

MINING PLAN

INCLUDING PROGRESSIVE MINE CLOSURE PLAN

Submitted under Rule 16 of MCR 2016 & Rule 23 of MCDR 2017 for approval

for

Dharmapura Iron Ore Mine Block
(M.L.no. 2239)

in Ramgad Village, Sandur Taluka, Ballari District



Preferred Bidder



JSW STEEL LTD

Rule 45 reg. no: IBM/432/2011

Area: 43.58 Ha
in Ramgad Reserve Forest

Lease period: 50 years as per MMDR Amendment Act 2015

Category: A-Fully Mechanized, Open Cast, Private, Captive

Prepared by

Sunil Kumar Singh
B E (Mining)

Qualified Person
Dec-2019

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ANNEXURES

- | Nos. | DESCRIPTION |
|------|--|
| 1. | Copy of LOI by DMG, GoK for Mining Lease |
| 2. | Copy of Environmental Clearance |
| 3. | Copy of Forest Clearance |
| 4. | IBM approval letter of RUMP |
| 5. | Certificate of Company Registration |
| 6. | List of Directors |
| 7. | Copy of Board Resolution |
| 8. | Photo ID of Nominated Owner |
| 9. | Copy of QP certificates |
| 10. | Recovery Study Report |
| 11. | Lithologs of drilled BH |
| 12. | Analysis Reports of drilled BH |
| 13. | Other Analysis Reports |
| 14. | Feasibility Study Report |
| 15. | Environment Monitoring data |
| 16. | Letter regarding public road |

PLATES



Nos.	DESCRIPTION	
I a	Location Plan	NTS
I b	Key Plan / Precise area map on Toposheet	1 : 50,000
I c	CEC Lease sketch	1 : 4000
I d	Vectorised DGPS map	1 : 3960
I e	Satellite map	1 : 12,000
II a	Surface Plan	1 : 2000
II b	Geological Plan	1 : 2000
II c	Geological Cross Sections	1 : 1000
III a to e	Production development plans	1 : 2000
III f	Production development sections	1 : 1000
IV	Reclamation plan	1 : 2000
V	Environment Plan	1 : 5000
VI	Conceptual Plan	1 : 2000
VII	Financial Area Assurance Plan	1 : 2000



INTRODUCTORY NOTE:

Dharmapura Iron Ore Mines block (ML No. 2239) located in Ramgad Village of Sandur Taluk, Bellary Dist., Karnataka, over an extent of 43.58 ha area in Ramgad Range Forest is a B category iron ore mining lease and its lease period is expiring by 31.03.2020.

The Government of Karnataka (GoK) has identified this lease along with others which are expiring on 31.03.2020 for electronic auction for grant of Mining Lease in accordance with the Mineral (Auction) Rules, 2015 and Mineral (Auction) Amendment Rules, 2017 and JSW Steel Ltd emerged as the 'Preferred Bidder' in the said auction process.

Subsequent to auction, a Letter of Intent (LoI) has been issued by GoK to JSW Steel Ltd (copy enclosed as **Annexure-1**). Accordingly, the preferred bidder (JSW Steel Ltd) has to submit a Mining Plan to satisfy the conditions of LoI (under clause 3.4 section a and subsection iv) to be considered as Successful Bidder.

The said lease (ML no. 2239) has been granted with Environmental Clearance (vide letter no: J-11015/79/2004-IA.II(M) dated 11.04.2005) as well as Forest Clearance (vide letter no:8-67/90-FC dated 30.01.1997). Copies enclosed as **Annexure-2 and 3**. These are co-terminus with the existing lease period, that is upto 2020. However, after approval of this MP, preferred bidder will initiate the process of getting transfer of both EC & FC in favour of JSW Steel Ltd with the concerned authorities as there is proposal of extending these by 3 years (2+1) is being examined by MOEFCC.

This Mining Plan is approved subject to the conditions / stipulations Indicated in the Mining Plan approval letter No. 279/1106/2019/BN4. Date 07/01/2020

क्षेत्रीय खान नियंत्रक
Regional Controller of Mines
भारतीय खान ब्यूरो
Indian Bureau of Mines,
बैंगलूर / Bangalore - 560 022

Hence, a Mining Plan along with PMCP has been prepared and submitted for approval under Rule 16 of MCR 2016 with a production programme of 0.18 MTPA based on the exploration data as given in the latest Modifications in the approved Mining Plan document approved by HBM vide letter no.279/69/89/BNG/1222 dated 04.07.2018 (Annexure-4) for this mining lease as this lease is currently under operation by the existing lessee.

JSW Steel Ltd has been allotted following mining leases thro auction route in the state of Karnataka and the details of the same are given below:

Table-1:

SL No.	Lease reference no.& date	Area in Ha	Postal address / Location	Type of Mineral	Status of Mining plan/ scheme	Working/ Non-working	Date of execution and Dt of expiry
1	ML no. 0004 12.01.2018	32.68	JSW Steel Limited (Mines Division), Near Talur Cross, Vidyanagar, 583275 Taluk: Sandur	IRON ORE	MP Approved For 2017-18 to 2021-22	Working	12.01.2018 & 11.01.2068
2	ML no. 0005 17.03.2018	21.03			MP Approved For 2018-19 to 2022-23	Working	17.03.2018 & 16.03.2068
3	ML no. 0006 22.2.2018	100.54			MP Approved For 2018-19 to 2022-23	Working	22.2.2018 & 21.12.2068
4	ML no. 0007 27.05.2019	130.53			MP Approved For 2019-20 to 2023-24	Working	27.05.2019 & 26.05.2069

Apart from the above, the following ML areas have been issued with Lol in favour of JSW Steel Ltd from the Dept of Mines & Geology (DMG) as preferred bidder. These are being processed for grant of ML.

Table-2:

SL No.	ML no. (Old)	Erstwhile Mine/Lessee name	Lol no. and date	Status
1	2621	Ramarao Poal	No:DMG/MLS/CCA/12/2621/2016-17 dated 26.10.2016	Under process and Lease execution pending
2	995	MML Ubbalagandi	No:DMG-17012/7/2018/2019-20 dated 07.08.2019	
3	1602	Narayan Mines Pvt. Ltd	No:DMG-2020:MLS:AUC:2018-19 ML 1602 dated 13.08.2019	
4	3246	Mineral Enterprises	No:DMG-2020:MLS:AUC:2018-19 dated 13.08.2019	

1.0 GENERAL

Table -3:

a)

Name of Preferred bidder	M/s JSW STEEL LTD.,
Mine code and Rule 45 registration no.	Nominated Owner: Dr. Vinod Nowal
Address	Not yet allotted IBM/432/2011
District	JSW Mining Office, Near Talur Cross, Vidyanagar, 583275 Taluk: Sandur
State	Ballari
Pin code	Karnataka
Phone	583275
Fax	022-42868128
Mobile	022-42863000
E-mail id	+91-944989998
	Vinod.nowal@jsw.in



b) Status of applicant/lessee :

Listed Public Limited Company x

(Copy of Registration of Company & Memorandum of Association is given in Annexure-5. Annexure-6 shows List of Directors and Annexure-7, Board Resolution Copy and Annexure-8 shows photo ID of nominated Owner)

c) Mineral(s) which is are included in the prospecting license (for fresh grant):

Not applicable

d) Mineral(s) which is included in the letter of Intent / lease deed:

Iron Ore

e) Mineral(s) which the lessee intends to mine:

Iron Ore

f) Name of Qualified Person preparing Mining Plan:

Table -4:

Name	Sri Sunil Kumar Singh
Qualification	B E, Mining
Address	JSW Mining Office, Near Talur Cross, Vidyanagar, 583275 Sandur (Taluk), Ballari (District)
Phone	08395-245956
Fax	08395-250132
Mobile	09449598135
E-mail id	Sunil.singh@jsw.in

(Annexure-9 shows copies of certificates enclosed in as proof of qualification and experience of Qualified Person under rule 15 MCR 2016)



LOCATION & ACCESSIBILITY:

2.

a) Lease Details (existing mine)

The mine is located about 12 km away from Sandur town, approachable by an all-weather road. Nearest railway siding facility is at Ramgad situated at a distance of 7 km from the mine.

Table-5:

Name of the mine	Dharmapura Iron Ore Mines block (ML No. 2239)
Lat/long of any boundary point	A-1 Latitude: N 15° 08' 21.88741" Longitude: N 76° 27' 12.46759" There are 15 corner pillars and lat/long values of these pillars are listed in Table - 7
Date of grant of Lol	13.08.2019
Period/Expiry Date	50 yrs as per MMDR (Amendment) Act-2015
Postal Address	Dharmapura Iron Ore Mines, near Ramgad village, Sandur taluk
District	Ballari
State	Karnataka
Pin code	583 201
Phone	08395-245956
Fax	08395-250132
Mobile	+91-9448286155
E-mail id	Sunil.singh@jsw.in

b) Details of applied /lease area with location map (fresh area /mine):

Table-6: Status of Land

Forest		Non-forest
Ramgad Reserve Forest	Area-43.58 ha	Not applicable

Total lease area : 43.58 ha

District & State : Ballari, Karnataka

Taluka : Sandur

Village : Ramgad



Whether the area falls under CRZ? The lease area does not fall under Coastal Regulation Zone (CRZ).

Existence of public road/railway line, if any and approximate distance

This mine is located about 12 km away from Sandur town with an all-weather approach road. A public road is passing through this lease (Sushilanagar to Venkatagiri), which is marked in the Surface Plan. Nearest railway siding facility, Ramgad situated at a distance of 7 km from the mine.

Topo sheet No: 57 A/8

Location data of all lease boundary points are given in the following table:

Table -7: Co-ordinates of Boundary pillars

BP. No.	DGPS Co-ordinates (WGS84)	
	Latitude	Longitude
A1	N 15° 08' 21.88741"	E 76° 27' 12.46759"
A2	N 15° 08' 22.70921"	E 76° 27' 12.12318"
A3	N 15° 08' 23.43496"	E 76° 27' 12.13369"
A4	N 15° 08' 24.46297"	E 76° 27' 12.36169"
A5	N 15° 08' 25.46284"	E 76° 27' 12.43282"
A6	N 15° 08' 27.12432"	E 76° 27' 11.90697"
A7	N 15° 08' 28.03190"	E 76° 27' 11.05525"
A8	N 15° 08' 34.76335"	E 76° 27' 04.75160"
A9	N 15° 08' 36.27902"	E 76° 27' 02.30334"
A10	N 15° 08' 39.76828"	E 76° 26' 59.22418"
A11	N 15° 08' 43.61506"	E 76° 26' 50.95688"
A12	N 15° 08' 52.87795"	E 76° 27' 11.08488"
A13	N 15° 08' 35.66792"	E 76° 27' 20.25874"
A14	N 15° 08' 39.81727"	E 76° 27' 29.54029"
A15	N 15° 08' 35.53386"	E 76° 27' 31.93583"

Three Ground Control Points (GCP) near to A-13 are shown in Surface Plan/Geological Plan.

