

## EXECUTIVE SUMMARY

### 1.1 Introduction

The Dharma Iron Ore Mine lease area is located near Ramgad Village of Sandur Taluk, Ballari District, Karnataka spread over an extent of 43.58 ha. area in Ramanamalai Block Reserved Forest. 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.

The Dharma Iron Ore Mine (erstwhile lessee M/s Zeenath Transport Company- ML no. 2239) is one of the mine owned by M/s JSW Steel Limited. The lease was granted to M/s JSW Steel limited through e-auction which was held on 24.07.2019 and M/s JSW Steel Limited was declared as Preferred Bidder (letter no. DMG-2020: MLS: AUC: 2018-19/5172 dated 19.02.2020). Subsequently, received Letter of Intent (letter no. DMG-2020: MLS: AUC: 2018-19 dated 13.08.2019) and became Successful Bidder (letter no. DMG-2020: MLS: AUC: 2018-19/5172 dated 19.02.2020). The mining lease was granted on 30.07.2020 (vide letter no. DMG/MLS/ Grant-013/2020-21/1972 and Mine lease deed was executed for Dharma mine on 30.07.2020 vide letter DGM/MLS 013/2020-21/2011.

The mining lease are located between Latitude: N 15°08'21.89" and N 15°08'35.53" and Longitude: E 76°27'12.47" and E 76°27'31.94".

The mining lease area is beyond the eco-sensitive zone (ESZ) of Daroji Sloth Bear Sanctuary (DSBC). The aerial distance of nearest mine boundary to the DSBS is:

1. Daroji Sloth Bear Sanctuary- 10.93 km
2. Eco sensitive zone of Daroji Bear Sanctuary- 9.42 km

Approved mining plan in the name of M/s JSW Steel Limited (letter no.279/1106/2019/BNG/38; dated 07.01.2020) for production capacity of 0.18 MMTPA.

Environmental Clearance (EC) has been vested, as per Gazette Notification by MoEF&CC (S.O.1224E), dated 28.03.2020 from previous lessee for a period of 2 years or till obtaining the fresh EC whichever is earlier.

Stage 1 Forest Clearance (FC) has been applied by M/s JSW Steel limited vide Proposal No. FP/KA/MIN/44852/2020.

Subsequently, as per the Forest Guidelines under Forest (Conservation) Act, 1980 dated 07.07.2021, transfer of approvals to new lessee may be accorded by the concerned State Government/UT Administration subject to fulfilment of conditions/provisions stipulated in the relevant guidelines of the Ministry.

As per the vesting order received from GOK vide letter no. CI 62 MMM 2020 dated 01.07.2020, provides deemed extension of all valid rights, approvals, clearances, licenses and the like vested with the previous lessee for period of two years to new lessee.

Accordingly, Dharma Iron Ore Mine started its mining operations after obtaining all necessary approvals on 25.09.2020.

Dharma Iron Ore Mine of M/s JSW Steel Ltd have applied for approved TOR on 27.08.2020 and after EDS resubmitted the application on 03.12.2020 for the production of 0.18 MMTPA iron ore over an area of 43.58 ha. The mine received approved TOR by SEIAA on 9.08.2021.

## 1.2 Project Description

The mining lease area is located between Latitude N 15°08'21.89" and N 15°08'52.88" and Longitude E 76°26'50.96" and E 76°27'31.94" in GOI topo sheet no. 57A/8. Dendritic drainage pattern is observed in the area. The highest elevation is 960m RL and the lowest elevation is about 790m RL. As the area is part of forest, moderate vegetation with small trees and shrubs/bushes are observed.

The salient features of the Dharma Iron Ore Mine are given in **Table 1**.

