2018

PRE-FEASIBILITY REPORT

JARIBAHAL IRONORE MINE (106.53 HA)
M/S PATNAIK MINERAL PVT LTD
AT: JARIBAHAL, PO: JODA, TAHASIL: BARBIL,
DIST: KEONJHAR, ODISHA

ENVIRONMENT CONSULTANT:
M/S KALYANI LABORATORIES PVT LTD
PLOT NO: 1867, BOMIKHAL
BHUBANESWAR 751010

Document No. : KLPL-EIA/(MM)2018 - 09		**Document Name: Pre Feasibility Report for Enhancement of Production from Jaribahal Iron Ore Mines (106.53 Ha) of M/s Patnaik Minerals Pvt. Ltd.**	
Rev. No.:	**Date:** 31.07.2018	**Copy No.:**	**Signature of EIA Co-ordinator**

1. INTRODUCTION OF THE PROJECT / BACKGROUND INFORMATION

i. Identification of the project and project proponent:

Patnaik Minerals Pvt. Ltd. (PMPL) proposes to enhance the production of iron ore from 0.998 MTPA to 2.05 MTPA and setting up crushing, screening and Jigging plant at the existing mine at Jaribahal village in Keonjhar district, Orissa over an area of 106.53 Ha. The project requires environmental clearance as per the EIA Notification, MoEF, Govt. of India, New Delhi dated 14th September 2006 and subsequent amendments. The project is listed under "Category – A" as per Sl. No 1 (a) in the schedule of MoEF notification 2006.

Project Location

Name of the Project	:	Jaribahal Iron Ore Mines
District & State	:	Keonjhar, Orissa.
Sub Division	:	Champua
Village	:	Jaribahal & Palasha
Lease area	:	106.53 Hectares
Whether the Area is		
Recorded to be in forest	:	3.8938 Ha of village forest category
Ownership / Occupancy	:	State Govt. & Tenanted Land

Land Schedule of the Renewal ML area:

Land schedule of the renewed ML area of Jaribahal Iron ore mines comes under village Palasa (ka), Palasa (Kha) and Jaribahal under Champua sub division of Keonjhar district. The lease area of 106.53 Ha consists of 3.893 Ha of village forest category, 95.206 Ha of broken DLC Forest and 7.434 Ha of Non forest Govt. land. The details of the land schedule are as follows:

Land Schedule of the Area

Class of Land	**Kissam**	**Area**	
		In Acre	**In Ha**
Forest Land			
Govt. Waste Land	A.A.A	235.158	95.206
Tenant Forest Land	Jungle	0.498	0.202
Revenue Forest Land	Jungle	9.118	3.691
Total Forest Land		244.77	99.099
Tenant Non Forest	Taila	10.866	4.399

Land			
Non Forest Govt. Land		7.5	3.035
Total Non-Forest Land		18.361	7.434
Total		263.138	106.533

ii. Identification of the project proponent

M/s Pattanik Minerals Pvt. Ltd (PMPL) has been engaged in the business of mining of Iron and Manganese Ore for more than 50 years in the Joda-Barbil region of the state of Orissa, which is considered as the hub of mining in Orissa. It also calibrates iron ore and meets the raw material requirement of several sponge iron and pig iron plants in the country. The company has also forward integrated its mining activities and setup a Sponge Iron plant (DRI) having capacity of 1 lakh TPA in Keonjhar, Orissa for value addition of its captive raw material.

The Company has also diversified into the following areas:

Renewable Energy

i) **Wind Energy:**

The company has entered into renewable energy sector and has already set up 45 MW capacities of Wind Energy in Maharashtra and Gujarat in association with Suzlon Energy Ltd and Enercon India Ltd respectively and has projected to achieve 100 MW capacity from wind energy by 2012.

ii) **Hydro Power :**

The Company is also in the process of putting Hydro Power Projects in Orissa. The company has already signed MOU with Govt. of Orissa 37 MW and is in the process of preparation of Detailed Project Report (DPR).

Leisure & Entertainment:

The promoter of the company has also ventured into Leisure & Entertainment industry by acquiring controlling stake of an existing company BDA-NICCO Limited in Bhubaneswar. The promoters have also successfully established a commercial complex at Barbil.

Infrastructure:

In order to cater to the increasing demand for calibrated Iron Ore & railway logistics to handle the bulk cargo, PMPL has promoted "BANSPANI IRON LIMITED (BIL) a Joint Venture Company with Rungta Mines Limited, who are also one of the leading mining companies in the area having one of the largest deposits of iron ore. This company has an Iron Ore processing facility with capacity of 1.5 MTPA and a Private Railway Siding with 3 loading lines and presently handles about 4 Million Tonnes per annum of loading by rakes.

Background of promoter directors

Sri. S.K.Patnaik, Director, is a technically qualified Engineer and has about 28 years experience in mining and related industrial activity in the area. He is the Managing Director of Patnaik Minerals (P) Ltd. and Whole Time Director of Banspani Iron Limited and looks after the day to day operations of the company.

Sri. A.N.Patnaik, Director has about 35 years of experience in mining activities and presently he is the Director of the promoters company, looking after the Limestone and Dolomite mining activities of the promoter company.

Shri A. Patnaik, Director, a Graduate Engineer with Post Graduate in Business Administration has over 15 years experience and is associated with the Limestone & Dolomite mining activities of the Company

iii. Brief Description and Nature of the Project:

Jaribahal Iron Mines over 106.533 hects is located in village Jaribahal under Champua Sub division of Keonjhar District of Odisha. Originally the mining lease over 157.625 hectares was granted for Manganese ore in favor of Sri B.D.Patnaik for a period of 20 years w.e.f 20.06.1954 to 19.06.1974 in village Jaribahal & Palasa under Keonjhar dist, Odisha. After commencement of qmining of 6 years iron ore was found over an area of 63.536 hectares and a separate lease was granted / executed for this area for the balance period of 14 years of the original lease from 03.06.1960 to 19.06.1974.

The balance area 94.089 hectares remained valid as per the original lease term expiring on 19.06.1974. Later on in the year 1964 iron ore was found in an area of 42.998 hectares out of the balance area of 94.089 hectares, a separate lease was executed for a period of 10 years from 02.01.1964 to 19.06.1974. The balance area of 51.091 hectares out of the original area of 157.625 hectares remained in the original lease. Out of 51.091 hectares only 14.73 hectares found to be Manganese bearing area and separate lease was formed for Manganese ore keeping

the lease term valid as per original lease i.e. up to 19.06.1974. Balance non mineralized area over 36.352 hectares was relinquished to the Government.

The 1st renewal for the area 63.536 hectares was granted for 14 years w.e.f. 20.06.1974 to 19.06.1988. The 1st renewal for the area 42.998 hectares was granted for 10 years w.e.f. 20.06.1974 to 19.06.1984. The 2nd renewal for the area 42.998 hectares was granted for only 4 years w.e.f. 20.06.1984 to 19.06.1988 to make the lease co-terminus with the area of 63.536 hectares.

The Govt. vide letter no. 11256 dtd. 04.10.1985 directed the company for amalgamation of both the leases i.e. 63.536 hectares and 42.998 hectares for systematic & scientific exploitation of minerals and also to make both the leases co-terminus. The leases were amalgamated on 17.06.1987 & formatted a single lease of 106.534 hectares.