Table -8: Latitude and longitudes of the GCP

Sl. No.	Description	Co-ordinates	Distance from A 13	Bearing	Direction
1.	Generator Room	N 15° 08' 41.1" E 76° 27' 23.8"	196m	32°	NE
2.	Plant Office in M.L. No. 2309	N 15° 08' 41.8" E 76° 27' 21.8"	161m	16°	NE
3.	Masonry Check dam	N 15° 08' 48.0" E 76° 27' 21.6"	380m	05°	NE

3.0 DETAILS OF APPROVED MINING PLAN:



3.1) Date and reference of earlier approved Mining Plan/Schemes

Not applicable as this is first Mining Plan prepared after M/s JSW Steel Ltd declared as a Preferred Bidder.

3.2) Details of last modifications-if any (for the previous approved period) of approved MP/SOM, indicating date of approval, reason for modification

Not applicable as this is first Mining Plan prepared after M/s JSW Steel Ltd declared as a Preferred Bidder.

3.3) Review of earlier approved proposal in respect of excavation exploration, reclamation etc.

Not applicable as this is first Mining Plan prepared after M/s JSW Steel Ltd declared as a Preferred Bidder.

3.4) Status of compliance of violations pointed out by IBM

Not applicable as this is first Mining Plan prepared after M/s JSW Steel Ltd declared as a Preferred Bidder.

3.5) Indicate and give details of any suspension/closure/prohibitory order issued by any Government agency under any rule or Court of law :

Not applicable as this is first Mining Plan prepared after M/s JSW Steel Ltd declared as a Preferred Bidder.

3.6) In case the MP/SOM is submitted under rules 9 and 10 of the MCDR'88 or under rule 17(3) of the MCR' 2016 for approval of modification, specify reason and justification for modification under these rules.

Not applicable.

Part - A

GEOLOGY & EXPLORATION:

1. a) Briefly describe the topography, drainage pattern, vegetation, climate, and rainfall data of the area applied/mining lease area:

Ramgad range, where the mining lease is located forms southwestern part of the Bellary-Hospet group of hill ranges. The area of the lease forms a rugged hilly terrain trending N30°W/S30°E with valleys and ridges. Steep slopes are present towards western part of the area. Dendritic drainage pattern is observed in the area. The highest elevation is 960mRL and the lowest elevation is about 790mRL. As the area is part of forest, moderate vegetation with small trees and shrubs/bushes were observed. Average annual rainfall in area is around 575mm. The area enjoys moderate climate in winter and very temperate climate during summer. Moderate vegetation is visible in the lease area.

- b) Brief descriptions of Regional Geology with reference to location of lease/applied area:

The mining lease is in southwestern part of the Bellary-Hospet group of iron ore deposits hosted by Sandur Schist Belt near Ramgad village of Sandur taluka, Bellary district, Karnataka State.

The Sandur Schist belt is one of the Dharwar type precambrian supracrustal belts in the Karnataka Craton of South India. This is the smallest of the three basins and covers an area of just 960 sq. km. It is structurally highly disturbed and squeezed out of shape by the intrusion of younger granites. Shale facies as in the other basins is confined to the western margin. Well-developed mafic magmatism and strong development of manganeseiferous greywacke, Phyllite and numerous bands of banded hematite quartzite (BHQ) characterize the basin. The basin is known for its rich accumulation of both iron and manganese ores. Basement cover relations are obscured because of intense deformation and intrusion by younger granites.

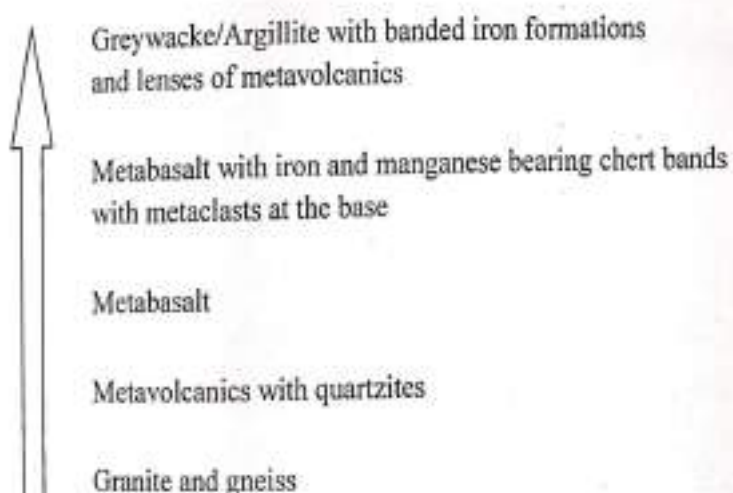


The Sandur Schist Belt has a lens-shaped geometry of about 60 km long with a maximum width of 28 km in the central part. Our formations have been distinguished in this basin: Yeshwantnagar, Deogiri, Donimalai and Nandihalli Formations. The Yeshwantnagar Formation is largely composed of Volcanic flows; the Deogiri formation is composed of manganiferous greywacke, argillite. The Donimalai Formation consists of extensive development of banded hematite, chert and jasper.

The top most Nandihalli Formation is made up of metabasalts with intercalation of greywacke and argillites. Lateritization has played an important role in the concentration of manganese and iron in the profile, giving rise to rich accumulation of Manganese and Iron ore for which this schist belt is well known. Manganese mineralization area restricted to Devagiri formation whereas Iron Ore enrichment are within the Donimalai formation (mineralization has stratigraphic control).

(Adopted from Geology of Karnataka by BP Radhakrishna)

The general lithological succession of this area is as follows:

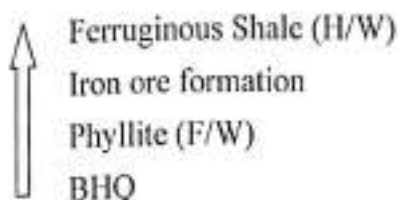


(Source: Bellary District Resource Map, GSI).



- c) Detailed description of geology of the lease area such as shape and size of the mineral/ore deposit, disposition various litho-units indicating structural features- if any etc. (Applicable for Mining Plan for grant & renewal and not for Scheme of Mining/Modifications in the approved mining plan/Scheme of Mining).

ML area is located in Ramanamalai block of Ramgad Range. The general sequence of rock formations found in the area is;



In general, the strike of the ore formation is due NW - SE with high angle of dips varying between 65° to 70° towards NE. The total strike length of the ore body exposed is about 675m with an average width of about 140m. Iron ore analysis shows Fe content varying between 45 to 66%. Lumps and fine ratio in this mine are about 40:60.

BHQ is present at northern and southern part of the lease area. The grade of BHQ varies from 35% to 47.17% Fe. BHQ reserves/resources with 60% recovery (+45% Fe) are also estimated as per the recovery study report (Annexure-10).

Ferruginous shales/phyllites are exposed adjacent to ore bands. Its colour varies from reddish to brown.

- d) (i) Name & address of the Prospecting/Exploration Agency:

For the present lessee, the exploration work carried out by:

M/s. MAPP Drilling & Exploration (Pvt.) Ltd.,

Secunderabad

M/s. Explo Technique (Pvt.) Ltd.,

Bangalore



- e) Details of prospecting/exploration already carried out
- i) Number of pits and trenches indicating dimensions, spacing etc along and across the strike/foliation with reference to geological plan.

No pitting and trenching were made.

- ii) Number of boreholes indicating type (Core/RC/DTH), dia, spacing, inclination, Collar level, depth etc., with standard borehole logs duly marking on geological plan/sections:

The erstwhile lessee has undertaken vertical core drilling during 2013 to 2017 as part of exploration. The details are given below:

Table-9: Location and other details of the core boreholes

Year of drilling	Borehole ID	Depth (m)	Location		Collar RL (m)
			Northing	Easting	
2013-14	DH. No.02	50	1674540	652873	863.14
	DH.No.03	85	1674557	652734	858.91
	DH. No.04	70	1674639	652819	839.86
	DH. No. 05	95	1674644	652676	853.43
	DH. No. 05A	43	1674655	652741	836.75
	DH. No. 06	50	1674707	652797	848.40
	DH. No. 07	50	1674757	652603	846.70
	DH. No. 08	68	1674781	652615	852.76
	DH. No. 09	27	1674802	652472	880.20
	DH. No. 10	55	1674846	652563	872.00
	DH. No. 12	45	1674918	652473	873.12
	DH. No. 15	68	1674766	652689	845.72
Sub Total	12	706			
2014-15	DH. No. 01	34	1674585	652807	839.84
	DH. No. 14	32	1674934	652509	865.05
	DH. No. 16	105	1674917	652591	841.01
	DH. No. 17	55	1675040	652532	829.55
	DH. No. 18	70	1674893	652642	834.68
Sub Total	5	296			
2016-17	BH-13	85	1674550	656452	849.85
	BH-19	20	1674589	656507	843.72
Sub Total	2	105			
April 2017	BH-11	24	1674959	656097	875.50
	BH-20	55	1674618	656354	840.24
	BH-21	65	1674732	656304	836.15
	BH-25	34	1674676	656190	885.45
	BH-26	24	1674869	656091	883.30
	BH-27	34	1674751	656135	886.25
Sub Total	6	236			
Total	25	1343			



Lithologs with chemical analysis data of six boreholes drilled in 2017 given in Annexure-11,12.

iii) *Details of sample analysis indicating type of sample (surface/subsurface, from pits/trenches/boreholes etc):*

Samples from recent boreholes and some ore samples from stocks etc were tested for determination of grade. Copies of Analysis Reports are enclosed as Annexure-12.

iv) *Expenditure incurred in various prospecting operations:*

Expenditure for exploration was about Rs. 52.07 lakhs.

- f) The surface plan of the lease area may be prepared on a scale of 1: 1000 or 1: 2000 with contour interval of maximum of 10m depending upon the topography and size of the area duly marked by grid lines showing all features indicated under Rule 28(1)(a) of MCDR 1988.

Prepared and enclosed as Plate no-II a on a scale of 1:2000

- g) For preparation of geological plan, surface plan prepared on a scale of 1: 1000 or 1: 2000 scale specified under para 1.0 (f) of Part A of the format may be taken as the base plan. The details of exploration already carried out along with supporting data for existence of mineral, locations of proposed exploration, various lithounits along with structural features, mineralized / ore zone with grade variation if any may be marked on the geological plan along with other features indicated under Rule 28 (1)(b) of MCDR 1988:

Prepared and enclosed as Plate no-II b on a scale of 1:2000

- h) Geological sections may be prepared on natural scale of geological plan at suitable interval across the lease area from boundary to boundary:

Prepared and enclosed as Plate no-II c/1 & IIc/2 on a scale of 1:2000

- i) Broadly indicate the future programme of exploration with due justification (duly marking on Geological plan year wise location in different colours) taking into consideration the future tentative excavation programme planned in next five years as in table below:



So far exploration was carried out by drilling 25 core boreholes in the lease area. The mineralization area of 11.29 ha under G1 scale and about 0.23 Ha. under G2 Scale and 3.86 ha under G3 scale is covered under exploration. To upgrade the exploration to G1 scale from G2 & G3 scale and to establish the depth of BHQ (Siliceous ore) as per Rule 12 (4A) of MCDR 2018, it is proposed to drill 10 vertical RC boreholes for a total meterage of 980m in the first year of this plan period.