**TABLE 1 SALIENT FEATURES OF DHARMAPURA IRON ORE MINE**

Name of the mine	Dharma Iron Ore Mine ML No. 0013 (Old ML No. 2239)
Area	43.58 Ha
Forest	Ramanamalai Block Reserved Forest
Lat/long	Latitude: N 15°08'21.89" and N 15°08'52.88" and Longitude: E 76°27'12.47" and E 76°27'11.08"
Topo sheet No	57 A/8
Date of grant of Lol	13.08.2019

Period/Expiry Date	50 years as per MMDR (Amendment) Act-2015
Production Capacity	0.18 MMTPA (As per Approved Mine Plan)
Postal Address	Dharma Iron Ore Mine, near Ramgad village, Sandur taluk
District	Ballari
State	Karnataka
Type of mine	Open cast mine
Method of mining	Fully mechanized open cast method
Total reserves & resources	10.898057 Million Tonnes
Mineable reserves	2.00686 Million Tonnes
Inferred Mineral resources	3.383696 Million Tonnes
Expected life of mine	30 years [ $(2006860 + 3383696) / 180000 = 29.95$ Years]
Ore to Waste ratio(Max)	1: 0.54
Excavation (maximum)	0.278 MMTPA
Average no. of working days	300
Number of shifts	1
Working hours	7
Bench height & width	7m height and width of 8m
Top and Bottom Bench existing	960 m RL , 822 m RL
Present working benches	855 m RL , 821 m RL
Waste (till for 5 years)	4.17 lac Tonnes
Ultimate pit slope	45 degrees from vertical
Power requirement & source	30 KW, Source- DG sets
Water requirement & source	50 KLD, Mine pit water and nearby borewell
Project Cost (Gross Block cost)	Rs 3458.01 lacs

Mining are carried out by fully mechanized open cast mining method. Drilling and blasting technique are used whenever required to handle hard formation. The blasted material are excavated by the hydraulic excavators and front-end loaders having

various bucket capacities for achieving the planned production. The waste excavation are also met with the machinery deployed as per the excavation plan.

No wet mineral processing are done, only dry crushing and screening process are used for production of Fines (0 to less than 10 mm) and Lumps (10mm to less than 40 mm). The ROM (Runoff Mine) are extracted from the mine pit and as per the size, ROM are fed to screening & crushing plant. Deployment of Tertiary crushers will be undertaken as and when required.

The excavated material including ROM & waste are loaded into dumpers and tippers of 20 to 25 tonnes capacity and 19 to 23 tonnes capacity of trucks respectively for transportation of the material.

For achieving the desired production and waste quantity as per the excavation plan approximately 8000 & 6000 trips of dumpers are required respectively for internal transportation. For external transportation of finished product from stockyard to JSW Steel Plant approximately 85 to 105 trips /day having tipper capacities of 19 Tonnes and 23 tonnes are required.

The finished products are loaded on tippers by front end loader of suitable capacity and stacked in designated stockpiles. The final product is being dispatched to JSW Steel Plant by tippers and allied weigh bridge operations. The low-grade ore is suitably mixed with high grade ore to achieve desired Fe percentage and supplied to the customers.

## 1.3 Resource Requirement:

### Land Requirement

The lease area of 43.58 ha is in forest land. At the end of life of mine, land used under mining will increase from the present 20.62 Ha to 23.24 Ha.

**TABLE 2 LAND USE PATTERN - EXISTING & PROPOSED (CONCEPTUAL STAGE)**

Sl. No.	Category	Existing Land use pattern (Ha)	Percentage
1	Mining	20.62	47.32
2	Dumping	12.77	29.30
3	Statutory Building	1.33	3.05
4	Mineral stock	1.44	3.30
5	Roads	2.35	5.39

6	Safety zone area	2.54	5.83
7	Untouched area	2.53	5.81
Total		43.58	100

Proposed Land use pattern

Sl.No.	Category	Proposed Land use pattern- Plan period (Ha)	% of Land Used	Proposed Land use pattern- Conceptual period (Ha)	% of Land Used
1	Mining	20.62	47.32	23.24	53.33
2	Dumping	12.77	29.30	14.12	32.40
3	Statutory Building	1.33	3.05	1.33	3.05
4	Mineral stock	2.62	6.01	0	0.00
5	Road	2.35	5.39	2.35	5.39
6	Safety zone area (Green Belt)	2.54	5.83	2.54	5.83
7	Untouched Area	1.35	3.10	0	0.00
Total		43.58	100	100.00	100

Source: Approved Mining Plan

Due to above activities the landscape of the terrain will be modified to some extent. Further impacts due to change in land scenario and land use can affect the land use, top soil and drainage pattern of the surrounding area of mine lease for which mitigation measures are being taken.

