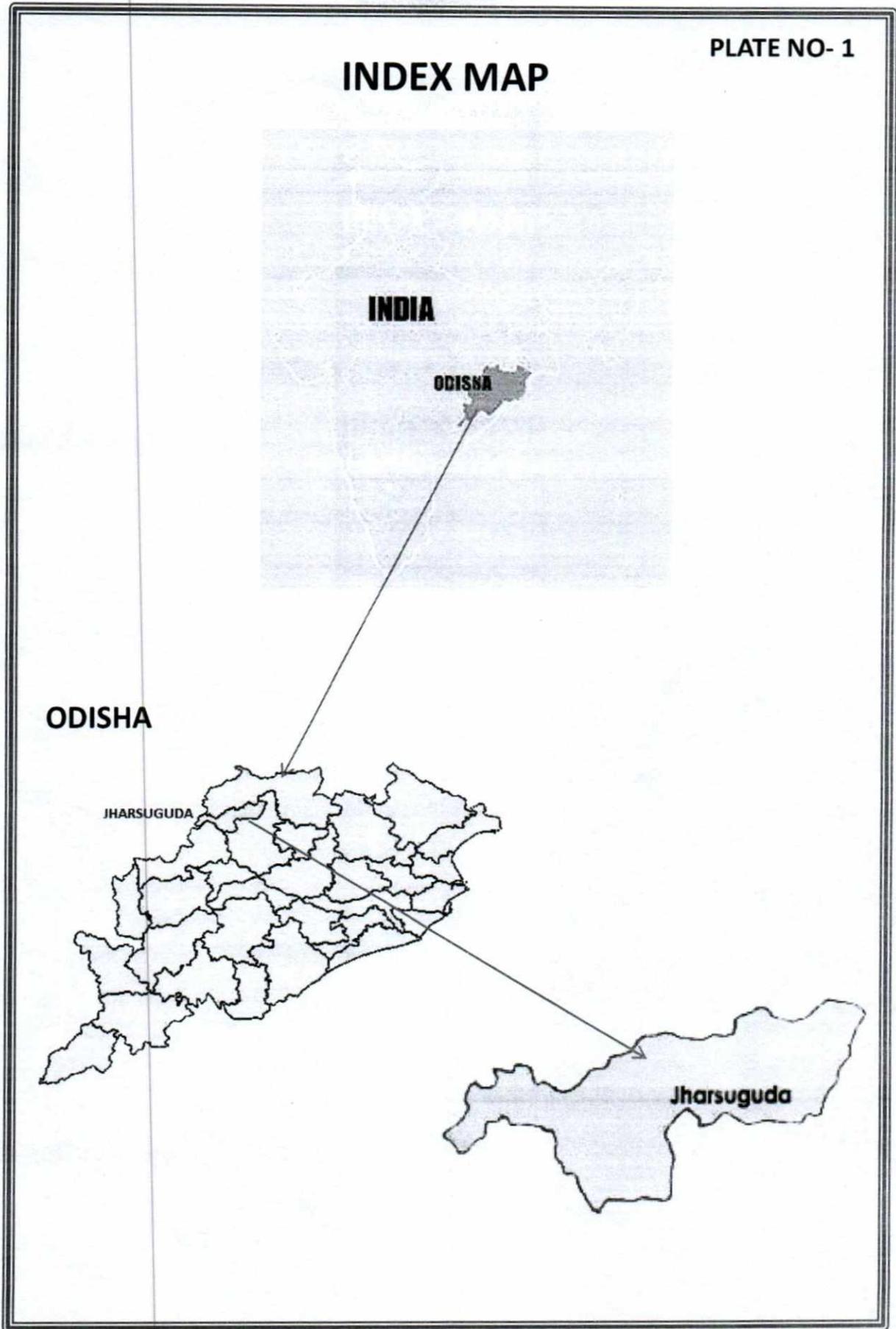
  
DR. Sarat Choudhary  
Retd. Principal  
Expert Member, DEIAA

  
SubCollector, Jharsuguda  
Member secretary DEIAA

  
District Magistrate  
& Collector, Jharsuguda  
Chairman DEIAA

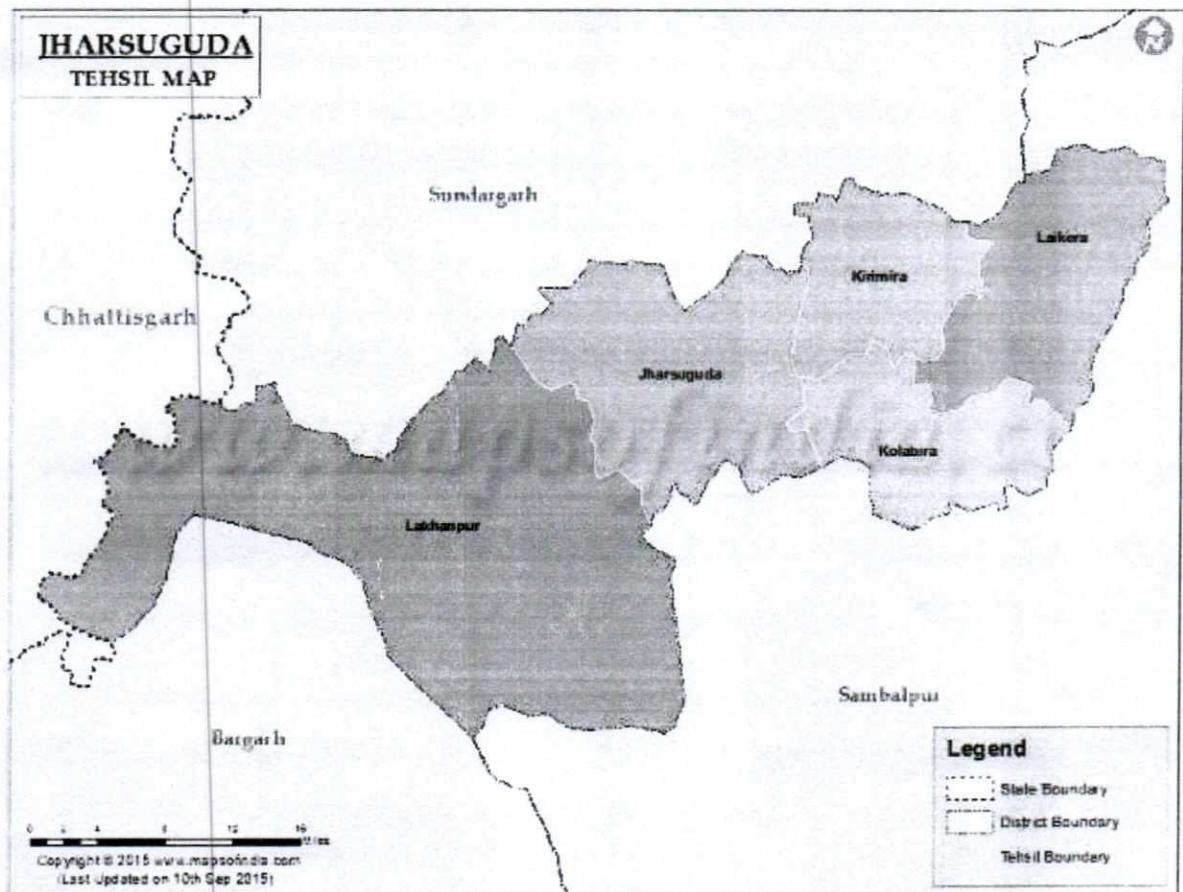


# INDEX MAP

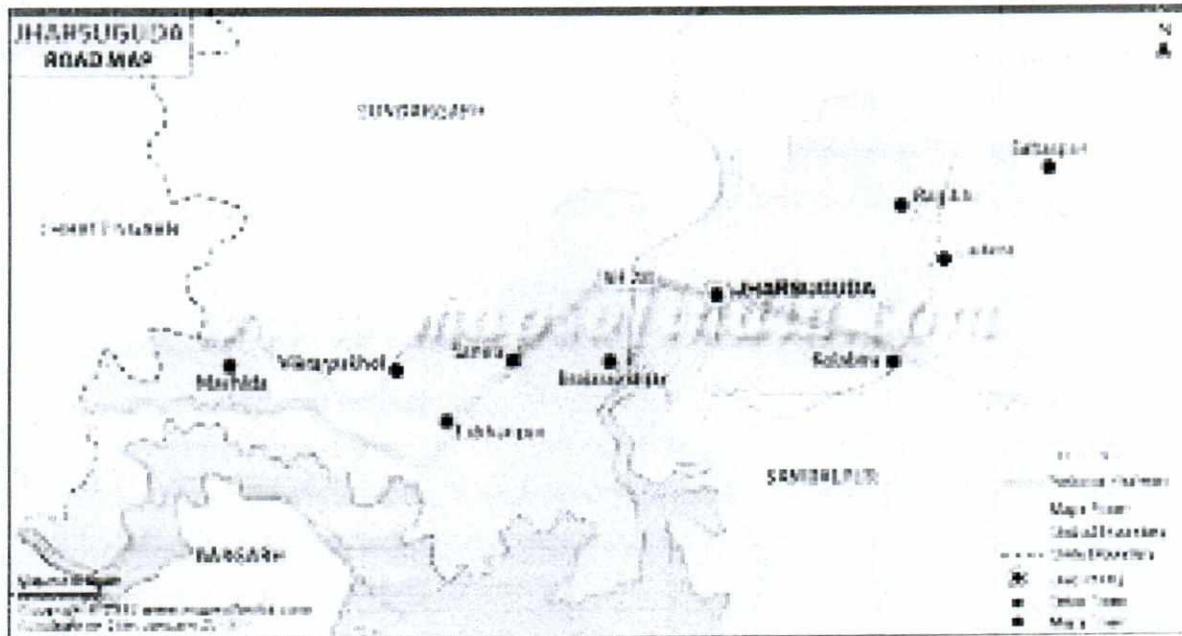




### MAP SHOWING THE TAHASILS OF JHARSUGUDA DISTRICT



### 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.

In Jharsuguda district Coal extraction is done by Mahanadi Coalfields Limited (MCL.) a subsidiary of Coal India Limited. There are five numbers of Opencast Projects and nine numbers of underground leases in operation by MCL. The total area held by MCL for Mining Operation is 9255.267Hectare in the district. Major Consumers of the IB Valley Area Coal across the Country are like NALCO, NTPC, Tamilnadu Electricity Board (TNEB), West Bengal Power Development Corporation (WPDCL), Aravali Power Co.(P) Ltd. T.P.P. Hariyana, Talwandi Saboo Power Ltd. Punjab, Tata Electric Power, Jharkhand, Vendanta Pvt. Ltd., OPGC Odisha, Mahagenco Akola, Maharashtra, Gopani Iron & Power , Chandrapura, Maharashtra, etc. The State Govt is earning revenue of 550-600 crores as royalty & around 150 crores as DMF from 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.

Besides above mentioned coal mines, there are two numbers of Quartzite mines operating in the district. One is Chuinpali Quartzite mines of M/s TRL Krosaki Refractories Limited over 102.123 Hectare area situated at Chuinpali Village of Lakhanpur Tahasil and the other is Bhikampali Quartzite Mines of M/s OCL India Ltd. over 4.897 Hectare in Bhikamplai Village of Lakhanpur Tahasil of Jharsuguda District.

