# PRE-FEASIBILITY REPORT
# FOR

# KATAMATI IRON ORE MINE, (ML AREA: 403.3238 HA) ENHANCEMENT OF PRODUCTION OF IRON ORE FROM 8.0 MTPA TO 13.5 MTPA (ROM) WITH TOTAL EXCAVATION OF 15.0 MTPA
# at

## DEOJHAR VILLAGE UNDER

## KEONJHAR DISTRICT OF ODISHA STATE

*by:*

TATA

TATA STEEL

**Katamati Iron Mine**

**Deojhar Village, Keonjhar District, Odisha-758034**

*Submitted to:*

**Ministry of Environment, Forest & Climate Change (MoEF&CC)**

**New Delhi**

*Environment Consultant:*

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*October, 2018*

## 1.0 EXECUTIVE SUMMARY

Tata Steel Limited (TSL) holds the Katamati Iron Mine lease over an area of 403.3238 ha located in Keonjhar district of Odisha state and is being worked for winning of iron ore. The Katamati iron mine lease was originally granted on 17.01.1933 for 30 years over an area of 12.17 sq. miles (3152.018 ha) including Joda West and Khondbond blocks. It was renewed on 17.01.1963 for a period of 20 years over the same area. During the second renewal, Katamati formed an independent lease over an area of 403.3238 ha and renewed for a period of 20 years with effect from 17.01.1983. The third renewal of the mining lease was applied on 05.09.2001 for a period of 20 years with effect from 17.01.2003. However, in view of the Mines and Minerals (Development & Regulation) Amendment Act 2015, the lease period has been extended upto 31.03.2030 vide letter no.III(A)SM-02/2004/3308/SM, Bhubaneswar dated 18.04.2015 issued by Steel & Mines Department, Govt. of Odisha. Subsequently the supplementary lease deed has been executed on 27.11.2016 and registered on 28.11.2016 with registration no. 11031600471, Barbil.

The mine is captive for Tata Steel Limited. The entire ore produced from the mine is fed to the Company's steel plant located at Jamshedpur and Kalinganagar along with it's sister companies / subsidiaries like Tata Sponge Iron Limited, Tata Metalliks Limited TAYO ROLLS, Bhushan Steel Limited and other plants of the company. The mining lease extension order granted by Department of Steel & Mines, Govt of India under Section 8(A) of MMDR Act, 1957 as amended by the MMDR Amendment Act' 2015 vide letter no. III (A) SM-2/2004/3303/SM, dated 18.04.2015 to support that the mine is captive .The mine was initially worked manually by open cast method and subsequently operation was discontinued in 1966. The mine was restarted in 1974 with semi-mechanized operation and during 2000-02 it became fully mechanized.

Currently, the mine has production capacity (Run Of Mine) of 8 MTPA for which Environment Clearance has already been obtained vide letter no. J-11015/63/2008-IA-II (M), dated 26.11.2010. As per new definition of ROM as per notified Mineral (Other than Atomic and Hydrocarbons Energy Minerals) Concession Rules 2016, the company has applied for EC Corrigendum based on the excavation quantity & as per approved mine plan of 9.08 MTPA, and the same has been recommended by EAC committee of MoEF&CC in subsequent meetings.

As per EC of 8 MTPA (ROM), 6-7 MTPA ROM is being sent to the processing plant (Both Wet and Dry plant) of Noamundi (It is located in the adjoining of Katamati) in which the ore of both the mine is fed simultaneously. The finished product is being sent to the steel plant through company's own railway siding located at Bottom bin area of Noamundi. The slime generated is kept in the slime dam located at Noamundi only. Rest 1-2 MTPA ROM is fed to the dry crushing and screening plant located at Katamati. The finished product is being sent to the steel plant through railway siding either through Noamundi or through public siding. The entire material is being used for captive consumption only. Katamati iron mine lease is captive and the ore mainly feeds to it 's steel plant at Jamshedpur and Kalinganagar

along with sister concern company like Tata Metalliks Limited, Tata Sponge Iron Limited, TAYO Rolls.

Presently Katamati Iron Mine is having the Environmental Clearance for 8 MTPA Iron ore (ROM) production granted by MoEF&CC, Govt. of India vide letter no. J-11015/63/2008.IA.II(M) dated 26.11.2010.

The Mine has obtained Consent to Operate under Air & Water Act for 8 MTPA Iron Ore (ROM) production granted by State Pollution Control Board, Odisha vide letter no. 4811/IND-I-CON-185, dated: 18.03.2016. This also includes operation of mobile iron ore crushing & screening plant with capacity of 2.0 MTPA. Although it is proposed that mobile plant will 2MTPA through put will be operated but as per the requirement more mobile plants can be opted.

Katamati lease comprises of 360.010 ha forest land and 43.3118 ha non-forest land. Western part of Katamati falls completely within the forest land whereas Eastern part covers partly forest land and partly non-forest land. About 114.1911 ha is the broken up forest area prior to 1980 which includes some portion of Pit I, II & III. Present mining operation at Katamati is being carried out in non-forest land only. Mining operation in forest area have been temporarily discontinued in accordance with the judgment dated 12.12.1996 of Hon'ble Supreme Court regarding stoppage of ongoing non-forest activities in forest areas and subsequent order from Divisional Forest Officer of Keonjhar. As iron ore at Katamati has wide occurrence in forest area, it necessitates for acquiring fresh forest land for continuance of mining operation in future. The steel company had submitted a de-reservation proposal over 199.1720 ha forest land on 17.04.2007, which includes 31.1791 ha broken up forest area prior to 1980. As per the MoEF&CC, Govt. of India Circular dated 10.03.2015, 160.383 ha Non-forest area has been identified as forest as on 25.10.1980 (as per Sabik records) and accordingly Forest Diversion Proposal has been applied on 16.06.2016. In principle approval has been granted for the diversion of forest land of 360.01 ha 160.838 (sabik kisam forest land) +199.1720 (RF & KF)) By MoEF (GOI) vide letter No F.NO. 8-01/2018-FC dated 21.08.18

It is proposed to enhance the production capacity (Run of Mine) from 8 MTPA to 13.5 MTPA and excavation from 9.08 MTPA to 15 MTPA during the plan period due to increase iron requirement for the expansion of the existing steel plants, future acquisition and expansion of it's sister companies. This ramp up in capacity will remain beyond the plan period as well to continuously fulfill the iron ore requirement for company's existing steel plant expansion plans, future acquisition and sister companies. Out of this 13.5 MTPA, approximately 11.5-12.5 MTPA of ROM will be processed in tandem with Noamundi ore in the processing plant located at Noamundi. The current processing capacity of the plant at Noamundi is approximately 13 MTPA. The processing unit has already obtained Environmental Clearance (EC) for processing of 18 MTPA vide letter no. J- 11015/104/2011-IA. (II) (M), dated 10.06.2013. The slime generated from processing plant shall be stored in the slime dam located at Noamundi only. Approximately 1-2 MTPA ROM will be processed at the mobile dry crushing and screening plant located at

Katamati. Although it is proposed that mobile plant will 2MTPA through put will be operated but as per the requirement more mobile plants can be opted.

The finished product from Katamati Iron Mine shall be continued to be sent to the steel plant through railway siding either through Noamundi or through adjacent public siding by dumpers & trucks .

The production expansion proposal of Katamati Iron Mine (Run of Mine) from 8 MTPA to 13.5 MTPA and excavation from 9.08 MTPA to 15 MTPA shall limit with in the same lease area of 403.3238 ha and as per approved mine plan from IBM vide letter no. MS/FM/16-ORI/BHU/2017-18/2012, dated 9th Nov., 2017.

The total water for sprinkling on haul road & for drinking purpose will be fully supplied by Noamundi Iron Mine only. As there will be no processing plant at Katamati, hence there will be no recycling of water. The source of water for Noamundi Iron Mine is Baitarini river. The water will continue to be drawn from Baitarani river only. Separate Surface Water drawl permission for ~4800 KL/ Day would be processed to meet the water requirements of Katamati Iron Mine.

Currently TSL has agreement of 400 KVA with NESCO. The 11KV line from Odisha grid is laid mainly to illuminate the mine. The annual consumption is approximately 11 lakh Kwh. Considering the expansion of the mine, the consumption will increase to 2000 KVA in future for which required infrastructure will be laid down at suitable location. The electricity will be used mainly in illumination as well as processing plant and office building along with other infrastructure area. The manpower requirement will increase from 270 to 300.

## 2.0 IDENTIFICATION OF THE PROJECT/BACKGROUND INFORMATION

### 2.1 Identification of the Project & Project Proponent

TATA Steel Ltd proposes to enhance the production capacity (Run of Mine) from 8 MTPA to 13.5 MTPA and excavation from 9.08 MTPA to 15 MTPA during the plan period due to increase in iron ore requirement for the expansion of the existing steel plants, future acquisition and expansion of sister companies.

Tata Steel Limited Established in Jamshedpur, India in the year 1907, Tata Steel is part of the 150-year-old Tata group. Bringing to reality the vision of its founder, J. N. Tata, who inspired the steel and power industry in India, the Tata Steel Group is the 10th largest steel manufacturer in the world and is known to be the hallmark of corporate citizenship and business ethics. TATA Steel (based on capacity) is the 10th largest steel manufacturer in the World and Amongst the Top 3 global steel companies. Tata Steel has been adjudged as the 'Steel Industry Leader' globally by the Dow Jones Sustainability Index 2018 (DJSI). Tata Steel is also the only India-based company to emerge as a winner among all 60 sectors evaluated for DJSI 2018.

