PRE-FEASIBILITY REPORT

[As per Approved Mining Plan]

Jamadoba Colliery
(Raw Coal Production of 0.34MTPA)
Under Modernisation

At
Jharia Coal Field, Dhanbad District, Jharkhand

Submitted to:

Ministry of Environment, Forest & Climate Change
New Delhi

Submitted by:

M/s. Tata Steel Limited,
Jamadoba, Dhanbad District, Jharkhand

JUNE 2019

1.0 EXECUTIVE SUMMARY

<table>
<tr><th>Sr.No.</th><th>Description</th><th>Details</th></tr>
<tr><td>1</td><td>Name of the project</td><td>Modernization of Underground coal mining project - Jamadoba Colliery in Jharia coal field, Dhanbad district, Jharkhand State</td></tr>
<tr><td>2</td><td>Location</td><td><u>Coordinates</u>:
<table>
<tr><th>Points</th><th>Latitude</th><th>Longitude</th></tr>
<tr><td>1</td><td>23° 41' 53.3" N</td><td>86° 22' 09.5" E</td></tr>
<tr><td>12</td><td>23° 43' 17.0" N</td><td>86° 22' 08.9" E</td></tr>
<tr><td>15</td><td>23° 43' 35.9" N</td><td>86° 22' 16.5" E</td></tr>
<tr><td>55</td><td>23° 42' 43.1" N</td><td>86° 23' 58.8" E</td></tr>
<tr><td>63</td><td>23° 41' 04.6" N</td><td>86° 24' 46.4" E</td></tr>
<tr><td>66</td><td>23° 41' 06.6" N</td><td>86° 24' 30.4" E</td></tr>
<tr><td>89</td><td>23° 41' 22.0" N</td><td>86° 23' 08.8" E</td></tr>
<tr><td>90</td><td>23° 41' 21.4" N</td><td>86° 22' 58.1" E</td></tr>
</table>
<u>Mine lease co-ordinates are enclosed as Annexure-II</u></td></tr>
<tr><td>3</td><td>Name and address of the proponent</td><td>M/s. Tata Steel Ltd
Jharia Division,
PO: Jamadoba (PO),
District: Dhanbad,
State: Jharkhand</td></tr>
<tr><td>4</td><td>Production/Estimated Reserves</td><td>Production Capacity: 0.34 MTPA (raw coal)</td></tr>
<tr><td>5</td><td>Mining Methods & Technology</td><td>An underground mine extracting coal through Bord & Pillar system</td></tr>
<tr><td>6</td><td>Mine lease area</td><td>Mining Lease Area: 927.17 ha</td></tr>
<tr><td>7</td><td>Life of Mine</td><td>15 years</td></tr>
<tr><td>8</td><td>Lease period</td><td>999 years</td></tr>
<tr><td>9</td><td>Geological reserves</td><td>Total geological reserves: 204.0 Million Tonnes (Measured + Indicated+ Inferred)
Blocked reserve: 91.80 Million Tonnes
Mineable reserve: 41.68 Million Tonnes
Extractable reserve: 27.09 Million Tonnes</td></tr>
<tr><td>10</td><td>Total water requirement & source</td><td>Total water requirement: 11,100 m^3/ day

Source: Average mine water pumping discharge is 11,100 KLD. Consumption of water in mining activites is 3000 KLD out of which 2,700 KLD is used for stowing purpose. Remaining water is used for drinking water supply, community supply and washery make-up water.</td></tr>
<tr><td>11</td><td>Power requirement & source</td><td>130-140 KWH/ ton of raw coal production
Source: DVC</td></tr>
<tr><td>12</td><td>Nearest railway station, sea port, airport</td><td>Jamadoba halt RS- 0.6 km, E
Bhaga Railway station – 1.4 km NNE
Ranchi Airport- 116 km WSW</td></tr>
<tr><td>13</td><td>Nearest Town, City, District Headquarters</td><td>Dhanbad - 9 km, NNE
Jharia town – 3.2 km, NNE</td></tr>
<tr><td>14</td><td>Plot / Survey / Khasra No.</td><td>Survey of India Toposheet No.73 I/5,73 I/6, 73 I/9, 73 I/10</td></tr>
<tr><td>15</td><td>Existing infrastructure</td><td>Existing infrastructure such as access road & internal roads, DVC power supply, water supply Arrangement from water treatment plants, township, hospital, school, water treatment plant, effluent handling and recycling system, workshop & store, canteen, recreation center, religious place and sports facility are available.</td></tr>
<tr><td>16</td><td>Estimated cost of the project</td><td>Rs. 19.42Crores</td></tr>
</table>

2.0 INTRODUCTION OF THE PROJECT/BACKGROUND INFORMATION

M/s. Tata Steel Limited (TSL) established in 1907, is among the top ten global steel companies with an annual crude steel capacity of over 27.5 million tons per annum (MTPA) as on March 31, 2018. It is now the world's second-most geographically-diversified steel producer, with operations in 26 countries and commercial presence in over 50 countries. The Tata Steel Group recorded a turnover of US $ 20 billion in FY18. Tata Steel Group has over 76,000 employees across five continents and is a Fortune 500 company. Tata Steel retained the industry leader position in FY18 and ranked second overall in DJSI assessment, 2017.

TSL at Jamshedpur is undergoing expansion of its production thereby requiring more steel grade coal. Coal is the major constituent for production of steel. Therefore, in order to meet the enhanced requirement of coal at Jamshedpur steel plant, corresponding expansion of mines with washery is also required. Hence, modernization of Jamadoba Colliery is required to sustain the production level of 0.34 MTPA.

Jharia Division being captive coal mines of Tata Steel operates underground mines with beneficiation facilities to produce Steel Grade Coal required at Integrated Steel Plant at Jamshedpur and Kalinganagar to produce Steel. There are two groups operating under Jharia Division, namely Jamadoba Group and Sijua Group. Jamadoba colliery is part of Jamadoba group.

Jamadoba colliery is captive colliery coking coal mine of Tata steel limited with all its coal being used for its steel plant.

i) Identification of Project and Project Proponent

The Jamadoba Colliery (JDC) is owned by M/s Tata Steel Ltd (TSL). Jamadoba Colliery lies in the Jharia Coalfield, in the Dhanbad district of Jharkhand state. The TSL obtained the lease Jamadoba–Digwadih Block (group) in the year 1918 covering 1409.86 ha (3482.37 acres). It has three collieries namely Jamadoba Colliery, 6 & 7 Pits and Digwadih Colliery. Jamadoba Colliery lease area covers 927.17 ha spread over three revenue villages. The coal mined from the Jamadoba Colliery is fed to the preparation plant located within its lease hold.

The clean coal from the Jamadoba washery is dispatched to Jamshedpur and Kalinganagar Steel Plant. The envisaged expanded capacity of steel making is 9.7 MTPA needing 9.04 MTPA of clean coal of about 16.5% ash. The Jamadoba coal would just supplement coal supplies to steel plant from other sources, including import coal.

ii) Brief Description of Nature of the Project

The proposed project involves the mining of coal in an extent of 927.17 ha and falls in schedule 1(a) (i) Mining of Minerals of Category 'A'.

Presently, this colliery produces about 0.34 MT per annum with ROM ash content ranging between 20% and 49%. It has a workforce of 1096 persons with an average overall output per man-shift (OMS) of 2.13 tonne. Coal extracted at the face is transported by an underground network of belt conveyors to Jamadoba Coal Preparation Plant (CPP).