The 2nd renewal of 106.534 hectares was granted for a period of 10 years w.e.f. 20.06.1988 to 19.06.1998. The leases were transferred from Sri B.D. Patnaik to M/s. Patnaik Minerals (Pvt.) Ltd. on 13th Nov 1990. M/s. Patnaik Minerals (Pvt.) Ltd were carrying out business for mining & minerals. In terms of amendment of Section-8 of MMDR Act, 1957 w.e.f 20.01.1994 Patnaik Minerals (Pvt.) Ltd. requested to Govt. to revise the tenure of lease of 2nd renewals from 10 to 20 years. Considering the request, the state Govt. extended the lease period for further period of 10 years from 20.06.1998 to 19.06.2008. This extended period was treated as 3rd renewal by the Govt. and the lease executed.

Brief review of status of Mining Lease at present

The lessee applied for Renewal of Mining lease for a period of 20 years i.e. w.e.f 20.06.2008 to 19.06.2028. However, MMDR (Amendment) Act 2015 came into force by which the Govt. of Odisha, Department of Steel & Mines, pleased to decide for extending the validity period of above mining lease area under Section 8(A) (6) of the M&M (D&R) Act, 1957 as amended by the MMDR Amendment Act, 2015 from the date of expiry of the last valid period of lease i.e. 19.06.2008 to 31.03.2020 in favor of M/s Patnaik Minerals pvt Ltd.. Consequently after execution of the lease deed the lessee has resumed the mining operation on 20.04.2018.

iv. Need of the Project and Importance to Country & Region:

- Iron ore is the basic mineral and backbone of industrial development. Iron ore produced in orissa being utilized for production of iron (including sponge or direct reduced iron) and steel in the integrated steel plants. Steel is a basic commodity for all industrial activities; its quantitative consumption is considered as an index of industrial property.
- The proposed project with judicious and satisfactory mining methodologies will bring in a better standard of living by improving the existing infrastructural facilities, job opportunities and also the health status of the surrounding areas.
- In a larger perspective, it will improve our country's growth in production of Iron ore.
- Production of 2.05 MTPA of iron ore serves as raw materials to different steel industries of the state.
- The beneficiation plant including crushing, screening and zigging process helps in recovery of Iron ore from the waste material and enhances the production.

v. Domestic/ Export markets:

The iron ore produced from the lease area will be utilized by the steel industries.

vi. Employment Generation (Direct/ Indirect) due to project:

The detail man power requirement for existing and proposed enhancement project is as below:

Existing Manpower

Management & supervisory personnel

Sl No.	Post	Qualification	Nos.
1	General Manager(mines)	First Class Mines Manager's Certificate of Competency	01
2	Mining Engineer	Degree in Mining Engineering	01
3	Manager (Geology)	MSc in Geology having 10 years of experience	01
4	Surveyor	Surveyor's Certificate of Competency	01
5	Mechanical Engineer	Degree in Mechanical Engineering	01
6	Foreman (Crusher)	Diploma in Mechanical Engineering	02
7	Foreman (Mines)	Foreman's Certificate of Competency	03
8	Mining Mate	Mate cum-blaster's Certificate of Competency	03
9	Blaster	Blasters certificate of competency	02

10	Office Assistant	--	02
11	VT officer	1st class/2nd class	01
12	V.T instructor	Diploma in mining	01
Total	**---**	**---**	**19**

Total numbers of existing manpower in the project are 256. The existing manpower are quite sufficient to handle the targeted production smoothly.

Proposed Manpower

Management & supervisory personnel's

Sl No.	Post	Qualification	Nos.
1	General Manager(mines)	First Class Mines Manager's Certificate of Competency	01
2	Mining Engineer	Degree in Mining Engineering	01
3	Manager (Geology)	MSc in Geology having 10 years of experience	01
4	Surveyor	Surveyor's Certificate of Competency	01
5	Mechanical Engineer	Degree in Mechanical Engineering	01
6	Foreman (Crusher)	Diploma in Mechanical Engineering	02
7	Foreman (Mines)	Foreman's Certificate of Competency	04
8	Mining Mate	Mate cum-blaster's Certificate of Competency	03
9	Blaster	Blasters certificate of competency	02
10	Office Assistant	--	04
11	VT officer	1st class/2nd class	01
12	V.T instructor	Diploma in mining	01
Total	**---**	**---**	**22**

Laborer (Skilled / Semi Skilled / Un-Skilled)

Type	Percentage	Numbers
Highly skilled	5%	13
Skilled	40%	102
Semi-Skilled	25%	64
Un-skilled	30%	77
Total	**100%**	**256**

2. PROJECT DESCRIPTION

i. Project Location:

The project is located in Palasa (Ka), Palasa (Kha) and Jaribahal village in Champua sub division of Keonjhar district, Orissa. It is located at a distance of 17 Km from Joda and 80 Km from district head quarter Keonjhar. The lease area is approachable from Joda by a stretch of 17 Km of road. The nearest railway siding is at Jurudihi which is at a distance of 8 Km from the ML area. The location of the project area has been enumerated below. The location map is attached as **Annexure 1**.

Location Details of the Project Site

District & State	:	Keonjhar, Orissa
Taluka/ Subdivision	:	Champua
Village	:	Jaribahahal & Palasa
Lease Area (Hectare)	:	106.53 Ha
Toposheet No. with latitude and longitude	:	Toposheet no. 73G/5
Latitude	:	21°55'21" to 21°55'40" N
Longitude	:	85°24'18" to 85°24'39" E
Nearest Road	:	A stretch of road from Joda (17 Km)
Nearest Railway station	:	Jurudihi (8 Km)
Nearest City	:	Joda (17 Km)
District Head quarter	:	Keonjhar (80 Km)

The details of the lease area has been given as below:

Lease Details	
Date of Grant of Lease	Originally the mining lease over 157.625 hectares was granted for Manganese ore in favor of Sri B.D.Patnaik for a period of 20 years w.e.f 20.06.1954 to 19.06.1974
Date of execution of Lease	Mining lease area is 106.53 hectares and the lease was executed on 29.05.1989 for Iron ore for a period of 10 years and the renewal of mining lease under section 8(3) of the MM (D&R) Act, 1957 for a period of 20 years with effect from 20.06.88. Before expire of the lease period of one year on dt. 18.06.2007, lessee has filed the

	renewal application for the period of 20 years w.e.f 20.06.2008. However, as per the new MMDR (Amendment) Act 2015, the Mining Supplementary Lease Deed has been executed and extended up to 31.03.2020.
Period/Expiry date	31.03.2020
Details of Applied Lease area with location map(fresh area/ mine)	The M.L area over 106.533 hectares falls in Jaribahl and Palsa villages Tehsil- Barbil, Sub-division- Champua, District Keonjhar, Odisha. Out of the total lease area 99.099ha is forest land and remaining 7.434ha is non-forest land.
Existence of public road/railway line, if any nearby and approximate distance	The mine can be approached from Joda due south by a stretch of 10 Kms through Joda - Palaspanga Express Highway which passes from eastern side of the lease area. The nearest railway siding is Jurudihi which is at a distance of 8 Km from the mine. The area is bounded by the mining lease of M/s. OMC.

ii. Magnitude of Operation:

The mine will be operated by Fully Mechanized Method. The quarry bench height & width will be maintained 6m & 9m respectively for the production of iron ore. But at the ultimate stage the bench height and width will be kept at 10m each. Mining equipments like DTH drill of 100mm dia, compressor of 450cfm, tipper/dumper (10-35t), hydraulic excavators of 1.8 to 3.2 cum capacity etc will be used during ensuing scheme period to achieve the targeted production. Processes of excavation and loading of overburden/waste will be done by deploying hydraulic excavators and dumpers.