Table: 10-Proposed RC (vertical) boreholes

Sl no.	Bore hole no.	Year of drilling.	Section	Location (WGS-84)		mRL	Depth (m)	Grid Inter- val
				Longitude(E)	Latitude(N)			
1	PBH-1	First Year	A1-A1'	656490	1674620	844	120	100m x 50m
2	PBH-2		A2-A2'	656432	1674606	831	100	
3	PBH-3		B-B'	656374	1674639	830	110	
4	PBH-4		B-B'	656408	1674671	832	110	
5	PBH-5		C-C'	656361	1674679	827	110	
6	PBH-6		D-D'	656335	1674763	838	140	
7	PBH-7		E-E'	656198	1674711	877	100	
8	PBH-8		F-F'	656156	1674790	870	100	
9	PBH-9		G-G'	656254	1674930	841	60	
10	PBH-10		I-I'	656123	1674983	860	30	
TOTAL							980	



- j) Reserves and Resources as per UNFC with respect to the threshold value notified by IBM may be furnished in a tabular form as given below: (Area explored under different level of exploration may be marked on the geological plan and UNFC code for area considered for different categories of reserve / resources estimation may also be marked on geological cross sections). Submit a feasibility/pre-feasibility study report along with financial analysis for economic viability of the deposit as specified under the UNFC field guidelines may be incorporated.

Resource/ reserves estimated by the erstwhile lessee (as per latest modification in the Mining Plan) and the details of estimation are given below:

Table -11: Reserves / Resources estimated by erstwhile lessee
as on 01.04.2018 (in tonnes)

Classification	UNFC Code	Iron Ore +45% Fe	BHQ +35% Fe (60% rec)	Total ore
A. Mineral Reserves				
Proved Mineral Reserve	111	3,747,169	558,792	4,305,961
Probable Mineral Reserve	122	387,204	195,334	582,538
Total Reserves		4,134,373	754,126	4,888,499
B. Remaining Resources				
Feasibility Mineral Resources	211	594,095	26,208	620,303
Pre-feasibility Mineral Resources	222	290,871	--	290,871
Indicated Mineral Resources	333	4,854,318	2,572,248	7,426,566
Total Resources		5,739,284	2,598,456	8,337,740
Total (A+B)		9,873,657	3,352,582	13,226,238

Now the reserves and resources are updated using latest surface geological plan. Geological cross sections were prepared at across the strike of the 100m interval. Sectional areas are calculated, and these areas are multiplied by sectional influence to arrive at the volume of the individual lithology. This volume is multiplied by bulk density to calculate tonnages. Tonnage factor is considered as 3.0 tons/cum for iron ore (based on field test reports, Annexure-10) with a recovery of 90%. BHQs are also estimated by taking Bulk density at 2.6 tons/cum. Recoverable portion of BHQ (+10mm) is considered as 60% as per the recovery study report. The grade of recovered BHQ will be of +45% Fe. (Annexure- 10). BD for waste is 2.0 tons/cum.



Proved Mineral Reserves (111) are estimated based on G1 level exploration data (drilling of 25 core BH in 100mx50m grid). Proved ore is considered up to the depth of ore intersection in individual boreholes. Actual ore exposure in working pits is also considered as proved ore limit of individual sections. No depth wise influence is considered for estimation of proved mineral reserves. **Probable Mineral Reserves (122)** are estimated based on G2 level of exploration data (within 200m x200m grid).

Feasibility Mineral Resource (211) are part of proved reserves which are blocked due to public road and its 50m safety zone.

Inferred Mineral Resource (333) are part of ore present in area below proved and probable reserves with geological extrapolation based on drill data and structure.

Table 12: Category wise area of Exploration

Category	Mineralised Area -ha	Non-Mineralised Area-ha	Total ha
G1	11.29	--	11.29
G2	0.23	--	0.23
G3	3.86	--	3.86
Unexplored	--	28.20	28.20
Total	15.38	28.20	43.58

- k) **Furnish detailed calculation of reserves/resources section wise (When the mine is fully mechanized, and deposit is of complex nature with variation of size, shape of mineralized zones, grade due to intrusion within ore zone etc, an attempt may be made to estimate reserves/resources by slice plan method). In case of deposits where underground mining is proposed, reserve/resources may be estimated by level plan method, as applicable, as per the proposed mining parameters.**

Following tables give section wise resource/ reserves updated (re-estimated) based on latest surface geological plan.

Table- 13: PROVED MINERAL RESERVES (1)

Sec No.	IRON ORE						BHQ - SILICEOUS ORE					
	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Recovery (90%)	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Quantity (Tonnes)
Al-A1'	4252	55	233860	3.0	701580	631422	3	55	165	2.6	0	0
A2-A2'	3564	45	160380	3.0	481140	433026	56	45	2520	2.6	0	0
B-B'	2303	50	115150	3.0	345450	310905	0	50	0	0	0	0
C-C'	1125	60	67500	3.0	202500	182250	0	60	0	0	0	0
D-D'	926	70	64820	3.0	194460	175014	0	70	0	0	0	0
E-E'	684	70	47880	3.0	143640	129276	0	70	0	0	0	0
F-F'	219	60	13140	3.0	39420	35478	0	60	0	0	0	0
Total			702730		2108190	1897371			2685	1611		4189

Table- 14: PROBABLE MINERAL RESERVES (122)

Iron Ore						
Sec No.	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Recovery (90%)
C-C'	650	60	39000	3.0	117000	105300
Total			39000		117000	105300

Table- 15: FEASIBILITY MINERAL RESOURCES (211)

Sec No.	IRON ORE						BHQ - SILICEOUS ORE					
	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Recovery (90%)	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Quantity (Tonnes)
Al-A1'	1296	55	71280	3.0	213840	192456	3716	55	204380	122628	2.6	318833
A2-A2'	1121	45	50445	3.0	151335	136202	4759	45	214155	128493	2.6	334082
C-C'	1023	60	61380	3.0	184140	165726	0	60	0	0	2.6	0
D-D'	1281	70	89670	3.0	269010	242109	0	70	0	0	2.6	0
E-E'	5622	70	393540	3.0	1180620	1062558	88	70	6160	3696	2.6	9610
F-F'	4831	60	291060	3.0	873180	785862	1052	60	63120	37872	2.6	98467
G-G'	1864	50	93200	3.0	279600	251640	2956	50	147800	88680	2.6	230568
H-H'	1275	65	82875	3.0	248625	223763	4138	65	268970	161382	2.6	419593
I-I'	2393	60	143580	3.0	430740	387666	6927	60	415620	249372	2.6	648367
Total			1277030		3831090	3447981			1320205	792123		2059520

Table- 16: INFERRED MINERAL RESOURCES (333)

Sec No.	IRON ORE						BHQ - SILICEOUS ORE					
	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Recovery (90%)	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Quantity (Tonnes)
Al-A1'	803	55	44165	3.0	132495	119246	0	55	0	0	2.6	0
A2-A2'	1700	45	76500	3.0	229500	206550	0	45	0	0	2.6	0
B-B'	1639	50	82950	3.0	248850	223965	0	50	0	0	2.6	0
D-D'	1635	70	114450	3.0	343350	309015	0	70	0	0	2.6	0
J-J'	2222	50	111100	3.0	333300	299970	5462	50	273100	163860	2.6	426036
K-K'	412	65	26780	3.0	80340	72306	6015	50	300750	180450	2.6	469170
L-L'	0	65	0	3.0	0	0	6086	50	304300	182580	2.6	474708
M-M'	0	50	0	3.0	0	0	5360	50	268000	160800	2.6	418080
N-N'	0	50	0	3.0	0	0	4675	50	233750	140250	2.6	364650
Total			455945		1367835	1231052			1379900	827940		2152644

Geological Plan enclosed as Plate IIb, and Plate IIc is Geological cross sections.



Mineral Reserves/Resources:

Mineral Resources: (Mineral resources may be estimated purely based on level of exploration, with reference to the threshold value of minerals declared by IBM)

Table - 17: Updated Reserves/resources in million tonnes as on 20.12.2019

Level of Exploration	Iron Ore	BHQ (Siliceous ore)	Total
G1 - Detailed exploration	5.345	2.064	7.409
G2 - General Exploration	0.105	-	0.105
G3 - Prospecting	1.231	2.153	3.384
G4- Reconnaissance	--	-	-

Reserves and resources have arrived after applying results of feasibility and economic evaluation (Pl refer Annexure-I4) of the deposit based on the various factors such as:

- Open cast mining method, recovery factor as 90% for Iron ore - as all the ore in the ore zone is saleable - and 60% for BHQ (Siliceous ore).
- Threshold value (as per new IBM notification) of +45% Fe for iron ore and +35% Fe for BHQ (Siliceous Ore), and ultimate pit depth.
- Mineral / ore blocked at lease boundary safety zone and ore blocked due to public road and its 50m safety zone is estimated separately.

Table-18: Reserves/resources in tonnes as on 20.12.2019

Classification	UNFC Code	Iron Ore +45% Fe	Siliceous Ore (BHQ) +35% Fe	Total ore
A. Mineral Reserves				
Proved Mineral Reserve	111	1,897,371	4,189	1,901,560
Probable Mineral Reserve	122	105,300	--	105,300
Sub Total Reserves		2,002,671	4,189	2,006,860
B. Remaining Resources				
Feasibility Mineral Resources	211	3,447,981	2,059,520	5,507,501
Inferred Mineral Resources	333	1,231,052	2,152,644	3,383,696
Sub Total Resources		4,679,033	4,212,164	8,891,197
Total (A+B)		6,681,704	4,216,353	10,898,057

Note: It is not possible to quantify grade wise reserves, as normally there is considerable variation in size and grade distribution within the ore zone, which results variable recovery factor and bulk density. Thus, tonnages arrived are tentative.

MINING – OPEN CAST MINING:**OPEN CAST MINING:**

- a) Briefly describe the existing as well as proposed method for excavation with all design parameters indicating on plans /sections.

Existing: There is only one pit of 705m length and 297m width existing in the lease area as on 20.12.2019. Only one major pit is being worked now for reef iron ore. Overall pit slope is 45° and face slope is 70-80°.

Table-19: Working pit details-existing

Extent	Top mRL	Bottom mRL	Ore Bench Nos.	Waste Bench Nos.	Total Nos. of Bench	Avg. Height	Avg. Width
20.97 Ha	960	822	11*	13	24	6m	10m

*Partially in ore and partially in waste. The major portion is in ore.

There are 5 inactive waste dumps existing which are old and covered with natural vegetation and retention wall / garland drain has been provided at dump bottom. Two active dumps are located at NE and NW corner of the lease area and named as AD1 and AD2 respectively. These Inactive five dumps are spread SW slopes, NE portion and SE slopes. ID1 and ID2 are big one and others are small. The details of these existing position of ID and AD dumps are given below.