The proposed modernisation of underground mine is planned with annual production capacity of 0.34 million tonnes.

iii) Need for the Project and its Importance to the Country and or Region

Jamadoba Colliery is the captive source of coking coal for existing steel plant of M/s. Tata Steel Ltd (TSL) at Jamshedpur. The run-of-mine (ROM) coal is sent for beneficiation at Jamadoba washery. The clean coal from washery is sent for steel making units at Jamshedpur and the tailings and rejects are sold to various customers.

iv) Demand-Supply Gap

Jamadoba Colliery, a captive coal mine of Tata Steel Ltd is already operating underground coal mines to supply the coal to their steel plant to reduce the supply of imported coal. Jharia Division being captive coal mines of Tata Steel operates underground mines with beneficiation facilities to produce Steel Grade Coal required at Integrated Steel Plant at Jamshedpur to produce Steel.

v) Imports vs. Indigenous Production

The short supply/availability of coking coal was accentuated during last couple of years when the market price of coal touched an all-time record and good quality coking coal was in short supply in world market. India's import of coal has been increasing rapidly but production of coal from own mines brings stability and raw material security.

vi) Export Possibility

The excavated coal will be used for the captive purpose only at Tata steel Ltd, Jamshedpur, kalingangar.

vii) Domestic/Export Markets

Jamadoba colliery is captive mine of Tata Steel Ltd and supplies clean coal to Jamshedpur, kalingangar steel plants.

viii) Employment Generation (Direct and Indirect) due to the Project

The present employment status shall remain same in future after proposed modernization also.

3.0 PROJECT DESCRIPTION

i) Type of project including interlinked and interdependent projects, if any

It is a captive coal mine of Tata Steel to produce steel grade coal for production of steel at its plant in Jamshedpur.

ii) Location (map showing general location, specific location, and project boundary & project site layout) with coordinates.

Jamadoba Colliery is located in the South-Eastern segment of Jharia coalfield in the Dhanbad district of Jharkhand. It is situated 12 km South of Dhanbad town. The colliery lies in the Survey of India Toposheet No. 73 I/6. The nearest railway station, Bhaga, on South-Eastern Railway, is about 1.3 km from the colliery. Nearest town Jharia is about 3.2 km and district town Dhanbad is about 9 km.

Nearest NH i.e. NH-32, is about 4.0 km away, on West side at Pootkie. Nearest airport i.e. Ranchi, is about 170 km away. The coordinates of the proposed modernization project are given in **Table-1**.The index map is shown in **Figure-1**. The toposheet and google image of study area are shown in **Figure-2** and **Figure-3** respectively.

TABLE-1
LATITUDE & LONGITUDE OF THE CORNER POINTS OF MINE LEASE

Point	Latitude	Longitude	Point	Latitude	Longitude
0	23° 41' 53.3"	86° 22' 9.5"	25	23° 43' 16.7"	86° 22' 55.3"
1	23° 41' 53.4"	86° 22' 9.5"	26	23° 43' 16.1"	86° 22' 58.2"
2	23° 42' 20.2"	86° 22' 15.1"	27	23° 43' 13.7"	86° 22' 59.9"
3	23° 42' 27.9"	86° 22' 16.7"	28	23° 43' 12.4"	86° 23' 2.3"
4	23° 42' 32.0"	86° 22' 16.8"	29	23° 43' 10.0"	86° 23' 2.2"
5	23° 42' 41.5"	86° 22' 17.0"	30	23° 43' 8.7"	86° 23' 2.7"
6	23° 42' 45.0"	86° 22' 16.2"	31	23° 43' 6.0"	86° 23' 1.9"
7	23° 42' 50.5"	86° 22' 14.9"	32	23° 43' 1.1"	86° 22' 57.4"
8	23° 42' 54.2"	86° 22' 14.0"	33	23° 42' 54.4"	86° 22' 58.8"
9	23° 43' 1.9"	86° 22' 11.7"	34	23° 42' 54.5"	86° 23' 2.1"
10	23° 43' 2.2"	86° 22' 11.5"	35	23° 42' 48.2"	86° 23' 5.5"
11	23° 43' 4.6"	86° 22' 10.3"	36	23° 42' 46.0"	86° 23' 7.3"
12	23° 43' 17.0"	86° 22' 8.9"	37	23° 42' 45.2"	86° 23' 7.1"
13	23° 43' 28.2"	86° 22' 14.4"	38	23° 42' 44.7"	86° 23' 7.0"
14	23° 43' 32.7"	86° 22' 15.0"	39	23° 42' 44.8"	86° 23' 11.4"
15	23° 43' 35.9"	86° 22' 16.5"	40	23° 42' 40.3"	86° 23' 12.4"
16	23° 43' 34.7"	86° 22' 17.8"	41	23° 42' 37.3"	86° 23' 13.8"
17	23° 43' 34.1"	86° 22' 20.7"	42	23° 42' 36.4"	86° 23' 17.9"
18	23° 43' 30.3"	86° 22' 32.8"	43	23° 42' 35.9"	86° 23' 20.7"
19	23° 43' 27.7"	86° 22' 39.5"	44	23° 42' 34.7"	86° 23' 24.8"
20	23° 43' 25.7"	86° 22' 47.0"	45	23° 42' 35.1"	86° 23' 27.1"
21	23° 43' 24.6"	86° 22' 49.8"	46	23° 42' 35.5"	86° 23' 28.3"
22	23° 43' 20.7"	86° 22' 52.9"	47	23° 42' 35.0"	86° 23' 33.6"

Point	Latitude	Longitude	Point	Latitude	Longitude
23	23° 43' 19.3"	86° 22' 52.3"	48	23° 42' 34.2"	86° 23' 37.4"
24	23° 43' 18.8"	86° 22' 55.3"	49	23° 42' 33.9"	86° 23' 42.6"
50	23° 42' 33.9"	86° 23' 45.2"	75	23° 41' 44.2"	86° 23' 50.2"
51	23° 42' 35.1"	86° 23' 47.8"	76	23° 41' 46.5"	86° 23' 45.2"
52	23° 42' 36.7"	86° 23' 49.0"	77	23° 41' 47.2"	86° 23' 39.9"
53	23° 42' 38.5"	86° 23' 50.0"	78	23° 41' 47.4"	86° 23' 32.6"
54	23° 42' 41.2"	86° 23' 56.3"	79	23° 41' 44.3"	86° 23' 21.4"
55	23° 42' 43.1"	86° 23' 58.8"	80	23° 41' 44.1"	86° 23' 19.5"
56	23° 42' 32.4"	86° 24' 3.9"	81	23° 41' 45.0"	86° 23' 17.6"
57	23° 42' 30.5"	86° 24' 4.8"	82	23° 41' 43.2"	86° 23' 15.7"
58	23° 42' 28.4"	86° 24' 7.3"	83	23° 41' 40.3"	86° 23' 13.4"
59	23° 42' 24.6"	86° 24' 10.5"	84	23° 41' 34.8"	86° 23' 11.3"
60	23° 42' 23.6"	86° 24' 11.3"	85	23° 41' 31.5"	86° 23' 8.9"
61	23° 41' 57.8"	86° 24' 22.9"	86	23° 41' 30.2"	86° 23' 8.6"
62	23° 41' 9.4"	86° 24' 44.7"	87	23° 41' 27.7"	86° 23' 9.4"
63	23° 41' 4.6"	86° 24' 46.4"	88	23° 41' 25.7"	86° 23' 9.5"
64	23° 41' 4.6"	86° 24' 41.2"	89	23° 41' 22.0"	86° 23' 8.8"
65	23° 41' 7.6"	86° 24' 34.0"	90	23° 41' 21.4"	86° 22' 58.1"
66	23° 41' 6.6"	86° 24' 30.4"	91	23° 41' 21.5"	86° 22' 58.0"
67	23° 41' 13.1"	86° 24' 27.6"	92	23° 41' 26.1"	86° 22' 50.5"
68	23° 41' 18.2"	86° 24' 26.2"	93	23° 41' 27.0"	86° 22' 46.5"
69	23° 41' 21.5"	86° 24' 20.9"	94	23° 41' 28.0"	86° 22' 38.7"
70	23° 41' 24.3"	86° 24' 19.9"	95	23° 41' 31.0"	86° 22' 31.7"
71	23° 41' 26.1"	86° 24' 18.9"	96	23° 41' 35.0"	86° 22' 25.1"
72	23° 41' 33.8"	86° 24' 12.3"	97	23° 41' 41.0"	86° 22' 16.0"
73	23° 41' 40.5"	86° 23' 59.7"	98	23° 41' 41.3"	86° 22' 15.8"
74	23° 41' 38.5"	86° 23' 54.8"	99	23° 41' 45.9"	86° 22' 12.8"