Geo-mining Character/Recovery factor/ Tonnage Factor :

Geo-Mining Parameters	Quantitative Description
Total Recovery %	75% out of the total excavation
Waste generation	25% out of the total excavation
Saleable ore incidence	90% (out of recovered volume of 75%) (+55% Fe)
Mineral Reject ore generation	10% (out of recovered volume of 75%) (45-55% Fe)
Bulk density	3.5 t/m3 for Saleable ore, 3.0t/m3 sub grade

Bench height	6m
Bench width	9m
Cut-off Grade	55% Fe
Threshold Value	45% Fe
Mineral Reject ore	+45% Fe-55% Fe

Existing method of mining:

The mine under reference belongs to category - A (Fully Mechanized) mine. The mining operation closed since 2011 after the expiry of the lease period for want of Forest Clearance. After obtaining all the statutory clearances with the payment of compensation the supplementary lease deed executed on 16.04.2018. Subsequently, the mining operation has been re-started on 20.04.2018. Surface plan showing the existing feature of the mine has been attached as **Annexure 3.** Based on the earlier operation the salient features are furnished below:

Salient description of Present Mining Methods: (As per Approved Scheme of Mining)

Sl no	**Salient features**	**Description**
1)	Method of Mining	Fully Mechanized (FM)
2)	Existing production	0.998 million tons per annum
3)	Type of ore	Lateritic iron ore, HLIO, SLIO, Blue Dust
4)	Means of raising	Wagon drills, compressors, Volvo, Tipper
5)	Bench height and width	6m / 9m
6)	Stripping ratio (t/m3) (Ore: OB)	1: 0.19
7)	Over all slope	37.5^0
8)	Transportation ore to the stacking yard	Through dumper & tippers
9)	Nature of overburden	Generally soft and consists of BHJ, shales, and Laterites
10)	Blasting proposal	Deep hole blasting is carried on to dislodge the boulders.
11)	Mineral beneficiation	Through 300TPH Screen and crushing unit.
12)	Output per man shift	10t to 35t

Details of the Existing Quarry

As a result of earlier mining activity a total of 9 nos of quarries, 3 nos of dump, 14 nos of ore and Mineral Reject stack have been formed within the ML area. The details of existing features and their dimensions are as follows:

Details of the Existing Quarry.

Sl N	Name of the quarry	Grid Location	Dimension (L x W) In mtr.	Number of Benches	Top R.L (m)	Bottom RL(m)	Area covered (Ha)
1	Quarry no. – 1	580N/900E to 250N/950E & 500N/805E to 350N/1060E	255 x 245	5	560	525	6.25
2	Quarry no. – 2	300N/800E to 120N/920E & 240N/780E to 250N/950E	180 x 178	5	590	560	3.20
3	Quarry no. – 3	130N/850E to 120S/930E & 40S/790E to to 50S/1110E	250 x 206	8	595	550	5.15
4	Quarry no. – 4	710N/650E to 290N/810E & 650N/550E to 330N/890E	320 x 162.5	5	590	562	5.20
5	Quarry no. – 5	650N/540E -200N/510E & 310N/410E-490N/720E	450 x 207	6	615	580	9.30
6	Quarry no. – 6	220N/510E to 290S/620E & 90S/190E to 290S/625E	510 x 205	6	650	615	10.45
7	Quarry no. – 7	120N/500E to 310S/800E & 115N/495E to 250S/905E	430 x 248	6	625	590	10.66
8	Quarry no. – 8	250N/700E to 220S/910E & 120N/505E to 180S/910E	468 x 218	6	615	580	10.20
9	Quarry no. – 9	10S/190E to 340S/200E & 260S/20W to 325S/300E	318 x 182	8	630	580	5.80

Details of the Existing Dump

Sl No	Name of the Dump	Grid Location	Length (m)	Width(m	Height(n	Volume in cur
1	Dump no. – 4	110S/980E to to 110S/1300E & 150N/ 950E to 300N/ 1100E	400	204	40	3264000
2	Dump no. – 2	300S/920E to 300S/1100E & 110S/980E to to 110S/1100E	150	85	20	255000
3	Sub grade Dump no. – 5	200N/500E to 380N/400E & 300N/250E to 380N500E	220	122	25	671000
4	Sub grade Dump no. – 9	10N/00 to 170S/00 & 10N/160E to 170S/100E	160	126	40	806400

Details of the Existing Stack Yard

EXISTING STACK POSITION AT MINES HEAD				
SL. NO	**SIZE OF ORE**	**QUARY NO.**	**GRADE**	**QUANTITY**
1)	ROM	38x16.71x2.5x3= 4762.350 Labour Plot Q-9 27x12.x1.8x3= 1822.500 Q-5 60x30x6.9985x3 = 7792.150 Q-9 **Total = 44377.000**		44377.000 MT
2)	MANNU AL LUMP	20x12x2.361x3 = 1699.920 Q-5 30506x20x2.281x3 = 4175.130 Labour Plot Q-9 32x20x6.719x3 = 12900.800 .M.L Q-5 **Total = 18775.850**	+65% Fe -65% Fe	5875.050 MT 12900.800 MT
3)	LOW	12x3.5x1.411x3 =177.770 Q-5	-60% Fe	177.770 MT

	GREADE LUMP (BHQ/BHJ)			
4)	SCREEN LUMP	28x12.5x2.933x3= 3079.650DKK Q-3 45x30x4.635x3 =19771.750 Q-9 8x4x1.052x3 = 100.992 Q-1 1.2x1x0.527x3 = 1.897 Q-2 **Total = 21954.289**	-65% Fe -62% Fe -60% Fe	3080.050 MT 18773.240 MT 101.000 MT
5)	SCREEN 10-40MM	25X15X3.071X3=3454.875 DKK Q-7 28x9x2x3 = 1512.000 DKK Q-6 15x12x1.8x3 = 972.000 Q-1 44x18x6.903x3 = 16401.528 Q-9 10x6x1.647x3= 296.460 Q-2 1.5x0.75x0.322x3=1.086 Q-5 **Total = 22637.949**	-65% Fe -62% Fe -60% Fe	3455.400 MT 18886.050 MT 296.500 MT
6)	SCREEN (3-18) MM	35.5x12.5x3.873x3=**5155.931** Q-9	-62% Fe	5156.700 MT
7)	SCREEN (FINES)	62x45.2x8.24x2.5 = 57729.440 Q-1 45x32x4.25x2.5 = 15300.000 **Total = 73029.440** 44x15.5x14.409x2.5 = 24567.345 Q-9 32x29x13.870x2.5 = 32178.400 Q-2 **Total = 56745.745**	-65% Fe -62% Fe -60% Fe	73029.410 MT 24567.610 MT 32180.000 MT
CRUSHER HEAD				
1)	5-18 MM	15x12x1.058x3=**571.430** Q-5	-65% Fe	571.430 MT
2)	10-40 MM	7x4x1.866x3 =**156.750** Q-5	-65% Fe	156.750 MT
3)	FINES	60x30x10.814x2.5=**48665.390** Q-2	-65% Fe	48665.390 MT
4)	MINERAL REJECT	55x36.86x8.223x3=**47488.240** Q-5		47488.240 MT

FROM MINERAL REJECT STOCK				
1)	5-18 MM	7x3x0.942x3=**59.350** Q-5	-65% Fe	59.350 MT
2)	10-40 MM	2x1x0.7x3 = **4.200** Q-5	-65% Fe	4.200 MT
3)	FINES	55x50x12.739x2.5=**87581.000** Q-5	-65% Fe	87581.000 MT

Status of Reclamation or Rehabilitation

None of the mining area has been exhausted till date. Therefore, reclamation of mined out land has not been carried out till date. Planning has been made to continue the production in active quarry till the exhaust of quarry. There is no possibility of reclamation / rehabilitation by back-filling of mined out area during the scheme period.

