Executive Summary

Environmental Impact Assessment

for

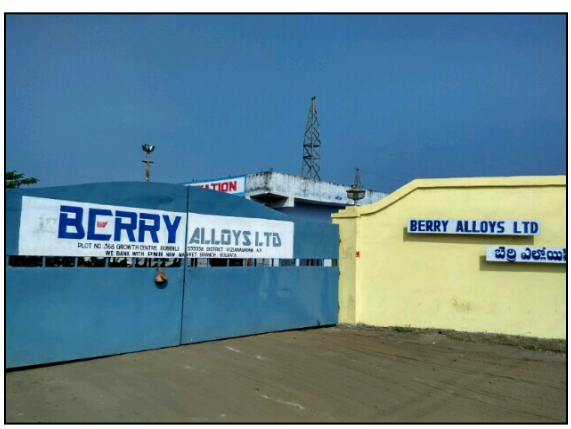
Expansion of Ferro Alloys unit Production
(Addition of 2 x 9 MVA Submerged Electric Arc Furnace)

at

**Plot No.368, APIIC Growth Centre, Bobbili Village & Mandal,
Vizianagaram District, Andhra Pradesh**

Season : December 2016 to February 2017

File no.: J-11011/1129/2007-IA-II(I)



Project Proponent:

M/s. Berry Alloys Limited

**Plot No.368, APIIC Growth Centre, Bobbili Village & Mandal,
Vizianagaram District, Andhra Pradesh.**

Environment Consultant:

Sri Sai Manasa Nature Tech Pvt. Ltd.,

QCI/NABET Accredited Vide S. No. 138, (Dated 16.12.2016 displayed on NABET website)

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March 2017

EXECUTIVE SUMMARY

1.0 INTRODUCTION

Environmental Impact Assessment (EIA) is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It is a decision making tool, which guides the decision makers in taking appropriate decisions for proposed projects. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are taken into account during the project designing.

1.1 Environmental Clearance

As per the Environmental Impact Assessment (EIA); Notification S.O. 1533, 14-09-2006 issued by MoEFCC, Government of India, the proposed ferroalloys expansion project is categorized as Category – A project, which mandates obtaining prior Environmental Clearance from MoEFCC, GOI, NEW DELHI.

1.2 Terms of Reference

Berry Alloys Ltd. (BAL) submitted the application for Environmental Clearance as per the new notification along with prescribed Form1, proposed Terms of Reference for EIA study and pre-Feasibility report on the project in November 2016. The Expert Appraisal Committee considered the project in the 28th meeting held on February 5th to 7th, 2018 and prescribed Terms of References is incorporated in the EIA report.

1.3 Brief Description of Project

The proposed project is expansion in production of ferroalloys adding 2 x 9 MVA submerged Electrical Arc Furnace. After expansion total Furnace capacity will be 6 x 9 MVA. The project is located at Plot No: 368 APIIC Industrial Growth Centre Bobbili, Vizianagaram District, Andhra Pradesh. The project location map is given in **Figure 1.1**, and 10 km study area map is given in **Figure 1.2**.

Product Details

Product	Existing Quantity	Proposed Quantity	After Expansion
Ferro Manganese	86400 TPA or	43200 TPA or	129600 TPA or
Silico Manganese	72000 TPA or	36000 TPA	108000 TPA or
Ferro Silica	25200 TPA or	-	25200 TPA or
Ferro Chrome	36000 TPA	-	36000 TPA

Project Proponents

The project proponents are M/s. Berry Alloys Limited, incorporated in 2007 under companies act 1956 with their registered office at Suit No: 308, Ashoka House, 3A, Hare Street, Kolkata – 700001.