Table-20: Existing waste dump details as on 20.12.2019

Dump No.	Extent ha	Top mRL	Bottom mRL	Stages Nos.	Slope degree	Status	UTM Co-ordinates	
							Northing	Easting
AD-1	2.80	851	820	2	40°	Active	1675215	655898
							1675034	656218
AD-2	3.90	895	869	3	40°	Active	1675023	655631
							1674718	655984
ID-1	2.56	925	862	1	40°	Inactive	1674899	655933
							1674263	656215
ID-2	3.65	890	855	1	40°	Inactive	1674981	655524
							1674550	655984
ID-3*	0.60	856	834	2	40°	Inactive	1674753	656507
							1674586	656633
ID-4*	0.57	876	845	1	40°	Inactive	1675093	655865
							1674979	656065
ID-5	0.076	831	820	1	40°	Inactive	1674759	656598
							1674695	656661

*Note: ID3 and ID4 dumps are mentioned as subgrade dump in the last approved UMP. The grade and quantity availability will be assessed after the lease execution based on the field condition. The same will be incorporated in the modification to the Mining plan.



Apart from above, one mineral stock is present over an area of 1.44 ha as on 20.12.2019. The existing stock comprises fines and calibrated iron ore. Quantity has not been assessed since the exiting lessee is moving this material on e-auction basis.

Proposed workings: It is proposed to operate the mine by fully mechanized open cast mining method by forming benches of 7m height and width of 8m. Drilling/blasting will be deployed for hard formations. The mining method involves extraction and loading of ore, crushing/screening and transportation and handling waste material.

During this plan period, workings for iron ore will be between sections A1-A1' to E-E'. Production proposals will be restricted in proved zone only. The slope of the benches will be around 80° and overall pit slope will be maintained at 45° with horizontal. Approach roads with enough width will be made. Drilling and blasting technique will be adopted -whenever required- in hard to medium hard zone. Topmost bench will be pushed back to facilitate the formation of benches properly. Ore zone is excavated and loaded by excavators into dumpers and transported to Crushing/Screening Plant for bifurcation of ROM into calibrated ore and fines. Wheel loaders, Excavators and dumpers are used for loading and dumping of ore / waste material.

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

I. Insitu Tentative Excavation:

Proposed production will be 1.80 LTPA of Iron Ore of +45% Fe as per permissible production quantity by CEC, in this plan period after lease execution post 2020. BHQ will not be part of above production, as production quantity is less, only Iron ore will be produced. However, study about BHQ & its beneficiation will be carried out and planning for same will be made in the next plan period.

Table-21: Year wise production/development –in Cum

Year	Total tentative Excavation	Top Soil	OB/SB /IB	ROM Iron Ore	Mineral rejects	ROM/Waste Ratio
1	2	3	4	5	6	7
First	89,373	-	29,379	59,994	-	1:0.43
Second	104,687	-	44,711	59,976	-	1:0.69
Third	108,872	-	48,900	59,972	-	1:0.76
Fourth	100,604	-	40,691	59,913	-	1:0.62
Fifth	104,941	-	44,979	59,962	-	1:0.69



Table-22: Year wise production/development –in tonnes

Year	Total tentative Excavation	Top Soil	OB/SB/ IB	ROM Iron Ore	Mineral rejects	ROM/Waste Ratio
1	2	3	4	5	6	7
First	238,740	-	58,758	179,982	-	1: 0.33
Second	269,350	-	89,422	179,928	-	1: 0.50
Third	277,715	-	97,801	179,915	-	1: 0.54
Fourth	261,120	-	81,381	179,739	-	1: 0.45
Fifth	269,845	-	89,958	179,888	-	1: 0.50

The above tonnages are arrived after taking following factors:

	Iron Ore	BHQ	Waste
Bulk Density	3.0 t/cum	2.6 t/cum	2.0 t/cum
Recovery	90%	60%	-

II. Dump re-handling: (for the purpose of recovery of mineral):

No proposals of dump re-handling in this plan period.

- c) **Enclose Individual year wise development plans and sections showing pit layouts, dumps, stacks of mineral reject, if any, etc in case of 'A' category mines. Composite development plans showing pit layouts, dumps, stacks of mineral reject, if any, etc. and year wise sections in case of 'B' category mines.**

Production program proposed as per CEC approved production of 1.80 LTPA of iron ore from this mine. Workings will be in the existing pit between sections A1-A1' to E-E' and advancement of benches will be towards NW-SE direction on the strike length of the ore zone and NE to SW direction across the strike of the ore zone. The following table gives year wise details of working levels, location grids, number of benches etc.

Table-23: Details of workings

Year	Area Ha	Sections	Advance ment	Nb. of benches	Level mRL	Co-ordinates	
						Northing	Easting
1 st Year	0.87	A1 & A2	SE		851	167466	656379
					821	1674532	656506
2 nd Year	2.87	A1, A2, B, C & D	NE & SW	5	855	1674744	656238
					821	1674532	656506
3 rd Year	3.37	A1, A2, B, C, D & E	N, NW & W	8	872	1674771	656166
					813	1674523	656506
4 th Year	3.54	A1, A2, B & C	N & W	9	872	1674771	656166
					806	1674523	656506
5 th Year	3.78	A1, A2, B, C, D & E	N & W	9	872	1674792	656127
					806	1674523	656506

Plates III a to c give year wise Production and Development plans and Plate III f shows sections in 1:1,000 scale.

First year production & development:

In the first year of working after execution of lease, about 0.87 Ha area around sections A1-A1' to A2-A2' is proposed for working in 4 nos. of benches. During this year about 1.80 lakh tonnes of iron ore will be produced and corresponding waste of 58,758 tonnes will be handled. The handled waste will be dumped in the dump yard AD2 located at NW corner of the lease area. The ROM will be screened/crushed and finished products will be transported to JSW steel plant for captive consumption. This activity will be same in all the years of mining plan period. The ore to overburden ratio will be 1:0.33. The levels of workings will be between 851mRL and 821mRL.

Table-24: Section wise calculation for proposed workings-First year

IRON ORE							WASTE					
Sec No.	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Recovery (90%)	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Total waste*
A1-A1'	906	55	49830	3.0	149490	134541	246	55	13530	2.0	27060	42009
A2-A2'	374	45	16830	3.0	50490	45441	130	45	5850	2.0	11700	16749
Total			66660		199980	179982			19380		38760	58758

*Note: Total waste includes 10% intercalated waste from ore zone.

Second year production & development:

In second year of working, about 2.87 Ha area around sections A1-A1' to D-D' is proposed for working in 5 nos. of benches. During this year about 1.80 Lakh tonnes of iron ore will be produced and corresponding waste of 89,422 tonnes will be handled. The handled waste will be dumped in the dump yard AD2 located at NW corner of the lease area. The ore to overburden waste ratio will be 1:0.50. The levels of workings will be between 855mRL and 821mRL.

Table-25: Section wise calculation for proposed workings-Second year

Sec No.	IRON ORE						WASTE					
	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Recovery (90%)	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Total waste*
A1-A1'	481	55	26455	3.0	79365	71429	95	55	5225	2.0	10450	18387
A2-A2'	163	45	7335	3.0	22005	19805	0	45	0	2.0	0	2201
B-B'	171	50	8550	3.0	25650	23085	162	50	8100	2.0	16200	18765
C-C'	160	60	9600	3.0	28800	25920	94	60	5640	2.0	11280	14160
D-D'	210	70	14700	3.0	44100	39690	225	70	15750	2.0	31500	35910
Total			66640		199920	179928			34715		69430	89422

Third year production & development:

In this year, about 3.37 ha area around sections A1-A1' to E-E' is proposed for working in 8 nos. of benches. During this year about 1.80 Lakh tonnes of iron ore will be produced and corresponding waste of 97,801 tonnes will be handled. The ore to overburden ratio will be 1:0.54. The handled waste will be dumped in the dump yard AD2 located at NW corner of the lease area. The levels of workings will be between 872mRL and 813mRL in the same pit of previous year will be worked further down.

Table-26: Section wise calculation for proposed workings-Third year

Sec No.	IRON ORE						WASTE					
	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Recovery (90%)	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Total waste*
A1-A1'	215	55	11825	3.0	35475	31928	67	55	3685	2.0	7370	10918
A2-A2'	312	45	14040	3.0	42120	37908	148	45	6660	2.0	13320	17532
B-B'	183	50	9150	3.0	27450	24705	50	50	2500	2.0	5000	7745
C-C'	163	60	9780	3.0	29340	26406	138	60	8280	2.0	16560	19494
D-D'	176	70	12320	3.0	36960	33264	19	70	1330	2.0	2660	6356
E-E'	136	70	9520	3.0	28560	25704	235	70	16450	2.0	32900	35756
Total			66635		199905	179915			38905		77810	97801

*Note: Total waste includes 10% intercalated waste from ore zone.



Fourth year production & development:

In fourth year of working, about 3.54 Ha area around sections A1-A1' to C-C' is proposed for working in 9 nos. of benches. During this year about 1.80 Lakh tonnes of iron ore will be produced and corresponding waste of 81,381 tonnes will be handled. The ore to overburden waste ratio will be 1:0.45. The handled waste will be dumped in the dump yard AD2 located at NW corner of the lease area. The levels of workings will be between 872mRL and 806mRL.

Table-27: Section wise calculation for proposed workings-Fourth year

Sec No.	IRON ORE						WASTE					
	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Recovery (90%)	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Total waste*
A1-A1'	268	55	14740	3.0	44220	39798	56	55	3080	2.0	6160	10582
A2-A2'	556	45	25020	3.0	75060	67554	71	45	3195	2.0	6390	13896
B-B'	253	50	12650	3.0	37950	34155	317	50	15850	2.0	31700	35495
C-C'	236	60	14160	3.0	42480	38232	143	60	8580	2.0	17160	21408
Total			66570		199710	179739			30705		61410	81381

*Note: Total waste includes 10% intercalated waste from ore zone.

Fifth year production & development:

For this year of plan period, 3.78 ha area around sections A-A' to E-E' is proposed for working in 9 nos. of benches. During this year also 1.80 Lakh tonnes of iron ore will be produced and corresponding waste of 89,958 tonnes will be handled. The ore to overburden waste ratio will be 1:0.50. The handled waste will be dumped in the AD2 area located at NW corner of the lease area. The levels of workings will be between 872mRL and 806mRL. The generated waste will be dumped in the earmarked area as in previous years.

Table-28: Section wise calculation for proposed workings-Fifth year

Sec No.	IRON ORE						WASTE					
	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Recovery (90%)	Area (sqm)	Influ (m)	Volume (cum)	BD (t/cum)	Quantity (Tonnes)	Total waste*
A1-A1'	180	55	9900	3.0	29700	26730	68	55	3740	2.0	7480	10450
A2-A2'	349	45	15705	3.0	47115	42404	145	45	6525	2.0	13050	17762
B-B'	120	50	6000	3.0	18000	16200	0	50	0	2.0	0	1800
C-C'	95	60	5700	3.0	17100	15390	0	60	0	2.0	0	1710
D-D'	171	70	11970	3.0	35910	32319	210	70	14700	2.0	29400	32991
E-E'	115	70	8050	3.0	24150	21735	72	70	5040	2.0	10080	12495
F-F'	155	60	9300	3.0	27900	25110	83	60	4980	2.0	9960	12750
Total			66625		199875	179888			34985		69970	89958

*Note: Total waste includes 10% intercalated waste from ore zone.