**Water Requirement:**

Total water requirement is 50 KLD for dust suppression, plantation and domestic use.

Domestic water 5 KLD will be drawn from company bore wells located at Nandihalli. For plantation and dust suppression mine pit water is being used. In future processed water from JSW steel plant will be used. The water pipeline is under construction & likely to be completed after getting necessary approvals from government authorities.

**Manpower:**

As the mine has started its operation, the total employment is 200 (direct employment is 11 and contractual workers are 39 whereas indirect employment are around 150).

Most of the work force employed by the lessee will be for mine supervision, greenbelt development, production and development and implementation of R & R (Rehabilitation & Resettlement) structure.

## 1.4 Description of Environment

The baseline data consists of primary data generated during the period 1<sup>st</sup> October 2020 to 31<sup>st</sup> December 2020 representing post-monsoon season and secondary data collected from various Govt. /Private statutory departments/agencies.

### 11.4.1 Meteorology

Meteorological data was recorded hourly for three months. Calm condition prevailed over 57.38 % of the time of the study period. The predominant wind directions were NE over 4.0 % of the time in which speed of 0.27 to 1.36 m/s was recorded.

The maximum & minimum temperature 36.5 & 18.3 (°C), relative humidity 98.4 & 42.4 (%) & total Rainfall 20.3 (mm) recorded during this season respectively.

### 1.4.1 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) has been carried out at eight locations with a frequency of two days per week for three months during October - December season of 2020. The results thus obtained indicate that the concentrations of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, and NO<sub>2</sub> in the ambient air are within the National Ambient Air Quality (NAAQ) standards for Residential and Rural areas (**Table 3**).

TABLE 3 AMBIENT AIR QUALITY LEVELS

Sr. No.	Parameters	Values (Range) (µg/m <sup>3</sup> )	Limits (µg/m <sup>3</sup> )
1	PM <sub>2.5</sub>	23.66-57.60	60
2	PM <sub>10</sub>	44.00-92.50	100
3	SO <sub>2</sub>	6.80-16.5	80
4	NO <sub>2</sub>	10.23-28.40	80

### 1.4.2 Water Quality

To assess the physical and chemical properties of water in the region, water samples from one surface and six ground water locations were collected around the project

site. In ground water, the Iron concentrations are found to be in the range of 0.18 to 0.22 mg/l and were observed to be within the desirable limit of 0.30 mg/l. The Fluoride is in the range of 0.42 to 0.60 mg/l which is below 1 mg/l limit. Similarly, Nitrate is in the range of 6.50 to 9.50 mg/l which is below 45 mg/l limit. The result shows that all the parameters are well within the acceptable limit of IS: 10500 except the Hardness which is higher than prescribed limit but below the permissible limit.

In surface water, the Iron concentrations are found to be in the range of 0.320 mg/l and were observed to be within the desirable limit of 0.50 mg/l. The TDS are in the range of 310.0 mg/l, and is observed to be within the desirable limit of 1500 mg/l. Total Coliform organisms (MPN/100ml) is 200 which is well below desirable limit of 5000. The results show that all the parameters are well within the prescribed limit of IS: 2296 (Class C).

### **1.4.3 Noise Levels**

Ambient noise levels were measured at eight locations around the existing mine site. The daytime and night time noise levels in all the residential locations were observed to be within the permissible limits. The Leq values are in the range of 41.5 to 56.1 dB (A).