**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 Synclinorium. 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 beryi 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°01' East
	Latitude	Degree	21° 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	Paddy	Wheat	Maize	Mung	Biri	Kulthi	TILL	Groundnut	Mustard	Potatoes	Jute	Sugarcane
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.

Allopathic Govt medical institutions	93 No
Beds facilities	DHH- 300 beds- 1No CHCs- 60 beds- 6 Nos OH- 10 beds- 1No
Homoeopathic dispensaries	7 No
Ayurvedic dispensaries	9 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:

<b>AGE</b>	<b>GEOLOGICAL UNIT</b>	<b>LITHOLOGY</b>
------------	------------------------	------------------

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	Chattisgarh Super Group	Raipur Group	Shale, calcareous shale, quartzite
Lower Proterozoic		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		Lower Bonai Group	Metabasics
		Peninsular Gneiss (Younger phase)	Augen gneiss and migmatite
Archaean		Peninsular Gneiss (Older phase)	Medium grained biotite granite gneiss

## 5. DRAINAGE AND IRRIGATION PATTERN.

The drainage of the district is mainly controlled by rivers like IB & Bheden. 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	Sediments get deposited along with sand after receding of flood water.	35,00,000 Cum(Approx.)	-
2	River Bheden	Bamara	21°467' N 84°14' 40"E	50Km	2120 sq km	50Km	-do-	50,00,000 Cum(Approx.)	-

## 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	27
7	Current Fallow	28
8	Other Fallow	3
9	Net Area Sown	60
10	Mining	10
	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:

Depth of water level (mbgl)/ Period	April	August	November	January
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:

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

Sl.No	Name Of Tahasil	2015-16	2016-17	2017-18	2018-19
1	Jharsuguda	342000	1253000	1937000	1978000
2	Kirmira	0	0	0	0
3	Kolabira	0	36000	95000	105000