With operations in 26 countries and commercial presence in 50 countries, the Tata Steel Group has a steel production capacity of 27.5 MTPA (as on March 31, 2018).

Tata Steel India has manufacturing units at Jamshedpur, Jharkhand, with a production capacity of 10 MTPA and at Kalinganagar, Odisha, with a production capacity of 3 MTPA. In FY 2017-18, Kalinganagar unit received approvals for expansion to 8 MTPA. Tata Steel operates with a completely integrated value chain that extends from mining to finished steel goods. Therefore, the captive requirement of the iron ore will gradually increase from 32.6 Million tonnes in 2018-19 to 46.7 million tonnes in 2021-22 which would go up to ~ 59.9 million tonnes by 2029-30.

The expansion of iron mines from existing capacity to future requirement is due to large organic and inorganic growth of company.

## 2.2 Brief Description and Nature of the Project

Katamati Iron Mine has a capacity of producing 8 MTPA of ROM. It is proposed to expand the capacity due to the captive requirement of iron ore for own steel plant. Since the mine is a captive mine, hence the production is restricted within in existing lease area and based on the requirement of Jamshedpur & Kalinganagar steel plants and other sister companies (Tata Metaliks Limited, Tata Sponge Iron Limited, TAYO).

The quantity of ROM produced during the year 2017-18 was 7.3 MT. As the company has already installed and commissioned a new Steel plant in Odisha named as Kalinganagar Steel Plant, hence it is proposed to achieve ROM production of 13.5 MTPA to meet increased requirement for captive consumption in Steel Plant at Jamshedpur, Kalinganagar and other sister units (Tata Metaliks Limited, Tata Sponge Iron Limited, TAYO and other plants of the company), including organic and inorganic growth requirements obtained due to mergers and acquisitions of the company (Bhushan Steel etc.). The mining lease of Katamati covers an area of 403.3238 hectares and is located adjacent to Noamundi Iron Mine along Jharkhand-Odisha interstate boundary. The mining operations are carried out by mechanized open-cast mining method. The Katamati mine is having three pits named as Pit I, Pit II & Pit III, out of which only pit I is presently working and Pit II & Pit III are not working due to lack of forest clearances. The operation in Pit II & III would start only after obtaining the forest clearance over the area for which de reservation (forest diversion) proposal has been submitted.

As per EIA Notification dated 14$^{th}$ September 2006, as amended on 01.12.2009, the production enhancement of Katamati Iron Mine from (Run of Mine) from 8 MTPA to 13.5 MTPA and excavation from 9.08 MTPA to 15 MTPA project falls under Category "A", Project or Activity 1(a).

## 2.3 Need for the Project and its Importance to the Country and Region

India is the world's third-largest producer of crude steel (up from eighth in 2003) and is expected to become the second-largest producer. The steel sector in India contributes nearly two per cent of the country's gross domestic product (GDP) and employs over 6,00,000 people. The growth in the Indian steel sector has been driven by domestic availability of raw materials such as iron ore and cost-effective

labour. Consequently, the steel sector has been a major contributor to India's manufacturing output. The Indian steel industry is very modern with state-of-the-art steel mills. It has always strived for continuous modernization and up-gradation of older plants and higher energy efficiency levels. Presently, India's crude steel capacity is around 126 Million Tonnes (MT) and Production of crude steel was 97.4 MT during 2016-17.

The Union Government has given its approval for National Steel Policy (NSP) 2017 on 03.05.17. The new Steel Policy enshrines the long-term vision of the Government to give impetus to the steel sector. It seeks to enhance domestic steel consumption and ensure high quality steel production and create a technologically advanced and globally competitive steel industry. The policy projects crude steel capacity of 300 million tonnes (MT), production of 255 MT and seeks to increase per capita steel consumption to the level of 160 Kgs by 2030 from existing level of around 60 Kg and major segments of consumptions are infrastructure, automobiles and housing sectors. The policy also envisages to domestically meet the entire demand of high grade automotive steel, electrical steel, special steels and alloys for strategic applications and increase domestic availability of washed coking coal so as to reduce import dependence on coking coal from about 85% to around 65% by 2030-31. The Union Cabinet has also approved the policy for providing preference to domestically manufactured iron & steel products on Government procurement. The policy provides preference to Domestically Manufactured Iron & Steel Products (DMI&SP), in Government Procurement for specified steel products having minimum value addition of 15%.

Major projects of the Government of India like development of 100 Smart cities, Smart armed force stations, Delhi Mumbai Industrial Corridor, development of ports, expansion of Railways, National Solar Mission etc. are expected to increase demand of steel significantly in coming years.

The Indian steel industry is very modern with state-of-the-art steel mills. It has always strived for continuous modernisation and up-gradation of older plants and higher energy efficiency levels. Indian steel industries are classified into three categories such as major producers, main producers and secondary producers. TATA Steel, NMDC, JSW, JSPL etc comes under major producer.

India is expected to overtake Japan to become the world's second largest steel producer, and has envisaged achieving 300 MT of annual steel production capacity by 2030. Steel consumption is expected to grow 5.7 per cent year-on-year to 92.1 MT in 2018.

To achieve the 300MT annual steel production, all the existing projects shall be expanded, new projects shall be installed, merger and acquisition shall take place, thus demand for raw material will increase.

To meet the nation target of 300 MT annual steel production and merger and acquisition of new steel plant (Bhushan) and increasing domestic steel demand, it is very important that all the iron ore mines of TATA Steel shall raise the production from current capacity.

The captive requirement of the iron ore will gradually increase from 32.6 Million tonnes in 2018-19 to 46.7 million tonnes in 2021-22 which would go up to ~ 59.9 million tonnes by 2029-30.

Inline of this Katamati Iron Mine shall also raise its production from (Run of Mine) from 8 MTPA to 13.5 MTPA and excavation from 9.08 MTPA to 15 MTPA without lease expansion.

2.4 Demand-Supply Gap

In 2016, the world crude steel production reached 1630 million tonnes (mt) and showed a growth of 0.6% over 2015. China remained world's largest crude steel producer in 2016 (808 mt) followed by Japan (105 mt), India (96 mt) and the USA (79 mt). World Steel Association has projected Indian steel demand to grow by 6.1% in 2017 and by 7.1% in 2018 while globally, steel demand has been projected to grow by 1.3% in 2017 and by 0.9% in 2018. Chinese steel use is projected to show nil growth in 2017 and decline by 2% in 2018. Per capita finished steel consumption in 2016 is placed at 208 kg for world and 493 kg for China by World Steel Association.

In FY17, crude steel production in India was 97.42 MT, with the total crude steel production growing at a CAGR of 5.49 per cent over the last 6 years. As of March 2017, the capacity utilisation of steel producers is set to increase with strong export demand and signs of revival in domestic sales. Companies like TATA Steel, JSW and Essar Steel have experienced a sharp increase in steel manufacturing in the last few months. Steel manufacturing output of India is expected to increase to 128.6 MT by 2021, accelerating the country's share of global steel production from 5.4 per cent in 2017 to 7.7 per cent by 2021. India's steel output is expected to grow at a CAGR of 8.9 per cent during 2017-21 and India is expected to become top global steel producer.

Due to large organic and inorganic growth of company along with expansion of Kalinganagar steel plant iron ore demand will raise. To fulfill the existing gap all iron ore mine of TATA Steel including Katamati Iron Mine is going for production expansion.

The phase wise iron ore requirement of TATA Steel Limited for captive consumption is given in **Table-1** below.

**TABLE-1**
**PHASE WISE CAPTIVE CONSUMPTION OF IRON ORE**

| Financial Year | 2018-19 | 2020-21 | 2021-22 | 2024-25 | 2029-30 |
|---|---|---|---|---|---|
| Iron ore requirement(MT) | 32.6 | 35.6 | 46.7 | 54.6 | 59.9 |

In-line with this Katamati Iron Mine shall also raise its production from (Run of Mine) from 8 MTPA to 13.5 MTPA and excavation from 9.08 MTPA to 15 MTPA. The proposed expansion will be in approved lease area.

## 2.5 Import- Export Possibility

Going by planning commission projection, the total domestic production is expected to reach 4.2 million tonnes by the end of five year plan, but then 2.5 million tonnes will still have to be imported to meet steel sector's demand. The domestic steel industry, which is facing acute shortage of iron ore, is likely to increase its dependence on imported iron ore for this year as well. The continued ban in Goa, a delay in accordance of environment and forest clearances for several mines in Karnataka and a cap on iron ore mining in Odisha have resulted in a drastic decline in iron ore production.

The steel industry imported 3.05 million tonnes (mt) of iron ore in 2012-13, mainly for port-based steel mills. On account of reduced iron ore production and regional shortages of iron ore last year, major steel units like Essar, Hazira, Bhushan Steel and JSW Ispat had to resort to imports of iron ore.

Compared to 970,000 tonnes of iron ore imported in 2011-12, the imports in 2012-13 have gone up 3.1 times. However, during the current financial year, iron ore imports are likely to go up 67 per cent to around 5 mt. This is mainly due to lower production of iron ore domestically.

After expansion iron ore produced from Katamati Iron Mine will be used for captive consumption.

## 2.6 Export Possibility

Over the last five years, there has been an increase in the export of iron ore driven by the steel demand in China. Seaborne trade of iron ore has increased from 500 million tons in 2002 to slightly over 800 million tons in 2007. Exports from India have also increased from 50 million tons to approximately 90 million tons during the same period.