Ambient noise level within ML Area at Dump Site (N-1) and Exit point (N-2) were found to be 61.5 & 60.4 dB (A) in day time and 50.1 & 50.6 dB (A) in night time respectively. All the values are well within the prescribed limit of 75 and 70 dB (A), for industrial area in day and night time respectively. Ambient Noise level at Close to the Mine (N-3), Ramgad (N-4), Siddapur (N-5), Jaisingapur (N-6), Sushila Nagar (N-7) and Garga (N-8) were 53.1, 51.5, 50.4, 54.3, 52.6 in day time and 42.4, 41.8, 42.1, 41.3 and 42.7 at night time respectively. The noise levels were found to be within the prescribed limit of 55 dB (A) & 45 dB (A) for residential area in day and night time respectively.

### **1.4.4 Soil Quality**

Four representative soil samples were collected from core and buffer zone of mine lease area and analyzed to assess the present soil quality of the region. In the core zone, the soil cover is very less to support the vegetation and plant growth. The pH of the soil is neutral to slightly alkaline in nature. The nitrogen, phosphorus and potassium (NPK) values are less, which indicates that the soil is not supportive to plants growth. Based on the results, it is evident that the soils are not contaminated by any pollution sources.

### 1.4.5 Land Use

The land use pattern of the buffer zone i.e. 10 km radius area has been studied based on satellite data. Further, land cover map has been generated on 1:50,000 scale using digital classification. Based on the said study major land use/land cover categories are detailed in the **Table No 4**.

**TABLE 4** Major land use/land cover categories in 10 km radius

Sl. No	Category	Area in Ha	% of the Study Area
1	Dense Forest	2175.45	4.778
2	Open Scrub Forest	13780.70	30.268
3	Water bodies	458.96	1.008
4	Fallow Land	9833.68	21.599
5	Built Up Land	14176.00	31.136
6	Mining Area	4218.51	9.266
7	Agricultural Land	885.658	1.945

### 1.4.6 Ecological Environment

The presence of Schedule-I species in the core and buffer zone are not reported or observed during study period. Apparently, there is no presence of rare and endangered plants in the study area. There are also no endangered and threatened fish found in the study area.

### 1.4.7 Social Environment

The study area (10 km radius) area has a total population of 53920 according to 2011 census. The Sex ratio of the study area is 969 females per thousand male populations. The percentage of male and female population to the total population is 50.8 and 49.2 respectively.

People are positive about the project, provided Environment is well taken care of. The project brings in more employment opportunities including supporting jobs resulting in economic & social development of the people & area.

## 1.5 Summary of Anticipated Environmental Impacts and Mitigation

Dharma Iron Ore Mine is an existing operating mine. The environmental management measures are being implemented. The summary of adverse environmental impacts and mitigation measures are given in **Table No 5**.



TABLE 5 ENVIRONMENTAL IMPACTS &amp; MITIGATION

Environmental Component	Project Activities	Impacts	Adverse / Beneficial	Mitigation Measures adopted
Air Quality	Drilling and Blasting	Dust (PM) and gases (NOx) are produced during drilling and blasting operations	Adverse	<ul style="list-style-type: none"> <li>• Avoid blasting during adverse weather conditions. Development of greenbelt.</li> <li>• Use of wet drilling machine for dust control during drilling operations.</li> </ul>
	Overburden removal, extraction of iron ore, loading / unloading of overburden and iron ore, stock piling of iron ore, disposal of overburden at dump site within mine lease area	Increase in PM levels in ambient air due to dust generation and NO <sub>2</sub> concentration levels in ambient air due to vehicular emissions.	Adverse	<ul style="list-style-type: none"> <li>• Exposed area is limited to the minimum required for mining operations.</li> <li>• Water sprinkling on mine hauls roads. Overburden dumps are re-vegetated as soon as possible.</li> <li>• Use of canon mist / water sprinkler at Dumping yards and stockpile.</li> </ul>
	Transportation of overburden and iron ore within mine lease area	Increase in PM level due to dust generation and NO <sub>2</sub> concentration levels in ambient air due to vehicular emissions.	Adverse	<ul style="list-style-type: none"> <li>• Regular watering on haul and access roads using water sprinkling trucks.</li> <li>• Plantation to act as a barrier for minimizing propagation of dust.</li> </ul>
	Iron ore crushing and handling at iron ore storage area	Increase in PM concentration in ambient air.	Adverse	<ul style="list-style-type: none"> <li>• Water sprinkling systems / dry fog dust suppression systems are installed for control</li> </ul>