4	Laikera	0	10880	46240	48960
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	0	10240	10454
2	Kirmira	0	0	0	0
3	Kolabira	0	585	650	715
4	Laikera	0	77	330	349
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 is 51,29,849 cum which may increase after detail investigation.

Details of the potential areas are submitted as Annexure II.

## 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 Sundargarh and Sambalpur.

## 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 NO<sub>x</sub> , SO<sub>2</sub> 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 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 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 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 Minor 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 deparctch)	Captive or Non-captive	Method of Mining	Lt No & date of grant of EC	Location of Resource (GPS coordinates or Khata & Plot No) (Sketch map to be attached)	Longitude			Latitude			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							Degree	Minute	Second	Degree	Minute	Second				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	23	24	25	26
1	Jharsuguda	Stone	Chandni mal SQ A 23.08.2016	Nrupendra Kusai	Godmal, Jharsuguda	2191, dt. 16.07.2017	2015	2019	23.08.2016	Working	Non-captive	OC	663, dt. 30.01.2016	Khata No. 122 Plot No. 44 46	21	53	45.73	83	53	21.56	0.604	0.163	98338.61	889720
2	Jharsuguda	Stone	Chandni mal SQ B 27.08.2016	Sangram Sai	Bagharachaka, Jharsuguda	2191, dt. 16.07.2017	2015	2019	27.08.2016	Working	Non-captive	OC	665, dt. 30.01.2016	Khata No. 122 Plot No. 55 59	21	53	58.64	83	53	38.49	0.604	0.272	163897.69	1255297.5
3	Jharsu	Stone	Chandni mal	Getanjial	Bagharach	2191, dt.	2015	2019	27.08.2016	Working	Non-cap	OC	1604, dt. 18.06	Khata No. 122 Plot No. 207 208	21	53	31.20	83	54	11.20	1.207	0.062	75271.53	658017