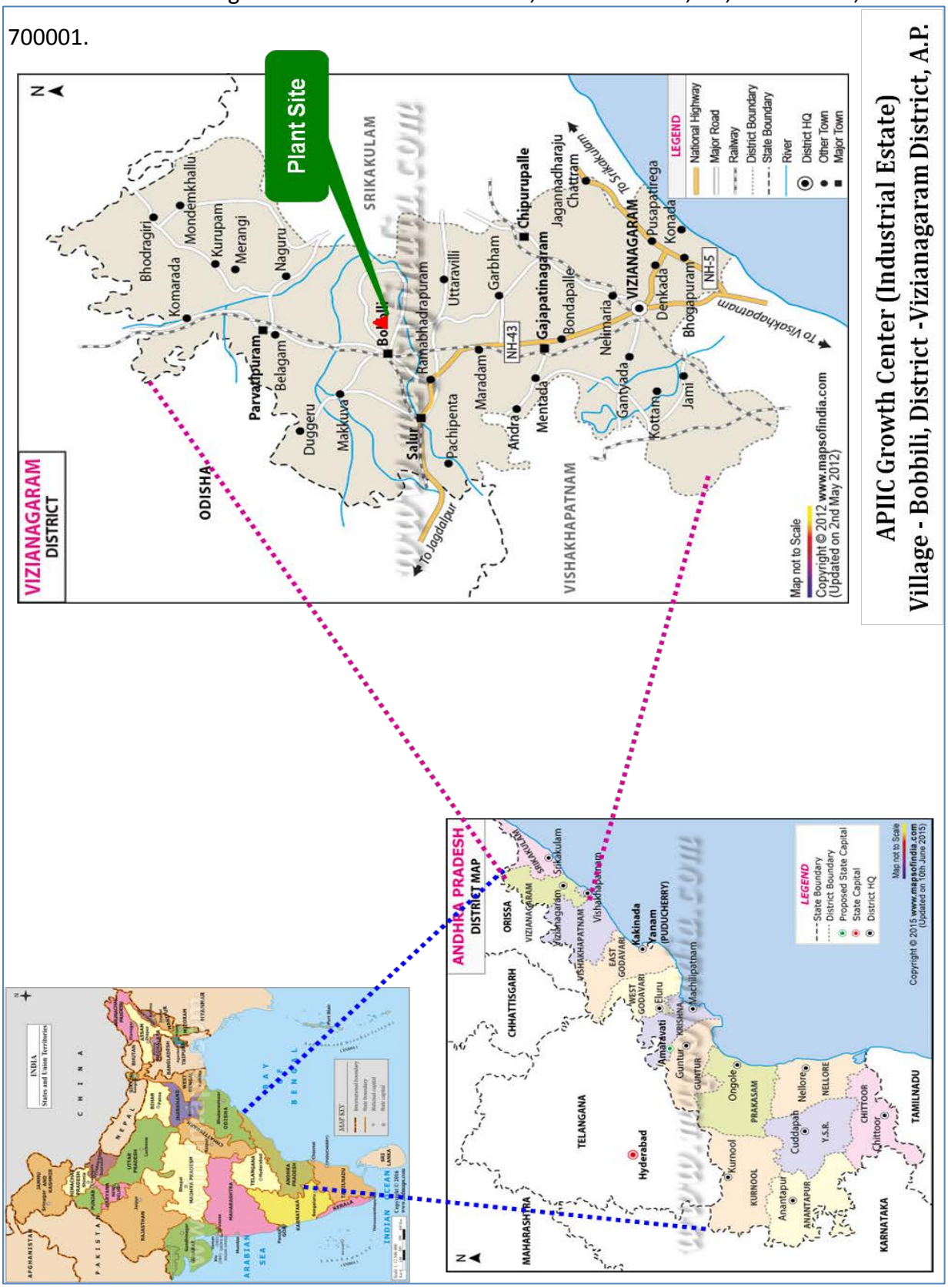


Figure 1: Project Location Map

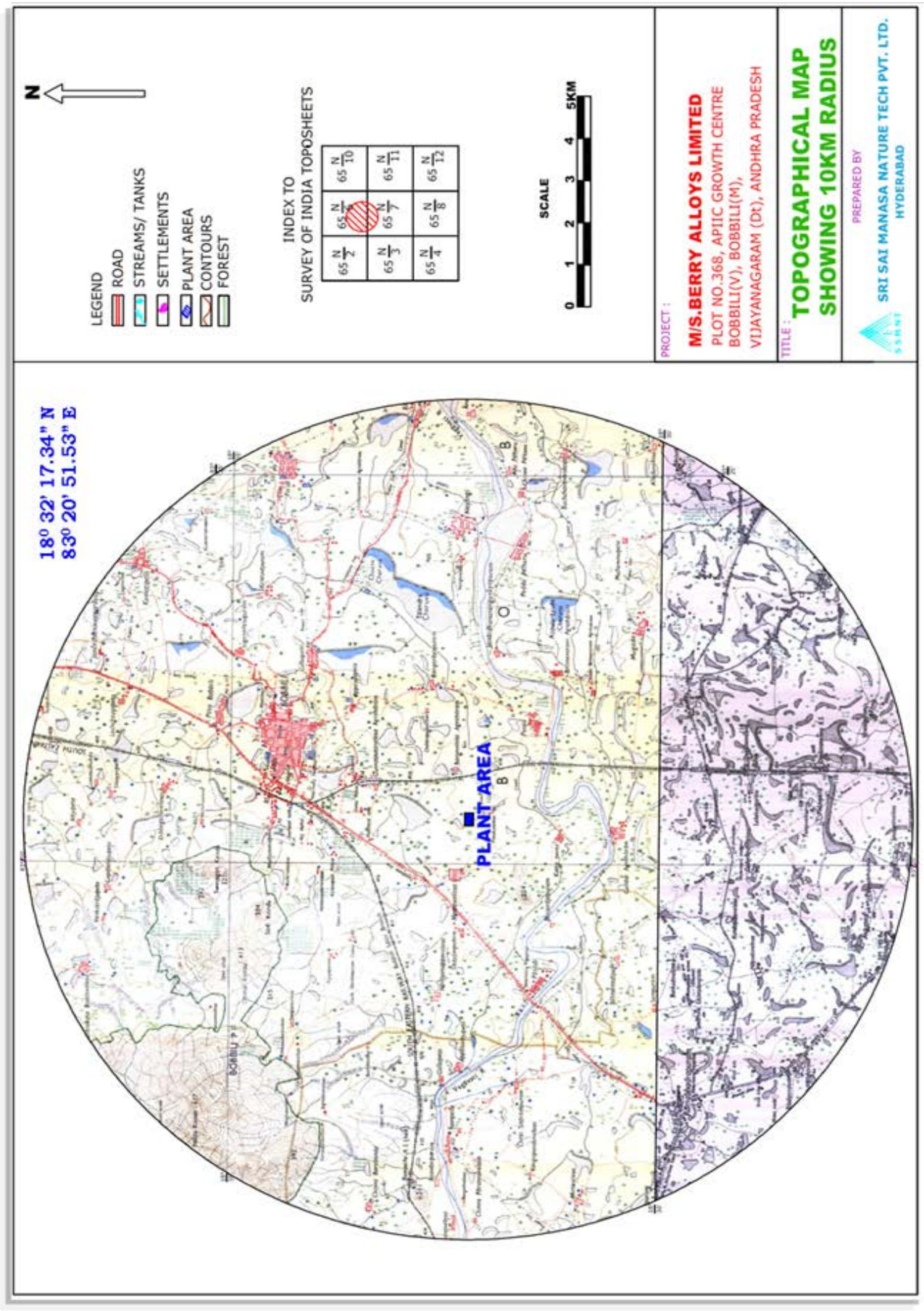


Figure 2: 10 KM Study Area Map of the Project Site

2.0 PROJECT DESCRIPTION

2.1 Raw Material Requirement

The raw materials required for the production of Ferro-manganese and Silico-manganese are:

- Manganese ore,
- Ferro-manganese slag,
- Quartz,
- Dolomite,
- Coal
- Coke

The working days of the plant are 330 days per year. The raw material requirement per day is given in **Table 1.**

Table 1: Raw Material Characteristics

Description	Physical	Chemical
Manganese Ore	Size : 6 – 75 mm Moisture : 5% max	Mn : 44% Fe : 5% Al_2O_3 : 5% SiO_2 : 6% MgO : 1.3% P : 0.6% S : 0.005% CaO : 0.6%
Ferro-manganese Slag (generated in Ferro - manganese process)	Size : 25 - 75mm Moisture : 0.5% max	MnO : 32.0 – 35.0% FeO : 0.8% Al_2O_3 : 10.5% SiO_2 : 30.0% CaO : 10.0% MgO : 9.0%
Dolomite	Size : 25 - 50mm Moisture : 0.5% max	MgO : 21.0% CaO : 31.0% SiO_2 : 0.8%
Quartz	Size : 25 - 50mm Moisture : 0.5% max	SiO_2 : 97.0%

