



# **DISTRICT SURVEY REPORT (DSR)**

**OF**

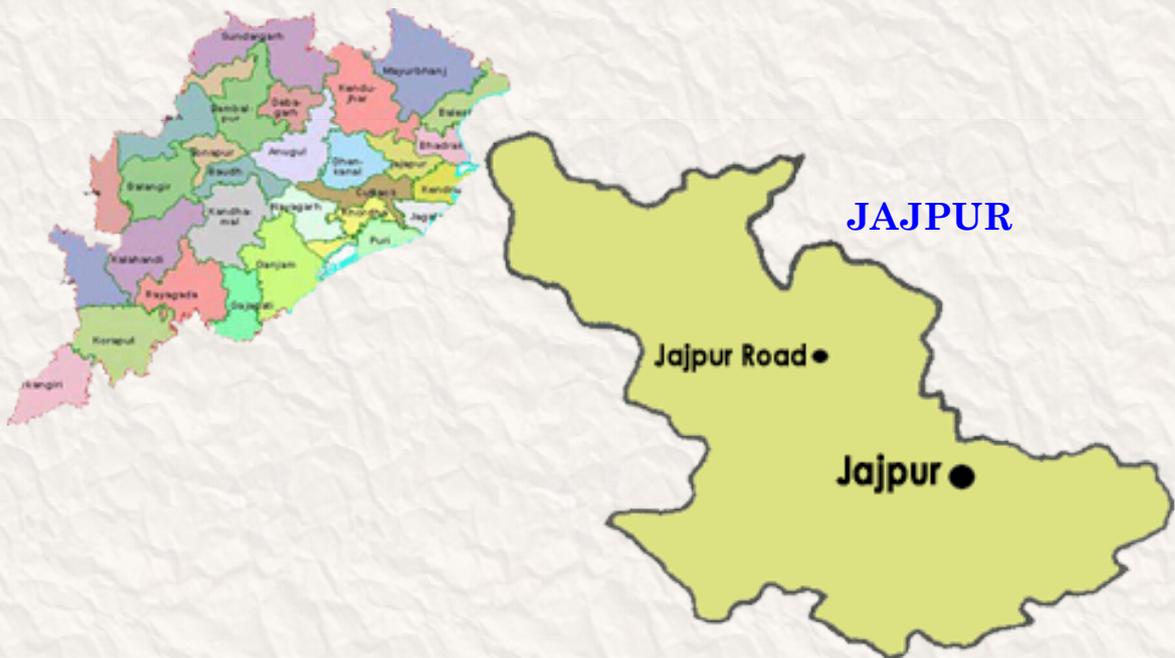
**JAJPUR DISTRICT, ODISHA**

**FOR**

**ROAD METAL / BUILDING STONE / BLACK STONE**

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

**ODISHA**



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, JAJPUR**

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# INDEX MAP

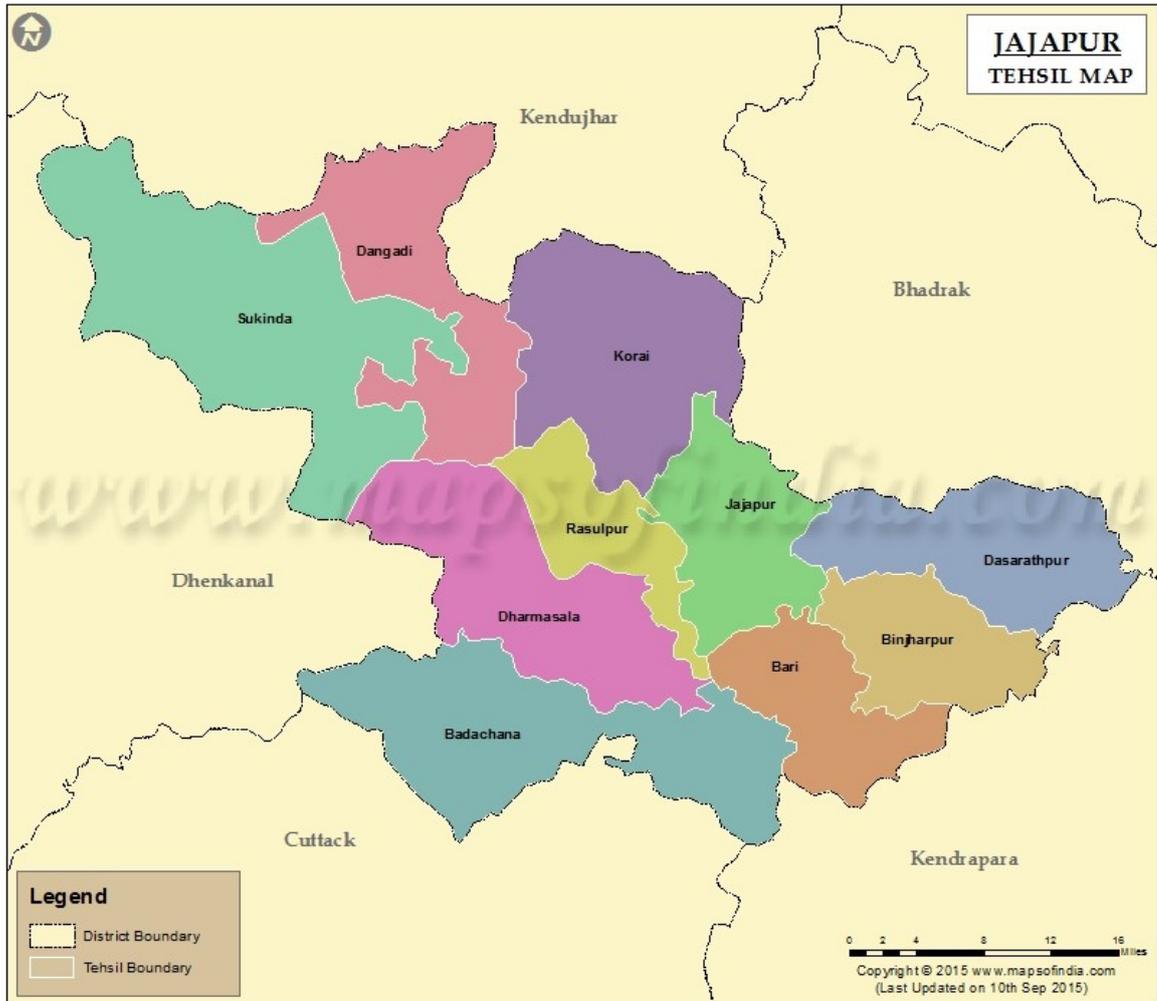


## ODISHA

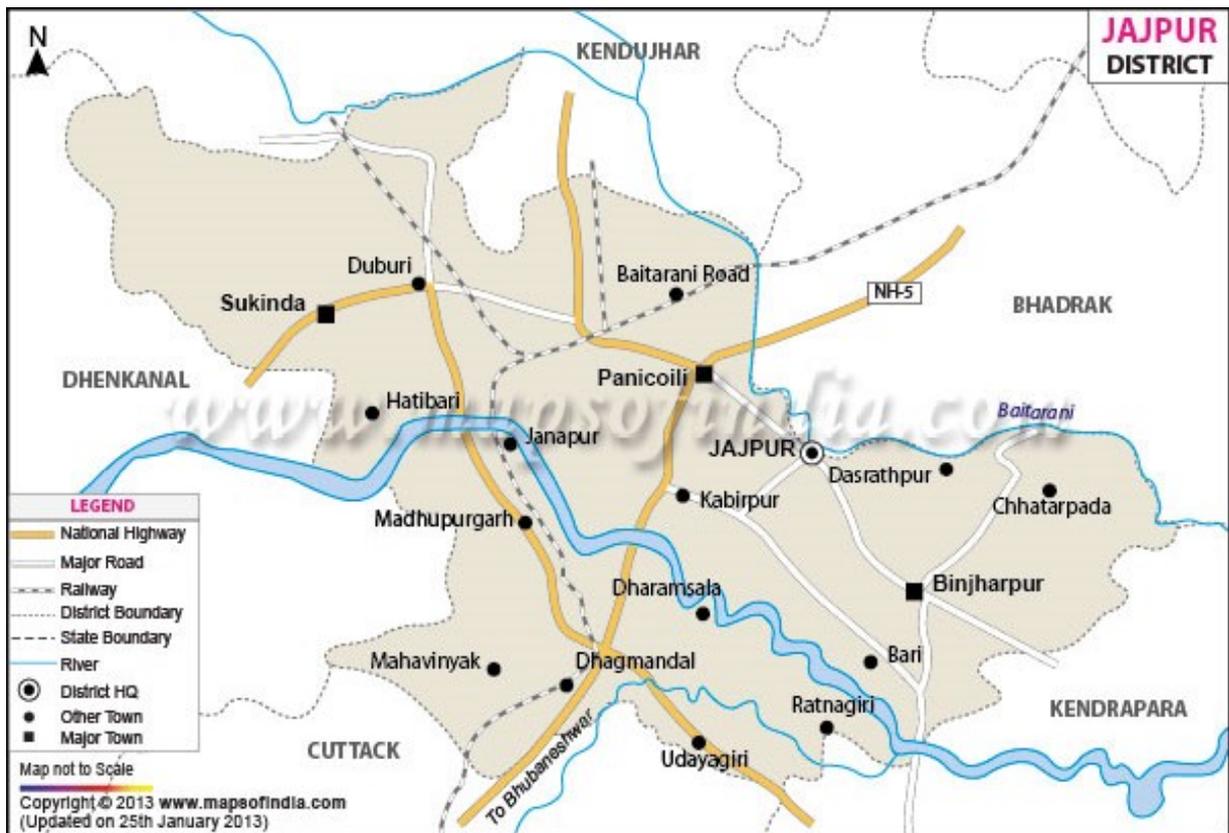


Jajpur

MAP SHOWING THE TAHASILS OF JAJPUR DISTRICT



### MAP SHOWING THE MAJOR ROADS OF JAJPUR 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

Jajpur District was formed by 'Jajati Keshari', the Somavanshi King in early 10th Century. The District takes its name from its head quarter town, Jajpur.