Proposed Method of Mining:

Fully mechanized method will be adopted to get the production of iron ore from each quarry. However, the existing laborers will be utilized in the manual sorting sizing of ore during the operation. The existing benches will be developed systematically by keeping and maintaining the bench height at 6m and width at 9m each. As a result of which the overall quarry slope will be maintained at an angle of 40^0. The open pit area is proposed to be developed with 10 – 12m wide haul roads at a gradient of 1:16. During the ensuing scheme period, no over burden and side burden have been produced. So, total excavated materials are considered for total RoM. It has been envisaged to make the development of quarries by adopting following methods:

Strategy for Development:

During ensuing scheme period, three quarries e.g. quarry - 1 & 9 have been selected for development. It has been planned to make ROM production of 291460MT iron ore from quarry-1 and 706420MT from quarry-9. Four nos of benches in quarry-1 and eight no of benches in quarry-9 will be developed during plan period. All benches are ore benches as for proposed production are envisaged within the existing broken up quarry.

Name of the quarry	**Area in Sqm to be developed.**	**Top RL**	**Bottom RL**	**Nos of bench to be developed.**	
				ORE	**OB**
Quarry-1	20000	544	520	4	Nil
Quarry-9	35000	628	580	8	Nil

Haul Road:

To obtain required production, the benches will be developed in a systematic manner i.e. the height and width of the benches will be kept at 6m and 9m respectively. The layout of roads for

haulage of ore/ waste and access to different installation in the mine will be developed complying with the statutory regulations stipulated in the Metalliferrous Mines Regulations, 1961. Overburden and Mineral Reject ore will be dispatched to the dumping and stacking. Sites located in the lease area. Fifteen meter wide haul road will be developed in the lease area as per need at a gradient up to 1:16. Regular maintenance will be done throughout the mine life to protect the road from damage and vehicles from wear & tear.

Site Services:

As far as day to day mine operation is concerned, the infrastructure such as site office, weigh bridge, rest shed, First-aid centre, blasting shed security house, magazine, guard house etc are already made available in the lease area.

Machineries to be deployed.

The mine will be operated in a three shift basis. Process of excavation and loading of overburden/waste will be done by deploying hydraulic excavators and dumpers. Excavators of 1.8m^3 to 3.2m^3 capacities will be deployed for excavation & loading of ROM ore and dumpers of 10t to 35t capacity shall be deployed for transportation of ore and OB. Hard iron ore will be loosened through drilling & blasting. For the purpose, DTH drill with 100mm dia, compressor of 450cfm, etc will be used during ensuing scheme period to achieve the targeted production. For maintenance of OB dumps dozers will be deployed. Loading & un-loading of sorted & sized ore is loaded by mechanized method.

Transportation.

Ore will be transported from quarry site to screen and crushing site for processing by use of 10/35 ton dumpers whereas waste materials will be dispatched from quarry to dumping site by using same capacity dumpers.

Indicate year-wise tentative Excavation in Cubic Meters indicating development, ROM, pit wise as in table below.

I. In situ Tentative Excavation (cum)

Year	Pit no.	Total tentative Excavation (cum)	Top Soil (cum)	OB/SB/IB (cum) (SB+IW)	ROM		Mineral reject (waste)	ROM Waste / Ratio
					Ore * (cum)	Mineral reject (cum)		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
2018-19	Quarry - 1	160200	--	40050	108135	12015	--	1 : 0.33

	Quarry-9	225500	--	56375	152212.5	16912.5	--	1 : 0.33
	Total	**385700**	--	**96425**	**260348**	**28928**	--	1 : 0.33
2019-20	Quarry - 1	120100	--	30025	81067.5	9007.5	--	1 : 0.33
	Quarry-9	265600	--	66400	179280	19920	--	1 : 0.33
Total		**385700**		**96425**	**260348**	**28928**	--	1 : 0.33

At present in this document, the tonnage factor and recovery factor has been considered as per exploration input from the drilled bore-hole data and time series data as below:

Tentative Ore Recovery Factor :

Geo-Mining Parameters	**Quantitative Description**
Total Recovery %	75% out of the total excavation
Waste generation	25% out of the total excavation
Saleable ore incidence	90% (out of recovered volume of 75%) (+55% Fe)
Mineral Reject ore generation	10% (out of recovered volume of 75%) (45-55% Fe)

Tentative Tonnage Factor : Saleable ore = 3.5t/ cum

Mineral Reject ore = 3.0t/ cum

Waste = 2.0t/cum

Thus, tentative tonnage proposed to be produced per year is arrived as below:

In situ Tentative Excavation (MT)

Year	**Pit no.**	**Total tentative RoM ore Excavation (MT)**	**Top Soil (MT)**	**OB/SB/IB (MT) (SB+IW)**	**ROM (MT)**		**Mineral reject (waste)**	**ROM Waste / Ratio**
					Ore * (MT)	**Mineral reject (MT)**		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
2018-19	Quarry - 1	414518	--	80100	378472	36045	--	1 : 0.19
	Quarry-9	583481	--	112750	532744	50738	--	1 : 0.19
	Total	**997999**	--	**192850**	**911216**	**86783**	--	1 : 0.19
2019-20	Quarry - 1	310759	--	60050	283736	27023	--	1 : 0.19
	Quarry-9	687240	--	132800	627480	59760	--	1 : 0.19
	Total	**997999**	--	**192850**	**911216**	**86783**	--	1 : 0.19

Dump Re-Handling (For The Purpose Of Recovery Of Mineral)

It has been planned to re-handle the existing dump-5 and 9 to recover iron ore during plan period. The details of re-handling will be as follows:

Year	Dump No./ Dump Identification No.	Re-handling of Mineral Reject with 30%recovery in cum	Estimated recovery of saleable ROM		Mineral Rejects	
			(in m3)	(in Tons)	(in m3)	(in Tons)
2018-19	Dump No.- 9	7560	6804	23814	756	2268
Sub-total		**7560**	**6804**	**23814**	**756**	**2268**
2019-20	Dump No.- 9	211680	190512	666792	21168	63504
	Dump No.- 5	95700	86130	301455	9570	28710
	Sub-total	307380	276642	968247	30738	92214
	Total	314940	283446	992061	31494	94482

The average grade of saleable ore within dump No-9 is 57.43%Fe and dump-5 is 58.21%Fe.

iii. Project description with process details (a schematic diagram / flow chart showing the project layout, components of the project etc, should be given)

The mine will be operated by Fully Mechanized Method. The quarry bench height & width will be maintained 6m & 9m respectively for the production of iron ore. But at the ultimate stage the bench height and width will be kept at 10m each. Mining equipments like DTH drill of 100mm dia, compressor of 450cfm, tipper/dumper (10-35t), hydraulic excavators of 1.8 to 3.2 cum capacity etc will be used during ensuing scheme period to achieve the targeted production. Processes of excavation and loading of overburden/waste will be done by deploying hydraulic excavators and dumpers.