				En gic ons Pvt	No. 993 709 071 9	09. 20 16							N And Longitudes of 83°29'37.0" E to 83°29'41.0"E.											
14	Lak han pur	Ston e	Dhul una aiv	Shr ee Bal aje ee En gic ons Pvt	Bel pah ar Mo b No. 993 709 071 9	72 6 dt d. 09. 20 16	10. 09. 20 16	09. 09. 20 21	10.09 .2016	Workin g	Non - cap tive	O C	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.	21	43	22.8 0	83	29	29.2 0	0.10M t	0.08Mt	12000 SqM	35,695
15	Lak han pur	Ston e	Bart ap	Shr ee Bal aje ee En gic ons Pvt	Bel pah ar Mo b No. 993 709 071 9	70 5 dt d. 09. 20 16	10. 09. 20 16	09. 09. 20 21	10.09 .2016	Workin g	Non - cap tive	O C	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.	21	49	48.2 0	83	47	47.6 0	0.095 mt	0.19mt	18,050 sQM	18,240
16	Lak han pur	Ston e	Kad am ghat	Ra dh ara ma n Sto ne cru she r	Bel pah ar Mo b No. 993 709 071 9	91 2 dt d. 17. 10. 20 16	18. 10. 20 16	17. 10. 20 21	18.10 .2016	Workin g	Non - cap tive	O C	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.	21	48	05.2 0	83	32	34.4 0	0.066 mt	0.06mt	3960 Sqmt	15741
17	Lak han pur	Ston e	Ra mp ella	Sa nja ya Pra dh an	Bel pah ar Mo b No. 943 725 652 0	69 1 dt d. 09. 20 16	10. 09. 20 16	09. 09. 20 21	10.09 .2016	Workin g	Non - cap tive	O C	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.	21	40	08.3 0	83	56	30.7 0	0.055 mt	0.03mt	1650 SQmt	12160

18	Lakhanpur	Stone	Giripali	Radharaman Stone crusher	Belapur Mob No. 9937090719	91 dt. 17. 10. 2016	18. 10. 2016	17. 10. 2021	18.10.2016	Working	Non-captive	O C	6861/26.7.2016	75,612,615,Ac 9032 & 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.	21	48	28.50	83	33	09.20	0.068 Mt	0.0548 mt	37,224 SQm	1,24,852
19	Lakhanpur	Stone	Goindpur 1	Balaji Corporation Prasant Singh		88 dt. 21. 10. 2016	22. 10. 16	21. 10. 2021	22.10.2016	Working	Non-Captive	O C	8985/06.10.2016	67, 437, 0.74 Latitudes of 21°46'88" N to 21°45'49.91" N And Longitudes of 83°41'02.64" E to 83°41'04.78"E.	21	45	49.12	83	41	03.35	0.072 Mt	0.03Mt	2160 SQm	6853 cum
20	Lakhanpur	Stone	Goindpur 2	Biswanath Agrawal	Belapur Mob. No. 9437059927	10 dt. 09. 11. 2016	10. 11. 16	09. 11. 2021	10.11.2016	Working	Non-Captive	O C	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 Longitudes of 83°41'11.10" E to 83°41'14.05"E.	21	45	32.30	83	41	12.17	0.18 Mt	0.062 Mt	11160 SQm	20427 cum
21	Lakhanpur	Stone	Ramela 2	Singh Enterprises	Belapur Mob. No. 993868790	88 dt. 21. 10. 2016	22. 10. 16	21. 10. 2021	22.10.2016	Working	Non-Captive	O C	8985/06.10.2016	331, 1048(P), AC.2.24 Latitudes of 21°36'31.75" N to 21°36'34.97" N And Longitudes of 83°54'45.56" E	21	36	34.97	83	54	46.10	0.08 Mt	0.112 Mt	8960 SQm	30868.20 cum

					3								to 83°54'50.12"E.										
22	Lakhanpur	Stone	Dhunda 2	Rabin dra Be hera	Bel pah ar Mo b. No. 993 868 790 3	19 0 03. 20 18	07. 03. 20 23	08.03 .2018	Workin g	Non - Cap tive	O C	5287 /21.0 6.201 7	295, 583(P), Ac.2.00 Latitudes of 21°43'13.1" N to 21°43'16.2" N And Longitudes of 83°29'37.7" E to 83°29'41.0"E.	21	43	13.1 0	83	29	37.9 0	0.072 Mt	0.112 Mt	8064 SQm	33744 cum
23	Lakhanpur	Stone	Kumar	Ritika En gg . Pr op . Sa nju Agra wala	Bel pah ar Mo b. No. 993 868 790 3	89 9 25. 10. 20 16	24. 10. 20 21	25.10 .2016	Workin g	Non - cap tive	O C	8985 /06.1 0.201 6	180, 285(P), Ac 1.00 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.	21	49	08.3 0	83	35	25.9 0	0.048 mt	0.116 mt	5568 SQM	10827 cum
24	Lakhanpur	Stone	Saranda mal III	Balaji Stone Crus her Pr p. Sunita Agra wala	Bel pah ar Mo b No. 993 709 071 9	73 7 10. 09. 20 16	09. 09. 20 21	10.09 .2016	Workin g	Non - cap tive	O C	6861 /26.7 .2016	235, 2520, Ac 3.80 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.	21	44	04.2 0	83	53	53.2 0	0.10m t	0.04mt	4000 SQM	46020 cum