				of dust emissions from dumper platform at crushing plant.
	General equipments operations	Elevate PM and NOx concentrations in ambient air.	Adverse	<ul style="list-style-type: none"> <li>• Regular maintenance of all equipment to minimize particulate matter emissions from diesel engines.</li> </ul>
	All activities	Excessive occupational exposures to airborne particulate matter.	Adverse	<ul style="list-style-type: none"> <li>• Occupational exposures to air pollutants are periodically being assessed at regular intervals.</li> <li>• Personal protective equipment are given to all workforce.</li> <li>• Engineering control measures are in place to handle the issue.</li> <li>• Provision &amp; ensuring use of personal protective equipment</li> <li>• Additionally, management control measures are also resorted to as a last control measure.</li> </ul>
Noise Levels and Ground Vibrations	Blasting	Community annoyance due to high impulsive noise levels, air overpressure and ground vibrations.	Adverse	<ul style="list-style-type: none"> <li>• Controlled blasting techniques are being practiced.</li> <li>• Use of scientific blasting method and optimizing maximum charge per delay. Not conducting blasting in high wind conditions.</li> </ul>
	General activities including machine & transportation of	Increase in noise levels Occupational hazard due to noise exposures and increase	Adverse	<ul style="list-style-type: none"> <li>• A detailed review of noise emissions and impacts from project activities will be carried out at regular intervals during the project life.</li> </ul>

	overburden and iron ore within the ML area.	in ambient noise levels.		<ul style="list-style-type: none"> <li>• Service vehicle movement will be limited to day time only.</li> <li>• Occupational noise exposures will be assessed. Locations where Leq (8 hour) noise exposures have the potential to exceed 85 dB (A), mitigation through engineered noise controls and management measures or through the provision of personal protective equipment will be implemented.</li> <li>• Regular noise monitoring will be carried-out.</li> <li>• Regular maintenance of equipments and use of silencers and lubricants to reduce sound where ever applicable.</li> </ul>
Water Resources and Quality	Deepening of ground water	<ul style="list-style-type: none"> <li>• Reduction in groundwater availability for domestic , irrigation and local business purpose.</li> </ul>	Adverse	<ul style="list-style-type: none"> <li>• Groundwater abstraction is minimal and is done for drinking and domestic purposes only.</li> <li>• Rainwater collection and harvesting is being practiced.</li> <li>• Ground water quality monitoring is being carried out once in season for 4 seasons in year.</li> <li>• Bio-Engineering measures have been carried out by the erstwhile lessee like construction of gully and check dams. The maintenance of the same is being done by the present lessee.</li> </ul>