On account of exposures of iron ore and its limited depth of occurrence, opencast method of mining will be continued on three shift basis with the deployment of DTH drills, associated compressors, dumpers, excavators and other auxiliary equipments for development, production, processing, protection of environment and safety.

Development during 2018-19

During this year Quarry no. 1& 9 have been proposed to be developed. The direction of advancement of benches will be west to east direction in quarry nos-1 &. 10% i.e. 19285MT of the total waste generated from the mines will be utilized for road construction and maintenance and balance 173565MT will be F at the proposed site.

The haul road has been proposed to be developed and maintained for transportation of ore & waste. The gradient of haul road will be maintained at 1:16. As working is confined within the existing quarries generation of top soil and overburden is observed to be nil.

Summarized statement for production of ore, waste and Mineral Reject

Particulars	**Quantity (MT)**
Production of ROM	997999
Production of saleable ore	911216
Generation of Sub Grade Ore	86783
Generation of Waste	192850
Stripping Ratio(Ore : waste) (MT/MT)	1:0.19

Summary Of Year Wise Production.

Salable ore (MT) 62 % Fe (Average)	**Sub grade ore 45-55 % Fe**	**ROM ore (MT) 54 % Fe (Average)**	**Intercalated Waste -45% Fe**
A	**B**	C=(A+B)	**D**
911216	86783	997999	161600

Summarised statement of production from qyarry and dump

	Saleable ore	**Mineral rejects/SG ore**	**Total ROM**
from Quarry	911216	86783	997999
from dump	23814	2268	26082
Total	935030	89051	1024081

Production due to dump re-handling

Year	**Dump No.**	**Surface area in sqm.(A)**	**Height in mtr. (B)**	**Volume in cum. (C)**	**Volume of ore in cum D= (CX30 %)**	**PRODUCTION in MT**	**High Grade E=(DX90 %x3.5)**	**Low Grade F=(DX10 %x 3.0)**
2018-19	Dump No.- 9	2520	10	25200	7560	**26,082**	23814	2268

Development during 2019-20

During this year Quarry no. 1 & 9 have been proposed to be developed. The direction of advancement of benches will be west to east direction in quarry nos-1 &. 10% i.e. 19285MT of the total waste generated from the mines will be utilized for road construction and maintenance and balance 173565MT will be dumped at the proposed site.

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Summarized statement for production of ore, waste and Mineral Reject

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Generation of Waste	192850
Stripping Ratio(Ore : waste) (MT/MT)	1:0.19

Summary Of Production. From Quarry

Salable ore (MT)	**Sub grade ore (MT)**	**ROM ore (MT)**	**Intercalated Waste**
62 % Fe (Average)	**45-55 % Fe**	**54 % Fe (Average)**	**-45% Fe**
A	**B**	C=(A+B)	**D**
911216	86783	997999	192850

Summarised Statement Of Production From Qyarry And Dump

	Saleable ore	**Mineral rejects/SG ore**	**Total ROM**
from Quarry	911216	86783	997999
from dump	968247	92214	1060461
Total	**1879463**	**178997**	**2058460**

Production due to dump re-handling

Year	Dump No.	Surface area in sqm.(A)	Height in mtr. (B)	Volume in cum. (C)	Volume of ore in cum D= (CX30 %)	production in MT	High Grade E=(DX90 %x3.5)	Low Grade F=(DX10 %x 3.0)
2019-20	Dump No.- 9	17640	40	705600	211680	730296	666792	63504
	Dump No.- 5	15950	20	319000	95700	330165	301455	28710
	Total				307380	1060461	968247	92214

Cumulative RoM production year wise from in situ and dump re-handling

Year	ROM from Quarry (MT)	ROM from dump re handling	Total ROM
2018-19	997999	26082	1024081
2019-20	997999	**1060461**	2058460
Total	**1995998**	**1086543**	**3082541**

Extent of Mechanization.

Proposed Machines for deployment:

Drilling and blasting will be adopted for loosening of hard rock mass which is about 70% of the total excavation. Loosening of rock mass will be done by drilling & blasting. For this purpose hydraulic/crawler mounted drill with, compressor will be deployed. Whenever secondary breaking is involved rock breaker will be used. Loading & transportation will be carried with the help of excavator in combination with 35 T dumpers.

Bull dozer will be utilized for dozing of loose materials. In addition, dozer will be utilized for leveling and compaction of haulage road and waste dump.

1. Drilling.

The proposed mining will have 6m height benches and will be drilled for blast holes by 100 mm dia crawler mounted pneumatic drills fed by compressed air and Sandvik DP 1100 hydraulic drills will be used.

Drill Machine Details

Type	**Make**	**Nos**	**Dia of the hole**	**Size/Capacity**
Crawler mounted drill	LM-100 Hydraulic drill	2	102 mm	30 m/hr

2. Excavation and loading

During the plan period, it is proposed to use the excavator of capacity of 3.2 Cu.m for mining operation in pits. Dumpers of capacity of 35MT/15 Cu.m will work in combination with those excavators for RoM removal.

Excavation Machine details

Type	Nos	Size/Capacity	Make
Excavator	3	3.2 Cu.m bucket	Komatsu, Hitachi, Volvo

3. Hauling

The dumping area is located on the barren area/ non mineralized zone. However, for calculation of number of dumpers requirement, 2.0 kms have been taken into consideration as lead on an average. The same distance is assumed for transportation of all materials including R.O.M ore, Mineral Reject ore etc. Run of mine ore and overburden will be transporting in the 35t dumpers.

Hauling Equipment details

* One number of 35T dumpers will be kept as a standby for breakdown purpose.

Type	Nos	**Size/Capacity**	**Make**
Dumpers	4(max)	35 Tons	BEML/VOLVO

4. Requirement of loader

Loading will be done by mechanized method. The dispatchable ore, sub grade and waste material will be loaded by the loader to the dumper. The bucket capacity of the loader will be 2.5Cu.m.

Loading Machine Details

Type	Nos	**Size/Capacity**	**Make**
Loader (WA – 300)	2	2.5 Cu.m bucket	Komatsu

Estimated of Excavator requirement for Screening and crushing plant.

It is proposed to use 0.9 cum capacity of excavator for feeding of screening/crushing plant. Total 11 nos of excavator with bucket capacity of 0.9 cum shall be required for each screening and crushing unit for feeding the materials to bumper of plant.

List of machineries.

