PRE-FEASIBILITY REPORT

Of

PROPOSED
1.30 MTPA IRON ORE BENEFICIATION PLANT &
0.80 MTPA JIGGING PLANT FOR SINTER FEED

At

THANA NO – 775, BOKNA - SHEET NO – 3,
KHATA NO – 2 & PLOT NO – 572
BARAHAMDA VILLAGE, NOAMUNDI TEHSIL
WEST SINGHBHUM DISTRICT- JHARKHAND

By

M/s. USHA MARTIN LIMITED, JHARKHAND
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CHAPTER – 1
EXECUTIVE SUMMARY

1. Executive Summary

M/s. USHA MARTIN LIMITED(UML) in the business of Iron ore mining and Steel making, intends to relocate its operating washing plant of capacity 240 TPH along with Iron Ore Beneficiation Plant of capacity 1.3 MTPA located at Jamshedpur to its mine site at Barajamda. Also, it is proposed to install a 0.80 MTPA capacity iron ore jigging plant to produce a sinter grade concentrate meeting the requirement of their sinter plant. Also can be used for merchant beneficiation in case of lower utilization for captive needs.

UML has their own mines estimated having 100 million tones reserves, out of which 90 million tones are of low grade assaying 53-58% Iron. These reserves are estimated to meet the plant production life of 20-25 years with annual mine production of about 4 MTPA.

The proposed developmental scheme envisages the following:

- An annual mining of 4.0 Mtpa of Iron ore assaying 53 to 58% Fe to produce Iron Ore by existing suitable dry crushing and screening unit(s). Setting up of Beneficiation plant, Jigging plant by shifting to mines area. The material suitable for Iron and steel making through Pelleisation, Blast Furnace route and coal based DRI route.

- The fines generated during mechanized mining and crushing amounting to 3.0 mtpa having granulometry of (-) 10 mm and below, assaying 56% Iron content which will be used for producing sinter grade concentrate @ 800,000 tonnes per annum by washing, jigging and screening process, assaying +62% Fe and pellet grade concentrate by full scale wet beneficiation techniques @ 1,300,000 tones per annum assaying +63% Fe.

The project will be located in an area of 54.65 Ha in non-forest land.

The process of beneficiation will consist mainly of washing, screening, primary grinding to liberation size, gravity separation, magnetic
separation and dewatering. While the jigging process comprise of washing followed by gravity separation at coarser fractions.

Water requirement of the plant is 3820 m³/day and water will be made available from Source Karo River water located 1.6 km in the western direction.

Solid waste (tailings) (0.90 MTPA) generated from project will be dewatered by gravity separation /Thickener centrifuge. Water from centrifuge is recycled back to process

Finer reject material will be sent to filter press to form cake. This solid waste will be dumped in tailing dump. Possible avenues in converting the tailings to value addition construction materials viz., bricks / decorative tiles for the following,

(i) Low cost housing
(ii) Developing pavements
(iii) For filling abandoned lands, low lying areas and closed mines.

Tailings lack in organic matter or micronutrients. Also Dried tailings will be excavated and disposed off and partially will be used for vegetation in and around the plant area after treating with biofertilizers

The water from the thickener will be reused in the plant and as such unit will be “Zero Discharge”.

Manpower of 130 workmen and 15 Executives will be involved for plant operation. Locals will be preferred based on suitability.

The project will be implemented in 24 months after obtaining all statutory approvals

The estimated capital cost for the project is Rs. 167.82 crores.
2. INTRODUCTION OF THE PROJECT/BACKGROUND INFORMATION

i. Identification of project and project proponent. In case of mining project, a copy of mining lease/letter of intent should be given.

M/s. USHA MARTIN LIMITED (UML) being in the business of Iron ore mining and Steel making, intends to relocate its operating washing plant of capacity 240 TPH along with Iron Ore Beneficiation Plant of capacity 1.3 MTPA located at Jamshedpur to its mine site at Barajamda. Also, it is proposed to install a 0.80 MTPA capacity iron ore jigging plant for sinter feed to produce a sinter grade concentrate meeting the requirement of their sinter plant.

UML has their own mines estimated having 100 million tones reserves, out of which 90 million tones are of low grade assaying 53-58% Iron. These reserves are estimated to meet the plant production life of 20-25 years with annual mine production of about 4.0 MTPA.

The proposed developmental scheme envisages the following:

• An annual mining of 4.0 MTPA of Iron ore assaying 53 to 58% Fe to produce Iron Ore by existing suitable dry crushing and screening unit(s), Setting up of Beneficiation plant, Jigging plant for sinter feed by shifting to plant area. The material suitable for Iron and steel making through pelletization, Blast Furnace route and coal based DRI route.

• The fines generated during mechanized mining and crushing amounting to 3.0 MTPA having granulometry of (-) 10 mm and below, assaying 56% Iron content which will be used for producing sinter grade concentrate @ 800000 tones per annum by washing, jigging and screening process, assaying +62% Fe and pellet grade concentrate by full scale wet beneficiation techniques @ 1,300,000 tones per annum assaying +63% Fe.

PROJECT PROponent:

Usha Martin is amongst the largest wire rope manufacturer in the world and a leading speciality steel producer in India. The wire rope manufacturing facilities located in India, UK, UAE, and Thailand produce one of the widest range of wire ropes in the world. Long standing usage in diverse sectors like Oil & Offshore, Mining, Crane,
Elevator etc is a testimony of expertise in manufacturing high quality wire rope products.

UML expertise in wire rope dates back to 1961 with the set up of first rope manufacturing unit. Since then, UM have been relentlessly dedicated on stringent controls on quality, at each stage of manufacturing to produce wire ropes, strands, wire, and steel products for the most demanding requirements of our customers.