The history of Jajpur dates back to the prehistoric times. The name Jajpur itself a testimony to this. Some scholars attribute it to the word Yajnapura , while others opine that the name originated from Jajatipura Sasanas in Jajpur area. Jajati is also said to have made Jajatipur as his capital and renamed the city as Jajapura. King Jajati, it is said, had organized a great yajna called Daswamedha at this place. For this, he brought 10,000 Brahmins from North India and got them settled in various localities later on. Preceding this event, Jajpur finds mention in ancient Indian mythology texts and the Puranic literatures alike where it is referred to as Viraja and Baitarini Tirtha, one of the most important tirthas of India. The place has also been described in the Kapilasamhita, Brahmanda Purana, Vayu Purana, Brahma Purana, Tantrachintamani, Astapithamahatmaya and Chaitanya Charitamrita. The place holds great significance among the Hindus as it is considered to be one of the Sakti Pithas where the amputated corpse of Sati, the consort of Shiva, fell having been chopped off by Lord Vishnu. Thus jajpur is referred to as Parvati Tirth sometimes. Jajpur has also been mentioned in the Mahabharat where it is stated that, at the

Viraja in the banks of Baitarini, the Pandava brothers had taken holy dip along with the saint Lomash. Historical anecdotes about the place can however be found only after 7th century A.D with the rise of the Bhaumkaras who ruled over Odisha with Guheswar Patak near Viraja as their Capital.

Earlier Jajpur was a breeding ground for both Buddhism and Jainism. Accounts from Hieun Tsang in 639 A.D. go on to prove the existence of Puspagiri Vihar in the precincts of Jajpur. Tantrayan sprang upon the decadence of Buddhism towards the 8th century. The Kubija Tantra describes Viraja as the Maheswari of Uddiyan.

A great revival of Brahmanism in India and Odisha happened with the emergence of the imperial Guptas. Royal houses encouraged Brahminism by getting Brahmins en masse from Banaras and other north Indian township and making them settled in their provinces. Accordingly Kings were known to perform yajnas to preserve their strength and reputation. In all probability jajati keshari also performed the Daswamedha yajna under Brahmanical on the banks of the Baitarani river. He is in fact known to have performed a series of different yajnas on the banks of the river.

Virajakshetra is triangular. In each corner we find a Siva temple at equal distance. These are Bileswar, Khiltateswar and Baruneswar. The first two temples have received land grants from king Anangabhimadeva, as is evident from Madalapanji. Beautiful ancient Buddhist and jaina images are found in the architectural programme of the temples. The Brahma Purana says that there were one less to one crore Sivalingas in jajpur area, which indicates the religious importance of the place.

Much of the architectural pomp of the place was destroyed in later periods as jajpur was subject to constant attacks by the muslim invaders. It was witness to many politically significant battles. One of the battles that changed the course of Odisha history by transferring power to the Afghans was also fought near Jajpur at Gohira Tikiri between the reigning king Mukundadeva Harichandan and Ramachandra bhanja.

Few people of Jajpur in Odisha know that the writer of the national song, Bankim Chandra Chatterjee was working as the Deputy Magistrate from 1882 to 1884 in Jajpur. Bankim worked as a deputy magistrate in Jajpur for about two years during his three decade long stint as a deputy magistrate in Bengal and Odisha as during that period Odisha was under the Bengal province. Bankim Chandra joined as a

deputy magistrate in 1859 and retired in 1891. Jajpur became a sub-division in 1859. The noted writer savoured the tranquility of the riverside in his official residence at Jajpur and penned 'Devi Chaudharani' based on a real story. It was published in 1884.

Earlier Jajpur was part of undivided Cuttack district. On 1st April 1993 it got its separate administrative identity. The district consists of 10 Blocks, 09 tahasils, 280 GPs, 4286 wards. Now Jajpur is poised as country's largest steel hub with many major units starting production and yet others are trying to find their place in its rich industrial scenario. Ever a land of fertile soil and rich mineral resources, Jajpur is also known as a melting pot of many religions, faiths and beliefs steadily holding in its rich mosaic the essence of fraternity and peace.

The District is bounded by Keonjhar and Bhadrak Districts on its North, Cuttack on its South, Dhenkanal District on its East and Kendrapada District on its West.

The Jajpur District located in between 20 degree 30' to 21 degree 10' North Latitude and 85 degree 40' to 86 degree 44' East Longitude. The District covering an area of 2887.69 sq km is moderately populated having total population of 18,26,275 as per 2011 census.

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

Minerals found in the district include iron ore, chromite, quartzite, pyroxenite apart from minor minerals like buildingstone, sand, laterite, morrum and brick earth.

### **Minerals found within the district:**

**Chromite:** Chromite deposits are located in the Sukinda Ultramafic complex around Bhimtangar, Kaliapani, Sukarangi, Saruabil and Surjang areas. The total reserve of chromite is estimated in the order of 164.24 million tonnes with 30% Cr<sub>2</sub>O<sub>3</sub>.

**Nickel:** Nickel ore is associated with chromite bodies within the Sukinda Ultramafic Complex and found around Kansa sector, Kamarda-Saruabil sector, Kaliapani sector and at Tisco sector. The total reserve of all grades (high + low) of Nickel ore is estimated in the order of 140 million tonnes.

**Iron ore:** Iron ore occurs at Daitari and Mahagiri hill ranges.

**Platinum group of elements (PGE):** The PGE occurs in dunite, peridotite and granite occurring in Sukinda valley area. The PGE values vary from 2ppb to 12ppb in these rocks and 50ppb in chromite and is relatively high, i.e. 60ppb to 500ppb in chromite horizons at places.

**Red ochre:** Small occurrences of red ochre are observed in Daitari hill ranges.

**Plastic clay:** The non swelling plastic clay occurs in north of Bhimtangar.

**Soapstone:** Small occurrences of soapstone are reported to the north of Brahmani River around 292m hill.

The concessions granted within the district for different minerals/ores other than minor minerals are as below:

Name of ore/mineral	No of concessions	Tent Area covered in Ha
Chromite	14	4112
Quartzite,	3	20
Pyroxenite	1	10
Iron ore	1	1813
Total		5955

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. Most of the building stone/black stone/road metals potentials are located in Dharmasala, and Sukinda Tahasils of the district. Others like laterite, morrum, sand and earth are distributed in almost all tahasils.

### 3. GENERAL PROFILE

#### a. Administrative set up:

SI No	Item	Unit	Magnitude
1	Location		
	Longitude	Degree	85°40' to 86°44' East
	Latitude	Degree	20° 33' to 21°10' North
2	Geographical area	Sq.Km.	2899

3	Sub-division	Numbers	1
4	Tahasils	Numbers	10
5	C D Blocks	Numbers	10
6	Towns	Numbers	2
7	Municipalities	Numbers	2
8	NACs	Numbers	0
9	Police Stations	Numbers	21
10	Gram Panchayats	Numbers	311
11	Villages	Numbers	1783
	Inhabited	Numbers	1598
	Uninhabited	Numbers	185
12	Parliament constituencies	Numbers	21
13	Assembly constituencies	Numbers	147

**b. Area and Population:**

The district has an area of 2899 sq.kms and 18.27 lakhs of population as per 2011 census. The district accounts for 1.86 percent of the states territory and shares 4.35 percent of the state's population. The density of population of the district is 630 per sq. kms. as against 270 person per sq.km of the state. As per 2011 census the schedule caste population is 433387 (23.7%) and schedule tribe population 151432 (8.3%). The literacy percentage of the district covers 80.1 against 72.9 of the state.

**c. Climate :**

The climate condition of 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.

**d. Economy:**

The District of Jajpur being rich in mineral deposit and having skilled human resources there is huge potential for establishment of SMEs.This is the only

sector next to agriculture which can provide maximum employment to the unemployed mass. In the decreasing trend to employment in Govt. and public sector under taking the only option left for our young mass is for establishment of self ventures. The state Govt.'s present policy of employment mission will be successful through SMEs mostly.