1. Existing Machineries

Type of Machinery	**capacity of each unit**	**No of unit**	**H.P of each unit**	**Electrical/ Non electrical**	**Used in open cast/underground**
Excavator	0.9	16	198	Non-Electrical	Open cast
Wagon drill	12kgf	22	158	Non-Electrical	Open cast
Tipper	4.5Cu.m	35	180	Non-Electrical	Open cast
Water Sprinkler	10000Litre	4	174	Non-Electrical	Open cast
Stationary screen plant	100TPH	1	100	Non-Electrical	Open cast
Mobile screen plant	150TPH	5	210	Non-Electrical	Open cast
crusher plant	150TPH	1	350	Non-Electrical	Open cast

2. Proposed Machineries

TYPE	**MODEL**	**CAPACITY**	**NOS.**
Excavator for RoM removal	Komatsu/Tata Hitachi / Volvo	3.2/2.5 cum	5
Excavator for feeding to plant	Komatsu/Tata Hitachi / Volvo	0.9 cum	11
Loader	Komatsu 300	2.5 cum	3
Pneumatic Drill	LM-100 Hydraulic drill	30m/Hr	3
Tipper/Dumper	Tata	35T/15Cu.m	15
Water Sprinkler	Tata	8000ltr	2
Rock Breaker	Volvo	---	3
Ambulance	Van	---	1

Weigh Bridge	---	---	2
Screen Plant	Terex, BHP, Taurian & Static	1X200TPH, 3X150TPH, 4X250TPH & 1 X 300TPH	7
Crusher Plant	SR 1000	1X250TPH, 1X 150 & 2X75TPH	4
Jigging Plant	Batac Jig	0.5million tone per annum	1

BLASTING:

As the nature of the ore is hard, about 70% of the total production will be obtained through blasting. The proposed mining will have 6.0m height benches and will be drilled for blast holes by 100 mm diameter crawler mounted pneumatic drills fed by compressed air and Sandvik DP 1100 hydraulic drills will be used. These holes will be drilled in staggered pattern with burden and spacing of 2.5m and 3.0m respectively. No secondary blasting will be done. Rock breaker will be utilized for the purpose.

TYPE OF EXPLOSIVE TO BE USED:

A powder factor of 7 tonne of saleable ore per Kg explosive is considered for estimating explosive requirement. However, this may suitably be changed depending upon the type of ore and other site conditions.

Charging by Explosive and Use

Generally slurry explosives like Aqua dyne, Nova prime, Energel Nova Column are used for charging up to 2/3rd hole length and remaining 1/3rd will be stemmed for a hole. Stemming material as Clay or clay mixed with sand or lateritic soil are stemmed 1/3rd of the hole. Class- 6 explosives like detonating fuse, Raydet and Nonels are used for firing with safety fuse and ordinary detonators for initiation. 10- 15 % of total charge is used as booster. Controlled blasting technique is adopted to minimize the ground vibration and flying fragments using non electric delay initiating device as shock tube like Raydet, Nonel in-line initiation is practiced for sequential firing.

Storage and Transportation of Explosives

An explosive magazine has been proposed at eastern side of the mining lease area. The capacity of the magazine will be as follows:-

Sl. No.	Explosives	Class / Division	Quantity
1.	Nitrate mixture	Class –III	10,000Kg
2.	Safety fuse	Class-VI/Div – 1	30,000m
3.	Detonating Fuse	Class – VI/Div –2	50,000m
4.	Electric & Ordinary Detonators	Class –VI/Div-3	50,000 nos

During ensuing scheme period, the existing pits have been selected for development. The lessee has obtained Environment Clearance for the production of 0.998million tone of ROM per annum. Based on that, it has been planned for the production of ROM of same quantity during next Scheme period.

During the scheme period, iron ore will be produced from quarry-1, and quarry-5. The benches will be developed in a systematic manner with 6m height and 9m width. The layout of roads for haulage of ore/ waste and access to different installation in the mine will be developed complying with the statutory regulations stipulated in the Metalliferrous Mines Regulations, 1961. Overburden and mineral reject ore will be dispatched to the dumping and stacking. Sites located in the lease area. Eight meter wide haul road will be developed in the lease area as per need at a gradient up to 1:16. The mine will be operated in a three shift basis. Process of excavation and loading of overburden/waste will be done by deploying hydraulic excavators and dumpers. Excavators of 1.8m^3 to 3.2m^3 capacities will be deployed for excavation & loading of ROM ore and dumpers of 10t to 35t capacity shall be deployed for transportation of ore and OB. Hard iron ore will be loosened through drilling & blasting. For the purpose, DTH drill with 102mm dia, compressor of 450cfm, etc will be used during ensuing scheme period to achieve the targeted production. For maintenance of OB dumps dozers will be deployed. Loading & un-loading of sorted & sized ore is loaded by mechanized method.

Development of Quarry-1 will be done by moving the existing benches laterally in the North eastern and eastern direction whereas in Quarry-2 pit the working will be done from top down ward in the North West direction. As a result of which there will be two proposed quarries. At the end of scheme period the dimension of the proposed quarries will be as follows

Name of the quarry	Area in Sqm	**Top RL**	**Bottom RL**
QUARRY-1	20000	544	520
QUARRY-5	16000	610	586

PIT ROAD LAYOUT

The existing benches of the proposed quarry will be utilized for haul road. The bench width has been kept at 9m. However, the after putting the berms of 1.0m width and 1.5m height of the haul road will be kept at 7m with gradient of 1:16. In case of ramp the gradient will be maintained at 1:12.

Site for disposal of waste along with ground preparation

It has been planned to dispose of the waste over the existing dump. The dump No-3 has been chosen for the disposal of waste. A retaining wall already exists all along the dump. However, the length will be increased and existing retaining wall will be maintained every year. The dumping will be carried out in a re-treating fashion.

Site for disposal of mineral rejects along with ground preparation

The proposed mineral rejects will be stored temporarily at the earmarked site. The Mineral Reject generated during each year will be stacked temporarily over 15000m2 eastern side of the existing sub grade stack area. However, this sub grade will be blended with the high grade iron ore found within the ML area and sold as per specification of consumers. Before stacking the Mineral Reject iron ore, all the preparatory work like retaining wall, garland drain will be constructed to prevent the wash offs outside the lease area.

iii. Raw material required along with estimated quantity, likely source, marketing area of final products, Mode of transport of raw Material and Finished product.

As this is a mining project there is no requirement of raw material

iv. Availability of water its source, Energy / power requirement and source should be given.

About 900cum of water will be utilized for processing plant, drinking, dust suppression and afforestation purposes.

Power Requirement

Period	**Power Requirement**	**Source**
30 minute maximum demand	350 kVA	NESCO from their present 750 KVA transformer installed at mines over a 11 kV overhead feeder.
Annual Energy consumption at 60%	1 million kwh	

load factor		

Apart from the power supply from NESCO the jigging plant will be equipped with a standby DG of 750 KVA for uninterrupted working.

v. Quantity of wastes to be generated (liquid and solid) and scheme for their Management / disposal.

The material generated during mining which has no iron content is regarded as waste, it is present within the ore bearing zone. From the borehole data it is found that the intercalated waste comprises mainly of hard ferruginous shale etc.

While considering the nature of the waste two types of rejects are considered

1. Overburden containing mainly soil alluvium, laterite, moroum , BHJ, BHQ etc
2. Off material ore below the 45% Fe content this is without market at present.

It is discussed in the previous chapter that 25% as waste in iron ore shall be generated from the total volume.