FIGURE-1
INDEX MAP

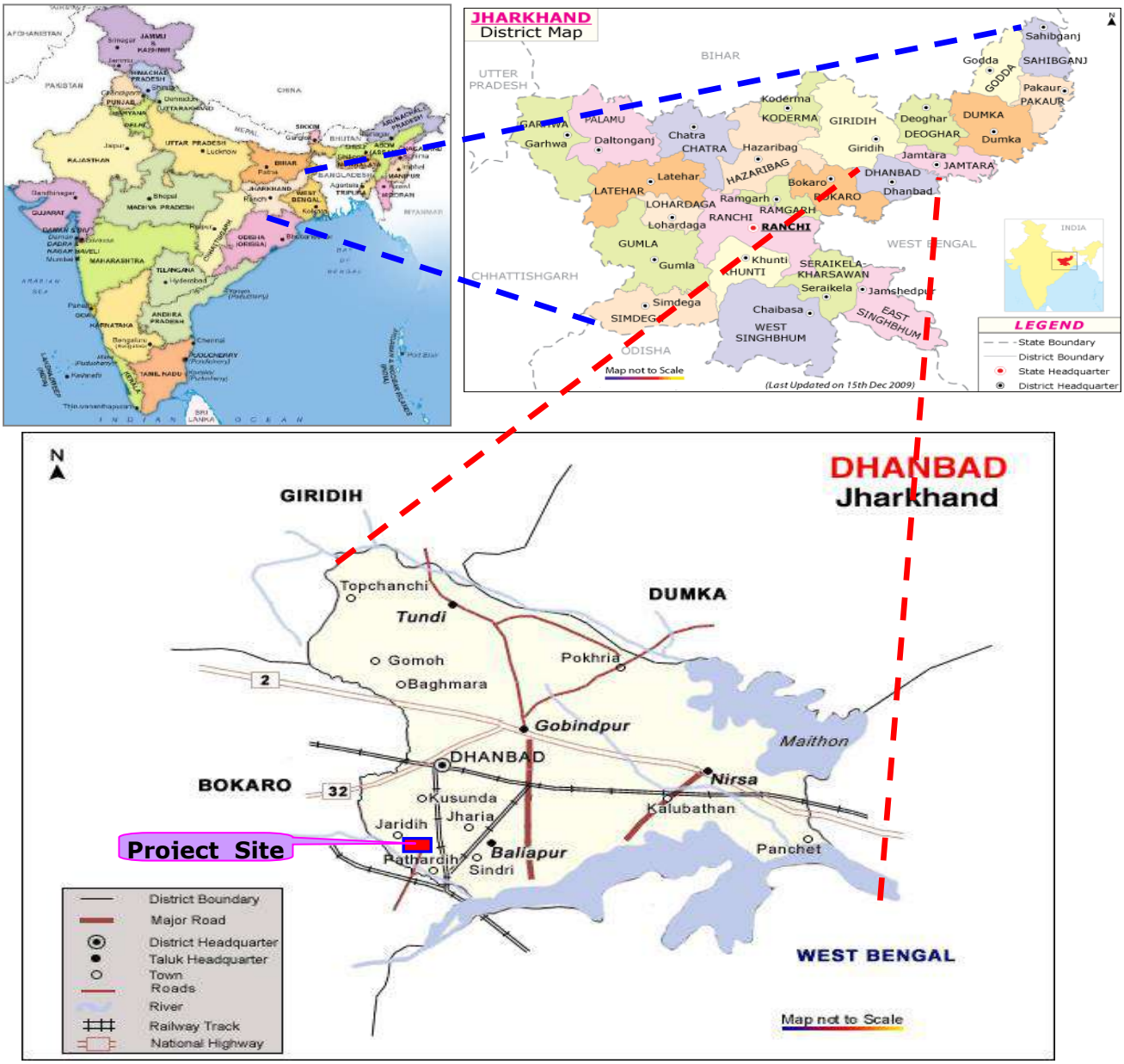


FIGURE-2
STUDY AREA MAP

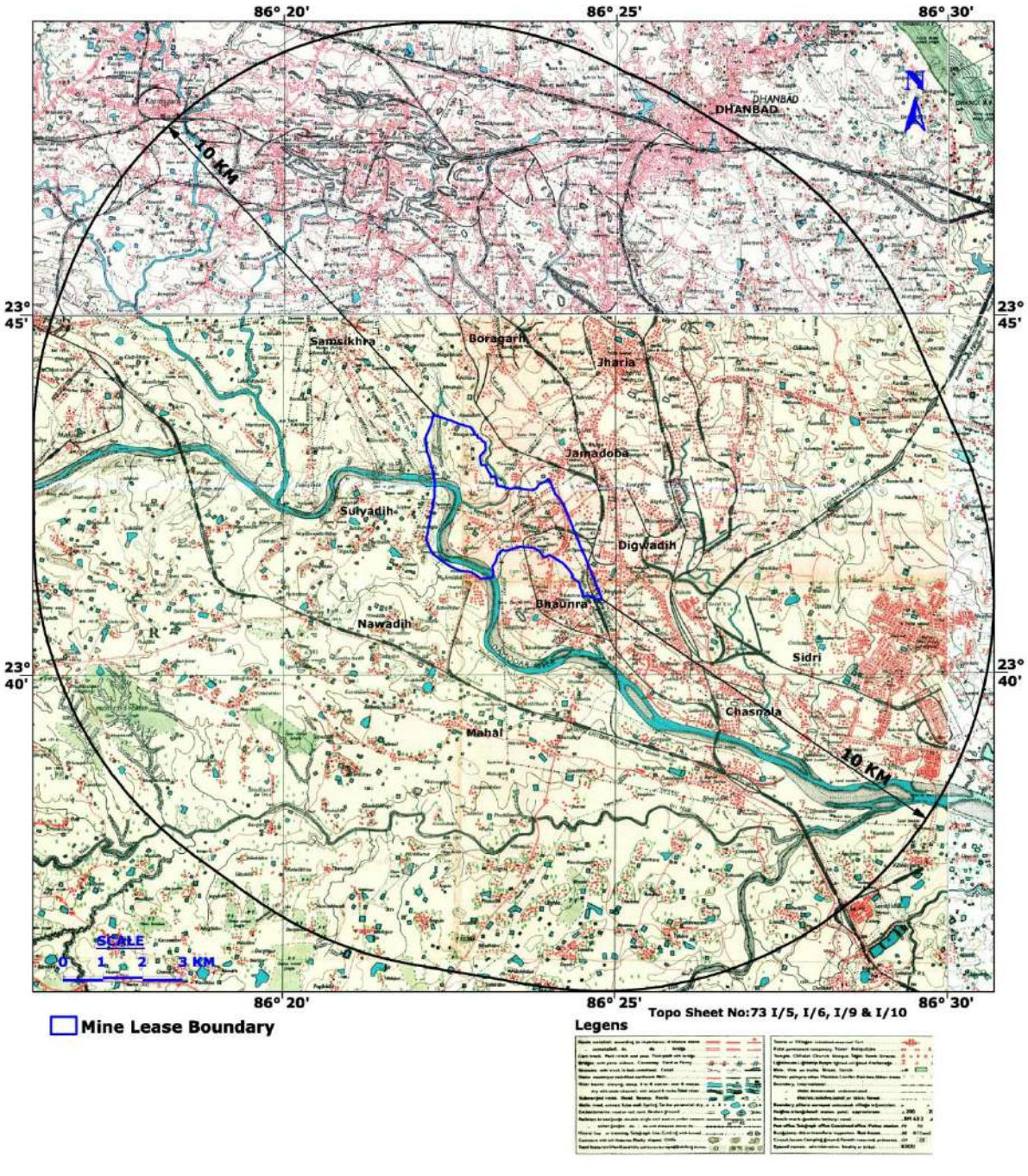
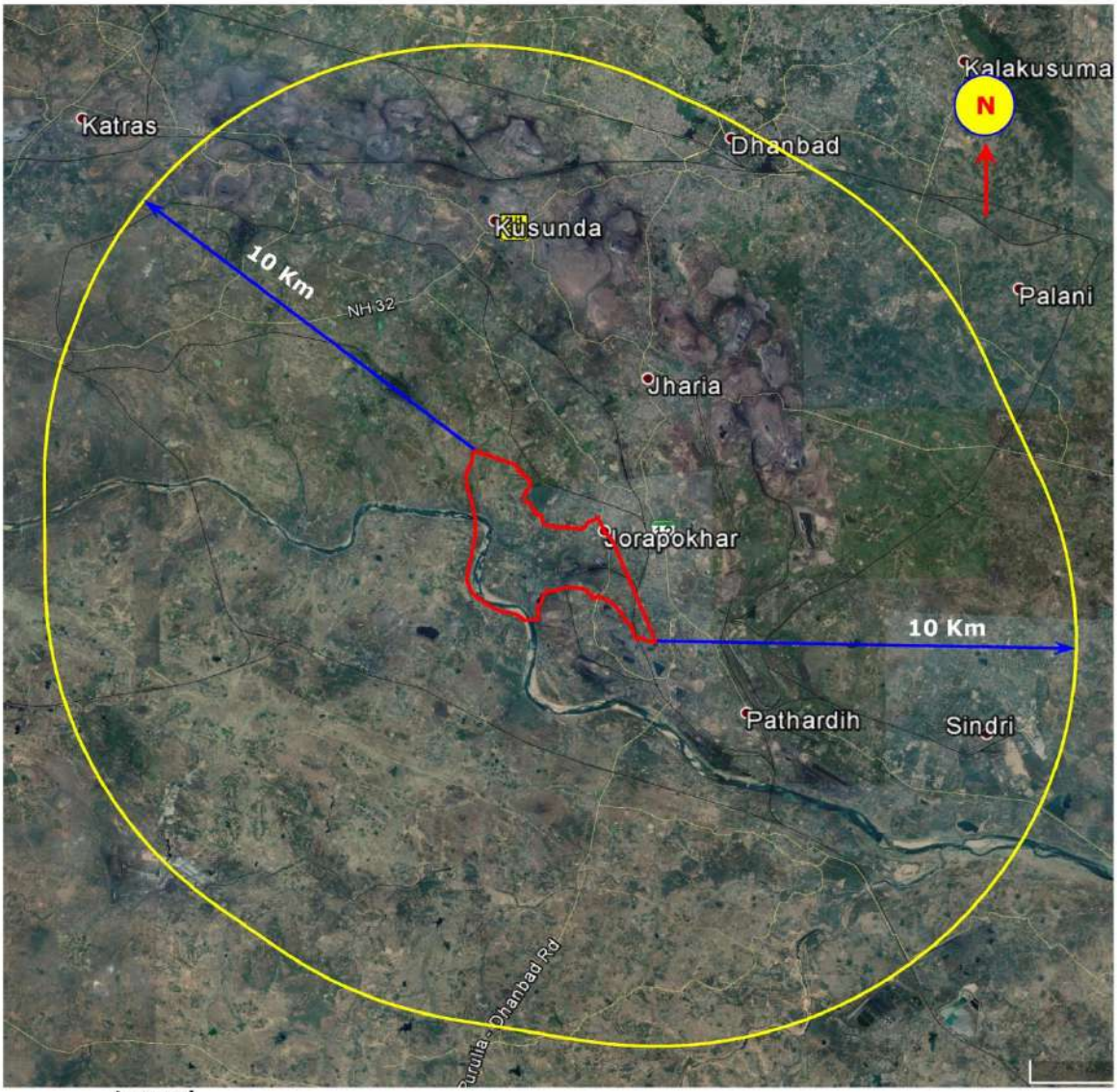


FIGURE-3
GOOGLE IMAGE



iii) Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations gone into should be highlighted

The proposed modernization of underground coal mining is site specific in nature and the project site has the following features:

- The site is devoid of any forest area;
- The area falls within the Jamadoba mining lease;
- The site is in close proximity to the existing mines of Jharia Coal field and as such transportation of infrastructure/technology for exploitation is easy; and
- Economically viable in respect of investment and production.

iv) Size or Magnitude of Operation

The Jamadoba colliery has maximum production capacity of 0.34 MTPA through underground method. The life of the project is expected to be 15 years as per mining plan. The total land involved for the mining activities is 927.17 ha. The total land lease area ownership breakup of 927.17 ha is given in **Table-2**.

TABLE-2
OWNERSHIP BREAK-UP OF SURFACE AREA

Sr. No.	Ownership	Area (in ha)
1	TSL Land	100.98
2	Private Land	732.48
3	Government Land	90.86
4	Railway Land	2.85
5	Forest Land	Nil
Total		**927.17**

v) Project Description with Process Details (a schematic diagram/flow chart showing the project layout, components of the project etc. should be given)

The project is an operational underground mine with 0.34 MTPA capacity. The coal is extracted through underground Bord & Pillar system of mining using SDL and LHD method. Besides this, there is no involvement of expansion in the lease area.

Selection of Underground Mining Method

Working seam depth ranges from 300 m to 780 m. Entire mining lease area is coal bearing. There are two rivulets (jores) at surface namely Puttiya & Dungri. River Damodar flows along part of South-Western edge of the lease area. In view of the above, there is no scope of changing over from existing underground mining method to opencast mining.

Proposed Modernization:

The regulatory concerns involving solid blasting permissions in lower seams considering the subsidence control at surface poses risk of coal winning operation with existing level of mechanized operation (SDL/LHD). To continue the production at same level in lower seams, higher level of mechanization is inevitable. Continuous miner (CM) will ensure the same level of production without solid blasting.