	Water required for mine (dust suppression systems, workshop, domestic facilities and greenbelt development)	<ul style="list-style-type: none"> <li>• Depletion of natural resource.</li> <li>• Changes to hydraulic regime.</li> </ul>	Adverse	<ul style="list-style-type: none"> <li>• The maximum requirement of water is 50 kld. Water conservation methods are being practiced.</li> <li>• Rainwater collection, Ground water recharge and reuse system has been implemented.</li> </ul>
	Waste water generated from domestic usage at mine.	Deterioration in ground water and soil quality when discharged untreated.	Adverse	<ul style="list-style-type: none"> <li>• The waste water from the toilets in mine office is discharged in to septic tank followed by soak pit.</li> </ul>
Hydrogeology and Drainage pattern	Mining and waste dumping	May change regional hydrology and drainage pattern of the area.	Adverse	<ul style="list-style-type: none"> <li>• Proper Drainage system is in place.</li> </ul>
Land use and Soil Characteristics	Mining and waste dumping	Existing land use of the core zone will alter.	Adverse	<ul style="list-style-type: none"> <li>• Land reclamation shall be carried out at conceptual stage</li> </ul>
Flora and Fauna	Mine development and operations	<p>Displacement of existing flora and fauna.</p> <p>Habitat loss, with consequent potential for adverse changes to species diversity and abundance.</p> <p>Deterioration of habitat values caused by fugitive dust and</p>	Adverse	<ul style="list-style-type: none"> <li>• Native species &amp; fruit bearing species have are planted. Regular plantation is being done.</li> </ul>

		noise emissions.		
Environmental Pollution, Health, Safety	Overall Mining operation	Annoyance, sleep disturbance and health impacts from noise emissions that exceed the safe limits.	Adverse	<ul style="list-style-type: none"> <li>• Afforestation on periphery of the mine to act as barriers.</li> <li>• Mining Operation is done in day time only.</li> <li>• Fixed water sprinkling system on Haul Roads, Water sprinklers on transport road, mine haul road, Dry Fog Dust Suppression system near Crushing and Screening unit</li> <li>• Creating awareness among employees and villagers regarding the health &amp; healthy life style.</li> <li>• Conducting medical camps.</li> </ul>
Socio-economic Aspects	Diversion of Forest Land for mining operations	Loss of land and vegetation	Adverse	<ul style="list-style-type: none"> <li>• Regular plantation in the lease area.</li> <li>• Compensatory Afforestation already given by the erstwhile lessee for land &amp; vegetation loss</li> <li>• At conceptual stage the lease area will be rehabilitated</li> </ul>
	Mining operations	Increase in employment opportunities both direct and indirect thereby increasing economic status of people of the region.	Beneficial	

## 1.6 Disaster Management Plan

The objective of the emergency preparedness and Disaster Management Plan is to offset the chance of casualty / minimize damage(s) to man, material and living beings in case there is any emergency. The benefits anticipated for implementation of emergency preparedness and DMP are as follows:

- Provide the rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Provide help and assistance to the affected persons;
- Provide authoritative information to the news media;
- Secure the safe rehabilitation of affected area; and
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.

In effect, it is to optimize operational efficiency to rescue rehabilitation and render medical help and to restore normalcy.

## 1.7 Project Benefits

### **Social, Economic development**

The existing project have imparted social benefits to surrounding population in the form of employment opportunities, educational facilities, roads, communication facilities, transportation, marketing, banking, postal services and health facilities directly or indirectly. The civic amenities have already been developed due to existing mines. The location of the mines has helped to improve the financial resources of the surrounding population by way of petty trade and employment opportunities. The projects had encouraged for setting up of various utility services and petty trade for local people i.e. in and around the mining lease area.

## **1.8 Environmental Management Plan**

The Environmental impacts and their Management Plan have been discussed in the above table. Total Capital Investment proposed for the Project is about Rs. 34.58 Cr. Capital cost towards environment management proposed is Rs. 170 lakhs. Recurring cost made under this is Rs. 77 lakhs per annum.

## **1.9 Reclamation and Rehabilitation of mined out areas**

After complete extraction of iron ore in conceptual stage, the mined-out land within the lease area will be fully reclaimed before abandoning the mine. The measures include technical and biological reclamation of mined out areas, plantation with native species on dumps and mined out benches.

## **1.10 Conclusion**

The mine has established environment cell with qualified and experienced staffs from the environmental field and the entire environmental management system is guided by the documented Environmental Policy of the Company. The Company implements best environmental practices and compliances to applicable statutory requirements. The Environmental Clearance (under EIA notification 2006) proposed for the project will encourage the Company towards excellence of environmental practices and development of people around the mine.