The country was the third largest exporter of iron ore till 2011 and lost its position owing to various factors. According to the Federation of Indian Mineral Industries, a very high export duty of 30 per cent, coupled with higher freight rates on iron ore meant for exports by the railways, iron ore exports have come down sharply during the last financial year. Production of iron ore has come down from 218 mt in 2008-09 to 140 mt in 2012-13 due to enforcement of strict environmental and other regulatory measures.

The country had seen a surplus of almost 110 mt in 2008-09 and 2009-10. However, this has come down to a level of just 17 mt in 2012-13.

The iron ore produced from Katamati Iron Mine will be used for captive consumption. The mine is poised for expansion in coming years to meet proposed requirement of company's steel plants located at Jamshedpur, Kalinganagar and others plants of the sister concerns /company.

2.7 Employment Generation (Direct and Indirect)

Due to existing operational mine various direct and indirect employment are made. Due to expansion of same the employment opportunity shall be extended from existing. Potential direct employment is made for future expansion based on current technology and standards mining operation practices in a tabular format as follows:

**TABLE-2**
**EXISTING & PROPOSED EMPLOYMENT**

| Sr. No | Description | Existing | Future (Tentative) |
|---|---|---|---|
| 1 | Mine manager | 1 | 1 |
| 2 | Mining engineer(Degree & Diploma) | 13 | 15 |
| 3 | Geologist | 1 | 1 |
| 4 | Surveyor | 1 | 1 |
| 5 | Clerical staff | 23 | 32 |
| 6 | Skilled labour | 188 | 208 |
| 7 | Unskilled labour | 43 | 42 |
| 8 | **Total** | **270** | **300** |

*Source: Mine Plan*

However, based on current technology and standards of working various other indirect / contractual job opportunity shall be generated as per requirement.

## 3.0 PROJECT DESCRIPTION

3.1 Type of Project Including Interlinked and Independent Projects, If Any

Application for Katamati Iron Mine Environmental Clearance for expansion project from (Run of Mine) from 8 MTPA to 13.5 MTPA and excavation from 9.08 MTPA to 15 MTPA without lease expansion is made for independent Mining Project. However, the mining project includes mining, processing (on site and off site) and dispatch (Noamundi & Other public sidings). Detailed yearly maximum excavation of iron ore from Joda East mine is presented in **Table-3**.

**TABLE-3**
**YEAR WISE EXCAVATION PROGRAMME**
(Figures are in Million tonnes)

| Year | ROM | | Waste (Fe<45%) | Total Excavation | Stripping Ratio ORE:OB (t/Cum) |
|---|---|---|---|---|---|
| | Ore (Fe≥58%) | Mineral Reject/ Subgrade (Fe≥45% & <58%) | | | |
| 2018-19 | 6.3 | 0.5 | 0.7 | 7.5 | 1:0.041 |
| 2019-20 | 7 | 1 | 0.7 | 8.7 | 1:0.035 |
| 2020-21 | 6.6 | 1.4 | 1.08 | 9.08 | 1:0.054 |
| 2021-22 | 8.5 | 4.25 | 2.12 | 14.87 | 1:0.067 |
| 2022-23 | 10.7 | 2.8 | 1.5 | 15 | 1:0.044 |
| **TOTAL** | **39.1** | **9.95** | **6.1** | **55.15** | 1:0.050 |

It is proposed to enhance the production capacity of Katamati Iron Mine (Run of Mine) from 8 MTPA to 13.5 MTPA and excavation from 9.08 MTPA to 15 MTPA during the plan period due to increase iron requirement for the expansion of the existing steel plants, future acquisition and expansion of it's sister companies. This ramp up in capacity will remain beyond the plan period as well to continuously fulfill the iron ore requirement for company's existing steel plant expansion plans, future acquisition and sister companies. Out of this 13.5 MTPA, approximately 11.5-12.5 MTPA of ROM will be processed in tandem with Noamundi ore in the processing plant located at Noamundi. The current processing capacity of the plant at Noamundi is approximately 13 MTPA. The processing unit has already obtained Environmental Clearance (EC) for processing of 18 MTPA vide letter no. J-11015/104/2011-IA. (II) (M), dated 10.06.2013. The slime generated from processing plant shall be stored in the slime dam located at Noamundi only. Approximately 1-2 MTPA ROM will be processed at the mobile dry crushing and screening plant located at Katamati. Although it is proposed that mobile plant will 2MTPA through put will be operated but as per the requirement more mobile plants can be opted.The finished product from Katamati Iron Mine shall be continued to be sent to the steel plant through railway siding either through Noamundi or through adjacent public sidings. All the internal (within mine lease and adjacent to Noamundi lease) transportation shall be done by dumpers / trucks etc including transportation of material from Katamati Iron mine to adjacent railway siding Deojhar as provided by Railways and rest from Naomundi process plant to customer via conveyor belt till dispatch section (bottom bin area- railway siding) and from all railway siding to customer (All TATA Companies and other) via railway network.

## 3.2 Details of Alternate Site Analysis

No alternative site has been taken into consideration as this is an existing mining lease (site specific) and this proposal is for production expansion.

## 3.3 Location of the Project

The Katamati Iron Mine is located near the Deojhar village, Post office Deojhar, in the Keonjhar district of state Odisha. The Katamati mine lease is adjacent to Noamundi Iron Mine of TATA Steel and lies near the Jharkhand - border area in the Odisha state. The mine lease lies from latitude 22°05'N to 22°10'N and longitude from 85°25'E to 85°30'E in a survey of India toposheet no. 73 F/8 & F/12.

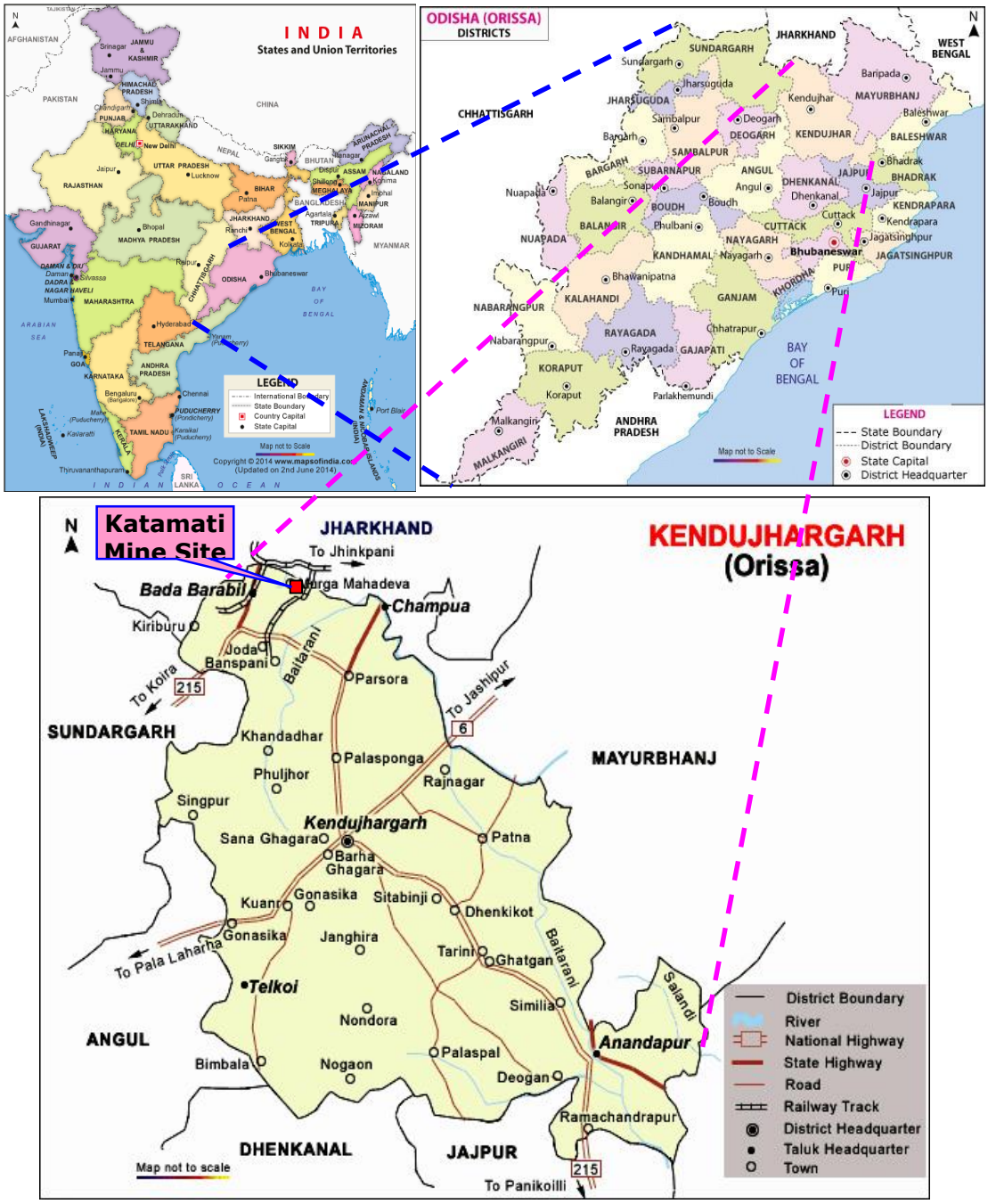


**FIGURE-1**
**INDEX MAP**

The location of the project is given in **Table-3.** The index map is given in **Figure-1.** The study area map is given in **Figure-2.** The google map is given in **Figure-3.** Further, Katamati mine site photographs are presented in **Figure-4.**