To extract coal from lower seams, the mine has to go for higher level of mechanization with SDL/LHD at faces, continuous miner for development, roof bolting along with conventional support and evacuation of coal by conveyors. It has been envisaged to introduce low capacity continuous miner in development district of XI seam of Jamadoba Colliery. Continuous coal cutting technology will be used to cut coal which will transport the coal to the back of it through inbuilt gathering arm loader and chain conveyor.

The production of the mine with the proposed modernization at the lower levels will reduce the interface manually and replaced with mechanical equipment, which will increase the safety of the manpower involved. This modernization further reduces use of blasting.

Bord & Pillar Mining

General dip of coal seams range between 7^0 to 8^0. However, there exists a folding on the South side with a change in dip ranging between $15^0 - 25^0$ to $25^0 - 45^0$. There are 13 faults with throws ranging from 10 m to 360 m, most of the faults being major faults. These faults run roughly North to South. The coal deposit at Jamadoba is adversely affected by Igneous Intrusives, such as dykes & sills. Sills have done extensive burning of several layers of coal. Seams XII & X are completely burnt. Seam XIII is pyrolitized extensively. Seams XV A, XV, XIV & XI are partially pyrolitized. All these burnings have substantially reduced workable coal reserve. Coal seams are therefore geologically disturbed severely. In view of this disturbance, there is no scope for long wall mining. We have no other choice except to continue with bord & pillar mining. There are a no. of surface features, such as rivulets, washery, power house, mine infrastructure, residential colonies and villages etc. Therefore, pillar extraction is being done in conjunction with sand stowing. The sequence of working has been top downwards.

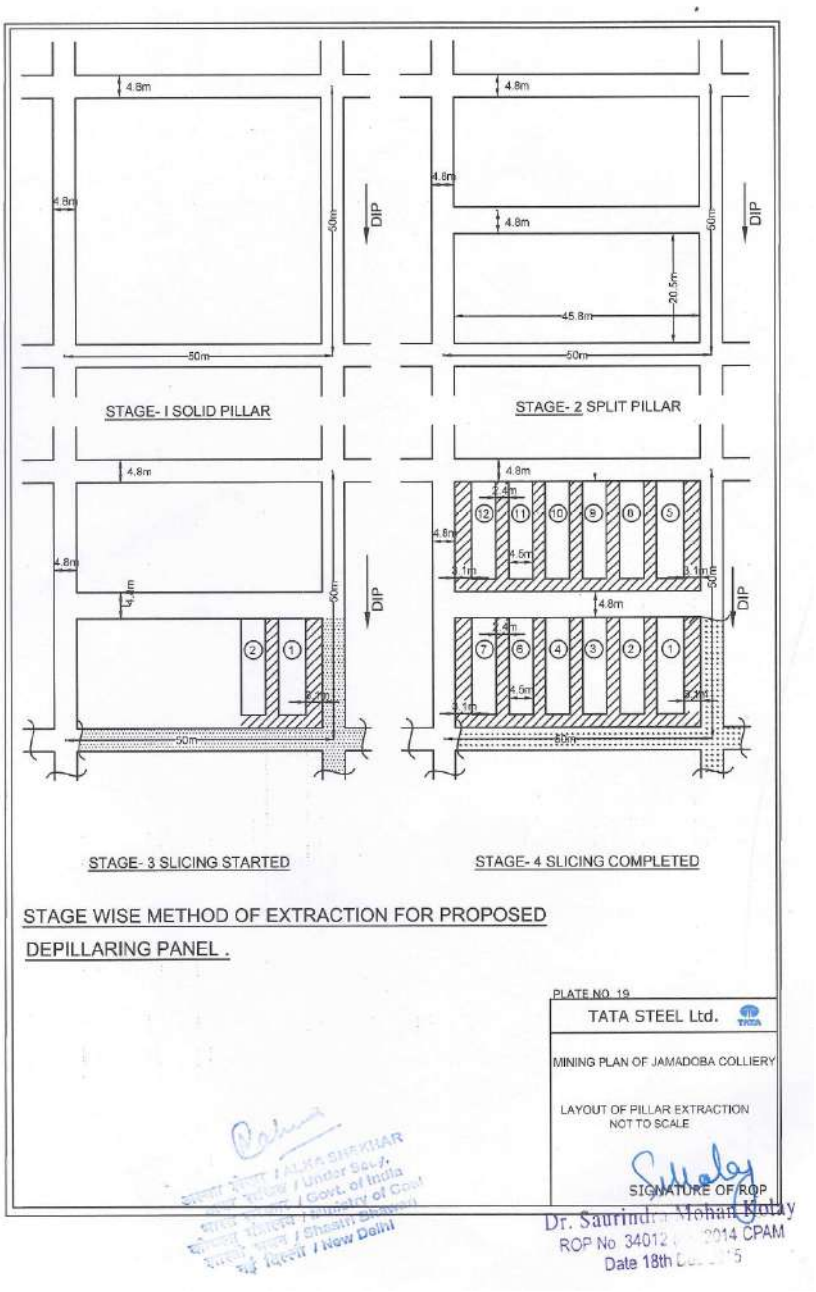


FIGURE-4
LAYOUT OF PILLAR EXTRACTION

vi) Raw material required along with estimated quantity, likely source, marketing area of final product/s, Mode of transport of raw Material and Finished Product

No Explosives will be used in coal extraction process. Small quantity of explosives will be used during induced blasting and the same will be stored, transported, handled and used in accordance with Indian Explosive Act 1884, MSIHC Rules 2000, Mines Act, 1952 and regulations there under.

In the proposed underground coal mining modernization project, about 125 tonnes of explosives and about 2,50,000 detonators will be used.

vii) Resource Optimization/Recycling and Reuse envisaged in the Project, if any, should be briefly outlined

Not envisaged.

viii) Availability of Water its Source, Energy/Power Requirement and Source should be given

The industrial water needs are met from the mine pumping, which is a continuous process to keep the underground workings water free for mining operation. Domestic water supplies are from MADA and TSL's own water treatment facilities.

In the proposed project, there is no need of water to carry out operations but drinking water will be required for the working people. This water will be supplied from the water treatment plants present in same lease area.

Part of mine water is retained in surface reservoirs. The total water used for the purpose of stowing amounts to 2700 m^3/day. Mine water is used for domestic requirement including drinking, domestic uses etc.

ix) Quantity of Wastes to be generated (liquid and solid) and scheme for their Management/Disposal

Liquid Waste:

The mine discharge water, which may contain coal fines, needs sedimentation, before discharge into the natural water course/ open land. Large settling tanks are available for storage and sedimentation of mine water before its discharge to conform to the effluent standards as prescribed by Ministry of Environment, Forest and Climate Change (MoEF&CC). Maintenance of small machines generates effluent which is handled through oil and grease trap and reuse of water.

Solid Waste:

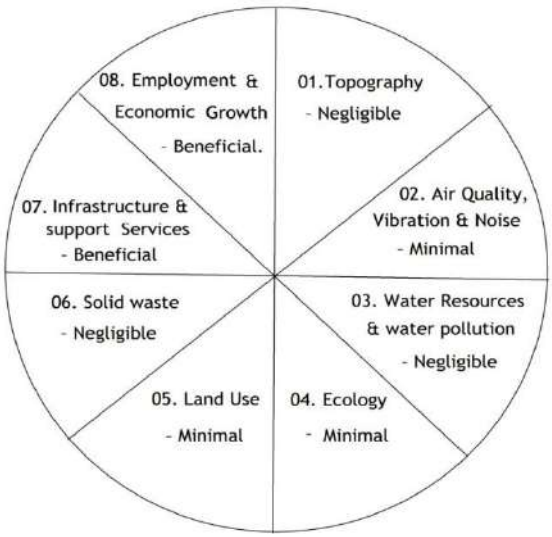
The solid waste produced during drivage of tunnels will be used for preparation bank head and filling of low lying areas. The water pumped-out will not have any pollutants added to it, except that of coal fines.