**e. Industry:**

No. of MSME units set up	Investment (In Rs. crores)	Employment Generated				Employment of women
		SC	ST	General	Total	
2240	13038.95	1112	148	4813	6073	933

Apart from these the heavy industries within the district are:

Sl No	Name of the Industry	Location	Production Items	Capacity	Status
1	Nilachal Ispat Nigam Ltd	Kalinganagar	Pig iron	492000MT	Working
2	Tata Steel Ltd	Duburi	steel	No Information	Working
3	Jindal Industries	Kalinganagar	Stainless Steel	1600000MT	Working
4	VISA Steel	Jakhapura	Mid steel	320000MT	Working
5	Rohit ferro tech ltd	Kalinga Nagar	Ferro Alloys	80,000MT	Working
6	K.J. Ispat Limited	Kalinganagar	Sponge iron	30000MT	Working
7	IDCOL ferrocrome	Jajpur Road	High carbon	18000MT	Working
8	Maithan Ispat Ltd	Kalinganagar	Sponge iron	740000MT	Working
9	MESCO	KHURUNTI	Pig Iron	600000MT	Working
10	Dinabandhu steel and Power	Kalinganagar	Steel	250000MT	Working

**f. Agriculture:**

During the year 2017-18, the net area sown was 124 thousand hectares against 5356 thousand hectares of the state. The production of paddy was

223.75 thousand MT, 0.20 thousand MT wheat, 5.06 thousand MT maize, 11.73 thousand MT mung, 7.31 thousand MT biri, 3.05 thousand MT kulthi, and 0.29 thousand MT til, 46.33 thousand MT groundnuts, 1.29 thousand MT mustard, 8.40 thousand MT potatoes, 7.57 thousand MT jute and 86.09 thousand MT sugarcane. During 2017-18, the total fertilizers used in Jajpur district is about 19420 MT with a breakage of 11011 MT nitrogenous, 4896 MT phosphatic and 3513 MT pottasic and the consumption of fertilizer per hectare is 90.36kg.

**g. Power:**

Consumption of electricity in Jajpur district during the year covers 82 million units per month and villages so far electrified as on 30.08.2019 is 1619 which constitutes almost 100% to the total villages of the district.

**h. Transport & Communication:**

Railway route length (14-15) km	131.66
No of Rly stations and PH(14-15)	17
Forest road (17-18) km	42
National Highway (16-17) km	202.02
State Highway (17-18) km	31.447
Major district road (17-18) km	56.334
Other dist road (17-18) km	901.021
Rural road(17-18) km	14352.264
Inter village road (16-17) km	886.349
Intra village road (16-17) km	1471.24

**i. Health:**

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

Govt. Allopathic medical institutions	75 No
Beds facilities	14 No
Homoeopathic dispensaries	20 No
Ayurvedic dispensaries	23 No

**j. Tourist places:**

There are 13 nos. of tourist center such as Ashokjhan, Baruneswarpitha, Chandikhol, Chhatia, Gokarnika, Jajpur, Kuransa, Mahavinayak, Patharajpur, Ratnagiri & Udayagiri, Satyapira, Singhapur and Vyasa Sarovar identified by department of Tourism and Culture, Odisha.

**k. Forest areas:**

Category of forest	Area in sq km
Reserve Forest	6.35
Unclassified Forest	0.01
Demarcated Protected Forest (DRF)	299.32
Undemarcated Protected Forest	0
Other forest under Revenue Dept	419.59
<b>Total</b>	<b>725.27</b>

**l. Education:**

Primary School (2017-18)	No. of Schools	1413
	Enrolment (No)	165963
	Pupil Teacher Ratio	21.05
Upper Primary School 2017-18	No. of Schools	992
	Enrolment (No)	92696
	Pupil Teacher Ratio	17.75
General College 2017-18	Junior	72
	Degree	44
Secondary School	No. of Schools	486
	Enrolment (No)	57511
	Pupil Teacher Ratio	25.53
Literacy Rate, 2011	Male	86.8
	Female	73.3
	Total	80.1

**m. Culture & Heritage:**

Once Jajpur District was a great centre of art and culture in ancient Odisha. This district is declared as a heritage district 'Biraja Khetra' is one of the ancient cities of Odisha rich in archaeological remains .It is reputed to be one of the important Tantra Khetras in the state. The ancient monuments like Biraja Temple, Lord Baraha Temple, Daswasamedhaghat, Jagannath Temple,

Trilochaneswar Temple, Ratnagiri, and Udayagiri and so many other places of historical importance add tourist attraction. Jaipur is also known as Navigaya. People all over the state and neighboring state come here to offer SRADDHA on the Bank of River Baitarini.

A land of rich and diverse artistic achievement, Jajpur's art and culture are the product of a long historical process in which the spiritual, philosophical and the humane dimensions have merged to yield the finest effects of culture and civilized life. The cultural heritage of Jajpur is reflected in its vibrant Art forms.

The district has village tradition of painting, architectures, sculpture, and handicrafts. The Jajpur school of painting has three streams such as Jhoti, Chita and Muruja.

#### **4. GEOLOGY**

Geologically the district can be broadly divided into four sectors. The northwestern and southwestern hilly areas comprise the meta-sediments of Gorumahisani Group and Eastern Ghat Supergroup with basic and ultramafic intrusions. The laterite covers the central and northwestern part of the district. The horizontally disposed Quaternary sediments occupy the southeast, east and northern part of the district. The Eastern Ghat Supergroup consists of quartz-feldspar-garnet-sillimanite  $\pm$  graphite schist/gneiss, garnetiferous quartzite, calcsilicate and charnockites. All these rocks have undergone intensive migmatization. The Gorumahisani Group comprises banded hematite/magnetite quartzite, banded hematite jasper, banded chert, quartzite, ferruginous shale, fuchsite quartzite, conglomerate, gritty quartzite, ortho quartzite. These are associated with metavolcanics, pyroxinite and chromiferous ultramafics. Granite and granophyres are intrusive into these rocks. The meta-sedimentaries and ultramafics have undergone intensive lateritization and the thickness varies from 5m to 15m. These rocks are overlain by Quaternary sediments of sub-recent to recent period. These sediments constitute transported laterite at the base, sandy clay with kankar, black clay and present flood plain deposits consisting of coarse to fine sand. The meta-sediments of Eastern Ghat Supergroup have undergone polyphase deformation. The axis of first generation of folds is represented by NE-SW

trend; the second generation is represented by NW-SE trend and the youngest one by the N-S trend. The axial planes of these folds are highly sheared and faulted. The Gorumahisani Group of meta-sediments has undergone three phases of deformation. The first and second generation of folds are co-axial and trend in N70°E-S70°W direction. The second generation of folds is of open type and plunges towards west. These folds are cross folded along N-S axis and are represented by broad warps.

**STRATIGRAPHY:**

The geological succession in the district is as follows:

Age	Supergroup	Group	Formation	Lithounit
Late Holocene			Brahmani	Fine Sand
Middle to Late Holocene			Bankigarh	Brownish Silty Clay (Upper Deltaic Facies) Black Clay (Lower Deltaic Facies)
Early Holocene to Late Pleistocene			Kaimundi	Clay with calcareous concretions
Early Pleistocene to Late Tertiary			Bolgarh	Laterite/ Latosol (Insitu)
Proterozoic			Intrusive	Granophyre Hornblende granite Basic lava Pyroxenite, Ultramafics Bonai granite Ortho quartzite Gritty quartzite Conglomerate
Archaean		Gorumahisani		Fuchsite quartzite/ andalusite quartz-schist / ferruginous shale Banded chert (q <sub>2c</sub> )/ BMQ, BHQ (q <sub>2h</sub> ), BHJ (q <sub>2j</sub> ) Quartzite
		Charnockite		Granetiferous granite and gneiss
	Eastern			Acid and intermediate charnockite

Ghat

Khondalite

Quartz-Feldspar-Garnet-Sillimanite ±  
Graphite Schist/ Gneiss

Calc silicate

## 5. DRAINAGE AND IRRIGATION PATTERN.

The drainage of the district is mainly controlled by rivers like Brahmani, Kharasuhan, Birupa, Baitarani & Kelua. 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 of deposition of sediments	Volume of sand deposited in last 4 yrs (Year-wise)				Any important note related to leasing of sand quarry within the river
								2015-16	2016-17	2017-18	2018-19	
A	B	C	D	E	F	G	H	I	J	K	L	M
1	Brahmani	Bedavyasa-Rourkela	22-14-45-N	68.5	28.4	30%	Flord water	45400 00 Cum	464 000 0	318 000 0	404 200 0	
2	Kharasuhan	Pankpal	20-82-12-N	26.5	12.34	30%	Flord wate	41100 0 Cum	412 000	330 000	357 000	
3	Kelua	Bedapur	20-76-41-N	20.1	8.04	12%	Flord Water	21100 0 Cum	212 000	182 000	210 000	
4	Birupa	Jobra	20-3-20-n	13.38	0.9	55	Flord Water	28000 Cum	300 00	286 00	385 00	
5	Tangighala	Hasinpur	20-72-57-N	28	1.94	40%	Flord Water	-	-	-	-	
6	Baitarani	Gonasika	900 mts (3000 Ft)	78	13482	23%	Due to settlement of sand particulars	The volume of sand is not maser able				The sand quarrying close to the river bank at meandering to reach and where the river embakment is very close to the bank is not safe both for the river bank and embakment
7	Kharsuhan	Jokadia	-	45 km from NH-5 to Singhpur	-	15%	Due to settlement of sand particulars	The volume of sand is not maser able				