**TABLE-3**
**LOCATION OF THE PROJECT**

| District/State | Tehsil | Village | Area in ha |
|---|---|---|---|
| Keonjhar, Odisha | Barbil Tehsil | Deojhar village | 403.3238 |

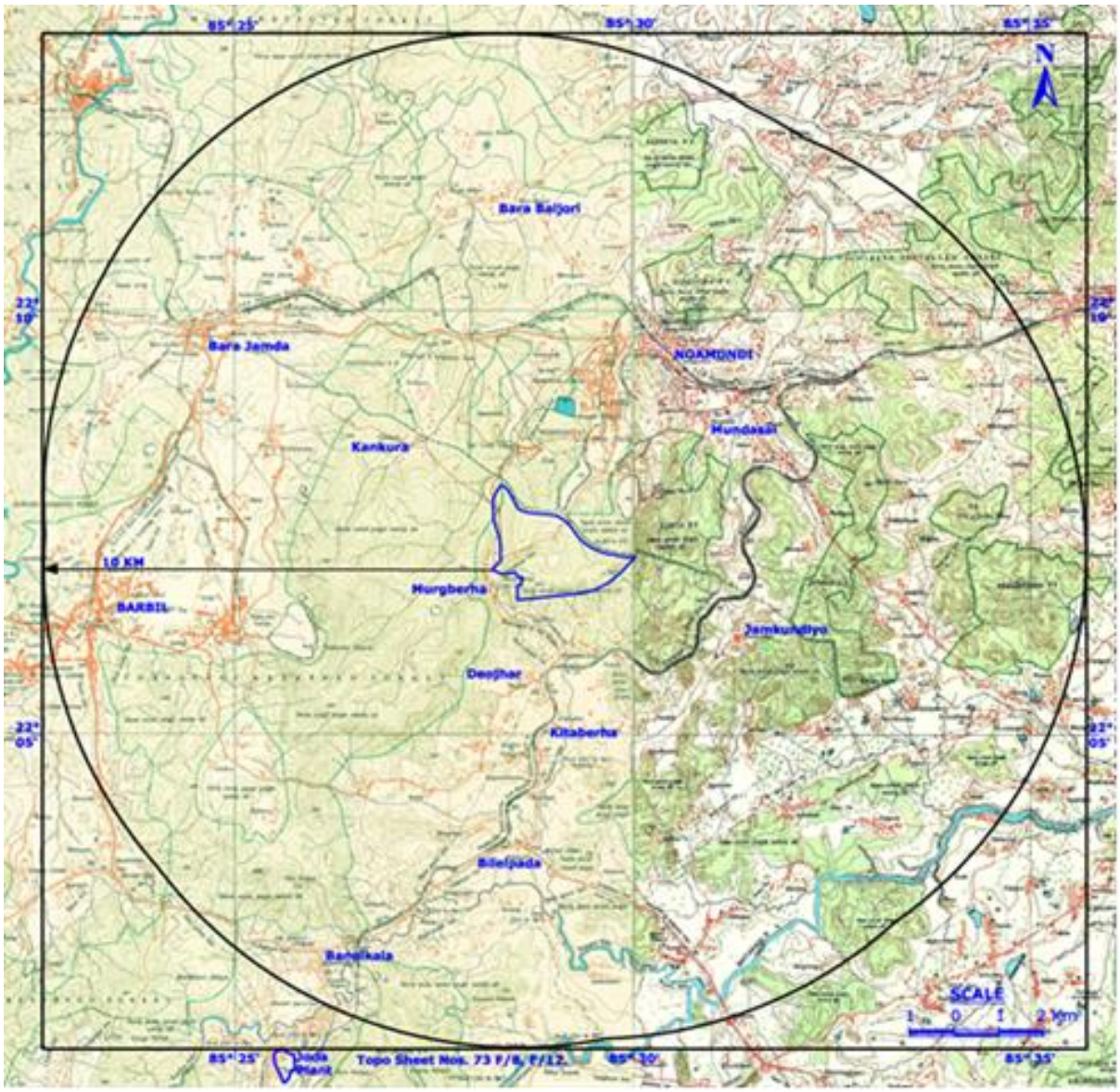


**FIGURE-2**
**STUDY AREA WITH BUFFER ZONE (10 KM RADIUS)**

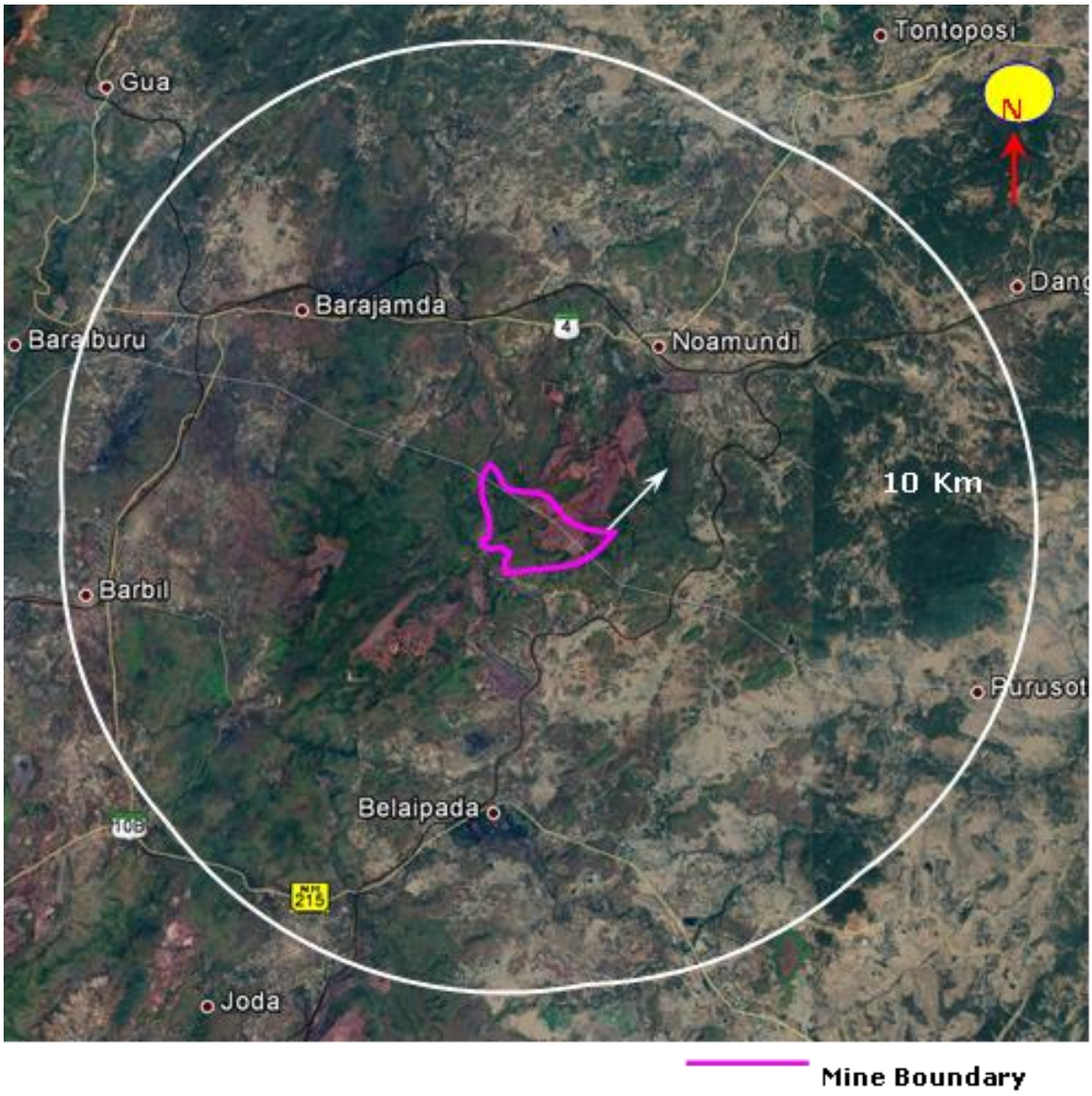


**FIGURE-3**
**STUDY AREA IN GOOGLE (10KM RADIUS)**

**FIGURE-4**
**SITE PHOTOGRAPHS OF THE PROJECT SITE**

## 3.4 Size or Magnitude of the Work

Katamati Iron Mine is having total lease area of 403.3238 ha area and total proposed production is 13.5 MTPA through open cast mining method.

As mentioned in the approved mining plan the proposed expansion capacity of the mine (Run of Mine) is 13.5 MTPA. Based on the current reserves (111/121/122) and the proposed rate of production, the life of the mine is estimated to be about 7 years. However, the life of the mine will further increase with further up gradation of reserves after the future fresh and infilling exploration proposed during the plan period. In addition to reserves of about 74.74 million tonnes (as on 01.04.2017), the mine is also having remaining resources of about 50.08 million tonnes. Thus the life is anticipated upto 2030.

## 3.5 Project Description with Process Details

The mining operations at Katamati has been done in two parts (i.e. Eastern Part & Western Part) consisting of Pit-I in eastern part and Pit-II & III in western part. Mining Operation in Pit-I of eastern part is completely mechanized by shovel-dumper combination, whereas mining operations in Pit-II & III of Western Part were carried out by semi-mechanised method of mining.