Wastewater treatment plant situated at Jamadoba is provided with settling tanks. The treated water is being used for domestic purposes. Apart from that mine water is being recycled for use in dust suppression and stowing.

The sewage of residential houses are having septic tanks and soak pits for their treatment. One STP of 200 KLD capacity has been installed at one of the residential colonies in JDC.

x) Schematic representations of the feasibility drawing which give information of EIA purpose:

It was observed that the pollution in the existing mines is within the permissible limit. However, the schematic representation of the feasibility is given below:



4.0 SITE ANALYSIS

i) Connectivity

It is situated 9 km South of Dhanbad town. The nearest railway station, Bhaga, on South-Eastern Railway, is about 1.3 km from the colliery. Nearest town Jharia is about 3.2 km and district town Dhanbad is about 9 km. Nearest NH i.e. NH-32, is about 8 km away, on NNW side at Putki. Nearest airport i.e. Ranchi, is about 116 km away.

ii) Land Form, Land use and Land ownership

The leasehold area for Jamadoba Colliery (927.17 ha) was purchased by the then Tata Iron & Steel Co. Ltd (TISCO) now TSL, in the year 1918 with a lease period of 999 years.

The ownership break up of total lease area is given in **Table-3**.

TABLE – 3
OWNERSHIP BREAK-UP OF SURFACE AREA

Sr. No.	Ownership	Area in ha
1	TSL Land	100.98
2	Private Land	732.48
3	Government Land	90.86
4	Railway Land	2.85
5	Forest Land	Nil
Total		**927.17**

The present land use will not undergo changes during the productive mining plan life of 15 years. As all the depillaring is proposed by stowing and no new openings or infrastructure is proposed during the mining plan period, no other changes will occur on surface.

The present land uses are typical of an underground mining area. A large tract of land remains undisturbed in spite of over 90 – 100 years of mining in the lease area. The present land uses in the lease area, of 927.17 ha, after decades of coal mining activities, has established in line with operational underground mine. The subsided areas due to caving in the past, has all been filled up and reclaimed for

plantation. For more than a decade, depillaring with only stowing operation has been executed. As all depillaring is undertaken with sand stowing, no subsided areas appear in the present land uses. The land uses in three stages of mining e.g. present uses, proposed uses and post mining land uses are detailed, hereafter, in **Table–4**.

TABLE–4
LAND USES OF THE JAMADOBA COLLIERY AREA IN THREE STAGES OF MINING

All area in ha

Pre-mining land use in 'Ha'			Type	Land Use (Proposed)	Land Use (End of life)	Land Use (Post-closure)						
						Agricultural land	Plantation	Water body	Public/ company use	Forest land (returnable)	Undisturbed	Total
Tenancy	Agricultural	$ Tata Steel has acquired the operating mine in 1918. Before that period this mine was operational under Indian Collieries Syndicate Limited. Thus, pre-mining land use plan is unavailable.	Excavation Area	11.5	Nil	-	-	-	-	-	-	Nil
	Township		Backfilled Area	Nil	Nil	-	-	-	-	-	-	Nil
	Grazing		Excavated void	Nil	Nil	-	-	-	-	-	-	Nil
	Barren		Without plantation	Nil	Nil	-	-	-	-	-	-	Nil
	Water bodies		Top soil dump	2.15	Nil	-	-	-	-	-	-	Nil
	Road		External dump	10	Nil	-	-	-	-	-	-	Nil
	Community		Safety zone/ rationalisation area	Nil*	Nil*	-	-	-	-	-	-	Nil
	Inhabitated		Road Diversion	Nil	Nil	-	-	-	-	-	-	Nil
	Village		Diversion below river/nallah/canal	Nil	Nil	-	-	-	-	-	-	Nil
Govt Non-forest	Agricultural		Road & Infrastructure Area	72.38	72.38	-	72.38	-	-	-	-	72.38
	Township		Garland drains	Nil	Nil	-	-	-	-	-	-	Nil
	Grazing/Other		Embankment	Nil	Nil	-	-	-	-	-	-	Nil
	Road		Green belt	Nil	22.55	-	22.55	-	-	-	-	22.55
	Waterbody		Water reservoir near pit/ water body	Nil	1.1	-	-	1.1	-	-	-	1.1
	Other		UG entry	1.7	1.7	-	1.7	-	-	-	-	1.7
Forest	Reserve		Pit head power plant	Nil	Nil	-	-	-	-	-	-	Nil
	Protected		Resettlement	Nil	Nil	-	-	-	-	-	-	Nil
	C-J-B-J		Undisturbed/ Mining right for UG	829.44**	829.44 **	692.48	3.25	81.26	52.45	-	-	829.44
Free hold			Others	Nil	Nil	-	-	-	-	-	-	Nil
Total				**927.17**	**927.17**	**692.48**	**99.88**	**82.36**	**52.45**	**-**	**-**	**927.17**

$ Present land use is as follows- 1. Land owned by Co. (a.Infrastructure mining/colony- 74.08 Ha, b. Open cast area- 23.65 Ha, c. Afforested land- 3.25 Ha); 2. Land owned by private owners (a. Agriculture- 692.48 Ha, Village- 40 Ha); 3. Govt Land (a. Forest- Nil, b. Road- 9.6 Ha, c. River/drain/ponds- 81.26 Ha) 4. Railway Land- 2.85 Ha.
*All land under Safety Zone are distributed and used under Agriculture/Public/Private Infrastructure/Green/Plantation Zone use etc and hence not shown seperately.
** Undisturbed land also includes Agricultural land (692.48 Ha) , railway land (2.85 Ha),Village (40 Ha), Water Body /Nala/River Canal (81.26 Ha), Road (9.6 Ha) and Plantation/Green Zone (3.25).

As for records, of total lease area of 927.17 ha, there is no forest land. The mine was started way back in year 1918. Due to U/G mining with stowing, no changes are anticipated from present to proposed land uses.

iii) TOPOGRAPHY (along with map)

- ***Physiography***

Topography of the lease area is mildly undulating. Surface elevation varies from highest 178 m to lowest 140 m above Mean Sea Level. General slope grades towards South and West as West side & South side area are bounded by Damodar River. Location map is shown in Figure-1 & 3.

- ***Drainage***

There are two jores – Kari / Puttiyajore and Dungrijore. Kari / Puttiyajore flows through North-West part of the lease and falls into Damodar River. Dungrijore flows centrally from North edge of lease to South edge where it falls into Damodar near Bhowrah North Colliery boundary. The topography of the lease area is shown in in Study area map given in Figure-3**.**

iv) Existing land use pattern (agriculture, non-agriculture, forest, water bodies (including area under CRZ), shortest distances from the periphery of the project to periphery of the forests, national park, wild life sanctuary, eco sensitive areas, water bodies (distance from the HFL of the river), CRZ. In case of notified industrial area, a copy of the Gazette notification of notified industrial area, a copy of the Gazette notification should be given

The present land uses are typical of an underground mining area. Large tracts of land remains undisturbed in spite of over 90 – 100 years of mining in the lease area. The present & proposed land uses are given in Table-4.

v) Existing Infrastructure

Existing infrastructure such as access road & internal roads, DVC power supply, water supply Arrangement from water treatment plants, township, hospital, school, water treatment plant, effluent handling and recycling system, workshop & store, canteen, recreation center, religious place and sports facility are available.