With a philosophy that quality ropes are made from quality steel, UML set up speciality steel plant in 1974. This integrated steel plant uses iron ore and coal to consistently produce high quality steel. Today, at one million tonnes capacity, it is the largest specialty steel plant in India in long product segment. The plant produces wire rod for wire drawing, alloy steel bar and wire rod for forging applications, commercial vehicles, cars, two wheelers, and engineering industries.

**ii. Brief description of nature of the project**

UML proposes to setup the following units for iron ore beneficiation at Barajamda, Jharkhand

- 1.30 MTPA Iron Ore Beneficiation plant
- 0.80 MTPA Jigging plant for sinter feed

Low grade Iron Ore fines produced from the mine will be transported to the Hopper crusher located in mining lease area by dump trucks and after crushing to the desired size in the crusher will be transported to the beneficiation plant.

The process of beneficiation will consist mainly of washing, screening, primary grinding to liberation size, gravity separation, magnetic separation and dewatering. While the jigging process comprise of washing followed by gravity separation at coarser fractions.

The Calibrated Ore/Beneficiated Ore of 2.1 MTPA will be transported to UML steel plant through proposed railway siding.

**iii. Need for the project and its importance to the country and or region.**

In view of spiraling cost of raw material, limited availability of good grade ores, constraints in transportation logistics due to non-availability of good infrastructure, the primary steel producers alone cannot meet the demand and as such secondary steel producers have greater opportunity to enhancing their production capacities to meet the local and / or regional demand at competitive prices. With the above opportunity, secondary steel producers are venturing into expansion schemes for upstream and downstream units for value
addition with use of cost effective technology suiting small to medium capacities.

The prevailing and continuing forecast of bullish steel market and restrictions imposed on export trading of high grade lump ores and ore fines by the Government, the fines that will be available in future could be gainfully used to produce value added feed stock which can be used for in-house Iron & Steel making. Also, use low-grade ores by beneficiation.

In view of the above background and to rationally utilize the available resources for producing prepared burden for productivity enhancement of steel making at lower cost, meet spiraling cost of raw material, limited availability of good grade material, there is a rising demand for Iron ore beneficiation, sinter plants & pellet plants having flexibility of using different type of raw material to meet the local demands which is logical.

Under the circumstances, with concern to the environmental pollution, M/s. UML has taken a right decision to relocate its operating Washing and Iron Ore Beneficiation Plant nearer to their Mine site at Barajamda.

**Future Consumption**

Jharkhand State is a major producer of steel and exporter of Iron ore and accounts for 31% of India's estimated total hematite and magnetite Iron ore resources i.e. approx. 9.2 billion tones.

The Company has its own mines in the region and the proposed plant will draw the ore requirements from its mines.

**iv. Demand – supply Gap**

The Iron ore demand has a direct correlation with the steel production. With the expected growth in domestic steel output in the coming decade, the demand for Iron ore is bound to rise in tandem, especially in India & other Asian countries. With the depletion of high grade ore, the demand of beneficiated ore will also increase to meet feed requirement of sintering and pelletization plant.

Of late, Iron & Steel making technologies are gradually shifting to more environmental friendly process of steel making viz. direct reduction / electric furnace route etc. as compared to the pollution hazardous and capital intensive conventional blast furnace route. These new routes of steel making require high grade feed stock with higher Fe content.

The existing Beneficiation Plant of M/s. UML is producing a concentrate meeting its pellet plant requirement assaying 62~63% Fe
content and less than 6.5% alumina plus silica. The Iron ore concentrate is being used for production of iron ore pellets at their Jamshedpur plant. Existing process flow sheet with some additional facilities will be followed as the same is proven. It is envisaged to add one/two equipment in the existing circuit for further quality improvement, if required, depending on the input ore quality after relocating and commissioning the plant.

v. **Imports vs. Indigenous production.**

India is self sufficient to meet the demands of the market with the GDP projected at 10% in the coming decades and in view of the infrastructure. Facilities going across the region the growth rate of demand will increase to meet the expansion of new proposal are muted.

vi. **Export possibility**

Since the plant is located in the landlocked area and away from the coast and the neighboring countries, the logistic cost involved for transporting good, it will not be economically viable to export of Iron ore.

vii. **Domestic / export markets**

The entire production is envisaged for the domestic market.

viii. **Employment generation (direct and indirect) due to the project.**

The project will create the direct employment of 20 Peoples during the operation phase of the project. During the construction phase, 145 people on daily average will be employed. UML will give preference to the local peoples during construction and operation phase of the project depending upon the skill, job requirement and capability. Several other indirect employment opportunities will be created in the surrounding areas transport, business, vehicle drivers and attendants, workshops, grocery, medical and retails etc.
CHAPTER – 3
PROJECT DESCRIPTION

3. Project Description

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

UML proposes to setup the following units for iron ore beneficiation at Barajamda, Jharkhand

- 1.30 MTPA Iron Ore Beneficiation plant
- 0.80 MTPA Jigging plant for sinter feed

Low grade Iron Ore fines produced from the mine will be transported to the Hopper crusher located in mining lease area by dump trucks and after crushing to the desired size in the crusher will be transported to the beneficiation plant by a covered belt conveyor.

The process of beneficiation will consist mainly of washing, screening, primary grinding to liberation size, gravity separation, magnetic separation and dewatering. While the jigging process comprise of washing followed by gravity separation at coarser fractions.

The Calibrated Ore/Beneficiated Ore of 2.1 MTPA will be transported to UML steel plant through proposed railway siding.

UML has obtained Environmental Clearance for the steel plant which is an interlinked project.