After getting the forest clearance, the preparatory work will start in the fresh virgin area to open up new benches. The mining will be done in two part i,e eastern part

and western part. A new pit named as Pit-IV in the Eastern Part will be opened after getting the forest clearance. The mining operation will be fully mechanized open cast mining method. Initially, Dozer, Grader etc will be deployed to expose the area for preparation of drill blocks. Blast hole drill will be deployed to drill the hole. Shovel- Dumper combination will be used to excavate and transport the material to the designated place. A part of Waste material generated during course of mining will be used for leveling the benches and maintaining the haul roads. Balance quantity will be stacked at the proposed site.

The increase in fleet size and additional manpower requirement will be fulfilled to achieve the enhance production as well as excavation capacity. It is proposed to enhance the production capacity (Run of Mine) from 8 MTPA to 13.5 MTPA and excavation from 9.08 MTPA to 15 MTPA during the plan period due to increase requirement from the steel plants and its sister companies. This ramp up in capacity will remain beyond the plan period as well to continuously fulfill the iron ore requirement for company's expansion in existing steel plants, future acquisitions and sister concerns. Out of this 13.5 MTPA, approximately11.5- 12.5 MTPA of ROM will be processed in tandem with Noamundi ore in the processing plant located at Noamundi. The current processing capacity of the plant at Noamundi is approximately 13 MTPA. The mine has already obtained Environment Clearance (EC) for processing of 18 MTPA. There is a proposal to install Low Grade (LG) plant to process the low grade ore in near future thus conserving the mineral. The finished product will continue to be sent to the steel plant through company's own railway siding located at Bottom bin area of Noamundi. The slime generated will be kept in the slime dam located at Noamundi only. Approximately 1-2 MTPA ROM will be processed at the mobile dry crushing and screening plant located at Katamati. The finished product will continue to be sent to the steel plant through railway siding either through Noamundi or through public siding. Haul road dust suppression will be effected with the help of fixed water sprinkling system and two mobile water sprinklers. Drills will be operated with in-built dust extraction/suppression system which has an interlock which prohibits drilling without water. There is no source of water at Katamati. The nearest water source is Jojo nalla and Noamundi Basti spring in the adjoining Noamundi lease. The total water for sprinkling on haul road & for drinking purpose will be fully supplied by Noamundi Iron Mine only. As there will be no processing plant at Katamati, hence there will be no recycling of water. The source of water for Noamundi Iron Mine is Baitarini river.

The water will continue to be drawn from Baitarani river only. Separate Surface Water drawl permission for ~4800 KL/ Day would be processed to meet the water requirements of Katamati Iron Mine.

The annual power consumption is approximately 11 lakh Kwh. Considering the expansion of the mine, the consumption will increase to 2000 KVA in future for which required infrastructure will be laid down at suitable location. The electricity will be used mainly in illumination as well as processing plant and office building along with other infrastructure area.

At present shovel, dumper, drill, dozer, grader, water sprinkler, diesel tanker, maintenance van and other ancillary equipment are being operated departmentally for mining of iron ore at Katamati. The list of existing equipment being used at Katamati iron mine is given in **Table-4**.

**TABLE-4**
**LIST OF EXISTING EQUIPMENTS**

| EQUIPMENTS | CAPACITY | NO.OF UNITS |
|---|---|---|
| Excavator EX-1100 | 5.7 CuM | 3 |
| Dumper | 100T | 9 |
| Dozer | 13.5 cum., 410 H.P. | 1 |
| Drill master ROC L8 | 6''Dia(1000 cfm/425 psi) | 1 |
| Drill master IDM-45 | 6''Dia(1000 cfm/300 psi) | 2 |
| Grader | 16 feet blade | 1 |
| Water sprinkler | 28 KL | 2 |
| Pit vehicles | | 3 |
| Maintenance van | | 1 |
| Diesel tanker | 10 KL | 1 |

*Source: Mine Plan*

In addition to above, some of the equipment's like shovel, mining loader, 100mm diameter drill, rock breaker, rock splitte, hoe, JCB etc. are proposed to be deployed either by outsourcing or by departmental procurement for miscellaneous works. Thus the following equipment's are proposed to be deployed during the plan period is given in **Table-5.**

**TABLE-5**
**LIST OF ADDITION PROPOSED EQUIPMENTS**

| EQUIPMENTS | CAPACITY | NO.OF UNITS |
|---|---|---|
| Mining loader | 10 CuM | 1 |
| Shovel | 5.7 CuM | 1 |
| Dumper | 100 T | 6 |
| Drill | 6''Dia(1000 cfm/425 psi) | 1 |
| Loader | (3.5/6)CuM | 2 |
| Water sprinkler | 50 KL | 1 |
| Rock breaker | 100 mm Mole Point | 1 |
| Rock splitter | | 1 |
| Back hoe | 1.2 CuM/2.5CuM | 2 |
| Crawler drill | 4" Dia.(600cfm) | 1 |
| JCB | | 2 |

*Source: Mine Plan*

It is envisaged that the proposed equipments will be as per the description mentioned above however a bigger fleet may be opted in order to reduce the traffic load which best suits the long term pit configuration.

3.6 Raw Material Required along with Estimated Quantity, Likely Source, Marketing area of Final Product/s, Mode of Transport of Raw Material & Finished Product

No raw material is required for the mining of mineral.

ROM from each and every dumper from Katamati is being weighed at the weighbridge before dispatch to Noamundi plant. In addition, one weighbridge of 60 Ton capacity has also been installed near existing mobile crushing and screening plant area to measure the quantity of ore fed into the plant as well as the quantity of products despatched from the plant. Moreover, the company is also dispatching the products of crushing & screening plant to Jamshedpur steel plant, Kalinganagar Steel Plant , other sister concerns (Tata Metaliks Limited, Tata Sponge Iron Limited, TAYO etc., and other plants of the company/sister concerns by road through Deojhar railway siding and also transported to Noamundi for blending with sized ore & fines ore generated from processing plants of Noamundi. The dispatch from Katamati mine to Deojhar siding is carried out through tippers engaged by contractors. At present the weighment of the tippers is carried out in one 120 T capacity weighbridge located beside the 200T weighbridge used for 100 T dumpers owned by the company.

3.7 Resource Optimization/Recycling & Reuse Envisaged in the Project :

The subgrade generated during the mining process will be stacked separately for its use for blending and beneficiation purpose. This will help us to optimize our resources and increase the life of Mine.

**TABLE-6**
**RESERVE & RESOURCE FIGURES ARE AS ON 01.07.2017.**
**(In Million Tonnes)**

| Category of Mineral Resources & Reserves | UNFC Code | Quantity | Fe grade in % |
|---|---|---|---|
| Total Mineral Reserves + Resources (A+B) | | 123.40 | Fe>45% |
| Total Mineral Reserves + Resources (A+B1) | | 95.76 | Fe>58% |
| A. Mineral Reserves | | 78.12 | Fe>58% |
| 1) Proved Mineral Reserve | 111 | 38.22 | |
| 2) Probable Mineral Reserve | 121 | 26.14 | |
| 3) Probable Mineral Reserve | 122 | 13.76 | |
| B. Remaining Mineral Resources | | 45.28 | Fe>45% |
| B1. Remaining Ore Mineral Resources | | 17.64 | Fe>58% |
| 1) Prefeasibility Mineral Resources | 211 | 3.32 | |
| 2) Prefeasibility Mineral Resources | 221 | 2.46 | |
| 3) Prefeasibility Mineral Resources | 222 | 11.57 | |
| 4) Inferred Mineral Resources | 333 | 0.29 | |
| B2. Remaining Subgrade Mineral Resources | | 27.64 | |

| | | | |
|---|---|---|---|
| 1) Prefeasibility Mineral Resources | 221 | 15.90 | Fe>45% & <58% |
| 2) Prefeasibility Mineral Resources | 222 | 9.67 | |
| 3) Inferred Mineral Resources | 333 | 2.07 | |

Source : Mining Plan

3.8 Availability of Water & its source, Energy/Power Requirement & Source should be given

*Water Demand & its Source:*

There is no source of water at Katamati. However, the company had applied for ground water of 500 KLD and surface water of 15600 KLD. As per present assessment the future requirement of water would be ~4800 KL/ Day and permission for same would be obtained from competent authority before such drawl. The water being used for water sprinkling on haul road & on ore fines stock piles, wheel washing, green belt development & for drinking purpose is fully supplied by Noamundi Iron Mine of Tata Steel Limited only. As there is no wet processing plant at Katamati, hence there is no possibility recycling of water. The source of water for Noamundi Iron Mine is Baitarini river. The existing and proposed water requirement of Katamati Iron Mine is given below **Table-7.**

**TABLE-7**
**EXISTING AND PROPOSED WATER REQUIREMENT**

| Particulars | Existing (KL/Day) | Proposed (KL/Day) |
|---|---|---|
| Water Sprinkling | 310 | 550 |
| Spraying ore fines stockpiles (dry Plant Products) | 144 | 150 |
| Drinking, Sanitation and Chemical Lab | 1080 | 1500 |
| Green Belt | 360 | 1000 |
| Workshop & Vehicle Washing | 0 | 100 |
| Miscellaneous uses (CSR & Others) | 1130 | 1500 |
| **Total (KL/Day)** | **3024** | **4800** |

Source : Mining Plan

*Power Requirement & its Source*

Currently, TSL has agreement of 400 KVA with NESCO. The 11KV line from Odisha grid is laid mainly to illuminate the mine. The annual consumption is approximately 11 lakh Kwh. Considering the expansion of the mine, the consumption will increase to 2000 KVA in future for which required infrastructure will be laid down at suitable location. The electricity will be used mainly in illumination as well as processing plant and office building along with other infrastructure area.