- d) Describe briefly giving salient features of the proposed method of working indicating Category of mine.

Mining will be carried out by fully mechanized (A-category) open cast mining method by making benches of 7m height and width of 8m. Excavators will be used for progressing the benches. The only one main pit of Iron ore reef which is already exposed extensively is proposed for production and development in this plan period. Systematic bench formation will be made to rectify old benches. Drilling and blasting technique will be used whenever required to handle hard formation. Since ore deposit is medium soft to hard in nature only around 30% of material may need blasting.

Extent of Mechanization: The mine will be operated by fully mechanized method. Hydraulic excavators will be used for progressing benches and for handling ore/waste material and tippers of 16tons capacity will be deployed for ore/waste transportation. Other activities like water supply for domestic use, water sprinkling, and afforestation will be carried out by water tankers. Jeeps will be deployed for movement of personnel/staff.

Adequacy of equipment: Maximum quantity handled per annum will be 1.80 lakh tonnes of iron ore every year along with corresponding waste of around 0.98 lakh tons (max) in the third year. The maximum proposed handling (ore and waste) will be around 2.78 lakh TPA.

One excavators of bucket capacity of 1.0cum will be deployed. It can handle about 178 tph. A typical hourly capacity of an excavator is calculated below.

Table -29

Hourly capacity = $(3600 \times BC \times Sf \times Ff \times Tf \times n) / Ct$	
Where	BC = Bucket capacity = 1.0 cum
	Sf = Swell factor = 0.8
	Ff = Fill factor = 0.9
	Tf = Tonnage Factor = 3
	n = Efficiency = 0.8
	Ct = Cycle time = 35 seconds
Hence TPH = $(3600 \times 1 \times 0.80 \times 0.9 \times 3 \times 0.8) / 35 = 178 \text{ tph}$	



Considering 300 working days x 7 hrs/day;
Yearly handling by one excavator = $178 \times 7 \times 300 \times 1 = 3774$ lakh tons annum.

Hence, proposed one excavator is more than enough, as maximum proposed handling will be around 2.78 lakh TPA.

Table - 30: Tipper requirement for transportation

Production		Development	
Production	1.80 LTPA	Development	0.98 LTPA
Working Days	300	Working Days	300
Production /Day	600	Development /Day	327
Effective working hours/day	7	Effective working hours/day	7
Production/hr	86	Handling/Hr	47
Tipper Requirement			
Production-Lead	0.5 Km	Lead	0.75 Km
Speed	20 Kmph	Speed	20 Kmph
One Trip	15 minutes	One Trip	20 minutes
No. of Trips /hr	4	No of Trips/hr	3
Effective working hours/day	7	Effective working hours/day	7
Total Material to be handled	600 tpd	Total Material to be handled	327 tpd
No of trips /day (14 T)	43	No of trips /day (14 T)	24
No of Trips by one tipper /Shift	28	No of Trips by one tipper /Shift	28
No of Tippers Required	1.54 (say 2)	No of Tippers Required	1

Proposed 3 nos. tippers are adequate and two will be kept as standby. Wheel loaders will be deployed for maintenance of dumps, feeding plants etc.

Drilling/Blasting:

About 30% material out of total handling of 2.78 lakh TPA will require blasting i.e. 0.83 lakh TPA as most of the lithology is medium hard.

Hence, maximum material to be blasted per day = 0.83 lakh tons/300 days
= 277 tpd

Quantity broken/hole = Burden x Spacing x Depth x Avg. Bulk Density
= $2.5 \text{ m} \times 3.0 \text{ m} \times 7 \text{ m} \times 2.75^* \text{ tons / m}^3$
= 144.375 tons/hole

(Av. Bulk density has been considered by weight volume ratio)

Daily requirement of holes = $277/144.375 = 1.92$ (say 2)



Hence, for a daily requirement of drilling meterage of 14m (2x7=14m) wagon drill is sufficient as it can drill 50-60mtrs/shift. However, blasting will be carried out two to three times per month.

Bench height & width shall be maintained at 7m and 8m respectively from ore each for easy operation of machinery. So, holes of 8 to 9 m will be drilled with covering inclination and sub-grade drilling. Drill holes in development shall have a spacing and burden of 3m and 2.5m respectively. Charge per hole will be kept at around 30kgs. Normally two rows of blasting pattern will be adopted to control the ground vibration, back break and noise pollution. Stemming of around 3m will be done to control the fly-rock generation. The maximum no. of holes kept in one blasting will be around 25-30. Use of MS delay detonators & cord relays will help in controlling the vibration and achieve better fragmentation. Blast initiation in the hole will be done using Nonel BTH shock tube of 25Ms and 42Ms. The powder factor will be around 7 tonnes/kg. Hence the charge per hole will vary from 30kg to 40kg depending on the strata. Annual requirement of Explosives will be around 1.53 tonnes (107,000/7t/kg). Slurry explosives will be used for blasting.

A magazine of about 2.0-ton capacity will be established, till such time, Explosive Contractors will be hired.

Table-31: List of proposed mining machinery

Type	Nos.	Size / Capacity	Make
Wagon drill /Compressor	1	115mm	Atlas Capsco
Excavator	1	1.0cum	CAT 336 D2L
Wheel Loader	2	1.5 cum	HM
JCB	1	0.9 cum	JCB
Tipper	5	16 tons	Tata
Jeep	2	5 Seater	Mahindra
Water Tanker	2	8000 Ltrs.	Tata
DG Set	1	33KVA	Kirloskar
Crusher/Screening plant	1	250 TPH	Power screen

6. Describe briefly the layout of mine workings, pit road layout, the layout of faces and sites for disposal of overburden/waste along with ground preparation prior to disposal of waste, reject etc. A reference to the plans and sections may be given. UPL or ultimate size of the pit is to be shown for identification of the suitable dumping site.



Mining is proposed in the Southern portion of the lease area where ore is already exposed, by fully mechanized open cast mining method by forming benches of 7m height and width of 8m. Workings will be between section lines A1-A1' to E-E' with bench advancement from NW to SE in the strike direction of the ore zone and NE to SW direction across the strike of the ore zone. Bench slope will be around 80° . Overall pit slope will be maintained at 45° with horizontal. Approach roads for each bench will be made with sufficient width. Top most existing bench will be pushed back to facilitate the formation of benches properly.

Dumping of waste material is proposed to be carried out in the slopes of NW portion of the lease area i.e., in AD2. Tippers of 16 tons capacity will be used to transport the waste generated from mine pit to the dump yard. Dumping will be with stages of each 10m height. In this plan period, 2.67 ha will be used for waste dumping out of total 12.77 ha area earmarked. Total waste generation in this plan period will be about 4.17 lakh tonnes and proposed dumping area is enough to accommodate the waste. This dumping area is in anti-dip side (footwall) of the ore body, away from UPL.

Table-32: Details of dumping -AD2

Year	Dumps	Waste tonnes	Area Ha	No. of stages	Level mRL	Location Co-ordinates	
						Northing	Easting
First	AD2	58,758	0.67	2	882	1674862	655891
					870	1674649	655982
Second	AD2	89,422	1.45	2	894	1674937	655805
					870	1674649	655982
Third	AD2	97,801	1.93	3	897	1674956	655755
					870	1674649	655979
Fourth	AD2	81,381	2.42	3	900	1674980	655701
					870	1674649	655984
Fifth	AD2	89,958	2.67	3	910	1674983	655685
					870	1674649	655983



The ultimate pit will cover 23.24 ha area. The ultimate slope of the pit will be 45° from vertical. At the end of conceptual stage, the ultimate size of the pit in terms of average length, width, depth will be about 836m x 278m x 70m.

Location of proposed workings and dumping are shown in the year wise layout plans, plate III/a to III/e. The year wise working sections are enclosed as Plate IIIc/1 & IIIc/2.

- f) Conceptual Mine planning up to the end of lease period taking into consideration the present available reserves and resources describing the excavation, recovery of ROM, Disposal of waste, backfilling of voids, reclamation and rehabilitation showing on a plan with few relevant sections.

Excavation: Based on the establishment of proved category (G1 & G2) of reserves after exploration, the mining area as well as ultimate pit limits is designed. Considering the current exploration data and geology, working layout is designed for the proposed production of 1.80 lakh tons of iron ore.

In this plan period area of mining will be in 20.62 ha that covers existing pit area. In the conceptual stage, 23.24 ha will be covered under mining and backfilling. All backfilled pits will be reclaimed with plantation. Fencing will cover the working pit & security will be deployed to prevent any unauthorized persons entering the mining area.

Recovery of ROM: Recovery of iron ore of +45% Fe is considered as 90% and BHQ as 60%.

Disposal of waste dumps: Dumping is proposed to be carried out in the NW part of lease area. In the plan period, 2.67 ha will be used from the existing dump (AD2) of total 12.77 ha area. Waste generation will be about 4.17 lakh tonnes in this plan period and proposed dumping area is enough to accommodate the waste. The existing active dumping area is in anti-dip side (footwall) of the ore body, away from UPL.



During Conceptual Period, an area of 14.12 ha has been earmarked. Apart from this back filling will also be taken up in exhausted pit area. As per the approved Reclamation & Rehabilitation Plan, AD1 & AD2 areas further considered for dumping over existing dump, which will additionally accommodate 0.494 MCM (0.99 Million tons) of waste up to conceptual stage.

The total waste generation during the life of mine will be assessed after exploration by the preferred bidder post execution of mining lease. And during next plan period concurrent back filling program will be made after getting data from exploration.

Sub grade ore: No sub grade ore generation is proposed.

Backfilling of voids:

No backfilling of voids as no mining pit is going to exhaust in this plan period. However, in next plan periods concurrent back filling of mined out pits will be taken up. In the conceptual stage, 23.24 ha will be covered under mining and backfilling. All backfilled pits will be reclaimed with plantation.

Reclamation and Rehabilitation:

For protection of the mining area and to prevent further degradation of land and stabilization of dumps, the following measures are proposed.

Table-33:

First Year:					
Area	Particulars	Description	Dimension (mtrs)		
			Length	Width	Height
Mineral stock (temporary)	TW-1: Toe Wall at the bottom	Foundation in hard soil mixed with boulders including hard rock	105	2.5	0.60
		Plain cement concrete (1:4:8) in foundation	105	2.5	0.15
		RR Stone masonry	105	1.0	2.0

No sub grade generation will be in this plan period. However, an area of 2.67 ha has been preserved for accommodation of mineral stock.