### Irrigation area (2017-18) in 000 Ha:

Major & Medium	Kharif	61.53
	Rabi	32.92
Mega Lift	Kharif	0.00

	Rabi	0.00
Minor Flow	Kharif	10.03
	Rabi	1.67
Minor Lift	Kharif	51.20
	Rabi	27.68

## 6. LANDUSE PATTERN

SI No	Landuse	Area in '000Ha
1	Forest Area	72
2	Misc. trees & Grooves	4
3	Permanent Pasture	4
4	Culturable Waste	4
5	Land put to Non Agril Use	41
6	Barren & Unculturable Land	5
7	Current Fallow	21
8	Other Fallow	5
9	Net Area Sown	124
10	Mining	10
	Geographical Area	281

## 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	2.63	0.41	1.1	1.9
Maximum	14.1	8.75	8.75	6.88

## 8. RAINFALL & CLIMATIC CONDITION

The district is generally hot with high humidity during April and May and cold during December and January. The monsoon generally breaks during the month of July and continues till end of October. The temperature goes as high as up to 45°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	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MARCH	TOTAL
15-16	96.40	74.60	186.60	495.50	142.40	146.60	30.10	0.20	10.90	-	31.90	11.40	1266.60
16-17	15.30	130.80	177.20	345.20	336.16	290.70	71.89	38.38	-	-	-	70.91	1504.58
17-18	2.55	86.73	189.45	227.46	249.26	135.67	250.12	74.29	15.79	-	-	-	1231.32
18-19	106.99	157.60	218.50	496.88	261.39	604.30	239.12	-	6.84	-	14.81	30.48	2136.19
AVG	53.31	112.43	192.93	391.37	264.05	294.29	147.80	28.36	8.38	-	12.43	28.91	1534.67

## 9. DETAILS OF MINING LEASES OF ROAD METAL

Attached as Annexure I

## 10. DETAILS OF ROYALTY COLLECTED

### Year-wise Calculation of Royalty (Rs) of Road metal

Sl.No.	Name Of Tahasil	2015-16	2016-17	2017-18	2018-19
1	Jajpur	0	0	0	0
2	Bari	0	0	0	0
3	Vyasanagar	0	0	0	0
4	Binjharpur	0	0	0	0
5	Dasarathpur	0	0	0	0
6	Danagadi	0	0	0	0
7	Rasulpur	0	0	0	0
8	Darpan	0	0	0	0
9	Dharmasala	127832319	211091291.6	202643341.3	189565283.3
10	Sukinda	0	0	0	0
<b>TOTAL</b>		<b>127832319</b>	<b>211091291.6</b>	<b>202643341.3</b>	<b>189565283.3</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	Jajpur	0	0	0	0
2	Bari	0	0	0	0
3	Vyasanagar	0	0	0	0
4	Binjharpur	0	0	0	0
5	Dasarathpur	0	0	0	0
6	Danagadi	0	0	0	0
7	Rasulpur	0	0	0	0
8	Darpan	0	0	0	0
9	Dharmasala	732568	780198	825391	2173337
10	Sukinda	0	0	0	0
<b>TOTAL</b>		732568	780198	825391	2173337

## 12. MINERAL MAP OF THE DISTRICT

Attached as Plate No 4.

## 13. LIST OF LOI HOLDERS ALONG WITH VALIDITY

No LOI has been issued. Hence not applicable.

## 14. TOTAL MINERAL RESERVE AVAILABLE IN THE DISTRICT

The tentative total mineral reserve of road metal/ buildingstone/ blackstone /white stone is 34876489 cum which may increase after detail investigation and survey.

Details of the potential areas is 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 is used mainly for various construction purposes like road making, concrete making, dams etc.

## 17. DEMAND & SUPPLY OF THE MINERAL

The demand for building/road metal is huge in the district and is approximately to the tune of 8,00,000 cum per annum. The demand is mainly fulfilled from the production of Dharmasala tahasil.

## **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**

There is no village coming under Eco-sensitive Zone in Jajpur District as per Notification No. 1659 (E) dt 17.06.2015 of the Govt. of India. Ministry of Environment, forest and Climate, New delhi. However, Kolha PRF of Jajpur district comes under Eco-Sensitive Zone of Kapilash Sanctuary, Dhenkanal.

## **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.

Fugitive particulate matter emissions during various stages of mining are

- Drilling & Blasting
- Ore excavation
- Loading and unloading
- Processing
- Ore/ mineral transportation in haul and transportation road

### **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. In summary

- Strata water gets disturbed and contaminated in case of intersection of ground water table
- Natural drainage pattern of the area gets disturbed
- Contamination of surface water bodies due to discharges of Mine drainage water (point source) and surface runoffs (non-point source), workshop effluent, effluent from ore/mineral processing plant

### **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.

All mining activities produce enormous noise and vibrations in the mining area

- Operation of drilling machines, blasting, excavation, ore/mineral processing, loading and unloading of mineral/ore, operation of Heavy Earth Moving Machineries like pay Loaders, excavators and Hyvas etc.
- Transportation of minerals inside the mine and to outside through trucks and tippers cause generation of noise
- Such high level of noise can cause health effects, poor work performance and disturbance to human and wildlife, and constant source of disturbance

## **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.

Mining causes various land disturbance/degradation due to change in land use pattern

- Removal of forest cover which causes loss to flora and fauna and takes many years to get back similar forest cover if the mining area is properly reclaimed.
- Removal of top soil and overburden causes loss on agriculture.
- Large scale excavation
- Dumping of solid wastes
- Cutting of roads
- Abandoned mine pits
- Land subsidence in underground mines
- Generation of windblown dust from stock piles, roads and over burden dumps

## **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.
- Retaining wall and garland drain and adequate treatment system like settling ponds shall be provided around the OB dump for proper surface runoff management
- 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 effluent if any from mine shall be discharged to soak pit via septic tank constructed as per BIS specification or shall be treated in a suitably designed Sewage Treatment Plant.
- Water conservation measures shall be taken by rain water harvesting and recycling and reuse of treated mine water

## **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, excavtion 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.
- No mining preferably blasting shall be carried out in night time so as to minimize impact of noise in the surrounding area. Adequate measures shall be taken for control of noise levels below the following limits.

(6.00 AM - 9.00 PM) - Leq 75 dB(A)

(9.00PM - 6.00 AM) - Leq 70 dB(A)

## **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.

- Top soil and overburden (OB) generated during mining shall be stacked separately at earmarked areas maintaining slope as prescribed in the mining plan. The same shall be used in road construction as per the guidelines specified in the mining plan
- Proper planning and optimization for minimum land use, separate removal and handling of top and sub-soils, proper decommissioning, closure, reclamation and rehabilitation, getting back original landscape after mine closure, reduction of land subsidence movements and taking safety measures.
- 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 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	TOTAL
15-16	841
16-17	679
17-18	1440
18-19	1475

There is no case of Silicosis found in Jajpur 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

## RUNNING QUARRY EASES OF ROAD METAL/BUILDING STONE

Sl. No.	Name Of Tahasil	Name of Minor Mineral	Name of village/Date of registration of lease	Location of Resource (GPS co-ordinates or Khata & Plot No) (Sketch map to be attached)	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)
A	B	C	D	E	F	G	H	I
1	Dharmasala	Bichhakhandi Black Stone Quarry No.1	Bichhakhandi	Khata No-822 plot No- 2338 (P) AC 5.00	0.14	0.12	0.1423	205760
2	Dharmasala	Bichhakhandi Black Stone Quarry No.2	Bichhakhandi	Khata No-822 plot No- 2338 (P) AC 5.00	0.14	0.12	0.1423	188442
.3	Dharmasala	Bichhakhandi Black Stone Quarry No.3	Bichhakhandi	Khata No-822 plot No- 2338 (P) AC 5.00	0.14	0.12	0.1423	173406
4	Dharmasala	Bichhakhandi Black Stone Quarry No.4	Bichhakhandi	Khata No-822 plot No- 2338 (P) AC 6.25	0.25	0.14	0.159	305256
5	Dharmasala	Bichhakhandi Black Stone Quarry No.5	Bichhakhandi	Khata No-822 plot No- 2338 (P) AC 5.00	0.14	0.12	0.1423	125060
6	Dharmasala	Bichhakhandi Black Stone Quarry No.07	Bichhakhandi	Khata No-822 plot No- 2338 (P) AC 9.30	0.18	0.12	0.194	390019
7	Dharmasala	Bichhakhandi Black Stone Quarry No.06	Bichhakhandi	Khata No-822 plot No- 2338 (P) AC 5.00	0.14	0.12	0.1423	2452076
8	Dharmasala	Bichhakhandi Black Stone Quarry No.17	Bichhakhandi	Khata No-822 plot No- 2338 (P) AC 11.50	0.21	0.18	0.2157	472952
9	Dharmasala	Bichhakhandi Black Stone Quarry No.18	Bichhakhandi	Khata No-822 plot No- 2338 (P) AC 5.00	0.14	0.12	0.1423	237365
10	Dharmasala	Bichhakhandi Black Stone Quarry No.19	Bichhakhandi	Khata No-389 Plot No.- 1815 (P) Ac 4.00	0.12	0.11	0.1272	95089
11	Dharmasala	Bichhakhandi Black Stone Quarry No.20	Bichhakhandi	Khata No-389 Plot No.- 1815 (P) Ac 4.00	0.11	0.1	0.1272	134082