2.2 Material Balance

The material balance is given in **Table 2 and Table 3.**

Table 2: Ferro Manganese

S No.	Raw Materials	Quantity (MT)
1	Manganese Ore (with Average Mn 44%)	2.1 – 2.4
2	Coke (with average Fixed Carbon 80%)	0.30
3	Coal (with average Fixed Carbon 60%)	0.3
4	Dolomite	0.2

Table 3: Silico Manganese

S No.	Raw Materials	Quantity (MT)
1	Manganese Ore (with Average Mn 44%)	2.5 – 2.8
2	Coke (with average Fixed Carbon 80%)	0.40
3	Coal (with average Fixed Carbon 60%)	0.40
4	Dolomite	0.2

Source of Raw Materials

Ore & Metal Company Limited/Open Market

2.3 Utilities

Water Requirement

The manufacturing process of Ferro Alloys does not require water at any stage. The water requirement in the Project will be for cooling purpose, domestic consumption and green belt development. The existing unit requires 60 KLD of water and second phase (proposed phase) requires 30 KLD of water. Total initial water requirement for the project will be 90 KLD. This requirement will be met from APIIC Growth Centre. The details of water requirement for different purposes are presented in **Table 4**

Table 4: Water Requirement

Item	Water Requirement in KLD (4 x 9 MVA)	Water Requirement in KLD (2 x 9 MVA)	Total Water Requirement (KLD)
Cooling Purpose	50	25	75
Domestic Purpose	10	5	15
Dust Suppression			
Greenbelt			
Total	**60**	**30**	**90**

Water Balance

There is no generation of process wastewater in the proposed project. Cooling water is continuously re-circulated in the cooling water circuits, heat exchangers and discharged to the sump or holding tank cooling towers where evaporation losses drift losses and spillages are encountered. Domestic waste water will be sent to the septic tank followed by soak pit. Zero Discharge norms will be followed.

Land Requirement

M/s. Berry Alloys Limited has acquired 13.42 acres of land in Growth Center APIIC. The proposed expansion activity will be established within the existing plant area only. The land breakup details are presented in **Table 5.**

Table 5: Land Break-up Details

S No	Particular	Existing (Acres)	Proposed Expansion (Acres)	After Expansion (Acres)
1	Plant	7.6	1.38	8.98
2	Greenbelt	4.44	-	4.44
3	Open Area	1.38	-	-
	Total land	**13.42**	**1.38**	**13.42**

Power Requirement

The existing power requirement is 30000 KVA and additional 15000 KVA will be required for proposed expansion. The power will be sourced from the Eastern Power Distribution Company of Andhra Pradesh Limited.

Man Power Requirement

The skilled/semiskilled /unskilled manpower required for the proposed Project is estimated is 50 and the existing Man Power is 120. The man power requirement will be fulfilled from the surrounding villages, to help for the improvement of the socio economic status in the surrounding rural areas.

2.4 Technology and Process Description

Most of the Ferro alloys e.g., Ferro Manganese and Silico Manganese are produced by smelting process. Smelting of the charged material is carried out in an electrical arc furnaces equipped with transformer of proper rating.

Basic Process

Ferro-alloys are produced by reducing metals from their oxides contained in ores by using a suitable reduction under conditions created to ensure a high recovery of the valuable elements from the starting materials. Such reduction reactions are characterized by stability of an oxide at high temperatures. The stability of all oxides will become more stable with increasing temperature. An element which forms a stronger oxide can under appropriate conditions be used as reductant for a less strong oxide. The reaction will proceed successfully if the difference of oxygen involved with a small difference, favorable conditions should be formed to make the reaction proceed. The presence of iron or iron oxides can facilitate some

reduction processes. Iron dissolves the reduced element, forms a compound with it, and thus lowers the melting point of an iron element alloy is lower than that of the pure element, e.g. in Ferro-manganese production, and therefore the reaction of reduction of the element can proceed at a lower temperature.