3.9 Quantity of astes to be generated (liquid & solid) & scheme for their management/disposal

As such, the area is devoid of top soil. During the excavation, we do not envisage any generation of top soil from the development areas. However, any top soil encountered during the excavation will be stored in the area. The top soil generated during the period shall continue to be used for afforestation purpose.

The subgrade material is found in the form of intercalated patches within the ore zone which has been delineated by exploratory drilling, sampling and assaying. This subgrade consists of ferruginous shale and clay material having high alumina (deleterious) with low iron content ranging from 45% to 58%. The mine development has been planned accordingly delineating iron ore (Fe>58%) for plant feed, subgrade patches (<45% & <58%Fe) and waste material (<45%Fe) for stacking. The entire exercise of mine planning is being carried out by using sophisticated mine planning software "SURPAC VISION" for systematic and scientific excavation planning. Further, short term mine planning is being practiced using blast hole drilling and sampling for deciphering the iron ore, subgrade patches and waste material separately. As such there is no program for disposal of subgrade outside the lease and its use for beneficiation and blending purposes, it is stacked separately for future use.

The mineralogical amenability of this subgrade material has been initiated; however, detailed mineral characterization, mineral liberation and beneficiation studies will be conducted shortly. Waste material consists of BHJ, Canga, Shale, Laterite etc.

At present the Katamati mine has two dumps named as Subgrade Dump no.3 and Waste Dump no.2. The quantity of waste generated in the past was very less and used primarily for bench floor leveling, making of new ramps and haul roads etc. The quantity of subgrade generated is being stacked in Subgrade Dump no.3.A total quantity of 6.71 million tonnes has been stacked as on 31.03.2017.

The Subgrade Dump no.3 and Subgrade Dump no.1 shall be used for stacking of subgrade material during the period. At the end of plan period Dump No. 1, 2 and 3 shall have the following parameters. The proposed design of sub grade dump No: 1 & 2 is given in **Table-8(a)-(b).**

**TABLE-8(a)**
**PROPOSED DESIGN OF SUBGRADE DUMP NO. 1**

| Terrace | Length (m) | Width (m) | Av. Height (m) | Av. Slope of terrace | Overall slope of dump |
|---|---|---|---|---|---|
| A (625-635mRL) | 260 | 110 | 10 | <37.5 degree | <28 degree |
| B (635-645mRL) | 110 | 45 | 10 | | |

Source : Mining Plan

Subgrade Dump no.1 has a total volumetric capacity of 0.50 mcum. The grid location of the dump is 11000E to 11500E and 14650N to 15200N.

The average quantity of waste generated will be ~ 2MTPA per annum

**TABLE-8(b)**
**PROPOSED DESIGN OF WASTE DUMP No. 2**

| Terrace | Length (m) | Width (m) | Av. Height (m) | Av. Slope of terrace | Overall slope of dump |
|---|---|---|---|---|---|
| A (625-635mRL) | 420 | 370 | 10 | <37.5 degree | <28 degree |
| B (635-645mRL) | 360 | 310 | 10 | | |

Source : Mining Plan

Waste Dump no.2 has a total volumetric capacity of 3.0 million cum. The grid location of the dump is 11270E to 11750E and 14900N to 15470N. In the first year, the dump will be extended towards the slime dam where the material will only be dumped after excavating the slime. It is anticipated that the forest clearance will be obtained in the second year. Hence, the proposal of waste dumping has been given from the second year in the forest area. As top terrace of Subgrade Dump 3 shall be rehandled to reduce the height and Some portion of the rehandle subgrade material will be fed to the processing plant of Noamundi as per the quality, Hence the final design of this dump is given below in **Table-8(c)**.

**TABLE-8(c)**
**PROPOSED DESIGN OF SUBGRADE DUMP No.3**

| Terrace | Length (m) | Width (m) | Av. Height (m) | Av. Slope of terrace | Overall slope of dump |
|---|---|---|---|---|---|
| A (645-655mRL) | 200 | 40 | 10 | <37.5 degree | <28 degree |
| B (655-665mRL) | 370 | 90 | 10 | | |
| C (665-675mRL) | 460 | 125 | 10 | | |
| D (675-685mRL) | 390 | 165 | 10 | | |
| E (685-695mRL) | 350 | 220 | 10 | | |
| F (695-705mRL) | 302 | 250 | 10 | | |
| G (705-715mRL) | 247 | 195 | 10 | | |
| H (715-725mRL) | 180 | 125 | 10 | | |

Source : Mining Plan

For accommodating the subgrade and waste above the slime dam, it is proposed to re-handle the slime below the proposed subgrade and waste dump. The grid location of the dump is 11690E to 12080E and 14050N to 14620N. The re-handled slime will be stacked separately above the slime dam. The quantity of slime to be rehandled is around 3 lakh cum. The capacity of slime stack is around 4 lakh cum taking into consideration the expansion of the re-handled slime. The details of the slime stack is given below in the **Table-10.**

**TABLE-10**
**PROPOSED DESIGN OF SLIME STACK**

| Terrace | Length (m) | Width (m) | Av. Height (m) | Av. Slope of terrace | Overall slope of dump |
|---|---|---|---|---|---|
| A (624-633mRL) | 365 | 110 | 9 | <37.5 degree | <28 degree |
| B (633-642mRL) | 300 | 60 | 9 | | |

Source : Mining Plan

Berm width will be maintained at 15 m. The grid location of the dump is 11340E to 11760E and 14750N to 14950N.

The proposed dimension of Dumps at the end of the life will be as under:

**TABLE: 11**
**ULTIMATE DIMENSION OF DUMPS AT CONCEPTUAL STAGE**

| Details of Dump | Subgrade Dump No.1 | Waste Dump No.2 | Subgrade Dump No.3 |
|---|---|---|---|
| Dump area at the base | 11.7 ha | 18 ha | 18.7 |
| RL at the base of the dump | 625 | 625 | 642 |
| RL at the top of the dump | 665 | 685 | 722 |
| Height of Dump (Overall) | 40m | 60 | 80 |
| Overall slope at conceptual stage | 20 | 17 | 17 |
| Total capacity of dump | 2.03 mcum | 4.06 mcum | 2.3 mcum |

Source : Mining Plan

***Precautions and Protective Measures for Dumps***

Garland drain and toe wall will be provided around the dump to arrest any surface run offs. Grass plantation shall be done on Subgrade Dump slopes for stabilization. Once the dump matures, it will be stabilized by grass /tree plantation completely. The slime stack will be covered with coir matting/ geo textiles. The slopes of the terraces shall be maintained at an angle less than 37 .5 degree and the ultimate slope angle of the dump is planned to be less than 27°.

The terraces are designed so that rain water is drained out of the dump and there is no accumulation of rain water. The rain water gets channelized to the toe wall and garland drain provided at the base of the dump.

In existing Subgrade Dump 3, Garland drain and retaining wall has already been provided. As the proposed advancement of the dump will not be beyond the present toe wall, therefore no toe wall and garland drain is proposed around dump 3. In existing Waste Dump-2, although toe wall and garland drain has been provided but during the plan period , it is proposed to advance the waste dump towards the slime dam area. Hence additional toe wall & garland drain shall be provided. Similarly, toe wall and garland drain shall also be provided around the proposed Subgrade Dump-1. The specifications for the retaining wall/toe wall to be constructed during the plan period is mentioned below **Table-12**.

**TABLE-12**
**PROPOSAL FOR CONSTRUCTION OF RETAINING WALL/ TOE WALL**

| Year | Subgrade Dump 1 | Subgrade Dump 3 | Waste Dump 2 | Slime Stack | Size (H x W) (m) |
|---|---|---|---|---|---|
| | Length (m) | Length (m) | Length (m) | Length (m) | |
| 2018-19 | 340 | 0 | 379 | 925 | 1.0 x 0.5 |
| 2019-20 | 0 | 465 | 0 | 0 | 1.0 x 0.5 |
| 2020-21 | 0 | 0 | 308 | 0 | 1.0 x 0.5 |
| 2021-22 | 0 | 0 | 305 | 0 | 1.0 x 0.5 |
| 2022-23 | 0 | 159 | 0 | 0 | 1.0 x 0.5 |
| **Total** | **340** | **624** | **992** | **925** | |

Source : Mining Plan

The toe wall shall be made of stones with wire netting and cement pitching. The specifications for the garland drain to be constructed during the plan period is mentioned below in **Table-13.**

**TABLE-13**
**PROPOSAL FOR GARLAND DRAIN**

| Year | Subgrade Dump 1 | Subgrade Dump 3 | Waste Dump 2 | Slime Stack | Size (H x W) (m) |
|---|---|---|---|---|---|
| | **Length (m)** | **Length (m)** | **Length (m)** | **Length (m)** | |
| 2018-19 | 340 | 0 | 379 | 925 | 1.0 x 0.5 |
| 2019-20 | 0 | 465 | 0 | 0 | 1.0 x 0.5 |
| 2020-21 | 0 | 0 | 308 | 0 | 1.0 x 0.5 |
| 2021-22 | 0 | 0 | 305 | 0 | 1.0 x 0.5 |
| 2022-23 | 0 | 159 | 0 | 0 | 1.0 x 0.5 |
| **Total** | **340** | **624** | **992** | **925** | |

Source : Mining Plan

## 4.0 SITE ANALYSIS

### 4.1 Connectivity

The site is well connected with NH-215, Express highway at a distance of 5.5 km, 7.5 km. Nearest town & city is Barbil (~ 19 km) and Keonjhar at 70 km. Nearest airport is Ranchi at a distance of 135 km.