Afforestation: Plantation will be made on inactive dump 1D as below:

Table-34: Year wise Plantation

Year	Area (ha)	Saplings	Survival Rate	Species
First	0.516	1290	80%	As per R&R recommendations
Second	0.516	1290		
Third	0.516	1290		
Fourth	0.516	1290		
Fifth	0.516	1290		

Land Use Pattern: Existing land use as well as proposed for this plan period and in conceptual stage is described below:

Table-35: Land Use in Ha

Type	Existing	This plan period	Conceptual Period
Mining	20.62	20.62	23.24**
Dumping	12.77	12.77	14.12
Statutory building	1.33	1.33	1.33
Mineral stock	1.44	2.62*	-
Road	2.35	2.35	2.35
Safety zone area	2.54	2.54	2.54
Untouched area	2.53	1.35	-
Total	43.58	43.58	43.58

Note:

*Mineral Stock - Existing 1.44 ha + 1.18 ha from Unused Area = 2.62 ha

**Mining - Plan period 20.62 ha. - 2.62 ha plan period Mineral Stock

B. UNDERGROUND MINING:

Not applicable



3.0 MINE DRAINAGE:

- a. Minimum and Maximum depth of water table based on observations from nearby wells and water bodies:

Minimum and maximum depth of water table based on observations from the nearby wells and water bodies is 20m (660mRL) to 30m (650mRL) from general ground level i.e. 680mRL.

- b. Indicate maximum and minimum depth of workings:

Present maximum working level is 825.80 mRL and minimum working level in center of the pit is 960mRL. During the plan period the maximum working level will be 806mRL and minimum level will be 872mRL.

- c. Quantity and quality of water likely to be encountered, the pumping arrangements and the places where the mine water is finally proposed to be discharged:

There is no chance of encountering ground water during mining as the lowest level in mining will be well above general ground level. Only rainwater drains off from the plateau towards western side and goes to the valleys.

- d. Describe regional and local drainage pattern. Also indicate annual rain fall, catchments area, and likely quantity of rainwater to flow through the lease area, arrangement for arresting solid wash off etc.

The precipitation within the part of the mining pit area of 20.62 Ha. accumulates in the bottom benches of the mining pit. A part of the accumulated water in the pit will percolate in the ground and part of the water being used for dust suppression and watering for plantation as per requirement. No rain water accumulates in the remaining lease area, it flows from hill slopes and does not accumulate till it reaches the lower valleys.



Hence, the drainage pattern is sub-dendritic in nature and is typical of the hilly area. A total of 8 nalas are originating from the lease area. Out of the total, 3 each are originating from north and east and 2 from western side of the lease area. There are few small seasonal water courses from the pit area. The three nalas originating from the eastern side and crossing the road towards Siddapura village. The two nalas from the western side is draining into the tank located near Gunda village, while, all the 3 eastern side nalas and 3 northern side nalas flowing towards northeastern side and join together to form a major nala and draining into tanks located near Siddapura, Jaisingpura, Rajapura villages.

Average annual rainfall in area is around 630.5mm. Whole lease area of 43.58 ha is catchment area for rainfall, hence the likely quantity of rainwater that will be flowing through the lease area will be 2.75 lakh cum ($0.631\text{m} \times 43.58 \times 10,000$). However, for protection of the mining area and for arresting solid wash-off the management measures for dumps have been proposed which are already discussed in above chapters.



4.0 STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE:

- a) Indicate briefly the nature and quantity of topsoil, overburden / waste and Mineral Reject to be disposed off:

There is no soil cover in proposed mining area, which is already broken during earlier period. In the reef-oriented areas, the waste generation is from the side burden shale patches and side burden BHQ of -35% Fe.

Table -36: Year wise quantity in tonnes of Waste and others

Year	Topsoil		Waste		Mineral rejects		
	Reuse / Spreading	Storage	Backfilling	Storage	Blending	Storage	Beneficiation
First	-	-	-	58,758	-	-	-
Second	-	-	-	89,422	-	-	-
Third	-	-	-	97,801	-	-	-
Fourth	-	-	-	81,381	-	-	-
Fifth	-	-	-	89,958	-	-	-

- b) The proposed dumping ground within the lease area be proved for presence or absence of mineral and be outside the UPL unless simultaneous backfilling is proposed or purely temporary dumping for a short period is proposed in mineralized area with technical constraints & justification.

Dumping is proposed to be carried out in the NW portion of the lease area. In this plan period, 2.67 ha will be used out of total 12.77 ha (AD2) area earmarked for dumping. The waste generation will be about 4.17 lakh tonnes in this plan period and proposed dumping area is enough to accommodate the waste. During Conceptual Period, an area of 14.12 ha has been earmarked for dumping. This dumping area is in anti-dip side (footwall) of the ore body, away from UPL and is a non-mineralized area.

5.0 USE OF MINERAL AND MINERAL REJECT



a) Requirement of end-use industry:

Since this mine is a captive mine, entire production will be utilized in the JSW Steel Plant. However, BHQ will not be mined in this plan period and study about BHQ characteristics & its beneficiation / usage will be carried out after lease execution and production planning for same will be made in next mining plan.

b) Requirement of intermediate industries involved in up gradation of mineral before its end-use:

No involvement of any intermediate industries before its end use. The proposed production in this plan period will be consumed by JSW Steel Plant.

c) Detail requirements for other industries, captive consumption, export, associated industrial use etc.

All iron ore of +45% Fe will be used in the steel industry run by in the JSW Steel Ltd.

d) Physical and chemical specification stipulated by buyers:

Physical and chemical specifications stipulated by JSW Steel Plant:

Table -39:

Category	Grade (Fe%)	Size
Calibrated Iron ore	+45	+10 to -40 mm
Fines Iron Ore	+45	-10 mm

e) Details of processes adopted to upgrade the ROM to suit the user requirements:

All the Ore produced will be sent for dry processing (Crushing / screening) into different sizes like +10-40mm calibrated Iron ore and -10mm fines Iron ore will be in Crushing / screening plant.



6.0 PROCESSING OF ROM AND MINERAL REJECT

a) Processing / beneficiation of the ROM or Mineral Reject:

No wet mineral processing, only dry crushing and screening for size separation as per requirement in Crushing/Screening Plant of 250 tph. ROM will be fed to plant to bifurcate the same in to -10mm fines and +10 to +40mm calibrated ore.

b) Flow sheet or schematic diagram of the processing procedure:

In the plant, the ROM shall be separated first into -10mm and +10mm material by screening. +10mm will be crushed in the crusher, set to crush at 40mm. The crushed material will be screened on 40mm and 10mm screens and material of -40mm+10mm and -10mm will be sent as Calibrated Ore and Fines respectively. The lumps if required are crushed to -40mm size and screened.

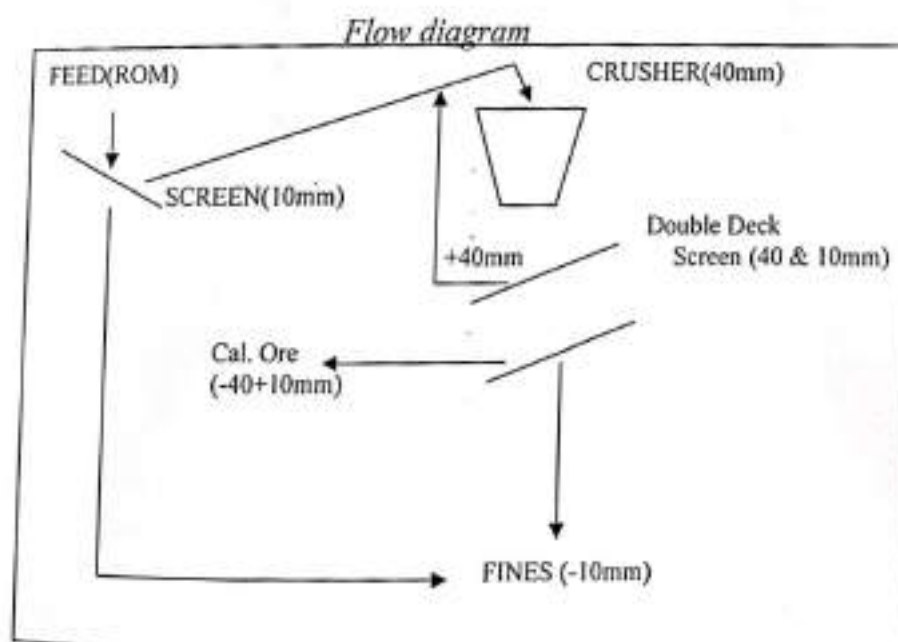


Table -40: Likely material balance

Description	Rate
Feed (ROM)	100 tph
Cal. Ore(-40+10mm)	40 tph
Fines (-10mm)	60 tph



c) Disposal method for tailings or reject from the processing plant:

No rejects from crushing / screening plant.

d) Quantity and quality of tailings /reject proposed to be disposed:

No rejects from crushing / screening plant.

e) Quantity and type of chemicals if any to be used in the processing plant:

Only dry screening and crushing and no chemicals are used.

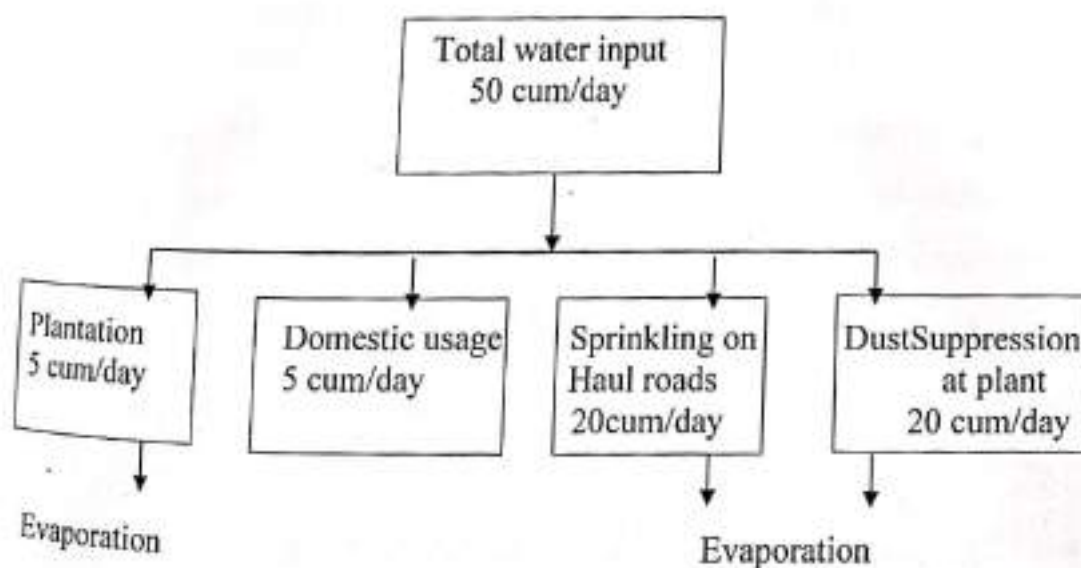
f) Specify quantity and type of chemicals to be stored on site / plant:

Not applicable.

g) Water requirement:

No water is required for processing except dust suppression. Other usages of water in the mine will be for dust suppression, afforestation and domestic use. Water is sourced from bore wells located in the nearby villages

Water Balance Chart



7.0 OTHERS

a) Site Services & Infrastructure:

The lease area is located near village Ramgad, Taluk Sandur, Dist-Ballari, State Karnataka. It is located at about 10 km from Sandur town. Mine will have having separate vehicles for staff and Manager. The approach road is good and approachable in all season. The infrastructure like Mine office, stores, Canteen, first aid-station, rest shelter etc will be in the lease.