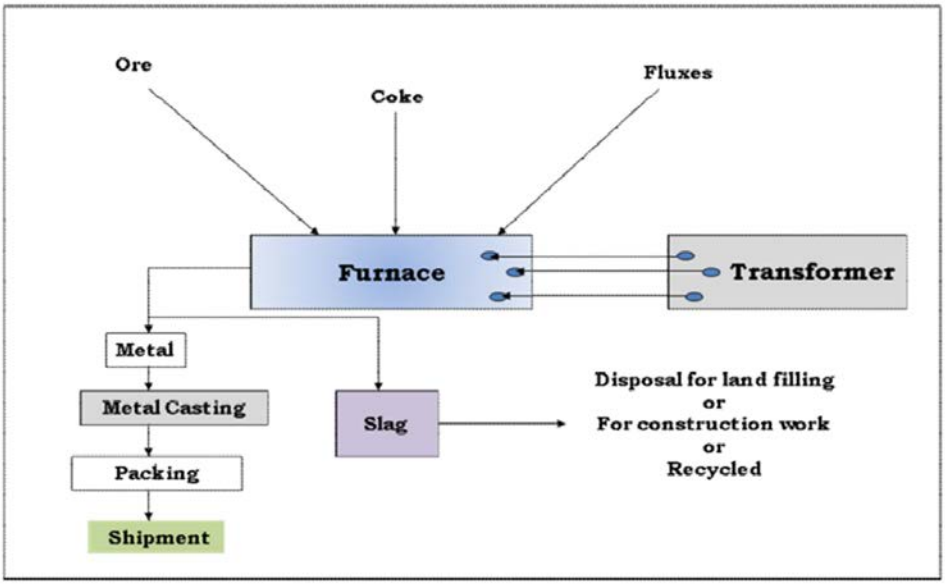


Figure 3: Process Flow Chart of Ferro Alloy Project

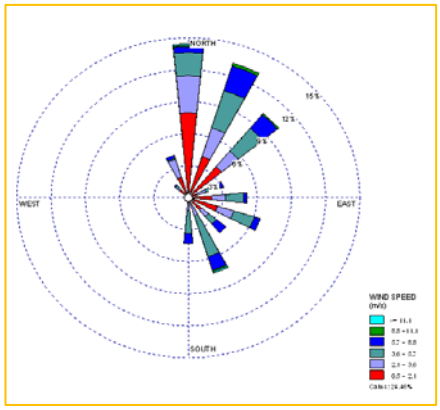
3.0 BASELINE ENVIRONMENTAL STUDIES

Baseline environmental studies were conducted in the proposed projcet area and in the area within 10 km radius from the proposed expansion project area to assess the existing environmental scenario in the area. The baseline environmental quality data for various components of environment, viz. Air, Noise, Water, Land were monitored during December 2016 to February 2017 in the study area covering 10 km around the Plant area.

3.1 Meteorology & Ambient Air Quality

Summary of the Meteorological Data Generated at Site

Summary of Site Specific Wind Pattern



3.2 Ambient Air Quality Status

The status of ambient air quality within the study area was monitored for the period of December 2016 to February 2017 at 8 locations including the Plant area and in nearby villages. Total 8 sampling locations were selected based on the meteorological conditions considering upwind and downwind directions. The levels of Respirable Particulate Matter (PM_{10}), Fine Particulates ($PM_{2.5}$), Sulphur Dioxide (SO_2,) and Oxides of Nitrogen (NO_X) were monitored. The minimum and maximum values of monitoring results are summarized in **Table 6.**

Table 6: Summary of Ambient Air Quality Results

Name of Village (s)	PM_{10} ($\mu g/m^3$)			$PM_{2.5}$ ($\mu g/m^3$)			SO_2 ($\mu g/m^3$)		
	Min.	**Max.**	**98th %**	**Min.**	**Max.**	**98th %**	**Min.**	**Max.**	**98th %**
Plant area	67.3	74.8	74.4	28.2	31.0	30.8	11.6	12.8	12.7
Paradi	48.3	55.2	54.9	18.8	21.1	21.0	12.3	14.1	14.0
Alajangi	44.8	55.9	55.3	17.7	21.9	21.6	12.4	15.2	15.0
Godryanivalasa	43.1	50.2	50.2	17.5	20.1	20.0	10.2	12.0	12.0
Somapuram	40.9	49.6	49.6	16.2	19.9	19.8	10.1	12.4	12.3
Dongaravalasa	37.2	43.8	43.6	14.2	16.3	16.3	9.3	10.9	10.7
Golladi	55.1	62.3	62.3	22.2	25.4	25.4	11.4	13.2	13.1
Bobbilli	60.5	69.8	69.7	24.3	28.5	28.4	11.8	13.8	13.8
CPCB Standards	**100**			**60**			**80**		