12	Dharmasala	Bichhakhandi Black Stone Quarry No.22	Bichhakhandi	Khata No-389 Plot No.- 1815 (P) Ac 6.50	0.15	0.11	0.1622	248546
13	Dharmasala	Bichhakhandi Black Stone Quarry No.24	Bichhakhandi	Khata No-389 Plot No.- 1815 (P) Ac 5.00	0.14	0.12	0.1423	116699
14	Dharmasala	Bichhakhandi Black Stone Quarry	Bichhakhandi	Khata No-389 Plot No.- 1815 (P) Ac 2.00	0.07	0.03	0.09	37904
15	Dharmasala	Sahanidiha Black Stone	Sahanidiha	Khata No-384 Plot No. 50 Ac 41.30	0.35	0.25	0.4075	
16	Dharmasala	Sahanidiha Black Stone Quarry No. 2 LTQ No. 16\16-17	Sahanidiha	Khata No-384 Plot No. 50 Ac 4.00	0.12	0.08	0.1272	
17	Dharmasala	Sahanidiha Black Stone quarry No. 3	Sahanidiha	Khata No-384 Plot No. 50 Ac 7.50	0.17	0.14	0.1742	460500
18	Dharmasala	Lunibara Black Stone Quarry No.01	Lunibara	Khata No-224 Plot No. 707/104 AC 12.50	0.22	0.2	0.2249	358782
19	Dharmasala	Lunibar Bioc Stone Quarry No.02	Lunibara	Khata No-224 Plot No. 707/104 AC 10.00	0.18	0.14	0.2012	502873
20	Dharmasala	Lunibar Black Stone Quarry No.05	Lunibara	Khata No-224 Plot No. 707/104 AC 12.50	0.21	0.2	0.2249	618852
21	Dharmasala	Lunibar Black Stone Quarry No.04	Lunibara	Khata No-224 Plot No. 707/104 AC 10.00	0.19	0.14	0.2012	438915
22	Dharmasala	Lunibar Black Stone Quarry No.03	Lunibara	Khata No-224 Plot No. 707/104 AC 12.50	0.21	0.2	0.2249	245092
23	Dharmasala	Anjira Black Stone Quarry No.01	Anjira	Khata No-1729 Plot no. 322(P) Ac 0.50, P No 673 AC 13.00, PNo. 3597 AC 10.80	0.03	0.015	0.045	
24	Dharmasala	Anjira Black stone Quarry No.02,LTQ No.15\16-17	Anjira	Khata No-416 Plot No. 516(P) AC 0.60	0.04 0.22 0.29 0.21	0.02 0.2 0.25 0.18	0.045 0.2294 0.2963 0.2091	
25	Dharmasala	Anjira Black Stone Quarry No.04	Anjira	khata No. 1729 plot No. 673(P)Ac 3.810 P No.1343(P),AC.2 .20	0.03	0.014	0.0493	269397
26	Dharmasala	Anjira Black Stone Quarry No.05	Anjira	Khata No-416 Plot No. 845(P) AC 6.00	0.111, 0.064	0.102, 0.04	0.124, 0.0944	398146
27	Dharmasala	Anjira Black Stone Quarry No.07	Anjira	Khata No-416 Plot No. 845(P) AC 7.50	0.1423	0.084	0.1558	613800

28	Dharmasala	Anjira Black Stone Quarry No.11	Anjira	Khata No-1729 Plot No. 1385(P) Ac 4.00	0.1663	0.144	0.1742	202233
29	Dharmasala	Anjira Black Stone Quarry No.14	Anjira	Khata No-416 Plot No. 845(P) AC 5.00	0.1023	0.098	0.1272	193818
30	Dharmasala	Anjira Black Stone Quarry No.16	Anjira	Khata No-1729 Plot No. 1385(P) Ac 12.50	0.1123	0.084	0.1423	364162
31	Dharmasala	Anjira Block Stone Quarry No.17	Anjira	Khata No. 1729 Plot No- 1343(P) Ac 6.00	0.2023	0.184	0.2249	385057
32	Dharmasala	Anjira Block Stone Quarry No.12	Anjira	Khata No-1729 Plot No. 1385(P) Ac 6.00	0.1453	0.094	0.1558	349596
33	Dharmasala	Anjira Block Stone Quarry No.9	Anjira	Khata No-1729 Plot No. 1343(P) Ac 0.64 1385(P) Ac 9.76	0.0423, 0.1721	0.084, 0.1403	0.0509, 0.1987	770297
34	Dharmasala	Baraman Black Stone Quarry No 2	Baraman	Khata No-247 Plot No 1261 AC 7.30	0.1423	0.084	0.1719	127974
35	Dharmasala	Makundapur Black Stone Quarry	Makundapur	Khata No-469 Plot No. 1332 (P) Ac 2.00	0.023	0.014	0.09	57641
36	Dharmasala	Rahadpur Block Stone Quarry No 4	Rahadpur	Khata No-235 Plot No. 1(P) AC 5.00	0.2423	0.184	0.2845	81968
37	Dharmasala	Rashadpur Block Stone Quarry No 5	Rahadpur	Khata No-235 Plot No. 1(P) AC 5.00	0.14	0.12	0.1423	150760
38	Dharmasala	Rashadpur Block Stone Quarry No 6	Rahadpur	Khata No-235 Plot No. 1(P) AC 7.00	0.14	0.12	0.1423	
39	Dharmasala	Rahadpur Block Stone Quarry No 7	Rahadpur	Khata No-235 Plot No. 1(P) AC 5.00	0.14	0.12	0.1423	82750
40	Dharmasala	Rahadpur Block Stone Quarry No 10	Rahadpur	Khata No-235 Plot No. 1(P) AC 7.00	0.14	0.12	0.1423	676800
41	Dharmasala	Rahadpur Black stone quarry	Rahadpur	Khata No-235 Plot No. 1(P) AC 10.00	0.1471	0.1124	0.1683	275593
42	Dharmasala	Rahadpur Black stone quarry	Rahadpur	Khata No-235 Plot No. 1(P) AC 6.00	0.1971	0.152	0.2012	114376
43	Dharmasala	Rahadpur Black stone quarry	Rahadpur	Khata No-235 Plot No. 1(P) AC 25.00	0.1471	0.1144	0.1558	1094380
44	Dharmasala	Badarda black stone quarry No.1	Badarda	Khata No-362 Plot No- 6(P) Ac 1.35, Plot No 12 Ac 1.15	0.2471	0.1724	0.3181	35262

45	Dharmasala	Badarda black stone quarry no 02	Badarda	Khata No-362 Plot No 41(P) Ac 6.00	0.0451, 0.0325	0.0124, 0.0457	0.0739, 0.0682	739125
46	Dharmasala	Barada Black stone quarry no 3	Badarda	Khata No-362 Plot No 183(P) Ac 4.00 Plot No. 41(P) Ac 0.40	0.1471	0.1124	0.1558	121708
47	Dharmasala	Barada Black stone quarry No 4	Badarda	Khata No-362 Plot No 41 (P) AC 6.00	0.1271, 0.0302	0.1124, 0.0152	0.1364, 0.0402	270005
48	Dharmasala	Barada Black Stone Quarry	Badarda	Khata No-362 Plot No 41 (P) AC 5.00	0.1371	0.1224	0.1558	137958
49	Dharmasala	Dankari Black stone quarry No 1	Dankari	Khata No-221 Plot No 600 (P) AC 41.50	0.14	0.12	0.1423	3668000
50	Dharmasala	Dankari Black stone quarry No 2/3	Dankari	Khata No-221 Plot No 600 (P) AC 4.00	0.3541	0.2914	0.4098	422500
51	Dharmasala	Dankari Black stone quarry No 4-Jan	Dankari	Khata No-465 plot No 140/206(P) AC 8.00	0.1152	0.102	0.1272	296980
52	Dharmasala	Dankari Black Stone Quarry No.5	Dankari	Khata No-465 plot No 140/206(P) AC 15.00	0.139	0.104	0.1799	388182
53	Dharmasala	Dankari Black Stone Quarry No.4/7	Dankari	Khata No-465 Plot No 1596 (P) AC 12.50	0.201	0.184	0.2464	392696
54	Dharmasala	Dankari Black Stone Quarry No.9/8	Dankari	Khata No-221 Plot No 600(P) AC 12.00	0.214	0.198	0.2249	351000
55	Dharmasala	Dankari Black Stone Quarry No 5/10	Dankari	Khata No-221 Plot No 600(P) AC 4.00	0.214	0.198	0.2249	414000
56	Dharmasala	Dankari Black Stone Quarry No.3/9	Dankari	Khata No-221 Plot No 600(P) AC 5.00	0.114	0.105	0.1423	396900
57	Dharmasala	Dankari Black Stone Quarry No.6/11	Dankar	Khata No-465 Plot No 45(P) AC 7.00	0.1541	0.122	0.1683	433508
58	Dharmasala	Dankari Black Stone Dankari Quarry No.7/12	Dankari	Khata No-221 Plot No 600(P) Ac 12.50	0.2031	0.192	0.2249	486018
59	Dharmasala	Dankari Black Stone Quarry No.8/13	Dankari	Khata No-465 Plot No 45(P) AC 12.50.00	0.2031	0.192	0.2249	795920
60	Dharmasala	Dankari Black Stone Quarry No 14	Dankari	Khata No-221 Plot No 600(P) AC 12.00	0.2031	0.192	0.2249	674332
61	Dharmasala	Dankari Black Stone Quarry No. 15	Dankari	Khata No-221 Plot No 600 (P) Ac 12.00	0.2031	0.192	0.2249	919601