25	Lakhanpur	Stone	Ramel-a-1	Balaji Stone Crusher	Bel pahar Mob No. 993	729 dtd. 09.09.2016	10.09.2016	09.09.2021	10.09.2016	Working	Non-captive	O C	6861/26.7.2016	331, 1048(P), Ac 2.24 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"	21	36	36.80	83	54	46.10	0.112 mt	0.052 mt	5824 SQM	28626 cum
26	Lakhanpur	Amपालि	Amपालि-Stone Quarry Area: Ha. 8.36	Balaji Stone Crusher	Bel pahar Mob No. 993	739 dtd. 05.10.2016	2016-17	2020-21	06.10.2016	Working	Non Captive	O C	1377 dtd. 04.05.2016	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.	21	44	21.10	83	32	34.40	0.20 mtr	0.18mtr	36000 sqm	972174 cum
27	Lakhanpur	Sarandamal	Sarandamal-1	Ome ga enterp rise	Bel pahar Mob. No.	383 dtd. 18.05.	19.05.2018	18.05.2023	19.05.2018	Working	Non captive	O C	3324 dtd. 12.04.2018	Latitudes of 21°44'46.44" N to 21°44'49.55" N And Longitudes of	21	44	48.50	83	53	11.50	0.088 mtr	0.08mtr	7040 sqm	65071.20 cum

			Stone Quarry Area: Ha. 0.70	s partner Ramyash Singh	993 868 790 3	20 18							83°53'08.51" E to 83°53'12.63"E.											
28	Lakhanpur	Sarandamal	Sarandamal - 2 Stone Quarry Area: Ha. 0.56	Jagan Nath Naik	Baliput Mob. 977 765 850 9	77 dt d. 28. 01. 19	29. 01. 20 19	28. 01. 20 19	29.01 .2019	Working	Non Captive	O C	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.	21	45	16.2 5	83	53	55.4 5	0.044 mtr	0.664 mtr	2816 sqm	35715.2 5 cum
29	Lakhanpur	Dalgaon	Dalgaon- Stone Quarry Area: Ha. 1.40	Sanjay Kumar Pradhan	Banadhahal Mob: 943 725 652 0	12 2 dt d. 27. 01. 17	28. 01. 20 17	27. 01. 20 22	27.01 .2017	Working	No Captive	O C	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.	21	43	44.4 5	83	53	04.5 2	0.196 mtr	0.06 mtr	11760 sqm	46620 cum
30	Lakhanpur	Semliana	Semliana- Stone Quarry Area	SHIV Shakti Stone Crush	Jharsuguda Mob: 993 846 554 7	16 1 dt d. 07. 03. 18	08. 03. 20 18	07. 03. 20 23	07.03 .2018	Working	Non Captive	O C	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.	21	41	4.73	83	27	7.56	0.232 mtr	0.187 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	Status	Location of the Source (Total Hillock) recommended for mineral concession (GPS co-ordinates or Khata & Plot No) (Sketch map to be attached)	Latitude			Longitude			Area of the mineral potential patch (in sq m)	Mineable mineral potential (in cum)
						De gr ee	Mi nut e	Seco nd	De gr ee	Mi nut e	Seco nd		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Jharsuguda	Chandnima I/S/Q A	Stone	Running	Khata No. 122 Plot No. 44, 46	21	53	45.73	83	53	21.56	98338.61	886250
2	Jharsuguda	Chandnima I/S/Q B	Stone	Running	Khata No. 122 Plot No. 55, 59	21	53	58.64	83	53	38.49	163897.69	1488600
3	Jharsuguda	Chandnima I/S/Q C	Stone	Running	Khata No. 122 Plot No. 207, 208, 50	21	53	31.20	83	54	11.20	75271.53	683100
4	Jharsuguda	Chandnima I/S/Q D	Stone	Running	Khata No. 122 Plot No. 988	21	53	33.50	83	54	21.15	25090.51	181400
5	Jharsuguda	Kandakuda S/Q A	Stone	Running	Khata No. 21 Plot No. 6, 8, 23, 29, 31, 35	21	54	35	83	51	36.32	54632.56	200520
6	Jharsuguda	Kechhobahal S/Q B	Stone	Running	Khata No. 110 Plot No. 944	21	54	32.76	83	53	04.80	21144.82	118720
7	Jharsuguda	Kandakuda S/Q B	Stone 10.38	New	Khata No. 21 Plot No. 38, 41, 52, 55	21	54	35.20	83	52	17.40	42491.99	220680
8	Jharsuguda	Kandakuda S/Q C	Stone 15.17	New	Khata No. 21 Plot No. 65, 67, 70, 82	21	54	35.20	83	52	17.40	61188.47	220680
9	Jharsuguda	Kechhobahal S/Q C	Stone 2.40	New	Khata No. 110 Plot No. 780/1756	21	55	16.23	83	52	43.15	9712.45	101976
10	Jharsuguda	Chichinda S/Q	Stone 29.30	New	Khata No. 176 Plot No. 51	21	56	17.35	83	53	24.42	118572.9	1245015
11	Kolabira	Paikpada	Paikpada	New	Khata No 117	21	55	16.23	83	52	43.15	17280.08	61920