Dumping during plan period:

During mining operation, the intercalations like shale limonite brecciated hematite jasper will be excavated. These materials will be analyzed properly before disposed off as waste. As calculated a total of 161600MT of waste material will be generated during ensuing scheme period. This will be disposed off over the old existing dump-4.

Selection of dumping Site:

Selection of dumping site mostly depends upon the factors like topography, drainage, land use, mineral inventory, Pit configuration; mine waste characteristics, its volume of generation and economy in transportation. Keeping in view the above physical as well as techno-economic factors, the dumping will be carried out over the existing dump which is non- mineralized in nature.

Maximum Height and Spread of Dumps:

Total tentative waste materials likely to be generated during conceptual period will be 9149810 Cu.m. During plan period, 192850cum of waste will be generated. Cumulatively 9342660cum of waste will be generated during plan and beyond plan period. For road maintenance 10% i.e 934266 cum has proposed to be utilized and 7609959 cum will be utilized for back filling purpose and balance 8408394 cum will be utilized for dumping over 0.60 ha with an average height of 30m. Utmost care will be undertaken to ensure the survival & growth of existing trees in the area

and drought resistant & fast growing trees will be planted in the reclaimed area over 101.946 hectares and 4.587 hectares plantation over the virgin land within the conceptual period. The following protection measures are proposed for the dump for safeguarding the environment.

- Regular compaction of the active dump top spaces for controlling erosion during rain & wind.
- Maintaining the terraces along the dump slopes for all the time to control erosion and slope failure.
- Erection of retaining wall along the dump slopes for all the time to prevent the slope failure.
- Construction of garland drain and settling tank to arrest loose materials and to drain clean water outside.

The proposal for protective work of dump as follows:-

Year	Location	Size of Retaining wall	Size of Garland drain	Size of Settling tank
2018-19	Around the Proposed dump,	1330mX1mX1m	1550mX1mX1m	3nos(10mX4mX3m)
2019-20	Maintenance	Maintenance	Maintenance	Maintenance

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4. SITE ANALYSIS

i. Connectivity

The M.L area over 106.533 hectares falls in Jaribahl and Palsa villages Tehsil- Barbil, Sub-division- Champua, District Keonjhar, Odisha. Out of the total lease area 99.099ha is forest land and remaining 7.434ha is non-forest land. The mine can be approached from Joda due south by a stretch of 17 Kms through Joda - Palaspanga Express Highway which passes from eastern side of the lease area. The nearest railway siding is Jurudihi which is at a distance of 8 Km from the mine. The area is bounded by the mining lease of M/s. OMC. Location map showing the project site has been attached as **Annexure 1.**

ii. Land Form, Land use and Land ownership.

The M.L area over 106.533 hectares falls in Jaribahl and Palsa villages Tehsil- Barbil, Sub-division- Champua, District Keonjhar, Odisha. Out of the total lease area 99.099ha is forest land

and remaining 7.434ha is non-forest land. Stage II clearance has been obtained for the total forest area of 99.099 Ha. (Copy attached as **Annexure 2**). An area of 97.603hectares land is already degraded/ utilized for mining, dumping, office, road etc excluding plantation/safety zone. During conceptual period the same area will be utilized for mining and allied activities. A total area of 8.930Ha safety zone will be maintained as green belt during entire life of the mine. The details of land use pattern will be as follows:

ITEM	**Existing**	**Scheme Period**	**Ultimate Period**
Mining	66.21	66.21	73.41
Dumping	15.35	15.35	15.35
Stacking	15.905	15.905	2.935
Road	2.200	2.200	1.750
Site Service	0.071	0.071	0.071
Plant area	1.210	1.210	1.210
Sub total	**100.946**	**100.946**	**94.726**
Safety zone area/ plantation	5.587	5.587	11.807
Total	**106.533**	**106.533**	**106.533**

iii. Topography (along with map).

The mining lease hold area of Jaribahal iron ore mines lies in the Champua block in Keonjhar district of Orissa. The area is located approximately 80 km from the district headquarter, Keonjhar, and is covered in the Toposheets No. 73G/5 and lies between latitudes of 21° 55' 21'' to 21° 55'40'' N and longitude of 85° 24' 18'' to 85° 24' 39'' E. The core zone mainly consists of Govt. waste land, Tenanted land, Forest land and Non forest waste land. It exhibits uneven topography associated with mounds and small hills. Physiographically the area froms a part of NW-SE stretch of hill exposing all most a flat top and steep escarpments on all side expecting the southern side that shows a gentler slope the relif between the top and foothills being about 90 meters. The Jaribahal part of the hill strech in the north is separated from that of Palsa (running almost east to west) by saddle of lateric and float ore occurrences. The lease holds are displays a topography having highest altitude of 620 meters. Above M.S.L. in the southern part and gradually slopes down to the north western part with an average gradient of 25^0 and the lowest

altitude of 530 meters above M.S.L. is marked in the northern part of the lease area.. (Map attached)

iv. Soil classification

The soil is apparently derived from the underlying & igneous metamorphic rocks and the difference in it is mainly due to classification and transformation affected by the surface drainage. The finer particles have been carried into the low-lying areas along the drainage lines rendering the soil a clayer or salty texture and sandy. Generally the soil of the district is light textured lateric and medium textured red loam soils. There are two major soil types in the buffer zone i.e. Alfisols and Ultisols.

a. Alfisols

These soils include Red sandy soil and Red gravelly soil. These soils are deficient in nitrogen and P_2O_3. Both total and available K_2O are fairly adequate and pH varies from 6.5 to 7.3. The reddish colour is due to oxidation of original ferruginous materials. Alluvial soil is also quite significant.

b. Ultisols:

It consists of mainly lateritic soils, which are found in high lands of northern, western and Southwestern parts of the buffer zone. These types of soils are characterized by vesicles and compactness. These are composed of mainly hydrated oxides of aluminum and iron..

v. Climatic data from secondary sources.

The meteorological data recorded during the study period is very useful for proper interpretation of the baseline information regarding Jaribahal Iron ore mine project, Orissa and surrounding area for air dispersion. Historical data on meteorological parameters will also play an important role in identifying the general meteorological regime of the region.

The major part of the district falls under the agro-climatic zone of North Central Plateau. The climate is hot and moist sub-humid with a dry period during the winter season from October to March and a wet period from mid-June to mid- September when over 80% of rainfall occurs. The rainfall in the area is mostly because of south – west monsoon. The annual average rainfall of about 1534.5 mm occurs during the monsoon period and the average number of rainy days is around 70. The climate is characterized by high inter-annual variability. Temperatures vary according to altitude and are highest in May (up to 41.4°C) and lowest in January (down to 7.4°C).

vi. Social Infrastructure available

As the area is situated near Joda & barbil the health facilities are available to the local people. Joda township is located at a distance of 17 Km from the project area. Within the buffer zone of the project area there are only 2 primary health centers at Malada and Badakalimati. There are 13 primary health sub centers to provide the primary health facility to the people. The govt. hospitals as well as company hospitals like that of TATA are situated at Joda & Barbil. One ESI hospital is situated at Barbil. Hand pump & well are the major source of drinking water in the villages under study.