Name of Village (s)	NOx ($\mu g/m^3$)			Carbon Monoxide (CO) mg/m^3		
	Min.	**Max.**	**98th %**	**Min.**	**Max.**	**98th %**
Plant area	14.1	15.5	15.4	0.5	0.7	0.7
Paradi	15.0	17.1	17.0	0.0	0.0	0.0
Alajangi	14.8	18.2	18.0	0.0	0.0	0.0
Godryanivalasa	13.0	15.0	14.9	0.0	0.0	0.0
Somapuram	12.7	15.4	15.3	0.0	0.0	0.0
Dongaravalasa	12.1	13.2	13.1	0.0	0.0	0.0
Golladi	13.8	16.1	16.0	0.0	0.0	0.0
Bobbilli	14.7	17.4	17.2	0.2	0.2	0.2
CPCB Standards	**80**			**4.0**		

From the above results, it is observed that the ambient air quality with respect to PM_{10}, $PM_{2.5}$, SO_2 and NOx at all the monitoring locations was within the permissible limits specified by CPCB.

3.3 Ambient Noise Levels

Ambient noise level monitoring was carried out at the 8 monitoring locations, those were selected for ambient air quality monitoring. The monitoring results are summarized in **Table 7.**

Table 7: Summary of Ambient Noise Level Monitoring Results [Leq in dB(A)]

Equivalent Noise levels	Project Site	Paradi	Alajangi	Golladi	Somapuram	Godrayana valasa	Dongarvalasa	Bobbili
L_{Max}	69.6	53.9	54	54.1	48.3	49.2	49.5	63.6
L_{Min}	60.2	43.1	43.1	42.8	40.8	41.6	41.6	51.2
L_d	68.4	53.5	53.1	52.7	45.9	48.4	48.5	61.9
L_n	63.0	43.9	43.7	43.3	40.9	42.2	42.2	52.3
CPCB	**75**	**55**	**55**	**55**	**55**	**55**	**55**	**55**
Ld	**70**	**45**	**45**	**45**	**45**	**45**	**45**	**45**
Ln								

3.4 Surface and Ground Water Resources & Quality

Groundwater

- pH of the ground water samples collected was in the range of 7.7 – 8.11.
- Total Dissolved Solids in the samples was in the range of 365 - 814 mg/l.
- Total Hardness was found to vary between 181.8 – 363.6 mg/l.
- Chlorides concentration was found to vary between 35.47 – 167.43 mg/l.
- Fluoride concentration was found to vary between 0.57 – 0.81 mg/l.
- Sulphates concentration was found to vary between 27.16 – 69.14 mg/l.
- Heavy metal concentrations in all the samples were found to be well within the limits.

Surface Water

- Water samples from 8 surface water bodies have been collected and analyzed as per IS standards
- pH of the surface water samples collected was in the range of 7.25 - 7.88.
- Total dissolved solids in the samples were in the range of 471 - 2218 mg/l.
- Total Hardness was found to vary between 313.1 – 858.5 mg/l.
- Chlorides concentration was found to vary between 33.5 – 694.78 mg/l.
- Fluoride concentration was found to vary between 0.41 – 0.92 mg/l.
- Sulphates concentration was found to vary between 73.26 – 244.49 mg/l.
- Heavy metal concentrations in all the samples were found to be well within the limits.

3.5 Land use Land Cover classification

The Land Cover classes and their coverage are summarized in **Table 8**.

Table 8: LU/LC Classes and their Coverage in SQ. km of 10 km Radius)

S. No.	Particular	Area (ha.)	PGA *** (%)
1	Forest Land	18.311	5.825
2	Barren Land	5.195	1.652
3	Water body	19.391	6.169
4	Built-up Land	8.257	2.627
5	Agriculture Land	263.189	83.727
	Total	**31400**	**100**

3.6 Soil Quality

The following are the highlights of soil quality in the study area are as follows Soil Samples within 10 km Radius

- PH of the soil samples were found to be in the range of 6.52 – 7.96
- Organic content of the soil samples was found to be medium exhibiting in the range of 0.36 % - 0.81 % and average fertility
- Soils in the area were found to be sandy silty clayey in texture with sand percentage in the range between 12.4 – 51.2 %, silt between 42.5 – 61.9 % and Clay 6.3 – 32.8 %.