The subject proposal is categorized as Category A Project under Schedule 2 (b) which necessitates obtaining Environment Clearance from Ministry of Environment Forest and Climate Change (MoEF&CC) as production capacity is more than 0.1 MTPA.

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

The project site is located at Barajamda village, Noamundi Tehsil, West Singhbhum district Jharkhand.

The site is covered by Survey of India Toposheet No. 73/F/8. The site falls between A) 22°9’58.81"N - 22°10’13.38"N  B) 85°23’19.89”E - 85°23’39.77”E North latitude and East Longitude with an average altitude of 429-484 m above MSL.

The location map of the site is shown in Fig – 1
The area approach by nearest railway line connecting Gua – Noamundi of South Eastern Railway line is located at a distance of 0.7 km to Eastern direction from the site. Key map showing the location of various features around the project site is show in Fig – 2. Jamshedpur is major town is located at a distance of 109.0 km in NE direction.

The National Highway (NH-75) connecting Ranchi – Parsora is located at a distance of about 31.5 km in ESE direction,

The National Highway (NH-215) connecting Koira – Parsora is located at a distance of about 14.8 km in Sothern direction, (Odisha)

The State Highway (SH-4) connecting Gua – Noamundi is located at a distance of about 0.2 km in Southern direction, the nearest railway station is located at Bara Jamda RS which 1.5 km in ESE direction.

Key map showing the location of various features around the plant site is depicted in Fig – 2.

There are no wildlife sanctuaries, national parks, elephant/tiger reserves within 10-km radius of the study area. However proposed Karo Karampada Elephant Corridor is located at about 8 km in SW direction.

Nearest Settlements from the plant site
- BaraJamda – 1.3 km – ESE
- Boraiburu – 0.4 km – W
- Chaibasa – 60.0 km – NE

The following are the Reserve forests belonging to scrub forest category exists in the study area.

- Nuia Protected Forest – 0.5 km – N, Pandrasali Protected Forest – 4.3 km – ESE, Thakurani RF – 5.1km – ESE, Uliburu RF – 1.2km – SSW
- Tatiba Protected Forest – 1.7 km – W, Ghtkuri RF – 1.7 km – W, Gua Protected Forest – 2.9 km – NW

Salient features of Plant site are given in Table – 1 and Fig - 3 shows the study area of 10 km radius around the plant site.
FIG - 2

CLIENT : M/S. USHA MARTIN LIMITED
PROJECT : 1.30 MTPA IRON ORE BENEFICIATION PLANT & 0.80 MTPA JIGGING PLANT FOR SINTER FEED
Location : Kailana Village, Rencel, Jamshedpur District, North Part of Ranchhand State

KEYMAP

PREPARED BY
B.S.ENVI-TECH (P) LTD.,
SECUNDERABAD

LEGEND
PLANT SITE

SCALE
0 1 2 km
<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altitude</td>
<td>429-484 m above mean</td>
</tr>
<tr>
<td>Latitude</td>
<td>22° 9’58.81”N - 22°10’13.38”N</td>
</tr>
<tr>
<td>Longitude</td>
<td>85°23’19.89”E - 85°23’39.77”E</td>
</tr>
<tr>
<td>Village, Tehsil, District, State</td>
<td>Badjama Village, Noamundi Tehsil, West Singhbhum district Jharkhand.</td>
</tr>
<tr>
<td>Max. Temp. °C</td>
<td>47.7</td>
</tr>
<tr>
<td>Min. Temp. °C</td>
<td>3.9</td>
</tr>
<tr>
<td>Relative Humidity %</td>
<td>84-28</td>
</tr>
<tr>
<td>Annual rainfall</td>
<td>1379.3 mm</td>
</tr>
<tr>
<td>IMD Station</td>
<td>Jamshedpur – 109 km – NE</td>
</tr>
<tr>
<td>Topography</td>
<td>Undulated terrain</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Sandy clay loam</td>
</tr>
<tr>
<td>Nearest water bodies</td>
<td>Karo River – 1.6 km – Western Direction. Koina River – 8.9 km – WNW Direction. Rengali Reservoir – 87.0 km – SSW Rengali Dam – 105.0 km – SSW</td>
</tr>
<tr>
<td>Nearest Railway station</td>
<td>Bara Jamda – 1.5 km – ESE</td>
</tr>
<tr>
<td>Nearest Villages</td>
<td>Bara Jamda – 1.3 km – ESE Boraibusu – 0.4 km – W</td>
</tr>
<tr>
<td>Nearest Town</td>
<td>Jamshedpur – 109 km – NE</td>
</tr>
<tr>
<td>District Head Quarter</td>
<td>Chaibasa – 60.0 km – NE</td>
</tr>
<tr>
<td>Nearest Port Area</td>
<td>Dhamra Port – 220.0 km – SE</td>
</tr>
<tr>
<td>Inter State Boundary</td>
<td>Jharkhand – Odisha – 1.2 km – SSW</td>
</tr>
<tr>
<td>Nearest Air port</td>
<td>Jamshedpur – 106.0 km – NE</td>
</tr>
<tr>
<td>Nearest Forest</td>
<td>Nuia Protected Forest – 0.5 km – N Pandrasali Protected Forest – 4.3 km – ESE Thakurani RF – 5.1km – ESE Uliburu RF – 1.2km – SSW Tatiba Protected Forest – 1.7 km – W Ghtkuri RF – 1.7 km – W Gua Protected Forest – 2.9 km – NW</td>
</tr>
<tr>
<td>Historical places</td>
<td>None within 10 km radius</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------</td>
</tr>
</tbody>
</table>

*All distances mentioned in the above table are aerial distances*
iii. **Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations gone into should be highlighted.**

Keeping in view of proximity to the low grade iron ore deposit in the existing mine the subject project site has been selected.