62	Dharmasala	Dankari Black stone Quarry No 16	Dankari	Khata No-221 Plot No 600 (P) Ac 12.00	0.2031	0.192	0.2249	741929
63	Dharmasala	Bajabati Black Stone Quarry No.1	Bajabati	Khata No-215 Plot No 823(P) AC 7.50	0.145	0.132	0.1707	241839
64	Dharmasala	Bajabati Black Stone Quarry No.2	Bajabati	Khata No-215 Plot No 1050 (P) AC 5.00	0.14	0.129	0.698	119031
65	Dharmasala	Bajabati Black Stone Quarry No.3	Bajabati	Khata No-215 Plot No 823 (P) AC6.50	0.145	0.132	0.1707	163431
66	Dharmasala	Bajabati Black Stone Quarry No.4	Bajabati	Khata No-215 Plot No 75(P) ac 3.00	0.102	0.092	0.1102	56752
67	Dharmasala	Bajabati Black Stone Quarry No.5	Bajabati	Khata No-215 Plot No 823 (P) AC 9.00	0.185	0.124	0.1909	349825
68	Dharmasala	Aruha Black Stone Quarry No.1	Aruha	Khata No-274 Plot No 389 (P) AC 3.00	0.101	0.099	0.1102	247500
69	Dharmasala	Aruha Black Stone Quarry No.2	Aruha	Khata No-779 Plot No 2694 (P) AC 8.92 Plot No 2807 (P) AC 10.98			0.19, 0.21	999750

## Annexure II

## LOI ISSUED/POTENTIAL AREAS OF ROAD METAL/BUILDING STONE IN JAJPUR 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)	Average height of potential patch (in m)	Mineable mineral potential (in cum)
A		B	C	D	E	F	G
<b>SOURCES TO BE REACTIONS AFTER COMPLETION OF PRESENT LEASE PERIOD</b>							
1	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry No.1	Khata No-822 plot No- 2338 (P) AC 5.00	0.1423	0.12	205760
2	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry No.2	Khata No-822 plot No- 2338 (P) AC 5.00	0.1423	0.12	188442
.3	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry No.3	Khata No-822 plot No- 2338 (P) AC 5.00	0.1423	0.12	173406
4	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry No.4	Khata No-822 plot No- 2338 (P) AC 6.25	0.159	0.14	305256
5	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry No.5	Khata No-822 plot No- 2338 (P) AC 5.00	0.1423	0.12	125060
6	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry No.07	Khata No-822 plot No- 2338 (P) AC 9.30	0.194	0.12	390019
7	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry No.06	Khata No-822 plot No- 2338 (P) AC 5.00	0.1423	0.12	2452076
8	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry No.17	Khata No-822 plot No- 2338 (P) AC 11.50	0.2157	0.18	472952

9	Dharmasala	Bichhakhandi	Bichhakhandi Block Stone Quarry No.18	Khata No-822 plot No- 2338 (P) AC 5.00	0.1423	0.12	237365
10	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone QuarryNo.19	Khata No-389 Plot No.- 1815 (P) Ac 4.00	0.1272	0.11	95089
11	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry No.20	Khata No-389 Plot No.- 1815 (P) Ac 4.00	0.1272	0.1	134082
12	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry No.22	Khata No-389 Plot No.- 1815 (P) Ac 6.50	0.1622	0.11	248546
13	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry No.24	Khata No-389 Plot No.- 1815 (P) Ac 5.00	0.1423	0.12	116699
14	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry	Khata No-389 Plot No.- 1815 (P) Ac 2.00	0.09	0.03	37904
15	Dharmasala	Sahanidiha	Sahanidiha Black Stone	Khata No-384 Plot No. 50 Ac 41.30	0.4075	0.25	
16	Dharmasala	Sahanidiha	Sahanidiha Black Stone Quarry No. 2 LTQ No. 16\16-17	Khata No-384 Plot No. 50 Ac 4.00	0.1272	0.08	
17	Dharmasala	Sahanidiha	Sahanidiha Black Stone quarry No. 3	Khata No-384 Plot No. 50 Ac 7.50	0.1742	0.14	460500
18	Dharmasala	Lunibara	Lunibara Black Stone Quarry No.01	Khata No-224 Plot No. 707/104 AC 12.50	0.2249	0.2	358782
19	Dharmasala	Lunibara	Lunibar Block Stone Quarry No.02	Khata No-224 Plot No. 707/104 AC 10.00	0.2012	0.14	502873
20	Dharmasala	Lunibara	Lunibar Black Stone Quarry No.05	Khata No-224 Plot No. 707/104 AC 12.50	0.2249	0.2	618852
21	Dharmasala	Lunibara	Lunibar Black Stone Quarry No.04	Khata No-224 Plot No. 707/104 AC 10.00	0.2012	0.14	438915
22	Dharmasala	Lunibara	Lunibar Black Stone Quarry	Khata No-224 Plot No. 707/104 AC 12.50	0.2249	0.2	245092

			No.03				
23	Dharmasala	Anjira	Anjira Black Stone Quarry No.01	Khata No-1729 Plot no. 322(P) Ac 0.50, P No 673 AC 13.00, PNo. 3597 AC 10.80	0.045	0.015	
24	Dharmasala	Anjira	Anjira Black stone Quarry No.02,LTQ No.15\16-17	Khata No-416 Plot No. 516(P) AC 0.60	0.045 0.2294 0.2963 0.2091	0.02, 0.2, 0.25, 0.18	
25	Dharmasala	Anjira	Anjira Black Stone Quarry No.04	khata No. 1729 plot No. 673(P)Ac 3.810 P No.1343(P),AC.2.20	0.0493	0.014	269397
26	Dharmasala	Anjira	Anjira Black Stone Quarry No.05	Khata No-416 Plot No. 845(P) AC 6.00	0.124, 0.0944	0.102, 0.04	398146
27	Dharmasala	Anjira	Anjira Black Stone Quarry No.07	Khata No-416 Plot No. 845(P) AC 7.50	0.1558	0.084	613800
28	Dharmasala	Anjira	Anjira Black Stone Quarry No.11	Khata No-1729 Plot No. 1385(P) Ac 4.00	0.1742	0.144	202233
29	Dharmasala	Anjira	Anjira Black Stone Quarry No.14	Khata No-416 Plot No. 845(P) AC 5.00	0.1272	0.098	193818
30	Dharmasala	Anjira	Anjira Black Stone Quarry No.16	Khata No-1729 Plot No. 1385(P) Ac 12.50	0.1423	0.084	364162
31	Dharmasala	Anjira	Anjira Block Stone Quarry No.17	Khata No. 1729 Plot No- 1343(P) Ac 6.00	0.2249	0.184	338505 7
32	Dharmasala	Anjira	Anjira Block Stone Quarry No.12	Khata No-1729 Plot No. 1385(P) Ac 6.00	0.1558	0.094	349596
33	Dharmasala	Anjira	Anjira Block Stone Quarry No.9	Khata No-1729 Plot No. 1343(P) Ac 0.64 1385(P) Ac 9.76	0.0509, 0.1987	0.084, 0.1403	770297
34	Dharmasala	Baraman	Baraman Black Stone Quarry No 2	Khata No-247 Plot No 1261 AC 7.30	0.1719	0.084	127974
35	Dharmasala	Makundapur	Makundapur Black Stone Quarry	Khata No-469 Plot No. 1332 (P) Ac 2.00	0.09	0.014	57641