3.7 Biological Environment

Rare and Endangered Flora in the Study Area

The IUCN Red List is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. With its strong scientific base, the IUCN Red List is recognized as the most authoritative guide to the status of biological diversity. **Among the enumerated flora in the study area, none of them were assigned any threat category, by RED data book of Indian Plants.** (Nayar and Sastry, 1990) and Red list of threatened Vascular plants (IUCN, 2010; BSI, 2003).

3.8 Socio-economic Environment

Information on socio-demographic status and the trends of the communities in the 10 km radius, was collected through primary social survey and secondary data from census 2011 &

village directory 2011. Summary of the socio-economic status of the study area is given in **Table 9.**

Table 9: Population Details

Particulars	0-10 km
No. of Households	42885
Male Population	85175
Female Population	85028
Total Population	170203
Average Household Size	4.4
Male %	51.0 %
Female%	49.0 %
Schedule caste	21275
% To the total population	12.5 %
Schedule Tribes	6252
% To the total population	3.7 %
Total SC and ST population	27527
% To total population	16.2 %
Other caste population	162676
% To total population	83.8%
Total literate	95443
Average literacy (%)	56.0 %

4.0 MITIGATION MEASURES

4.1 AIR Pollution Control Measures

Following measures will be taken to control air/fugitive pollution during mining operation:

i. Stack height would be approx 30 m (4 nos.) for gaseous emission confirming to the CPCB norms. D. G. Sets, stack height of 3.0 m above the roof level will be maintained.

ii. Stack emission level will be kept within permissible limit by installation of bag filter and online stack emission monitoring will be done.

iii. Ambient air quality and stack emission would be regularly monitored and effective control exercised, so as to keep limits on stack emission loads would be met honestly at all the time.

iv. In order to avoid fugitive emissions from different sources, water will be sprayed. Also the roads within the premises will be concreted to prevent dust emission.

v. The ambient air monitoring will be carried out regularly in the work zone and surrounding areas, to check that ambient air levels of the contaminants, are well below the stipulated norms.

vi. Green belt around the periphery and within premises will be developed which will help in attenuating the pollutants emitted by the plant.

4.2 Water Quality Management

The proposed project would be based on "Zero Liquid Discharge" (ZLD)

4.3 Noise Pollution Control

Various components of industrial operations will cause some amount of noise, which will be controlled by proper maintenance and compact technology.

i. Time to time oiling and servicing of machineries will be done.

ii. Acoustic enclosure for Turbine and D.G. sets will be provided.

iii. Green belt development (plantation of dense trees across the boundary) will help in reducing noise levels in the plant as a result of attenuation of noise generated due to plant operations, and transportation.

4.4 Greenbelt Development and Plantation

About 33% of the plant site will be developed as green belt.

4.5 EMP and CSR Details

Details of environment management plan are given in **Table 10.**

Table 10: EMP Budget

S. No	Item	Recurring Cost per annum (Lac)	Capital Cost (Lac)
1	Air Pollution Control	3.0	20.00
2	Water Pollution Control	0.50	5.00
3	Noise Pollution Control	0.15	03.00
4	Environment Monitoring and Management	5.05	03.00
5	Occupational Health	1.00	10.00
6	Green Belt	0.25	3.00
7	Salary of EMP staff	6.0	00
8	Safety management.	0.15	4.00
9	Laboratory and chemicals	2.0	2.00
	Total	**18.1**	**50.0**

Details of budget for CSR activity are given in **Table 11.**

Table 11: Cost of CSR Activity

Activity	Year wise Budgects (Rs.Lacks)					
	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
1. Health Camps	1.0	1.0	1.0	1.0	1.0	**5.0**
2. Voactional Skill Development programmes	1.0	1.0	1.0	1.0	1.0	**5.0**
3. Entrepreneurship awareness camps	1.0	1.0	1.0	1.0	1.0	**5.0**
4. Setting up a Library and Carrer Counseling Centere	1.0	1.0	1.0	1.0	1.0	**5.0**
5. Maintence of roads	1.0	1.0	1.0	1.0	1.0	**5.0**
6. Driking Water facility	1.0	1.0	1.0	1.0	1.0	**5.0**
Total						**30.0**

5.0 CONCLUSION

As discussed, it is safe to say that the project is not likely to cause any significant impact on the ecology of the area, as adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of the project.