Tata Steel Ltd has created infrastructural facilities besides the measures for up-liftment of socio-economic conditions to locals and for its employees.

vi) Soil Classification

According to the National Bureau of Soil Science (NBSS) and Land Use Planning, Kolkata the study area is covered by five group of soil as given below:

- Typic Rhodustalfs;
- Lithic Usotorthents;
- Aeric Ochraqualfs;
- Lithic Ustochrepts; and
- Aeric Haplaquepts.

The first group of soil represents Granite-gneiss landscape whereas the remaining represents Gondwana landscape.

vii) Climatic Data from Secondary Sources

The climate of the area is dry humid and sub-tropical. It is characterized by hot and dry summer (March to June), rainy season (July to October) and winter (November to February). The average annual relative humidity is about 63%. In summer months, the relative humidity (RH) varies between 32% to 72%. The temperature rises up to 42^0C to 46.3^0C on some summer days, and in winter, the temperature drops down to 5^0C to 7^0C at times. Dust storms are common in dry season (May and June) before the onset of monsoon with increase in temperature and wind speed in the afternoon coupled with low humidity.

Major rainfall occurs during monsoon, and the maximum rainfall occurring in the month of August. The average annual rainfall in the area is reported to be 1100 mm and number of rainy days in a year is about 100 days. The wind speed of the area varies from 1.5 msl to 2.8 msl.

viii) Social Infrastructure Available

Medical and Public Health

For rendering first aid and day-to-day medical assistance to employees, there are two Dispensaries namely Jamadoba & Kalimela each consisting of 1 doctor and 1 pharmacist. For specialised treatment, patients are referred to Tata Central Hospital (TCH), located at Jamadoba itself. TCH has strength of 23 doctors, 65 staff and 32 nurses and it is equipped with specialized medical treatment. The next higher level of medical facility is available at Tata Main Hospital (TMH), Jamshedpur. In addition to these, patients are referred to Vellore, Mumbai, New Delhi, etc. for their specialised treatment. For communities, medical facility is provided through health camps, regular interaction with doctors and distribution of medicines etc.

Canteen

One canteen has been provided at the colliery premise. There is a hall with capacity of 60 no. of seats for having lunch. It offers refreshment and lunch on 50% subsidized rate. There are provisions for drinking water, lavatory, wash basin etc. The canteen staff strength of four persons consists of one manager, two cooks and one assistant.

Community Centre

There is a community centre provided for the employees and their dependants. The community centre consists of a big hall, TT room, Carrom room, Gymnasium etc. Many events such as cultural programmes, marriages, seminars, indoor sports are organized at the community centre.

Housing

Jamadoba Colliery maintains 17 no. of housing colonies having 1139 no. of quarters. The colony is well maintained with pucca roads, sanitary toilets, greeneries etc.

Water Supply for Domestic and Industrial Uses

All the quarters have been provided with drinking water supply connection. The water is supplied from Water Treatment Plant situated at Jamadoba. Besides

drinking water, there are community taps for mine water supply in the colonies which is used for the purpose of washing and other domestic use not requiring drinking water.

Water Cooler

There is provision of drinking water supply at no. 2 & 3 pit for the employees. Water cooler has been installed at 2 & 3 pit top, incline no. 2 and canteen to provide cool drinking water to the employees.

Pit Head Bath

The colliery maintains a Pit head bath for the employees for cleaning & washing at the close of a shift. Treated mine water is fed to Pit head bath.

Sports Facility

Carrom tournament, T.T tournament, Bridge tournament, Badminton tournament etc. are organized at the community centre and at recreation club throughout the year. Jamadoba colliery also participates in annual sports organized by Tata Collieries Sports Association held generally in the month of February every year including village sports.

Cultural Centre

The cultural programs are organized in Community Centre and at Kalimela. The employees and their dependents participate in the programmes. Mine management encourages the employees and their dependents to participate in such programs so that their talent can be developed.

Park

One "Employees' Park" has been developed at the colliery premises with sitting arrangement. Employees, supervisors all can use the park for health or leisure purpose.

Tata Steel Rural Development Society (TSRDS)

TSRDS, a NGO patronized by TATA STEEL interacts with residents of nearby villages and provides assistance as required. They also provide technical guidance for agriculture, water conservation, formation of self-help groups etc. Trade Fair, sports activities are organized by them from time to time. They provide medical assistance through mobile van and medical camps.

Educational Facility

Colliery maintains a primary school in Jamadoba area. TATA STEEL patronizes a few high schools, both English medium and Hindi medium in the area. Apart from these, management provides school bus to local schools and also for attending schools and colleges in and around Dhanbad. Scholarship is given to one ward of every employee at colliery school. Apart from this the other wards can also study at concessional fees at Tata DAV School, Bhelatand.

5.0 PLANNING BRIEF

i) Planning concept (type of industries, facilities, transportation etc.) Town and Country Planning/Development authority Classification:

Production will be done as per mining plan not exceeding 0.34 million tonnes per annum. A railway siding for these dispatches by Indian Railway is laid down in the Jamadoba Colliery lease area.

ii) Population Projection

There would not be any increase in population since it is an old establishment of Tata Steel which is now saturated. The man power of the existing workforce will be redeployed.

iii) Land use Planning (break up along with greenbelt etc.)

After cessation of mining, the land under infra area, washery etc. will all be reclaimed. It is proposed to use the buildings, i.e. office and residential areas for use of local community & society at large. The Table-4 shows the envisaged changes for bringing the land to better post mining land uses.

The main thrust of land use planning is to utilize the available areas and put them under vegetative cover. In the process, a landscape with aesthetic beauty will be developed.

Plants will be grown:

- Around fan house;
- Along the road sides both in the project and mine complex and in the vacant lands of the residential area; and
- Within the mine premises.

iv) Assessment of Infrastructure Demand (Physical and Social)

<u>Improvement in Physical Infrastructure</u>

The project is having positive impact on the socio-economic environment. It helps sustain the development of this area including further development of physical infrastructural facilities. The following physical infrastructure facilities are already improved due to project.

- Road Transport facilities;
- Housing facilities;
- Water supply and sanitation;
- Power;
- Medical facilities; and
- Community development etc.

<u>Improvement in Social Infrastructure</u>

The following changes in socio-economic status are in place due to mining activities:

Trade and Commerce

The area is mainly known for its rich deposition of power grade coal. Besides coal, agricultural products are the major things for trading. The main agricultural products grown in this area are rice, paddy, millets, onion, tomato, potato and maize etc.

Places of Historical Importance

Industrial development and consequent economic development lead to improvement of environment through better living and greater social awareness. On the other hand, continuation of project is likely to have several benefits like improvement in indirect employment generation and economic growth of the area, by way of improved infrastructure facilities and better socio-economic conditions.

v) Amenities/Facilities

Electricity is available in almost all the villages and communication facilities are overall satisfactory. However, post and telegraph facilities are limited to only a few villages and market facilities lacking in the area. Most of the households are using coalas fuel. However, people are also using gas or kerosene as a fuel as per economic condition. Educational facilities are available in almost all villages.