Following are the main criteria considered for locating the project at this location

a. UML has requisite land available at Barajamda near Barbil, a mining town.

b. Proximity to their mines within a radius of 15 kms.

c. Availability of non-forest land

d. Availability of perennial water source within a short radius from the site.

e. Short distance for transportation of low grade ore from mines

f. Availability of railway line for extending to proposed railway siding

g. The State Govt. of Jharkhand has agreed to provide sufficient power to this plant from the state grid.

h. Proper connectivity of the unit with roads and reliable transport network is available.

i. Proximity to rail head to optimize transportation costs.

j. Proximity to an established colony, which would offer reasonable amenities to the plant employees is also available.

k. HT power line 132 kV is nearer to the plant site.

l. Minimal habitation.

m. Few nearby industries

iv. **Size or magnitude of operation.**

Project proposal comprises of the following:

- 1.30 Million TPA Iron ore Beneficiation plant
- 0.80 Million TPA Iron ore Jigging Plant

The project will use 3.0 MTPA of low grade iron ore

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

**Manufacturing Process**

The process of beneficiation will consist mainly of washing, screening, primary grinding to liberation size, gravity separation, magnetic separation and dewatering.
The process of jigging comprises of washing followed by gravity separation at coarser fractions.

*Fig – 4 and 5* Process flow diagrams

**MAJOR PROCESS & FACILITIES**

**MINING AND FEED PREPARATION**

M/s UML, presently is involved in bulk mining of Iron ore from their mines and is using completely. The estimated mineable reserves in the deposits are about 100 Million tonnes. About 90% of the reserves are low to medium grade ores.

M/s UML intends to relocate and install its existing operating Beneficiation Plant for upgrading the low to medium grade ores assaying 53~58% Fe at Barajamda, which is within about 10 kms from nearest railway siding close to their mines. It is already installed crushing & dry screening units at the mines for production of calibrated lump ore from a top size of 250~300 mm to 10 to 40 mm for blast furnace and Iron ore fines for meeting Pellet and sinter requirement of (-) 10 mm.

The sized ore will be transported by road to nearby railway siding located at Barajamda. From the railway siding, the sized ores will be transported by rail to the Steel plant. The fines will be stacked in open stockyard for further processing. A fifteen (15) days stock in form of piles is proposed for the raw material which occupies an area of 06 acres.

**INPUT/ OUTPUT GRADES**

Based on the different products and production rate requirements, a flow sheet with material balance comprising the following major unit operations is derived.

<table>
<thead>
<tr>
<th>Input</th>
<th>Sinter Fines</th>
<th>Iron Ore Concentration For</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe% in</td>
<td>Desired grade Fe%</td>
<td>Desired grade Fe% : +63%</td>
</tr>
<tr>
<td>Size :</td>
<td>(-) 5 + 0.5 mm</td>
<td>(-) 325# 60% passing</td>
</tr>
<tr>
<td>(-) 10 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity</td>
<td>0.8 MTPA</td>
<td>1.30 MTPA</td>
</tr>
</tbody>
</table>
FIG-4:

FINAL PROCESS FLOW DIAGRAM FOR M/s. USHA MARTIN LIMITED OF CAPACITY

1.30 MTPA IRON ORE BENEFICIATION PLANT

ROM FINES

GROUND HOPPER

REJECTS FROM JIGGING PLANT

CYCLONE OVERFLOW FROM WASHING PLANT

-10 mm

200 TPH

DAY BIN

-10 to 0.5 mm

40 TPH

ROM FINES GROUND HOPPER

-0.5 mm

120 TPH

SCRUBBER (2 Nos.)

FINE SCREEN (present: 2 Nos.):

VIB. SCREEN (2 Nos.)

U/S

O/S

U/S

O/S

DOWP

INTERMEDIATE THICKENER

DSC (2 Nos.)

TAILING THICKENER

Tailing Thickener

FILTER (OPTIONAL)

SLURRY TANK

CONCENTRATE THICKENER

SECONDARY BALL MILL (2 Nos.)

PMC (2 Nos.)

U/F

O/F

175 TPH; 63.5 ~ 64%Fe

CONCENTRATE THICKENER

FILTER

SLURRY TANK

175 TPH; 63.5 ~ 64%Fe

FILTER

BENEFICIATED ORF

1.30 MTPA PRODUCTION

WATER TANK FOR RECIRCULATION

DAY BIN

SLURRY TANK

FILTER

SLURRY TANK

FILTER

1.30 MTPA PRODUCTION

WATER TANK FOR RECIRCULATION

BENEFICIATED ORF

1.30 MTPA PRODUCTION

WATER TANK FOR RECIRCULATION

BENEFICIATED ORF

1.30 MTPA PRODUCTION

WATER TANK FOR RECIRCULATION

BENEFICIATED ORF

1.30 MTPA PRODUCTION

WATER TANK FOR RECIRCULATION

BENEFICIATED ORF

1.30 MTPA PRODUCTION

WATER TANK FOR RECIRCULATION
FIG: 5

PROPOSED SCHEMATIC PROCESS FLOW DIAGRAM FOR M/s. USHA MARTIN LIMITED (IRON ORE WASHING PLANT)

LEGEND:

- REGULAR
- PROVISION

ROM FINES
GROUND HOPPER

DAY BIN

200 TPH; 10 mm

SCRUBBER

200 TPH; 57 - 58% Fe

O/S - 2

DOUBLE
DECK SCREEN

U/S

FEED HOPPERS

HYDROCYCLONE

O/F

U/F

TO IOBP

REJECTS CYCLONE

U/S

JIGS

DEWATERING
SCREENS

CONC

TAILS

U/S

O/S

100 TPH; 52% Fe

SINTER FEED
(STACKED)

100 TPH; 57% Fe

TO IOBP

REJECTS CYCLONE

WILL BE OPERATED
WHEN CYCLONE IS
NOT IN OPERATION

REGULAR

PROVISION
PLANT DESIGN PHILOSOPHY

- Annual working hours: 7920
- Continuous operations: 3 shifts (24 hours per day - 8 hours per shift)
- Annual Schedule Maintenance: 825 hours.