The communication facility to the project area is quite good. NH 215 connecting Panikoili to Rajamunda is just 0.5km to the eastern side of ML area. The nearest cities are Joda, Barbil and Keonjhar which are at a distance of 17, 25 and 80km respectively from the project village. The nearest railway passenger halt is at Joda.

5. PLANNING BRIEF

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

The project is for enhancement in production of iron ore from dump rehandling by crushing, screening and Jigging method. The existing road facility is sufficient for the transportation of raw material and finished product.

ii. Population Projection:

There will be ingress of population due to the proposed project as this will create employment and business opportunity for about 256 people.

iii. Land use planning (breakup along with green belt etc.)

The M.L area over 106.533 hectares falls in Jaribahl and Palsa villages Tehsil- Barbil, Sub-division- Champua, District Keonjhar, Odisha. Out of the total lease area 99.099ha is forest land and remaining 7.434ha is non-forest land. An area of 97.603hectares land is already degraded/ utilized for mining, dumping, office, road etc excluding plantation/safety zone. During conceptual period the same area will be utilized for mining and allied activities. A total area of 8.930Ha safety zone will be maintained as green belt during entire life of the mine. The details of land use pattern will be as follows:

ITEM	Existing	Scheme Period	Ultimate Period
Mining	66.21	66.21	73.41
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Stacking	15.905	15.905	2.935
Road	2.200	2.200	1.750
Site Service	0.071	0.071	0.071
Plant area	1.210	1.210	1.210
Sub total	**100.946**	**100.946**	**94.726**
Safety zone area/ plantation	5.587	5.587	11.807
Total	**106.533**	**106.533**	**106.533**

iv. Assessment of Infrastructure Demand (Physical & Social).

Office building and rest shed for workers, first aid center, drinking water facilities are present within the lease area

v. Amenities / Facilities

Office building and rest shed for workers, first aid center, drinking water facilities are present within the lease area

6. PROPOSED INFRASTRUCTURE

i. Industrial Area (Processing Area)

There is the proposal for installation of iron ore beneficiation unit with jigging plant within the lease area

ii. Residential Area (Non Processing Area)

Office building and rest shed for workers has been constructed over an area of 0.071 Ha.

iii. Green Belt

iv. Afforestation :-

There is the existing green belt over an area of 1.210 Ha and an area of 1.69Ha will be utilized for plantation in the safety zone and dump plantation. During the plan period afforestation programme will be carried out over an area of 1.69 hectares. The plantation would be carried out @ 2500nos per hectare. The year wise plantation within mining scheme period as follows:

Year	Area in hectares	No of Saplings	Location
2018– 19	0.845	5000	Northwestern side of the safety zone area, Safety zone along the road and gap filling of previous plantation area.
2019-20	0.845	5000	South eastern side of the safety zone area, dump plantation and gap filling of previous plantation area.
Total	**1.69**	**10000**	

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v. Social Infrastructure.

As the area is situated near Joda & barbil the health facilities are available to the local people. Joda township is located at a distance of 17 Km from the project area. Within the buffer zone of the project area there are only 2 primary health centers at Malada and Badakalimati. There are 13 primary health sub centers to provide the primary health facility to the people. The govt. hospitals as well as company hospitals like that of TATA are situated at Joda & Barbil. One ESI hospital is situated at Barbil. Hand pump & well are the major source of drinking water in the villages under study.

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

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vii. Drinking Water Management (Source & Supply of water)

Drinking water supply is from bore well within the project site. Drinking water requirement will be approx. 10000 Liters per day.

viii. Sewerage System

Domestic effluent generated from the plant will be treated in septic tank and will be discharged to soak pit.

ix. Solid Waste Management.

The material generated during mining which has no iron content is regarded as waste, it is present within the ore bearing zone. From the borehole data it is found that the intercalated waste comprises mainly of hard ferruginous shale etc.

While considering the nature of the waste two types of rejects are considered

3. Overburden containing mainly soil alluvium, laterite, moroum , BHJ, BHQ etc
4. Off material ore below the 45% Fe content this is without market at present.

It is discussed in the previous chapter that 25% as waste in iron ore shall be generated from the total volume.

Dumping during plan period:

During mining operation, the intercalations like shale limonite brecciated hematite jasper will be excavated. These materials will be analyzed properly before disposed off as waste. As calculated a total of 161600MT of waste material will be generated during ensuing scheme period. This will be disposed off over the old existing dump-4.

Selection of dumping Site:

Selection of dumping site mostly depends upon the factors like topography, drainage, land use, mineral inventory, Pit configuration; mine waste characteristics, its volume of generation and economy in transportation. Keeping in view the above physical as well as techno-economic factors, the dumping will be carried out over the existing dump which is non- mineralized in nature.

Maximum Height and Spread of Dumps:

Total tentative waste materials likely to be generated during conceptual period will be 9149810 Cu.m. During plan period, 192850cum of waste will be generated. Cumulatively 9342660cum of waste will be generated during plan and beyond plan period. For road maintenance 10% i.e 934266 cum has proposed to be utilized and 7609959 cum will be utilized for back filling purpose

and balance 8408394 cum will be utilized for dumping over 0.60 ha with an average height of 30m. Utmost care will be undertaken to ensure the survival & growth of existing trees in the area and drought resistant & fast growing trees will be planted in the reclaimed area over 101.946 hectares and 4.587 hectares plantation over the virgin land within the conceptual period. The following protection measures are proposed for the dump for safeguarding the environment.

- Regular compaction of the active dump top spaces for controlling erosion during rain & wind.
- Maintaining the terraces along the dump slopes for all the time to control erosion and slope failure.
- Erection of retaining wall along the dump slopes for all the time to prevent the slope failure.
- Construction of garland drain and settling tank to arrest loose materials and to drain clean water outside.

The proposal for protective work of dump as follows:-

Year	**Location**	**Size of Retaining wall**	**Size of Garland drain**	**Size of Settling tank**
2018-19	Around the Proposed dump,	1330mX1mX1m	1550mX1mX1m	3nos(10mX4mX3m)
2019-20	Maintenance	Maintenance	Maintenance	Maintenance

x. Power Requirement & Supply / Source.

Power Requirement

Period	**Power Requirement**	**Source**
30 minute maximum demand	350 kVA	NESCO from their present 750 KVA transformer installed at mines over a 11 kV overhead feeder.
Annual Energy consumption at 60% load factor	1 million kwh	

Apart from the power supply from NESCO the jigging plant will be equipped with a standby DG of 750 KVA for uninterrupted working.

7. REHABILITATION AND RESETTLEMENT (R & R) PLAN

i. Policy to be adopted (Central / State) in respect of the project affected persons including home oustees, land oustees and landless laborers (a brief outline to be given).

The project does not affect any settlement. So no rehabilitation and resettlement plan is being proposed.

8. PROJECT SHEDULE & COST ESTIMATES

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

The installation of jigging plant will start after obtaining statutory clearance.

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

Estimated project is 4500 lakhs. The proponent has all the equipment required for the project.

9. ANALYSIS OF PROPOSAL (FINAL RECOMMENDATIONS)

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

a) The state Govt. will earn royalty.

b) The Local people will get employment opportunity.

c) There will be positive impact on the infrastructural facilities of the locality

LIST OF ANNEXURES

Annexures	Titles
Annexure 1	Location Map
Annexure 2	Forest Clearance Letter
Annexure 3	Surface Plan