Sandur-Hospet road via Ramgad village is passing through the lease area. Main Hospet-Sandur state highway road via Sushilanagar village is passing at Eastern side of lease area at about 3km distance. Hospet (18km) is the nearest railway station and Marmugoa is the nearest port (400km). Sandur town is having all facilities like Police Station, Hospital, Post Office, School, Workshops etc.

Workshop: All major and capital repairs including maintenance and servicing of all mining equipment and machinery will be carried out at the proposed mine workshop. The workshop will be provided with all essential facilities under following sections:

- i. Heavy vehicles section
- ii. Medium and light vehicles section
- iii. Auto-Electrical section
- iv. Welding and blacksmith section
- v. Machinery and lathe section

All activities of the workshop are carried out under the control of qualified Mechanical and Electrical engineers with the employment of experienced mechanics and electricians. An independent store for all essential spare parts is also maintained at the mine workshop.

Canteen: A small canteen will be organized near the mine office to cater the needs of mining staff.

Dispensary: A dispensary/ cum-clinic is maintained at Toranagallu Office where from all basic medical needs of workers and staff can be fully met.



3. Employment potential:

Vice president, Mines (JSW Steel Ltd.) heads the mine organization followed by Mines Manager holding 1st class Certificate of competency. This mine will provide direct employment to 65 people and indirect employment to around 150 people.

Table -41: Category wise employment

Category: Highly Skilled

Designation	No. of Persons
Mines Manager	1
Asst. Mines Manager	1
Mining Engineer	1
Environment Engineer	1
Geologist	1
Mechanical Engineer	1
Electrical Engineer	1
Mine Surveyor	1
Mining Foreman	2
Mining Mate cum Blaster	2
Welfare officer	1
IT officer	1
Total	14

Table-44: Category: Skilled

Designation	No. of Persons
HEMM operator	10
Maintenance Dept. Staff	6
Office Staff	5
Total	21

Table-45: Category: Semi-skilled

Designation	No. of Persons
Helpers	6
Drivers	4
Total	10

Table-46: Category: Unskilled

Designation	No. of Persons
Workmen	20
Total	20



PROGRESSIVE MINE CLOSURE PLAN UNDER RULE 23 MCDR'1988



8.1 Environment Base line information:

Existing land use pattern: The mining lease area falls in reserved forest area of Ramgad Range in Sandur Taluk, Ballari Dist. The total area of the lease is 43.58 Ha. The existing land use pattern is given below:

Table-42: Existing Land use

Type	Area
Mining	20.62
Dumping	12.77
Statutory building	1.33
Mineral stock	1.44
Road	2.35
Safety zone area	2.54
Untouched area	2.53
Total	43.58

Water Regime:

The lease area is small and the elevation varies from 921 to 710 m above MSL. The natural slopes are fairly steep varying from 250 to 350 and loping towards NE and SW on either side. Naturally, no rain water accumulates in the lease area except mining pit area. All the rain water flows from hill slopes and does not accumulate till it reaches the lower valleys.

A total of 8 nallahs are originating from the lease area. Out of the total, 3 each are originating from north and east and 2 from western side of the lease area. There are few small seasonal water courses from the pit area. The three nalas originating from the eastern side and crossing the road towards Siddapura village. The two nalas from the western side is draining into the tank located near Gunda village, while, all the 3 eastern side nalas and 3 northern side nalas flowing towards northeastern side and join together to form a major nala and draining into tanks located near Siddapura, Jaisingpura, Rajapura villages.



Quality of air: Environmental monitoring data of the summer season 2018 collected by erstwhile lessee is enclosed (Annexure-15). All the parameters are well within the permissible limits as fixed by the CPCB and DGMS for Mining areas.

Noise level: Ambient Noise levels in core and buffer zone are within the permissible limits. Noise level data collected by erstwhile lessee is enclosed (Annexure-15). The noise values obtained were within the prescribed standards.

Flora: The vegetation occurring in the area belongs to Southern tropical dry deciduous forests according to Champion and Seth Classification of Forest Types of India (1968). The common tree species found in the area are *Acacia catechu*, *Anogeissus latifolia*, *Azadirachta indica*, *Buchanania lanzan*, *Chloroxylon swietenia*, *Dalbergia paniculata*, *Dolichandronea torovirens*, *Gardenia gummifera*, *Hardwickia binata*, *Holoptelea integrifolia*, *Phyllanthus emblica*, *Pongamia pinnata*, *Pterocarpus marsupium*, *Soymania febrifuga*, *Syzygium cumini*, *Tectona grandis*, *Terminalia elliptica*, *Trema orientalis*, *Wrightia tinctoria* and *Ziziphus mauritiana*.

Few climbers and twiners like *Cissampelos pareira*, *Cryptolepis buchananii*, *Ipomoea staphylinea* and *Thunbergia fragrans* are also observed. *Cassia auriculata*, *Chromolaena odorata*, *Dodonaea viscosa*, *Grewia hirsuta*, *Maytenus marginata*, *Triumfetta rhomboidea*, etc., are some of the shrubs encountered. The ground flora is chiefly seasonal. The dominant grasses include species like *Bothriochloa pertusa*, *Chrysopogon fulvus*, *Aristida adscensionis*, *Dactyloctenium aegyptium*, *Heteropogon contortus*, *Pennisetum pedicellatum*, *Rhynchelytrum repens*, *Urochloa panicoides*, *Cymbopogon nardus*, *Cynodon dactylon*, etc. There are several other herbs like *Ageratum conyzoides*, *Alternanthera pungens*, *Argemone mexicana*, etc.



The method of mining is open cast and it is operating in the forest land. Vegetation in and around present mine area under study is altered. Some of the tree species found growing are *Anogeissus latifolia*, *Bridelia retusa*, *Cassia fistula*, *Mallotus philippensis* and *Polyalthia cerasoides*. The shrubs occurring are: *Calotropis gigantea*, *Cipadessa baccifera*, *Clerodendrum serratum*, *Grewia hirsuta*, *Helicteres isora*, *Phyllanthus reticulatus*, *Tephrosia purpurea*, *Securinega virosa*, etc. Species are planted by the lessee include *Acacia mangium*, *Agave americana*, *Azadirachta indica*, *Cassia siamea*, *Eucalyptus* sp., *Dalbergia sissoo*, *Pongamia pinnata*, *Tecomastans* and *Tectonagrandis*.

Climatic conditions: The subject area forms a part of region dominated by tropical climate with hot Summer days, moderately cool Winter and moderate Monsoon. In general, the area enjoys moderately cool climate in winter, very high temperature during summer and moderate rain during summer months. The area receives both SW and NE monsoons, respectively from June to September and from October to November. The former period contributes to about 60% of the rain and the latter about 24%. The data observed during 2011 at IMD, Ballari revealed that the daily average temperature varied from 17.0 to 39°C, and that of the relative humidity from 27 to 77%.

Human settlements: There is no human settlement in the mining lease. Nine villages are situated within the buffer zone, with total population of 12,254 as per the census data.

Table -43: Details of villages in 10 Km Buffer zone

Villages	Population	Distance (Km)	Direction
Siddapur	1118	2.1	NE
Bhavihalli	3833	5.0	SE
Garaga	149	6.8	SW
Gollahalli	1533	9.7	SW
Nagalapura	1538	7.0	SW
Kallahalli	1489	9.7	NW
Jaisingpur	1814	4.5	NW
Dhanapura	227	9.8	NW
Ramagd	553	2.2	E

Public building, places of worship and monuments:

There are no public buildings, places of worship and monuments within the core zone. However, there are temples, mosques, churches are located in the buffer zone villages for worship.



Indicate any sanctuary is located in the vicinity of leasehold:

There is no sanctuary located in the vicinity of leasehold.



8.2 Impact Assessment:

- i) Land area indicating the area likely to be degraded due to mining, dumping roads, workshop, processing plant, tailing pond/dam, township etc.:

Due to the mining activity, there will be change in ground profile, due to pits, dumps and other allied activities. The land likely to be degraded is as below:

Table-44: Land Use in Ha

Type	Existing Area up to 2019-20	This plan period Area	Conceptual Period Area
Mining	20.62	20.62	23.24
Dumping	12.77	12.77	14.12
Statutory building	1.33	1.33	1.33
Mineral stock	1.44	2.62	-
Road	2.35	2.35	2.35
Safety zone area	2.54	2.54	2.54
Untouched area	2.53	1.35	-
Total	43.58	43.58	43.58

Table-45: Impact Assessment

Impact Areas	Likely Impacts	Mitigation methods (Existing/Proposed)
ii) Air Quality	Contamination of Respirable air due to mining operations like excavation /loading and haulage, drilling and blasting operations etc.	Preferred bidder will employed effective methods like dust suppression through water sprinkling on haul roads by water tankers on regular basis and covering of dust generation portions of crushing/screening plant, enhancement of green belt, etc.
iii) Water	Pollution due to runoff of silts from mining area/wash off from dumps into natural streams, contamination of ground water, drinking water potability gets affected.	Adequate engineering structures like Check dams, Toe walls / retaining walls, garland drains, settling ponds, gulley plugs have already been constructed by erstwhile lessee. Water samples analysed regularly at MoEF by erstwhile lessee accredited laboratory shows measured parameters are within standards. These measures will be continued, and construction of toe wall / garland drains is proposed for new Temporary BHQ dumps.
iv) Noise Levels	Irritation to Human settlements, acute hearing problems for human beings, fauna etc.	Careful Drilling and Blasting will be carried out. Diesel Generators will be provided with acoustic enclosures, Ear plugs/masks will be provided to workmen at site/working near HEMM. Audiometry tests will be carried out during medical examination. These will be continued to mitigate the effects of noise pollution.