### 4.2 Land Form, Land Use and Land Ownership

Present land use is already under industrial mining purposes. Land utilization during the expansion will be as per the approved Mining plan.

### 4.3 Topography

There are two ridges viz, eastern and western ridges. The eastern ridge of Katamati is the southward extension of Noamundi eastern ridge. Similarly, the western ridge of Katamati is the southward extension of Noamundi western ridge. The two ridges are bifurcated by the valley and large low land area is presently called Chirubera dam. The elevation varies between a high and low contour of 732 m and 534 m respectively.

### 4.4 Existing Land Use Pattern

Katamati lease comprises of 360.010 ha forest land and 43.3118 ha non-forest land. Western part of Katamati falls completely within the forest land whereas Eastern part covers partly forest land and partly non-forest land. About 114.1911 ha is the broken up forest area prior to 1980 which includes some portion of Pit I, II &III. Present mining operation at Katamati is being carried out in non-forest land only. As iron ore at Katamati has wide occurrence in forest area, it necessitates for acquiring fresh forest land for continuance of mining operation in future. The Steel Company had submitted a de-reservation proposal over 199.1720 ha forest land on 17.04.2007, which includes 31.1791 ha broken up forest area prior to 1980. As per the MoEF&CC, Govt. of India Circular dated 10.03.2015, 160.383 ha Non-forest area has been identified as forest as on 25.10.1980 (as per Sabik records) and accordingly Forest Diversion Proposal has been applied on 16.06.2016.

The existing, proposed land use during the plan period and the end of life land use pattern is given in below **Table-14, Table 15 Table-16.**

**TABLE-14**
**EXISTING LAND USE PATTERN**

| Sr. No. | Particulars | Forest land utilized (Ha.) | | | Non forest land | Total |
|---|---|---|---|---|---|---|
| | | Forest Land (Ha.) | Non forest land identified as Forest in Sabik RoR | Total forest | | |
| 1 | Mining/Excavation | 17.6022 | 55.588 | 73.1902 | 6.412 | 79.6022 |
| 2 | Dumping OB/Subgrade/Tailing Pond/ top soil storage | 5.1434 | 20.45 | 25.5934 | 18.8275 | 444.4209 |
| 3 | Mineral storage | 0.000 | 0.974 | 0.9740 | 0.0000 | 0.974 |
| 4 | Infrastructure (Workshop, Admin. Building, plant etc.) | 0.000 | 4.500 | 4.5000 | 2.8299 | 7.3299 |
| 5 | Roads pipeline, Railways, electric line etc. | 8.4335 | 1.500 | 9.9335 | 2.675 | 12.6085 |
| 6 | Effluent treatment plant | 0.000 | 0.000 | 0.0000 | 0.000 | 0.000 |
| 7 | Township area | 0.000 | 0.000 | 0.0000 | 0.000 | 0.000 |
| 8 | Others | 0.000 | 0.000 | 0.0000 | 0.000 | 0.000 |
| 9 | Total | 31.1791 | 83.012 | 114.1911 | 30.7444 | 144.9355 |
| 10 | Unutilized | 167.9929 | 77.826 | 245.8189 | 12.5694 | 258.3883 |
| | Total Lease Area | 199.172 | 160.838 | 360.0100 | 43.3138 | 403.3238 |

Source : Mining Plan

**TABLE 15**
**PROPOSED SURFACE AREA UTILISATION AT THE END OF PLAN PERIOD I.E. FY'2022-23**

(All figures in hectares)

| Sr.No | Particulars | Forest land utilized (Ha) | | | Non-forest land | Total |
|---|---|---|---|---|---|---|
| | | Forest Land (Ha) | Non forest land Identified as Forest in Sabik RoR | Total forest | | |
| 1 | Mining/ Excavation | 55.7352 | 87.6139 | 143.3491 | 11.2419 | 154.5910 |
| 2 | Dumping OB/Subgrade/Tailing Pond/top soil storage | 12.7865 | 22.6204 | 35.4069 | 23.6146 | 59.0215 |
| 3 | Mineral storage | 1.7907 | 0.9740 | 2.7647 | 0.0000 | 2.7647 |
| 4 | Infrastructure (Workshop, admin. Building, plant) | 2.2925 | 3.8956 | 6.1881 | 4.0709 | 10.2590 |

| Sr.No | Particulars | Forest land utilized (Ha) | | | Non-forest land | Total |
|---|---|---|---|---|---|---|
| | | Forest Land (Ha) | Non forest land Identified as Forest in Sabik RoR | Total forest | | |
| 5 | Roads, pipeline, Electric Line, Railways ( abandoned) | 10.2919 | 1.5301 | 11.822 | 2.7364 | 14.5584 |
| 6 | Effluent Treatment Plant | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 7 | Township area | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 8 | Others | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 9 | TOTAL | 82.8968 | 116.6340 | 199.5308 | 41.6638 | 241.1946 |
| | Unutilized | 116.2752 | 44.2040 | 160.4792 | 1.6500 | 162.1292 |
| | TOTAL LEASE AREA | 199.1720 | 160.8380 | 360.0100 | 43.3138 | 403.3238 |

Source : Mining Plan

**TABLE-16**
**LAND USE PATTERN AT CONCEPTUAL STAGE (End of Life)**

| Sr. No. | Particulars | Forest land utilized (Ha.) | | | Non forest land | Total |
|---|---|---|---|---|---|---|
| | | Forest Land (Ha.) | Non forest land identified as Forest in Sabik RoR | Total forest | | |
| 1 | Mining/Excavation | 171.618 | 121.2235 | 292.8415 | 5.042 | 297.8835 |
| 2 | Overburdan/Dump/ /Tailing Pond/ top soil storage | 11.1434 | 19.2468 | 30.3902 | 28.2673 | 58.6575 |
| 3 | Mineral storage | 0.000 | 1.750 | 1.7500 | 0.250 | 2.000 |
| 4 | Infrastructure (Workshop, Admin. Building, plant etc.) | 5.777 | 8.4596 | 14.2366 | 8.5779 | 22.8145 |
| 5 | Roads pipeline, Railways, electric line etc. | 8.4335 | 7.4499 | 15.8834 | 0.7500 | 16.6334 |
| 6 | Township area | 0.000 | 0.000 | 0.0000 | 0.000 | 0.000 |
| 7 | Others | 0.000 | 0.000 | 0.0000 | 0.000 | 0.000 |
| 8 | Total | 196.9719 | 158.1298 | 355.1017 | 42.8872 | 397.9889 |
| 9 | Safety zone | 2.2001 | 2.7082 | 4.9083 | 0.4266 | 5.3349 |
| | Total Lease Area | 199.172 | 160.838 | 360.0100 | 43.3138 | 403.3238 |

Source : Mining Plan

4.5 Existing Infrastructure

a) Site Services:

(i) Weighbridge:

At present there are three weigh bridges in the mine located at the entry/exit point of the mine consisting of 2 numbers of 200 tons & one number of 120 Tons. The weighbridges are provided with Cameras with recording and display facilities for online surveillance of the vehicle movement.

Each and every dumper from Katamati is being weighed at the weighbridge before dispatch to Noamundi Plant. In addition, one weighbridge of 60 Ton capacity has also been installed near existing mobile crushing and screening plant area to measure the quantity of ore fed into the plant as well as the quantity of products dispatched from the plant. Moreover, the company is also dispatching the products of crushing & screening plant to Jamshedpur steel plant, Kalinganagar Steel Plant & other sister concerns (Tata Metaliks Limited, Tata Sponge Iron Limited, TAYO) by road through Deojhar railway siding. The dispatch from Katamati mine to Deojhar siding is carried out through tippers engaged by contractors. At present the weighment of the tippers is carried out in one 120 T capacity weighbridge located beside the 200T weighbridge used for 100T dumpers owned by the company. Thus the area near weighbridge is getting congested & unsafe. Moreover, some portion of haul road is being used both by company's dumpers & contractor's tippers which is unsafe & poses a possible threat of accident. Therefore, it is proposed to install two weighbridges of 60T capacity each near gate no.2 to have independent areas as well as independent roads for tippers & 100T dumpers to ensure safe & scientific mining operations. This additional infrastructure area will incorporate two 60 T weighbridges, security gate & parking area for parking tippers & loading equipments belonging to contractor. Hence two more weighbridges of 60 ton capacity each shall also be installed near pillar no.FP2.

(ii) Office, Canteen and Rest Shelter:

At present, the pit office & rest shelter are housed in a double story building. The pit office is provided in 1st floor whereas rest shelter for employees is provided at ground floor. A training room is also provided in the ground floor to impart training & conduct meetings with employees. Individual lockers have been provided to all the employees to keep their belonging & PPE's. Two separate state of the art canteen building has also been constructed beside the Rest shelter.

The canteen is well ventilated and equipped with supply of cold drinking water & sufficient number of tables & chairs. Two numbers of toilets have also been provided adjacent to the pit office building. Well maintained lawn & park has been developed around the pit office to improve aesthetic beauty of the area.

The colony containing the housing facility is located in Noamundi lease area of the which is adjacent to the Katamati lease. Also the equipment workshop is common and is located in Noamundi lease.

4.6 Soil Classification

The distribution of different soil types in the district depends much on its physiographic and lithologic variations. The soil types in Keonjhar district can be broadly divided into two major groups namely Alfisols and Utisols.