6.0 PROPOSED INFRASTRUCTURE

i) Industrial Area (Processing Area)

This is an already operating colliery. Hence there is no change in existing infrastructure. The ML area shown in the conceptual map in **Annexure-I.**

ii) Residential Area (Non Processing Area)

No change in residential area proposed. The existing residential colonies shall remain exist and will be used for the entire life of the mine.

iii) Greenbelt

An area of around 12 ha will be put under greenbelt at the first five year in the project area.

iv) Social Infrastructure

Employment, medical facilities, educational facilities, transportation etc. will be further strengthened by Tata Steel Ltd.

v) Connectivity (Traffic and Transportation Road/Rail/Metro/Water ways etc.)

The site is well connected by all-weather road.

vi) Drinking Water Management (Source & Supply of Water)

All the quarters have been provided with drinking water supply connection. The water is supplied from Water Treatment Plant situated at Jamadoba. Besides the drinking water, there are community taps for mine water supply in the colonies which is used for the purpose of washing clothes etc.

vii) Sewerage System

The provision of septic tank and soak pit arrangement is made in order to control water pollution from domestic effluents. The financial provisions have been made towards installation of sewage treatment plant and sewage disposal in colonies.

viii) Industrial Waste Management

The industrial wastewater from the central workshop located in Jamadoba and vehicle washing is recycled after treatment in oil and grease trap.

ix) Solid Waste Management

Since it is an underground mine, no solid waste is generated except few scrap material. This material is sold off to scrap dealers. Hence, it can be said that there is no any significant impact on the various environmental attributes due to the mining activities.

x) Power Requirement & Supply/Source

Jamadoba group of mines receive power supply from 132/33 KV Patherdih sub-station of DVC. The substation for Jamadoba Colliery draws its requirement from 2 Pit R/s, Jamadoba. 33 KV Substation which has 1 no. 7.5 MVA & 2 nos. of 10 MVA transformers. For use of power at colliery, it is transformed to 11 KV and 3.3 KV. For the underground portion, power is supplied at 3.3 KV & stepped down to 550 volt at places where a group of machinery are deployed. There is 1 DG set of 6 MVA, installed for operating winders and main mechanical ventilator in case of emergency**.**

7.0 REHABILITATION AND RESETTLEMENT (R & R) PLAN

There are no R&R issues. The mine lease area is already a settled area. Colliery has been running for 9-10 decades and it is an operating underground mine without any expansion in the leasehold area. Therefore, no surface rights are to be possessed for mining. The concerns of the community gets addressed through the C.E.R. undertaken by TSL.

8.0 PROJECT SCHEDULE & COST ESTIMATES

i) Likely date of start of construction and likely date of completion (Time schedule for the project to be given)

It is an already operating mine.

ii) Estimated project cost along with analysis in terms of economic viability of the project:

Estimated project cost is about Rs. 19.42 Crores.

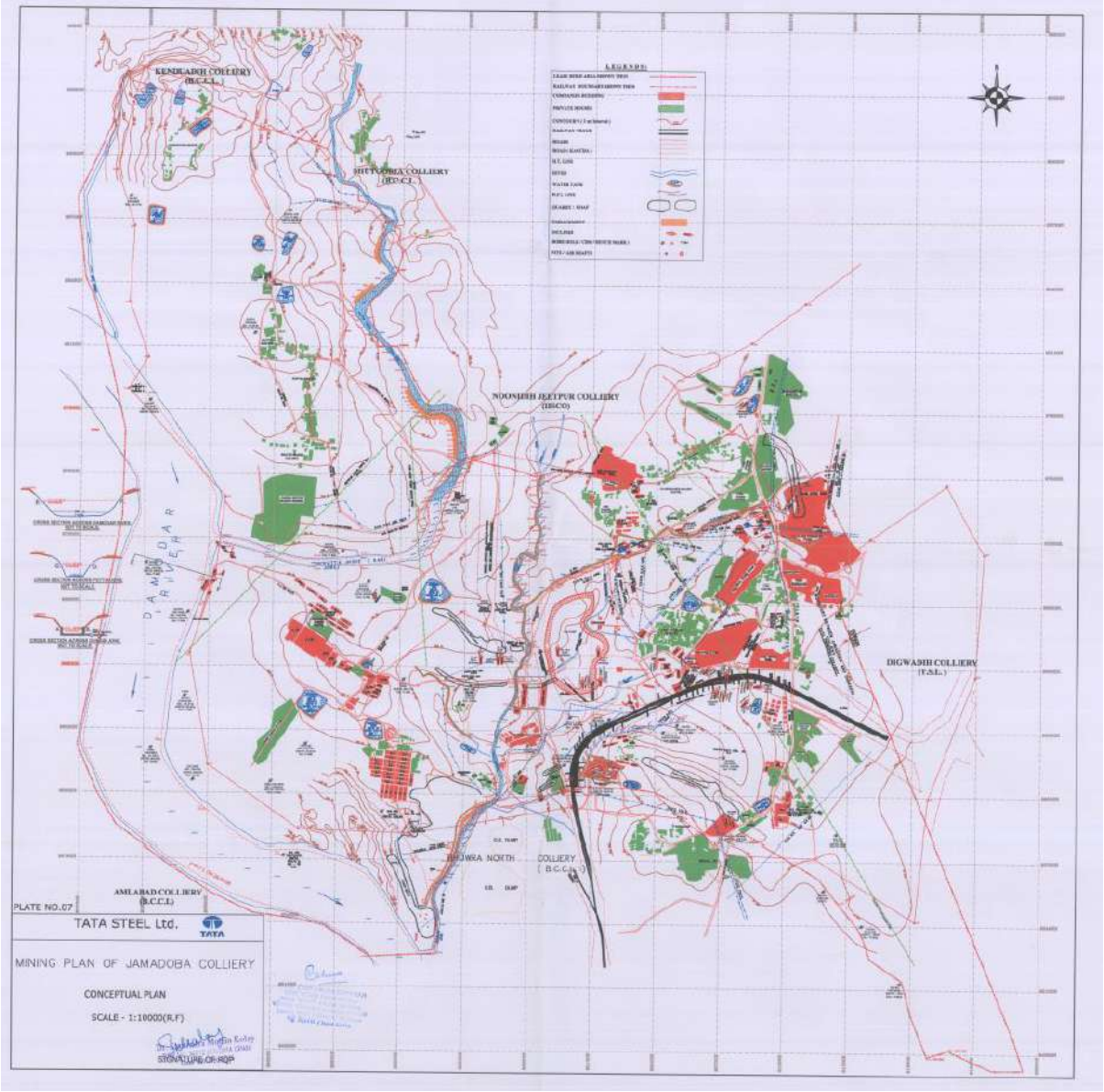
9.0 ANALYSIS OF PROPOSAL (FINAL RECOMMENDATIONS)

The raw coal mined out shall be used for beneficiation at washery and further use into own steel plant. Financial analysis as independent project is not applicable.

i) Financial and social benefits with special emphasis on the benefit to the local people including tribal population, if any, in the area

Large numbers of population of study area are employed in existing operations including tribal people either directly or indirectly earning their livelihood. Upcoming proposed modernization plant shall further add to their social and economic up-liftment in terms of indirect income generation opportunities. CER activities being run by Tata Steel will continue further.

ANNEXURE-I
CONCEPTUAL PLAN OF JAMADOBA COLLIERY



ANNEXURE-II

SURFACE FEATURES WITHIN MINE LEASE OF JAMADOBA COLLIERY