			Stone Quarry		Plot No 142, 426, 428, 431, 442, 1138, 1185, 1204, 119, 9 Plots								
12	Kolabira	Bhograpalli	Bhograpalli Stone quarry	Running	Khata No.82 Plot No.638	21	45	17.50	84	11	44.56	11493.07	12935
13	Lakhanpur	Dhulunda	Dhulunda Stone Quarry -1 Area: Ha. 0.80	Running	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.	21	43	14.20	83	29	28.20	8000 sq m.	15680
14	Lakhanpur	Dhulunda	Dhulunda Stone Quarry -3 Area: Ha. 1.20	Running	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.	21	43	18.50	83	29	40.80	12000 sq m	27495
15	Lakhanpur	Dhulunda	Dhulunda Stone Quarry -4 Area: Ha. 1.20	Running	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.	21	43	22.80	83	29	29.20	12000 sqm	35695
16	Lakhanpur	Bartap	Bartap Stone Quarry Area: Ha. 1.80	Running	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.	21	49	48.20	83	47	47.60	18050 sqm	18240
17	Lakhanpur	Kadamghat	Kadamghat Stone Quarry Area: Ha. 0.39	Running	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.	21	48	05.20	83	32	34.40	3960 sqm	15741
18	Lakhanpur	Rampella	Rampella Stone Quarry Area: Ha. 0.45	Running	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.	21	40	08.30	83	56	30.70	1650 sqm	12160
19	Lakhanpur	Girolpali	Girolpali Stone Quarry Area: Ha.	Running	Latitudes of 21°.48'26.1" N to 21°48'32.1" N And Longitudes of	21	48	28.50	83	33	09.20	37224 sqm	124852

			3.86		83°32'51.0" E to 83°33'11.0"E.									
20	Lakhanpur	Gobindpur	Gobindpur-1 Stone Quarry Area: Ha. 0.29	Running	Latitudes of 21°.46.88" N to 21°45'49.91" N And Longitudes of 83°41'02.64" E to 83°41'04.78"E.	21	45	49.12	83	41	03.35	2160 sqm	20427	
21	Lakhanpur	Gobindpur	Gobindpur-2 Stone Quarry Area: Ha. 0.62	Running	Latitudes of 21°.45'26.89" N to 21°45'32.30" N And Longitudes of 83°41'11.10" E to 83°41'14.05"E.	21	45	32.30	83	41	12.17	11160 sqm	20427	
22	Lakhanpur	Ramela	Ramela-2 Stone Quarry Area: Ha. 0.98	Running	Latitudes of 21°.36'31.75" N to 21°36'34.97" N And Longitudes of 83°54'45.56" E to 83°54'50.12"E.	21	36	34.97	83	54	46.10	8960 sqm	30868.20	
23	Lakhanpur	Dhullunda	Dhulunda Stone Quarry -2 Area: Ha. 0.80	Running	Latitudes of 21°43'13.1" N to 21°43'16.2" N And Longitudes of 83°29'37.7" E to 83°29'41.0"E.	21	43	13.10	83	29	37.90	8064 sqm	33744	
24	Lakhanpur	Kumar	Kumar Stone Quarry Area: Ha. 0.55	Running	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.	21	49	08.30	83	35	25.90	5568 sqm	10827	
25	Lakhanpur	Sarandama I	Sarandama I-III Stone Quarry Area: Ha. 0.40	Running	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.	21	44	04.20	83	53	53.20	4000 sqm	46020	
26	Lakhanpur	Ramela	Ramela-1 Stone Quarry Area: Ha. 0.58	Running	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.	21	36	36.80	83	54	46.10	5824 sqm	28626	
27	Lakhanpur	Amapali	Amapali- Stone Quarry	Running	Latitudes of 21°.44'07.2" N to 21°44'23.8" N And	21	44	21.10	83	32	34.40	83608 sqm	972174	