DEWATERING OF CONCENTRATE AND TAILINGS

The end products from the beneficiation process *i.e.*, concentrate and tailings are with very low solids concentration containing enormous quantity of water. For making the products easy to handle, large quantity of water has to be removed, which is recirculated for process. This phase separation of solids from liquid by sedimentation is called thickening. It is a mechanical dewatering process wherein material with low solids concentration is allowed to settle in a large basin with addition of some flocculent to enhance quick settling and to decrease the basin area.

The thickened slurry from the thickeners still has water content which requires to be dewatered for ease of handling. This is done by filtration process. Filtration is the process of separation of solids and liquid phase by passing them through a porous media to remove the bound water in the capillaries between solid particles. Dewatering is done by mechanical compression techniques. Keeping in view the concentrate characteristics and moisture required for surface transportability for downstream pelletization requirement, it is proposed to install by shifting the existing Vacuum Disk filter of Jamshedpur and also install 2-3 pressure filter units each for filtering concentrate. Also 5-6 numbers tailings pressure filters respectively. Pressure filter has edge over other filtration technologies in respect better fine particle recovery and low product moisture.

PRODUCT STORAGE AND HANDLING

Filtered concentrate in form of cake having 10% moisture will be stored in covered shed of capacity 20,000 MT. Similarly Sinter feed from washing and Jigging plant having moisture of 7-8% will be stored in cover shed of capacity 7500 M. Tons. The shed for both products will side by side in one line. This can be reclaimed by pay-loaders or by grab bucket - conveyor system and transported through trucks/Rail to the pellet plant. Transport through trucks/Rail will not contribute to any environmental pollution as the concentrate is in wet form. The area required will be three (1-2) acres with a stack height of 8 m.

**Fig - 6** shows the layout of the project with various units along with storage areas.
FIG - 6 SHOWS THE LAYOUT OF THE PROJECT

PLANT BLOCK DIAGRAM

ALL PLANT AREA - 18.72 Ha.

1.30 MTPA IRON ORE BENEFICIATION PLANT & 0.80 MTPA JIGGING PLANT FOR SINTER FEED

Water pump house
Tailing Filtration
Concentrate Filtration
Concentrate Storage Shed

50
100
125

50
150

Beneficiation Plant CCB/Office/Plant room
Beneficiation Plant
Jigging Plant
Raw material Storage

20
vi. **Raw material required along with estimated quantity, likely source, marketing area of final product/s, mode of transport of raw material and finished product.**

UML has their own mines estimated having 100 million tones reserves, out of which 90 million tones are of low grade assaying 53-58% Iron. These reserves are estimated to meet the plant production life of 20-25 years with annual mine production of maximum of about 4 mtpa. Alternatively can be sourced by procuring nearby mines.

vii. **Resource optimization / recycling and reuse envisaged in the project, if any, should be briefly outlined.**

The project will convert low grade into the high grade separating impurities mainly mud. Water used in the process is recycled continuous and only losses are made up on daily basis.

Possible avenues in converting the solid waste (tailings) to value addition construction materials viz., bricks / decorative tiles for the following,

(i) Low cost housing
(ii) Developing pavements
(iii) For filling abandoned lands, low lying areas and closed mines.

viii. **Availability of water its source, energy /power requirement**

Water will be drawn from River Karo, a perennial source which is around 1.6 Kms distance from the site. It is proposed to set up an intake well in the river with pumping station to pump water to the proposed beneficiation plant to be relocated. The estimated make-up water requirement for the plants shall be 3820 cum/day. Water reservoirs of adequate capacity will be constructed within the project premises for catering the water needs.

The total electric connected load is estimated to be 5500 kW and the power requirement will be about a maximum demand of 7000 KVA. It is proposed to receive power from State Electric Sub-Station or Captive Power Plant. M/s UML to approach Jharkhand Electrical Distribution Office to present their power requirement for allocation. Two incoming transformers will be installed along with switch gears and CBs and energy meter.

ix. **Quantity of wastes to be generated (liquid and solid) and scheme for their management/disposal.**

There is no generation of waste water except domestic effluent. Plant is designed for 100% utilization of recycled water. Rain water
harvesting is also proposed. Waste water generated from domestic uses is treated in septic tank followed by soak pit.

TAILINGS WASTE - It is proposed to convert part of the tailings to value addition construction materials viz., bricks / decorative tiles for the following, Low cost housing, Developing pavements and Part for filling abandoned lands and low lying area.

Tailings lack in organic matter or micronutrients. Dried tailings will be excavated and disposed of and partially will be used for vegetation in and around the plant area after treating with bio-fertilizers.

It is proposed to develop 33% of the project area into a green belt and also in and around the site to arrest dust & noise.

x. Schematic representations of the feasibility drawing which give information of EIA purpose.
CHAPTER – 4
SITE ANALYSIS

4.0 Site Analysis

i. Connectivity

Nearest railway line connecting BaraJamda of South Eastern Railway line is located at a distance of – 1.5 km in – ESE direction to the plant site.