36	Dharmasala	Rahadpur	Rahadpur Block Stone Quarry No 4	Khata No-235 Plot No. 1(P) AC 5.00	0.2845	0.184	81968
37	Dharmasala	Rahadpur	Rashadpur Block Stone Quarry No 5	Khata No-235 Plot No. 1(P) AC 5.00	0.1423	0.12	150760
38	Dharmasala	Rahadpur	Rashadpur Block Stone Quarry No 6	Khata No-235 Plot No. 1(P) AC 7.00	0.1423	0.12	
39	Dharmasala	Rahadpur	Rahadpur Block Stone Quarry No 7	Khata No-235 Plot No. 1(P) AC 5.00	0.1423	0.12	82750
40	Dharmasala	Rahadpur	Rahadpur Block Stone Quarry No 10	Khata No-235 Plot No. 1(P) AC 7.00	0.1423	0.12	676800
41	Dharmasala	Rahadpur	Rahadpur Black stone quarry	Khata No-235 Plot No. 1(P) AC 10.00	0.1683	0.1124	275593
42	Dharmasala	Rahadpur	Rahadpur Black stone quarry	Khata No-235 Plot No. 1(P) AC 6.00	0.2012	0.152	114376
43	Dharmasala	Rahadpur	Rahadpur Black stone quarry	Khata No-235 Plot No. 1(P) AC 25.00	0.1558	0.1144	1094380
44	Dharmasala	Badarda	Badarda black stone quarry No.1	Khata No-362 Plot No- 6(P) Ac 1.35, Plot No 12 Ac 1.15	0.3181	0.1724	35262
45	Dharmasala	Badarda	Badarda black stone quarry no 02	Khata No-362 Plot No 41(P) Ac 6.00	0.0739, 0.0682	0.0457, 0.0124	739125
46	Dharmasala	Badarda	Barada Black stone quarry no 3	Khata No-362 Plot No 183(P) Ac 4.00 Plot No. 41(P) Ac 0.40	0.1558	0.1124	121708
47	Dharmasala	Badarda	Barada Black stone quarry No 4	Khata No-362 Plot No 41 (P) AC 6.00	0.1364, 0.0402	0.1124, 0.0152	270005
48	Dharmasala	Badarda	Barada Black Stone Quarry	Khata No-362 Plot No 41 (P) AC 5.00	0.1558	0.1224	137958
49	Dharmasala	Dankari	Dankari Black stone quarry No 1	Khata No-221 Plot No 600 (P) AC 41.50	0.1423	0.12	3668000
50	Dharmasala	Dankari	Dankari Black stone quarry No 2/3	Khata No-221 Plot No 600 (P) AC 4.00	0.4098	0.2914	422500

51	Dharmasala	Dankari	Dankari Black stone quarry No 4-Jan	Khata No-465 plot No 140/206(P) AC 8.00	0.1272	0.102	296980
52	Dharmasala	Dankari	Dankari Black Stone Quarry No.5	Khata No-465 plot No 140/206(P) AC 15.00	0.1799	0.104	388182
53	Dharmasala	Dankari	Dankari Black Stone Quarry No.4/7	Khata No-465 Plot No 1596 (P) AC 12.50	0.2464	0.184	392696
54	Dharmasala	Dankari	Dankari Black Stone Quarry No.9/8	Khata No-221 Plot No 600(P) AC 12.00	0.2249	0.198	351000
55	Dharmasala	Dankari	Dankari Black Stone Quarry No 5/10	Khata No-221 Plot No 600(P) AC 4.00	0.2249	0.198	414000
56	Dharmasala	Dankari	Dankari Black Stone Quarry No.3/9	Khata No-221 Plot No 600(P) AC 5.00	0.1423	0.105	396900
57	Dharmasala	Dankar	Dankari Black Stone Quarry No.6/11	Khata No-465 Plot No 45(P) AC 7.00	0.1683	0.122	433508
58	Dharmasala	Dankari	Dankari Black Stone Dankari Quarry No.7/12	Khata No-221 Plot No 600(P) Ac 12.50	0.2249	0.192	486018
59	Dharmasala	Dankari	Dankari Black Stone Quarry No.8/13	Khata No-465 Plot No 45(P) AC 12.50.00	0.2249	0.192	795920
60	Dharmasala	Dankari	Dankari Black Stone Quarry No 14	Khata No-221 Plot No 600(P) AC 12.00	0.2249	0.192	674332
61	Dharmasala	Dankari	Dankari Black Stone Quarry No. 15	Khata No-221 Plot No 600 (P) Ac 12.00	0.2249	0.192	919601
62	Dharmasala	Dankari	Dankari Black stone Quarry No 16	Khata No-221 Plot No 600 (P) Ac 12.00	0.2249	0.192	741929
63	Dharmasala	Bajabati	Bajabati Black Stone Quarry No.1	Khata No-215 Plot No 823(P) AC 7.50	0.1707	0.132	241839
64	Dharmasala	Bajabati Black Stone Quarry No.2	Bajabati	Khata No-215 Plot No 1050 (P) AC 5.00	0.698	0.12	119031

65	Dharmasala	Bajabati Black Stone Quarry No.3	Bajabati	Khata No-215 Plot No 823 (P) AC6.50	0.1707	0.122	163431
66	Dharmasala	Bajabati Black Stone Quarry No.4	Bajabati	Khata No-215 Plot No 75(P) ac 3.00	0.1102	0.092	56752
67	Dharmasala	Bajabati Black Stone Quarry No.5	Bajabati	Khata No-215 Plot No 823 (P) AC 9.00	0.1909	0.124	349825
68	Dharmasala	Aruha Black Stone Quarry No.1	Aruha	Khata No-274 Plot No 389 (P) AC 3.00	0.1102	0.099	247500
69	Dharmasala	Aruha Black Stone Quarry No.2	Aruha	Khata No-779 Plot No 2694 (P) AC 8.92 Plot No 2807 (P) AC 10.98	0.19, 0.21		999750
<b>SOURCES TO BE INDUCTED AS NEW SOURCES</b>							
1	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry No. 11	Khata No-389 plot no-1815 (P) Ac 7.50			306492
2	Dharmasala	Bichhakhandi	Bichhakhandi Black Stone Quarry No. 21	Khata No 389 plot no-1826 (P) Ac 4.00			210037
3	Dharmasala	Anjira	Anjira Black Stone Quarry No.6	Khata no- 416 plot no-845 (P) Ac 5.00			250920
4	Dharmasala	Anjira	Anjira Black Stone Quarry No.8	Khata no -416 plot no-941 (p) Ac 3.00			140400
5	Dharmasala	Anjira	Anjira Black Stone Quarry No.10	Khata no 1729 plot no 1343 (p) Ac 12.00			917011
6	Dharmasala	Anjira	Anjira Black Stone Quarry No.18	Khata no 416 plot no 845 (p) Ac 3.00			173675
7	Dharmasala	Rahaadpur	Rahadpur Black Stone Quarry No.1	Khata no 235 plot no 1 (p) Ac 7.00			524240
8	Dharmasala	Rahadpur	Rahadpur Black Stone Quarry No.3	Khata no 235 plot no 1 (p)			544295
9	Dharmasala	Rahadpur	Rahadpur Black Stone Quarry No.8	Khata no 235 plot no 1 (p) Ac 7.00			287990
10	Dharmasala	Rahadpur	Rahadpur Black	Khata no 235 plot no 1 (p) Ac 7.00			299341

			Stone Quarry No.9/5				
11	Dharmasala	Dankari	Dankari black stone Quarry no	Khata no 221 plot no 600 (p) Ac 12.00			648472
12	Dharmasala	Dankari	Dankari black stone Quarry no	Khata no 465 plot no 140/206 (P) Ac 9.00			683468
13	Dharmasala	Aruha	AruhaBlack Stone Quarry No	Khata no 779 plot no 2694 (p) 2807 (P) Ac 10.98, 9.02			1575801
14	Dharmasala	Aruha	AruhaBlack Stone Quarry No	Khata no 779 plot 2808 (p), 2807 (P) Ac. 15.91, 3.07			578419
15	Dharmasala	Aruha	AruhaBlack Stone Quarry No	Khata no 779 plot no 2808(p), 2807 (p) Ac 9.78, 9.10			197252
16	Sukinda	Karadapal	Karadapal Boulder Quarry No-2	Kh- No. 715 Plot No. 225/3776	Ac. 5.00	40	50000
17	Sukinda	Bairimal	Bairimal Boulder Quarry No.-1	Kh-436, plot No 2, 17	Ac. 6.00	20	60000
18	Sukinda	Gunduchipasi	Gunduchipasi Boulder Quarry No.1	Kh- 303 Plt. No.694	Ac.8.00	40	80000
19	Sukinda	Gunduchipasi	Gunduchipasi Metal Quarry No.2	Kh- 303 Plt. No.694	Ac.12.00	40	120000
20	Sukinda	Gunduchipasi	Gunduchipasi Metal Quarry No.3	Kh- 303 Plt. No.694	Ac.12.00	40	120000
21	Sukinda	Gunduchipasi	Gunduchipasi Metal Quarry No.4	Kh- 303 Plt. No.694	Ac.2.50	40	30000
22	Sukinda	Kharadiha	Kharadiha Boulder Quarry No.-1	Kh 249 Plt. No.641	Ac.4.00	60	40000
23	Sukinda	Kharadiha	Kharadiha Boulder Quarry No.-2	Kh-249 Plot No 638	Ac.4.00	60	40000
24	Sukinda	Kharadiha	Kharadiha Boulder Quarry No.-3	Kh-249 Plot No 642	Ac.4.00	60	40000
25	Sukinda	Kharadiha	Kharadiha Meta Quarry No.-1	Kh-248 Plot No 899	Ac.4.00	50	40000
26	Sukinda	Nimapalli	Nimapalli	Kh-851	Ac.5.00	20	50000

			Morum Quarry No.2	Pit. No.-251			
27	Sukinda	Nizigarh	Nizigarh Laterite Stone	Kh-884 Pit. No.2171	Ac.4.00	10	40000
28	Sukinda	Ambasar	Ambasar Laterite Stone	Kh-453 & 456 Pit. No.1850, 1851	Ac.4.00	10	40000
29	Sukinda	Pimpudia	Pimpudia Laterite Stone	Kh-147 Pit- 938	Ac.1.20	10	20000
30	Sukinda	Pimpudia	Pimpudia Laterite Stone quarry	Kh-147 Pit- 892	Ac.3.42	10	40000
31	Sukinda	Nuadiha	Nuadiha Laterite Stone quarry	Kh-150 Pit-1	Ac. 35.38	15	360000