			Area: Ha. 8.36		Longitudes of 83°30'01.3" E to 83°30'59.4"E.								
28	Lakhanpur	Sarandama I	Sarandama I- 1 Stone Quarry Area: Ha. 0.70	Running	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.	21	44	48.50	83	53	11.50	7081 sqm	65071.20
29	Lakhanpur	Sarandama I	Sarandama I- 2 Stone Quarry Area: Ha. 0.56	Running	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.	21	45	16.25	83	53	55.45	5665 sqm	35715.25
30	Lakhanpur	Dalgaon	Dalgaon- Stone Quarry Area: Ha. 1.40	Running	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.	21	43	44.45	83	53	04.52	14002 sqm	46620
31	Lakhanpur	Semlia	Semlia- Stone Quarry Area: Ha. 3.13	Running	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.	21	41	4.73	83	27	7.56	31332 sqm	122280
32	Lakhanpur	Kandheikel a	Kandheikel a Stone Quarry Area: Ha. 1.02	New	Latitudes of 21°.41'28.57" N to 21°41'31.36" N And Longitudes of 83°27'21.57" E to 83°27'32.29"E.	21	41	29.64	83	27	29.49	10279 sqm	60016.25
33	Lakhanpur	Basenpali	Basenpali stone quarry	New	Latitudes of 83°.32'57".3" N to 83°33'09".0" N And Longitudes of 21°47'30".5" E to 21°47'46".5"E.	21	47	31.10	83	32	58.20	55600	596203
34	Lakhanpur	Semlia	Semlia stone quarry-II	New	Latitudes of 20°.40'28".93" N to 21°40'39".30" N And Longitudes of 83°26'42".16" E to 83°26'53"42"E.	20	40	28.93	83	26	42.16	110170	486200.5
35	Laikera	Nandamun	STONE 1.20	Running	21°59'20.06 " to	21	59	20.06	84	22	02.82	12019.162	49650

		da			21°59'25.50 " N 84°22'02.82" to 84°22'11.09"E								
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~~Sai~~  
Tdr, Kolabara,  
**TAHASILDAR  
KOLABARA**