Proposed Environmental Monitoring stations:

Table-46: Details of Monitoring Stations-Buffer Zone

WATER SAMPLING STATIONS	
LGW2	Siddapur village Bore well water
ZGW2	Bore well water with in the lease area
ZGW3	Gunda village Bore well water
LGW1	Sushilnagar village Bore well water
SURFACE WATER	
LSW1	Siddapur Halla
ZSW2	Gunda Tank water
ZSW3	Dhanayakana kere tank water
RPSW3	Seasonal nallah near Jaisingpur
SW1	Mine out let
NOISE LEVEL MONITORING STATIONS	
N1	Crushing & Screening
N2	Drilling & Loading
N3	Haulage tipper
N4	Dumping
N5	Mines Office
N6	Siddapur village
N7	Sushil nagar
N8	Gunda village
AIR MONITORING STATIONS	
AI	Venkatagiri Village
AII	Siddapur Village m
AIII	Sushilnagar Villa
AIV	Gunda Village
WORK ZONE AIR QUALITY MONITORING	
FA1	Drilling & Loading
FA2	Haulage
FA3	Dumping
FA4	Crushing & Screening



v) **Vibration due to blasting:**

Drilling & Blasting is an important and vital aspect of mining. It is essential to assess the impact of this activity on the surrounding area, especially on the near-by structures and dwelling houses, if any. The ore, which is medium hard in nature, drilling will be conducted by wagon drill and blasting will be in conjunction with ANFO and slurry explosive. The quantity of charge used in the mine at any point is very small. Further except for the essentials like rest shelter, canteen, mines office, no other infrastructure is within the mining area. Further, the area is located at 5 km away from the nearest village and at a level difference of about 350m, the terrain will not propagate the vibrations. Hence, the impact due to blasting is negligible. To control ground vibrations, optimum charge per hole will be used and MS delay detonators will be adopted.

vi) **Water Regime:**

No harmful ingredients are present in the iron ore deposits. The mining area being located in hilly region and mining is proposed for shallow depth, the ground water table will not be encountered during the mining operations. Hence, the leaching of any chemicals and carrying to this depth is not envisaged. Ground water levels in the Sandur shist belt i.e. mining region is being regularly monitored by the ground water division of Department of Mines and Geology, Govt. of Karnataka. As per the reports there is increasing trend in the ground water level. The areas already exposed to rains and drainages will not be altered, as no fresh areas are proposed to be broken-up. So no further effect on surface drainage is likely. Toe walls and increasing afforestation prevent silt flowing. So, the mining activities may not have much impact on the water regime.

vii) **Acid mine drainage:**

Not applicable as no acidic material is present in the mining area.



viii) *Surface subsidence:*

This is open cast mine in medium hard strata further open cast mining operations are being carried out in systematic and scientific method with proper bench geometry. Hence there is no surface subsidence.

ix) *Socio-economics:*

The mining activities do not cause any displacement of human settlement. The impact of the mining project in this respect will be always of positive nature. The subject mining project provided direct employment for 55 persons and also created jobs in the service sector for an equivalent numbers in transportation, loading, plantation in the mine and for office at Ballari etc.,. Majority of this work force is from local villages/taluks of Ballari district.

The socio-economic impact of the project is summarized, as below:

1. The working of the mine improved vastly, the financial resources of the surrounding population by way of petty trade, transport and employment opportunities. The proposed increase in production will further improve these.
2. It benefited the town of Sandur, Hospet and district headquarters. Ballari in the form of trade, growth of ancillary industries. Further, it will add to the existing benefits.
3. The mining activity will result in direct benefits to the Government by the way of royalty and other taxes.
4. Social benefits to the surrounding population in the form of additional educational facilities, roads, communication facilities, transportation, marketing, banking, postal services, health facilities are likely.
5. Direct employment for about 18 persons besides indirect and ancillary employment. Local people are preferred for employment under semi-skilled and un-skilled categories.
6. Further, this mine is also catering to the raw material needs of the local steel plants & sponge iron plants.

Historical monuments etc.:

There are no public buildings, places of worship or monuments are located near the lease area.



§3 Progressive Reclamation Plan:

§3.1 Mined-out land:

No proposal of backfilling as no mining area will be exhausted in this plan period. However, for protection of the mining area and to prevent further degradation of land and stabilization of dumps, adequate measures are proposed.

§3.2 Topsoil Management:

No topsoil is expected as proposed mining area is within worked-out pits. However, if any topsoil is encountered it will be used for plantation.

§3.3 Tailing Dam Management:

No proposals as no tailing dam is present or proposed.

§3.4 Acid mine drainage, if any and its mitigative measures:

Not applicable as no acidic material is present in the mining area.

§3.5 Surface subsidence mitigation measures:

Not applicable as the proposal is for opencast mining in a stable area.

Table-47: Summary of year wise proposal for item No. 8.3



Items	Details	Actual Position (as on 2020)	First	Second	Third	Fourth	Fifth	Remarks
Dump management	Area afforested (ha)	-	0.516	0.516	0.516	0.516	0.516	-
	No. of saplings planted	-	1290	1290	1290	1290	1290	-
	Cumulative no. of plants	-	1290	2580	3870	5160	6450	-
	Cost including watch and care during the year	-	Rs.1.29 lakhs per annum					
Management of worked out benches	Area available for rehabilitation(ha)	--	-	-	-	-	-	-
	Afforestation done (ha)	--	-	-	-	-	-	-
	No of saplings planted	--	-	-	-	-	-	-
	Cumulative no of plants	--	-	-	-	-	-	-
	Any other method of rehabilitation (specify)	--	-	-	-	-	-	-
	Cost including watch and care during the year	--	-	-	-	-	-	-
Reclamation and Rehabilitation by backfilling	Void available for Backfilling - in ha	--	-	-	-	-	-	-
	Void filled by waste/tailings(Area in Ha)	-	-	-	--	-	-	-
	Afforestation on the backfilled area	--	-	-	-	-	-	-
	Rehabilitation by making water reservoir	--	-	-	-	-	-	-
	Any other means (specify)	--	-	-	-	-	-	-
Rehabilitation of waste land within lease	Area available (ha)	--	-	-	-	-	-	-
	Area rehabilitated	--	-	-	-	-	-	-
	Method of rehabilitation	--	-	-	-	-	-	-
Others (specify)	Greenbelt plantation-ha	-	-	-	-	-	-	-
	No. of plantation	-	-	-	-	-	-	-
	Greenbelt plantation -cost (lakh Rs.)	-	-	-	-	-	-	-
	Engineering structures for waste dump management-cost (lakh Rs.)	Retaining wall (RW)	1(105 m x 1.5m x 1m)	Structures will be maintained				-
				5.25 lakhs @ Rs. 5000/-per meter.				
	Env. monitoring		Will be carried out as per guidelines					

Note: The Environmental Monitoring data will be generated regularly after execution of lease area, Time being the date of approved RMP has been enclosed.

86 Financial Assurance:

Not applicable, as this lease is proposed to be granted after auction wherein a MDPA will be signed between lessee and GoK. However, area proposed to put into use in this plan period as stated in Rule 27 of MMR, 2017 will be 42.23 ha.



Table-48:

Sl. No.	Type of Land Use	Area of land use (in ha)			Area (ha) considered as fully reclaimed & rehabilitated	Net area(ha) considered for calculation of financial assurance
		Area put on use at start of plan	Additional requirement during plan period	As at the end of Plan period		
	1	2	3	4	5	6
1	Area under mining	20.62	-	20.62	--	20.62
2	Storage for topsoil	-	-	-	--	-
3	Overburden dump	12.77	-	12.77	--	12.77
4	Mineral stock	1.44	+1.18	2.62*	--	2.62
5	Statutory Buildings	1.33	-	1.33	--	1.33
6	Roads	2.35	-	2.35	--	2.35
7	Railways	-	-	-	--	-
8	Green belt / safety zone	2.54	-	2.54	-	2.54
9	Crushing/Screening plant	-	-	-	-	-
10	ETP	-	-	-	-	-
11	Township area	-	-	-	-	-
12	Biodiversity Area	-	-	-	-	-
13	Others- Un used	2.53	-1.18	1.35	-	-
	Grand Total	43.58	-	43.58	-	42.23

NOTE: *Mineral Stock -2.62 ha. (Existing 1.44 ha + 1.18 ha. from Unused Area)

Ref: Conceptual Plan, Plate-VI


Sunil Kumar Singh
Qualified Person


क्षेत्रीय खान नियंत्रक
Regional Controller of Mines
भारतीय खान ब्यूरो
Indian Bureau of Mines.
बंगलूर / Bangalore - 560 022

This Mining Plan is approved subject to the conditions / stipulations indicated in the Mining Plan approval letter No. 279/11.06/2019/BNG.
Date 07/01/2020



JSW Steel Limited

Regd. Office : JSW Centre,
Bandra Kurla Complex,
Bandra (East), Mumbai - 400 051
CIN : L27102MH1994PLC0152925
Phone : +91 22 4286 1000
Fax : +91 22 4286 3000
Website : www.jsw.in

Consent letter/Undertaking/Certificate

1. Consent: The Submission of Mining plan in respect of Dharmapura Iron ore Mine (ML no- 2239) over an area of 43.58 Ha in Ramgad Village, Sandur Taluka, Ballari District, Karnataka State Under Rule 16 of MCR 2016 has been prepared by Sri. Sunil Kumar Singh, Qualified Person. This is to request the Regional Controller of Mines, Indian Bureau of Mines, Bangalore to make any further correspondence regarding any correction of the Mining plan with the said qualified person at his address below:

Mr. Sunil Kumar Singh
G.M.-Mines
JSW Steel Limited,
Mining Division
Near Talur Cross,
Vidyanagar -583 275
Sandur Taluk, Ballari Dist.
Karnataka.

We hereby undertake that all updating as made in the said Mining plan by the said qualified person be deemed to have been made with our knowledge and consent and shall be acceptable on us and binding in all respects.

02. Undertaking : It is certified that the CCOM Circular No-2/2010 will be implemented and complied with when an authorized agency is approved by the State Government.

3. Certificate: It is certified that the Progressive Mine Closure Plan of Dharmapura Iron ore Mine (ML no- 2239) over an area of 43.58 Ha complies with all statutory Rules, Regulations, Orders Made by the Central or State Government, Statutory Organization, Court etc., which have been taken into consideration and wherever any specific permission is required the lessee will approach the concerned authorities.

The information furnished in the Progressive Mine Closure Plan is true and correct to the best of our knowledge and records.

4. Certificate: "The provisions of Mines Act, Rules and Regulations made there under have been observed in the Mining plan over an area of 43.58 Ha in Ballari District in Karnataka State belonging to Dharmapura Iron ore Mine (ML no- 2239) of M/s JSW STEEL LTD and where specific permissions are required, the applicant will approach the D.G.M.S. Further, standards prescribed by DGMS in respect of Miner's health will be strictly implemented".

For M/s. JSW Steel Ltd.,

Dr. Vinod Nowal
Nominated Owner

Place: Vidyanagar

Date:



Part of O. P. Jindal Group



Vijayanagar Works :
P.O. Vidyanagar - 583 275,
Dist. Ballari, Karnataka, India.
CIN. : L27102MH1994PLC152925
Phone : +91 8395 250 120-30
Fax : +91 8395 250 132/142
Website : www.jsw.in

CERTIFICATE FROM QUALIFIED PERSON

The provisions of the Mineral Conservation and Development Rules 2017 have been observed in the preparation of the Mining Plan along with Progressive Mine Closure Plan of Dharmapura Iron ore Mine over an area of 43.58 Ha, in Ramgad Village, Sandur Taluka, Ballari District, Karnataka State and whenever specific permissions are required, the applicant will approach the concerned authorities of Indian Bureau of Mines.

The information furnished in the Mining Plan is true and correct to the best of our knowledge.

Place: Vidyanagar

Date:



Sunil Kumar Singh
Qualified person



PHOTOGRAPHS

Photographs of Mining Area (2239)



Main Pit



Siliceous Iron ore



Mine view





Iron ore stock in the mines



Dump area



Dump area with road view



GROUND CONTROL POINTS



GCP - 1 - Generator Room - N 15° 08' 41.1"
E 76° 27' 23.8"



GCP - 2 - Plant Office in ML. No. 2309 - N 15° 08' 41.8"
E 76° 27' 21.8"



GCP - 3 - Masonry Check Dam - N 15° 08' 48.0"
E 76° 27' 21.6"