The area is approachable from State Highway (SH-4) connecting Gua Noamundi Southern Direction which is about – 0.2 km from. The area is well connected by NH-215 connecting Koir – Parsora – 14.8 km – Southern Direction (Odisha) and also National Highway (NH-75) connecting Ranchi – Parsora – 31.5 km – ESE Direction.

From the mines to Plant material will be shifted through Converyer belt and small amount by road to the plant site is connected by all-weather metalled road. Output through nearest Railway station is Bara Jamda RS located at a distance of 1.5 km in ESE. Apart from the project proponent planning to establish private Railway siding near to Beneficiation plant.

Infrastructural facilities like Post & Telegraph Office, Telephone, Police Station and Primary Health Center etc., are available near to the plant site. The nearest airport is Jamshedpur at a distance of 106.0 km in NE

ii. Land form, land use and land ownership.

UML has requisite land available at Barajamda near Barbil, a mining town. The proposed project site of 54.65 Ha is located in non forest land. Land Category is private patta land. Present land use is with vegetation

Topography (along with map)

The project site is a sloping/Hilly terrain. The area is elevated on Northern side and sloping towards Southwest side. There are no water bodies in the proposed plant area. The surface rain water flows through the slopes of the area and join to seasonal nalla, passing in outside the area. Most of the plant area is covered by soil and iron ore exposed to the surface at lower attitudes
iii. Existing land use pattern (agriculture, non-agriculture, forest, water bodies (including area under CRZ), shortest distances from the periphery of the project to periphery of the forests, national park, wild life sanctuary, eco sensitive areas, water bodies (distance from the HFL of the river), CRZ, in case of notified industrial area, a copy of the Gazette notification should be given.

Present land use of the area is Non-Forest land. The same will be put to Industrial use.

The water bodies to the project site are:

- Karo River – 1.6 km – Western Direction.
- Koina River – 8.9 km – WNW Direction.
- Rengali Reservoir – 87.0 km – SSW
- Rengali Dam – 105.0 km – SSW

The following are the nearby rivers w.r.t proposed beneficiation Plant:

<table>
<thead>
<tr>
<th>River</th>
<th>Distance</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karo River</td>
<td>1.6 km</td>
<td>Western</td>
</tr>
<tr>
<td>Koina River</td>
<td>8.9 km</td>
<td>WNW Direction</td>
</tr>
</tbody>
</table>

Karo Karampada Elephant Corridor is at about 8.0 km in SW direction of project site.

Nearest forests to the plant site are:

- Nuia Protected Forest – 0.5 km – N
- Pandrasali Protected Forest – 4.3 km – ESE
- Thakurani RF – 5.1km – ESE
- Uliburu RF – 1.2km – SSW
- Tatiba Protected Forest – 1.7 km – W
- Ghtkuri RF – 1.7 km – W
- Gua Protected Forest – 2.9 km – NW

Existing infrastructure.

None

iv. Soil classification

The soil type is Sandy loam
v. **Climatic data from secondary sources**

In general the climate of this area is dry. Summer starts from mid of February and continues up to first week of June, when the monsoon breaks. The monsoon continues till the end of October. Winter is between November and middle of February. The peak of summer is in May. The maximum temperature is about 47.7°C. During the cold months of December the temperature falls to 3.9°C. The average rainfall of the district is 1379.3 mm.

vi. **Social infrastructure available.**

Barajamda is the nearest populated area situated at about 1.3 km from the plant site. It is a nearest town with well connected to all major cities by rail/road. All basic amenities such as school, hospital, market, etc., are available here. Chaibasa is major town, which is around 60 km from plant site.

A new Railway siding will be laid connecting SER Padapahar Barajamda Gua Branch.
CHAPTER – 5
PLANNING BRIEF

5.0 Planning Brief

i. Planning concept (type of industries, facilities, transportation etc.) Town and country planning/ development authority Classification

Not applicable.

ii. Population projection

The total manpower for running the plant would be 130 workmen and 15 executives and management staff including CEO and other senior management personnel. The costs have been taken accordingly.

iii. Land use planning (breakup along with greenbelt etc.,)

The landuse planning of 54.65 Ha for locating various units is given below

<table>
<thead>
<tr>
<th>Area (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Beneficiation plant</td>
</tr>
<tr>
<td>b. Jigging Plant</td>
</tr>
<tr>
<td>c. Storage of Raw material(low grade iron ore)</td>
</tr>
<tr>
<td>d. Storage of beneficiated ore</td>
</tr>
<tr>
<td>e. Tailing Dump Area</td>
</tr>
<tr>
<td>f. Greenbelt Area ... Ha</td>
</tr>
<tr>
<td>g. Railway siding Area</td>
</tr>
<tr>
<td>h. Vacant area</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

iv. Assessment of infrastructure demand (physical & social)

The establishment of the project would aid in the overall social and economic development of the region. The project will give employment to about 145 people. The will enhance the economic status.

Apart from the jobs, UML will provide medical and educational facilities to the employees which can also be availed by the people around the project. UML proposes to construct quarters to accommodate essential staff. Adequate recreational facilities will be created.

v. Amenities / Facilities.

Infrastructural facilities like Post & Telegraph Office, Telephone, Police Station and Primary Health Centre etc., are existing at Barajamda. The plant office with first aid rooms, rest shelters, toilets, tool/store
CHAPTER – 6
PROPOSED INFRASTRUCTURE

6.0 Proposed infrastructure

i. Industrial area (processing area)

The process of beneficiation will consist mainly of washing, screening, primary grinding to liberation size, gravity separation, magnetic separation and dewatering. While the jigging process comprise of washing followed by gravity separation at coarser fractions.