  
Tdr. Karmud.  
**TAHASILDAR  
KIRMIRA**

  
Tdr. Laikera.  
**Tahasildar  
Laikera**

  
Tdr. Lakhapur  
**TAHASILDAR  
LAKHANPUR**

  
**TAHASILDAR  
JHARSUGUDA**

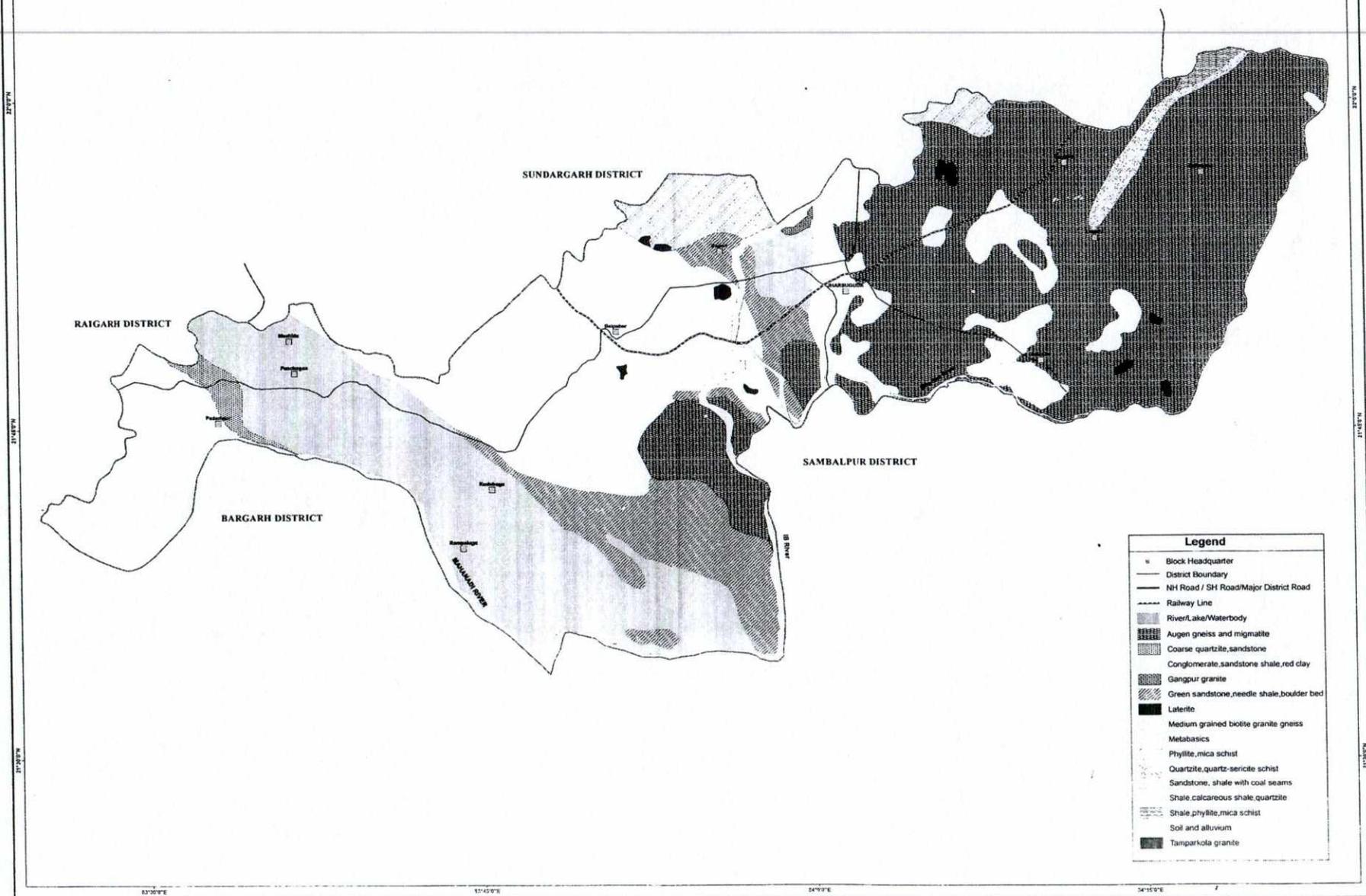


# MINERAL MAP OF JHARSUGUDA DISTRICT

SCALE : 1:110,000



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

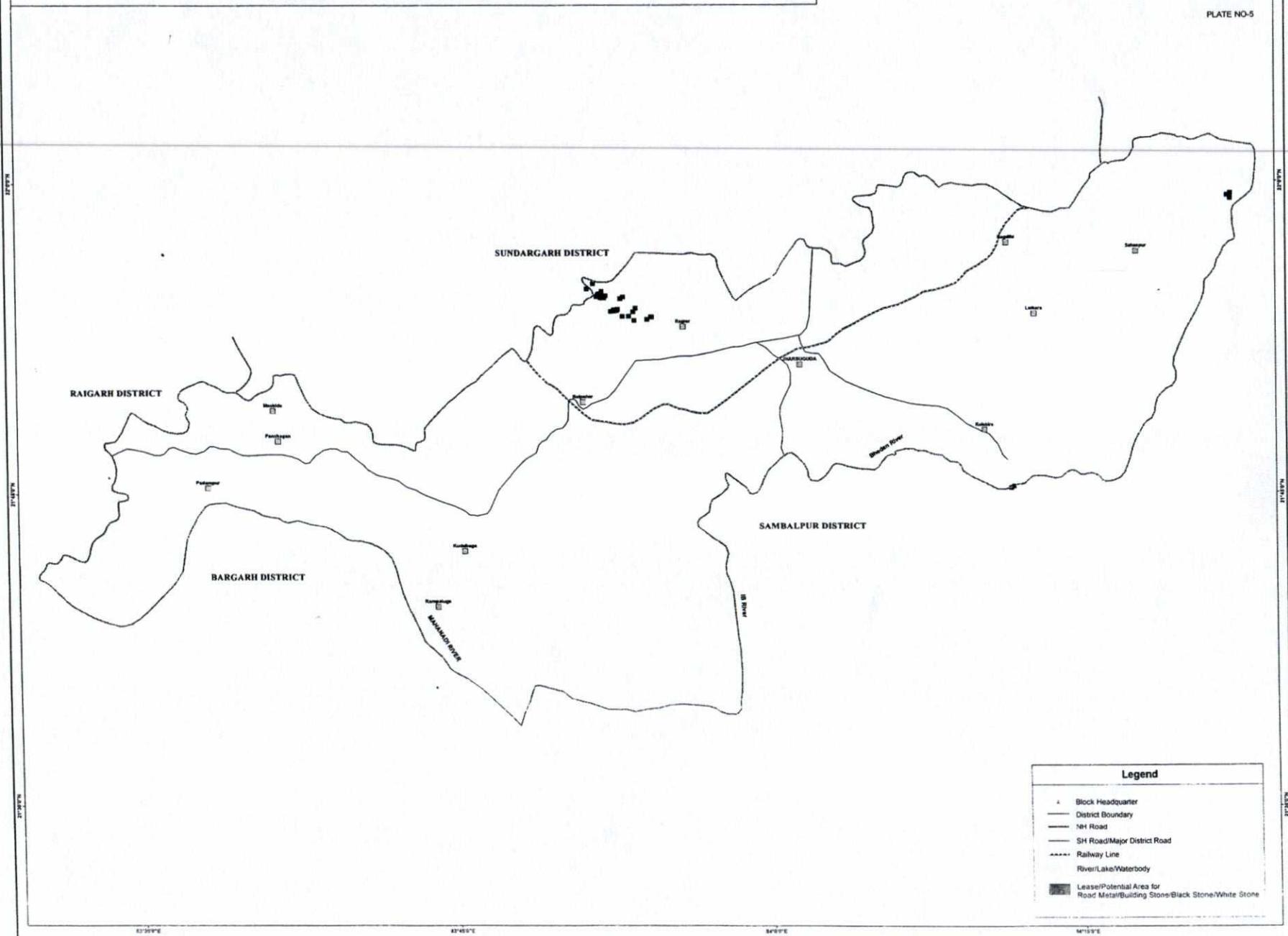


LEASE/POTENTIAL MAP OF ROAD METAL/BUILDING STONE/BLACK STONE/WHITE STONE  
IN JHARSUGUDA DISTRICT

SCALE 1:110,000



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