# MINERAL MAP OF JAJPUR DISTRICT

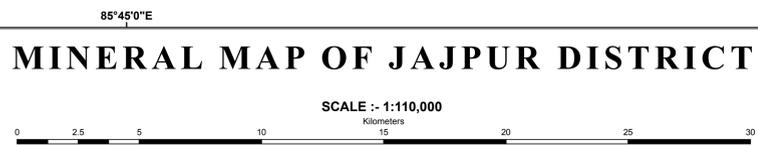
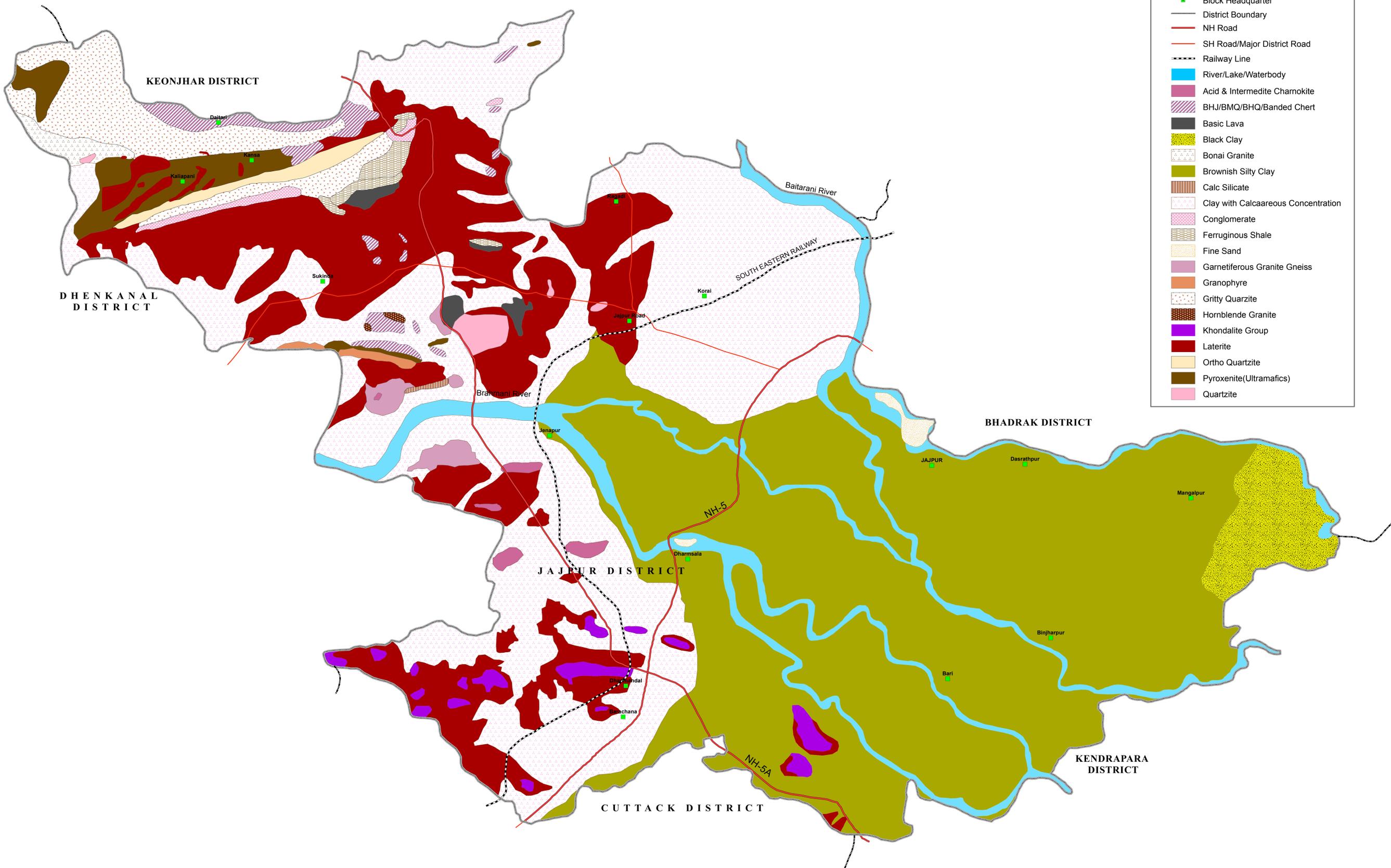


PLATE NO-4

Legend	
	Block Headquarter
	District Boundary
	NH Road
	SH Road/Major District Road
	Railway Line
	River/Lake/Waterbody
	Acid & Intermedite Charnokite
	BHJ/BMQ/BHQ/Banded Chert
	Basic Lava
	Black Clay
	Bonai Granite
	Brownish Silty Clay
	Calc Silicate
	Clay with Calcareous Concentration
	Conglomerate
	Ferruginous Shale
	Fine Sand
	Garnetiferous Granite Gneiss
	Granophyre
	Gritty Quarzite
	Hornblende Granite
	Khondalite Group
	Laterite
	Ortho Quarzite
	Pyroxenite(Ultramafics)
	Quartzite



85°45'0"E 86°0'0"E 86°15'0"E 86°30'0"E

21°00'0"N

21°00'0"N

21°00'0"N

21°00'0"N

21°15'0"N

21°15'0"N

20°45'0"N

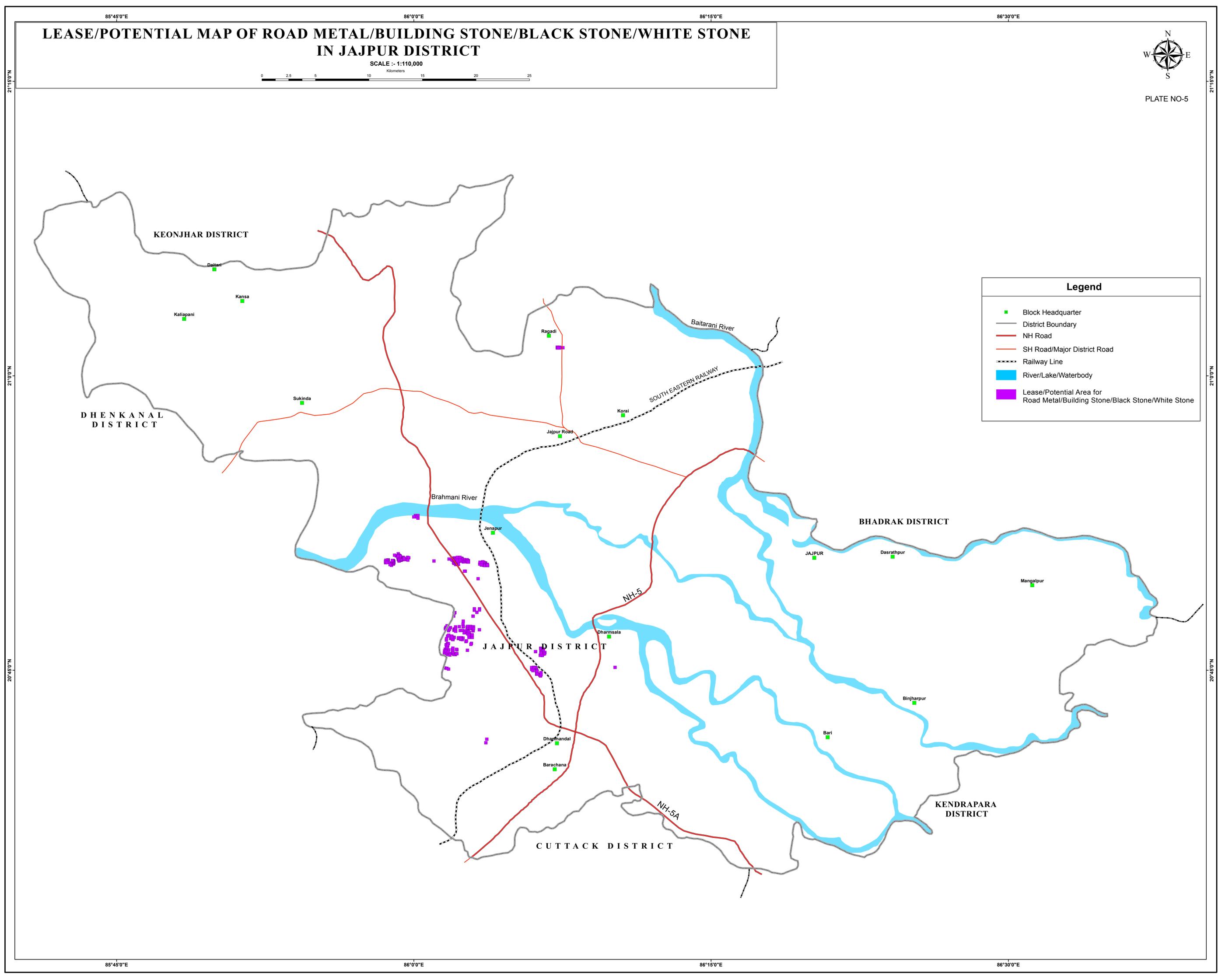
20°45'0"N

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