<table>
<thead>
<tr>
<th>PARTICULARS OF EQUIPMENT / FACILITIES</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw material Handling System</td>
<td>-</td>
</tr>
<tr>
<td>Stacker and Reclaimer</td>
<td>01 each</td>
</tr>
<tr>
<td>Ground Hopper</td>
<td>4</td>
</tr>
<tr>
<td>Storage yard; Capacity 100,000MT</td>
<td>1</td>
</tr>
<tr>
<td>Pay-loader to conveyor system</td>
<td>3</td>
</tr>
<tr>
<td>Silos (500 MT storage) each</td>
<td>4</td>
</tr>
<tr>
<td>Weigh feeders (300 tph capacity)</td>
<td>4</td>
</tr>
<tr>
<td>Rotary Drum Scrubber (120 tph - 2 Nos.) &amp; (240tph - 1n0. (Existing)</td>
<td>3</td>
</tr>
<tr>
<td>Vibrating Screen (120 tph) (Existing)</td>
<td>2</td>
</tr>
<tr>
<td>Vibrating screen (250 TPH)</td>
<td>1</td>
</tr>
<tr>
<td>De-sliming Cyclone#1(Existing)</td>
<td>1 set</td>
</tr>
<tr>
<td>De-sliming Cyclone#2 (Existing)</td>
<td>1 set</td>
</tr>
<tr>
<td>De-sliming Cyclone#3 (Existing)</td>
<td>1 set</td>
</tr>
<tr>
<td>Iron Ore washing Plant Hydro cyclone</td>
<td>1 set</td>
</tr>
<tr>
<td>IOWP cyclone</td>
<td>1 set</td>
</tr>
<tr>
<td>Secondary mill Cyclone (Existing)</td>
<td>1 set</td>
</tr>
<tr>
<td>Primary Mill Cyclone; (Existing)</td>
<td>2</td>
</tr>
<tr>
<td>Secondary Grinding Mill); Closed circuit grinding; (Existing)</td>
<td>2</td>
</tr>
<tr>
<td>Jigs (65 tph each) New</td>
<td>1 Set</td>
</tr>
<tr>
<td>Dewatering screens (concentrate, tails) New</td>
<td>5 Set</td>
</tr>
<tr>
<td>Rougher Spirals (Existing &amp; New additions)</td>
<td>1 set</td>
</tr>
<tr>
<td>Cleaner Spirals (Existing &amp; New additions)</td>
<td>1 set</td>
</tr>
<tr>
<td>HGMS (Existing &amp; New additions)</td>
<td>4</td>
</tr>
</tbody>
</table>
Intermediate Thickener (Existing) 1
Concentrate thickener (Existing) 1
Tailing Thickener (existing) 1
Agitator tank (existing & New systems) 1
Concentrate Pressure Filters (New) 2
Tailings Pressure filters (New) 4
Concentrate storage shed (New) 1
The below are partly existing and balance new
Pay loader to product handling system 1
Compressors 4
Slurry pumps, water pumps, sump pumps 1 lot
Piping and accessories (water, slurry, compressed gas) 1 lot
Valves and field instruments 1 lot
Electrical sub-station 11/11kV outdoor power 1 set
11/11 kV and 415V switch gear, DB, draw out 1 set
Stationary battery with charger 1 set
MCC panels/Instrumentation panels 1 lot
Motors (HT & LT) 1 lot
Shielding & earthing 1 lot
Instrumentation (field), control panels, DCS and panels 1 lot
Technological structures 1 lot
Maintenance & Ware House equipment 1 lot
Water treatment Plant, fire-fighting & laboratory 1 lot
Raw water reservoir 1
Process water sump 1
Sinter storage shed (33,000 MT) capacity 1
Filter cake storage shed (37,000 MT) capacity 1

ii. **Residential area (non-processing area)**

Essential staff will be accommodated in the quarters proposed within the project area. Accommodation in quarters will be provided.

iii. **Greenbelt**

33% of the total plant land area will be used for green belt development. Plantation will be done all along the roads and plant boundary to facilitate screening of dust and noise.
iv. **Social infrastructure**

The project in the area rather will have a positive socio-economic impact upon the nearby human settlement as indirect employment potential will be created due to plant and allied activities in the

In addition M/s Usha Martine Limited will take various social welfare programmes in the surrounding villages. The focus areas include:

- Economic development (Self Help Groups)
- Drinking Water
- Road network
- Sanitation
- Health & Hygiene
- Relief & Rehabilitation
- Temples & Religion Related Assistance
- Education

v. **Connectivity (traffic and transportation road/ rail/ metro/ Waterways etc.,)**

Nearest railway line connecting Gua – Noamundi of South Eastern line is located at a distance of 0.7 km to Eastern direction from the site. Jamshedpur is major town is located at a distance of 109.0 km in NE direction.

The National Highway (NH-75) connecting Ranchi – Parsora is located at a distance of about 31.5 km in ESE direction,

The National Highway (NH-215) connecting Koira – Parsora is located at a distance of about 14.8 km in Southern direction, (ODISHA)

The State Highway (SH-4) connecting Gua – Noamundi is located at a distance of about 0.2 km in Southern direction, the nearest railway station is located at Bara Jamda RS which is 1.5 km in ESE direction.

Nearest railway line connecting Bara Jamda of South Eastern Railway line is located at a distance of – 1.5 km in – ESE direction to the plant site.

vi. **Drinking water management (source & supply of water)**

Water requirement of the plant is 3820 m³/day and Water will be made available from Source – Karo River which is located nearby project area.