Alfisols : These soils predominantely occur in Harichandanpur, Hatadhi, Ghasipura, Anandpur, Ghatgaon, Telkoi blocks. This group of soil can be sub divided into sandy soil, red loamy soil, red gravelly soil and older alluvial soil. These soils are light textured usually devoid of lime concretions, nitrogen, phosphate and organic matter. The pH value varies from 6.5 to 7.3.

Ultisols: These soils predominantly occur in Champua, Patna, Jhumpura, Keojhar and Sharpada blocks. Essentially these are lateritic, red and yellow soil and red gravelly soil. These soils are poor in nitrogen, phosphate, potassium and organic matter. The pH value varies between 4.5 to 6.0. As per the agloclimatic classification the district falls in the north central plateau and northeastern coastal plain.

4.7 Climatic Data from the Secondary Sources

The district is characterized by tropical to sub tropical climate with hot summer, high and well-distributed rainfall during the monsoon and a cold winter. The summer season lasts from March to May, the rainy season starts in June and continues up to September. October and November constitute the autumn season and winter starts in December. May is the hottest month of the year with a maximum temperature is about 46° C and daily minimum temperature 25° C. December is the coldest month as the mean daily temperature recorded as 12° C. Relative humidity is generally high from June to December. In summer season humidity varies from 35- 40%. South-west monsoon is the principal source of rainfall in the district. Average annual rainfall is 1535 mm. About 80% of the total rainfall is received during the period from June to September.

4.8 Social Infrastructure Available

There is no likelihood of effect of outside people or influx on the existing local population. The lessee is spending substantial amount through Tata Steel Rural Development Society for peripheral developments such as education, health, sports, afforestation etc. Hence the benefits to the community and its economy because of this project are quite appreciable.

## 5.0 PLANNING BRIEF

5.1 Planning Concept (types of industries, facilities, transportation etc), Town and Country planning/Development authority Classification

The proposed project is expansion of iron ore mining and planning for excavation shall be governed by the approved mining plan.

5.2 Population Projection

Since inception of mining activities in production of iron ore mining from this mining project is beneficial. Direct and indirect employment will be generated due to the project. Unskilled /semi-skilled manpower can be sourced from the local area and skilled manpower will be sourced from outside. However, preference will be given to domilites of Odisha on merit or availability.

At present about 270 workers are engaged in the mining activities and for carrying out the proposed expansion, further employment will be provided to 300 people.

5.3 Land use Planning

Proposed expansion project will be set up in the existing mining lease area for built up structures, green belt etc. will be same as per scheme suggested in the approved mine plan for existing mine. Land use planning for proposed expansion project will be followed as per approved mine plan.

5.4 Assessment of Infrastructure Demand (Physical & Social)

TSL has assessed the demand of infrastructure (Physical & Social) in nearby area of the mine site and development activities have been started under corporate social responsibilities programs.

5.5 Amenities/ Facilities

Rest shelters, Toilets, drinking water facilities, first aid facilities, and regular medical checkup facilities has been provided for labors and their families.

## 6.0 PROPOSED INFRASTRUCTURE

6.1 Industrial Area (Processing Area)

Details of proposed infrastructure are presented in **Table-15.**

6.2 Residential Area (Non –Processing Area)

No residential area is proposed for the expansion of iron ore mining.

6.3 Greenbelt

*Afforestation*

**TABLE-17**
**NO. OF SAPLINGS PLANTED**

| Year | Proposed | Actual |
|---|---|---|
| *2013-14* | *0* | *15000 + 2000 Vetiver grass* |
| *2014-15* | *0* | *0* |
| *2015-16* | *5000* | *3788* |

| Year | Proposed | Actual |
|---|---|---|
| *2016-17* | *7500* | *2566* |
| *2017-18 (till Aug 17)* | *2500 + Vetiver grass* | *2981* |
| *Total* | | *21354 + 2000 Vetiver grass* |

Source : Mining Plan

***Conceptual Reclamation of Mined Out Area:***

At the end of life of the mine about 297.8835 ha area will be utilised for mining purpose. The mined out area will be reclaimed and rehabilitated as indicated in **Table-18.**

**TABLE-18**
**RECLAMATION OF THE MINED OUT AREA**

| Activity | Conceptual Land Degradation by mining | Reclamation measures | |
|---|---|---|---|
| | Area in ha | Area in ha | Measures |
| Mining Excavation | 312.345 | 255.9263<br>51.354<br>5.0647 | • Afforestation of mine benches by method of pitting & planting<br>• After backfilling with OB and waste afforestation will be done<br>• Bottom benches forming a pit shall be converted for water storage or rain water harvesting |

Source : Mining Plan

(a) Afforestation of Mined out area:

Out of 225.6935 ha of mined out top benches of the quarry, about 150 ha area shall be reclaimed concurrently by afforestation during the active mining operation. About 3.7 Lakhs saplings shall be planted under above afforestation programme. Balance area shall be reclaimed at the conceptual stage.

Method of pitting and planting as described below shall be adopted for plantation. Species like Acacia, Arjun, Cashew-Nut, Eucalyptus, Karanj, Subabul, Gamhar, Teak etc., which can survive and regenerate in the area, shall be planted. Temporary fencing shall be provided for safe guarding the saplings planted from Cattle's. Watering & Guarding shall be done for two to three years. Method of "Pitting & Planting" as described below shall be used for afforestation of mined out benches.

*Proposal for the year 2018-19 to 2022-23:*

As the mining operation has just expanded, there is no possibility of any area getting abandoned. Hence, in the coming five years, reclamation of mined out area has not been envisaged. Proposal for reclamation of mined out area during the plan period has been indicated in below **Table-19.**

**TABLE-19**
**RECLAMATION PLAN IN PLAN PERIOD**

| Year | Mined out area at beginning (ha) | Additional area proposed during the plan period (ha) | Total Mined out Area (ha) | Area Reclaimed & Rehabilitated during the plan period (ha) | Mined out area at the end of plan period (ha) |
|---|---|---|---|---|---|
| 2018-19 to 2022-23 | 79.6022 | 74.9888 | 154.591 | Nil | 154.591 |

Source : Mining Plan

*Proposal of Plantation for the Plan Period*

The year wise plantation proposal is given in following **Table-20.**

**TABLE-20**
**YEAR WISE PLANTATION PROGRAMME**

| Sr. No. | Year | Area (ha) | Plantation (No.) | Location |
|---|---|---|---|---|
| 1 | 2018-19 | 1.0 | 2000 | Safety Zone |
| 2 | 2019-20 | 1.0 | 2500 | Waste dump-2 |
| 3 | 2020-21 | 2.0 | 5000 | Subgrade dump-1 |
| 4 | 2021-22 | 1.5 | 3500 | Subgrade dump-1 & Waste dump-2 |
| 5 | 2022-23 | 2.0 | 5000 | Waste Dump-2 |
| **Total** | | **7.5** | **18000** | |

Source : Mining Plan

## 6.4 Social Infrastructure

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

## 6.5 Connectivity

The site is well connected with NH-215, Express highway at a distance of 5.5 km, 7.5 km. Nearest town & city is Barbil (~ 19 km) and Keonjhar at 70 km. Nearest airport is Ranchi at a distance of 135 km.

6.6 Drinking Water Management

There is no source of water at Katamati. The nearest water source is Jojo nalla and Noamundi Basti spring in the adjoining Noamundi lease. The total water for sprinkling on haul road & for drinking purpose will be fully supplied by Noamundi Iron Mine only. As there will be no processing plant at Katamati, hence there will be no recycling of water. The source of water for Noamundi Iron Mine is Baitarini river.

The water will continue to be drawn from Baitarani river only. Separate application for drawl of surface water ~4800 KL/ day would be made for various uses at Katamati Iron Mine.

6.7 Sewerage System

No construction or sewage waste is expected from the quarry process. However the domestic waste from the toilets will be given treatment through septic tank and soak pit arrangement.

6.8 Industrial Waste Management

No industrial waste will be generated. The generation of top soil, overburden and mine waste is envisaged as per the approved mine plan.

6.9 Solid Waste Management

The average quantity of waste to be handled will be ~ 2 MTPA. The dumps shall be maintained at the earmarked places as per the approved plan.

6.10 Power Requirement and Supply/ Source

Considering the expansion of the mine, the consumption will increase to 2000 KVA in future for which required infrastructure will be laid down at suitable location. The electricity will be used mainly in illumination as well as processing plant and office building along with other infrastructure area.

## 7.0 REHABILITATION AND RESETTLEMENT (R&R) PLAN

7.1 Policy to be adopted (Central/ State) in respect of the project affected persons including home outsees, land outsees and landless labores (a brief outline to be given)

No R&R plan is required as no displacement of people is proposed for the expansion of mining project.

## 8.0 PROJECT SCHEDULE & COST ESTIMATES

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

It is a running mine.

8.2 Estimated Project Cost along with analysis in terms of economic viability of Project

Total cost of the project is: Rs. 354 Crores

Cost for environment protection for the proposed expansion Project: 3 Crores

## 9.0 ANALYSIS OF PROPOSAL

9.1 Financial and Social Benefits with Special Emphasis on the Benefits to the Local People including the Tribal Population if any

Proposed expansion project will result in growth of the surrounding areas by increasing direct and indirect employment opportunities in the region including ancillary development and supporting infrastructure. Special emphasis on Financial and Social benefits will be given to the local people including tribal population, if any, in the area. Development of social amenities will be in the form of medical facilities, education to underprivileged and creation of self-help groups.