Water is required for wet processing, drinking, sanitation, plantation, Haul road dust suppression etc., water requirement is met from bore
wells within the Mines lease area and Karo River located 1.6 km from the plant site.

vii. Sewerage system

A separate sewerage network will be designed to collect sewage and treat the same in treatment plant

viii. Industrial waste management

The rejects of washing plant and jigging plant for sinter feed will be further upgraded in Beneficiation process which is a zero discharge process.

No toxic substances are generated from the beneficiation operation.
No chemicals are used in the process. No fuel is being used and hence no air pollution.

The entire beneficiation process being wet, there will be no generation of dust in the main process of the plant. Provisions for pollution control like filter bags, etc., have been considered for dust collection at transfer points near Ground hoppers.

100% of the return water will be reclaimed and fed back to the process and hence zero discharge.

Tailings generated during beneficiation process will be thickened in thickener and after dewatering in pressure filter, the semi-dry cake will be disposed of in identified tailings disposal area located near to the beneficiation plant. The tailings with 14-18% moisture will be conveyed to tailing dump area

ix. Solid waste management

It is proposed to convert part of the tailings to value addition construction materials viz., bricks / decorative tiles for the following,

- Low cost housing
- Developing pavements
- Part for filling abandoned lands and low lying area.

Tailings lack in organic matter or micronutrients. Dried tailings will be excavated and disposed of and partially will be used for vegetation in and around the plant area after treating with bio-fertilizers.

It is proposed to develop 33% of the project area into a green belt and also in and around the site to arrest dust & noise.
x. **Power requirement & supply/source**

The total electric connected load is estimated to be 5500 kW and the power requirement will be about a maximum demand of 7000 KVA. It is proposed to receive power from State Electric Sub-Station or Captive Power Plant. M/s UML to approach Jharkhand Electrical Distribution Office to present their power requirement for allocation. Two incoming transformers will be installed along with switch gears and CBs and energy meter. Also options of wheeling power from captive generation at UML plants currently at JSR and Ranhi.

**EMERGENCY POWER**

Emergency Power requirement for the critical equipment of plant is proposed to be met by installing one DG set of 500 kVA considering future facilities also. This will meet the need of emergency power to different units e.g. shop lighting, area lighting, and water supply system for firefighting purposes.
CHAPTER – 7
REHABILITATION AND RESETTLEMENT (R & R) PLAN

7.0 Rehabilitation and resettlement (R & R) Plan

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

The proposed project area does not cover any habitation and is a non-forest land. Hence the plant activities do not involve any displacement of human settlement. No public buildings, places, monuments etc., exist within the plant area or in the vicinity. The plant operations will not disturb/relocate any village.
CHAPTER – 8
PROJECT SCHEDULE & COST ESTIMATES

8.0 Project schedule & Cost Estimates

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

The total time required for completion of the project will be twenty four months (24 months) from zero date. Critical and long delivery equipment will be identified prior to ordering. Intermediate/ critical milestone shall be identified and regular monitoring will be done to ensure commissioning of the project as planned.

The implementation is expected to take place over 24 months.

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

The capital cost estimates of the project is based on prevailing price levels. The summary of estimated capital cost is given in Table.

<table>
<thead>
<tr>
<th>Capital Cost</th>
<th>Total cost (Rs. crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land &amp; site development</td>
<td>7.00</td>
</tr>
<tr>
<td>Building &amp; Miscellaneous civil</td>
<td>32.50</td>
</tr>
<tr>
<td>Works Plant &amp; Machinery</td>
<td></td>
</tr>
<tr>
<td>- Dismantling, transportation and re-erection of existing equipment</td>
<td>4.50</td>
</tr>
<tr>
<td>- Plant &amp; Machinery</td>
<td>115.00</td>
</tr>
<tr>
<td>- Miscellaneous assets</td>
<td>6.00</td>
</tr>
<tr>
<td>Land lease rental during construction</td>
<td>0.87</td>
</tr>
<tr>
<td>Interest during construction</td>
<td>7.15</td>
</tr>
<tr>
<td>Total Cost</td>
<td>173.02</td>
</tr>
</tbody>
</table>

Means of finance

<table>
<thead>
<tr>
<th>Means of finance</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rupee term loan</td>
<td>130.82</td>
</tr>
<tr>
<td>Equity</td>
<td>42.20</td>
</tr>
</tbody>
</table>

Economic viability of the project is detailed below.

<table>
<thead>
<tr>
<th>Assumptions:</th>
<th>7920 Hrs (330 days/ 24 hrs/3 shifts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual working hours Capacity Utilization</td>
<td>80% (330 days)</td>
</tr>
<tr>
<td>Landed cost of Iron ore fines</td>
<td>Rs 532.42- per MT Rs 5.50/kWh (State Grid)</td>
</tr>
<tr>
<td>Power cost</td>
<td>12%</td>
</tr>
<tr>
<td>Rate of Interest On term loan Holding</td>
<td>0.5 month 1 month</td>
</tr>
</tbody>
</table>
CHAPTER – 9
ANALYSIS OF PROPOSAL (FINAL RECOMMENDATIONS)

9.0 Analysis of proposal (Final Recommendations)

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

Economic development of the region depends largely upon the nature of activities undertaken in the surrounding region. Corporate development invariably contributes towards acceleration of the process of socio-economic upliftment of the rural society by means of employment, health & study programme, medical camps etc.,

Employment: Preference will be given for locals for employment based on qualifications & requirement

Medical facilities: Medical facilities will be provided for employee as well as people of nearby villages.

Educational facilities: Basic educational and vocational facilities will be provided for the children of employees as well as nearby villages.

Infrastructure facilities: Approach roads will be developed at par with plants roads