PRE-FEASIBILITY REPORT

for

Proposed

891.72 hectares - Limestone mines

at

Amreli District, Gujarat, India

HEIDELBERG CEMENT INDIA LTD

November 2015

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1. EXECUTIVE SUMMARY

Heidelberg Cement India (HCIL) Limited, a subsidiary of Heidelberg Cement Group, Germany presently has its operations in Central India at Damoh (Madhya Pradesh), Jhansi (Uttar Pradesh) and in Southern India at Ammasandra (Karnataka).

The proposal of HCIL is to develop limestone mines falling in village Rohisha, Balana and Vadhera in Jafrabad Taluk in the district of Amreli, Gujarat. The mining lease extends over an area of 891.72 hectares of continuous land and is planned adjacent to the new proposed cement plant. HCIL has obtained conditional approval of the mining lease for a period of 30 years from Dept of Geology and Mines, Government of Gujarat.

Geological reserves of 167 million tons of Limestone (within mining lease area) were estimated from the top of the surface which is +26m to '0'm from Mean Sea level. Mineable reserves were calculated as 117 million tons.

Limestone shall be mined using a combination of surface miners and blasting. The mined material shall be dozed and then loaded onto dumpers for further transport. Final transport to adjacent cement plant of HCIL shall be done with the help of belt conveyors.

Approximate 80 personnel shall be under employment to run the mining operations efficiently.

The project is expected to be commissioned in 36 - 48 months from the date of signing of main contract for cement machinery. Estimated project cost for all the facilities for mining activities being proposed by HCIL is approximately Rupees 60 Crores.

2. INTRODUCTION OF THE PROJECT/ BACKGROUND INFORMATION

2.1. IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

Heidelberg Cement Group is a global market leader in aggregates and a prominent player in the fields of cement, concrete and other downstream activities, ranking as one of the world's largest manufacturers of building materials. The Group has its operations in 40 countries globally.

Heidelberg Cement India (HCIL) Limited is a subsidiary of Heidelberg Cement Group, Germany. The Company has its operations in Central India at Damoh (Madhya Pradesh), Jhansi (Uttar Pradesh) and in Southern India at Ammasandra (Karnataka) with an installed cement production capacity of approx. 5.5 MTPA.

Presently, HCIL is involved in manufacturing the following various grades of cement at their existing installations:

- Ordinary Portland Cement (OPC)/ Portland Pozzolona Cement (PPC)
- Portland Slag Cement (PSC)

HCIL is now proposing to develop a captive limestone mine at Amreli district of Gujarat, for its proposed 4 MTPA Cement Plant at the adjacent location.

2.2. BRIEF DESCRIPTION OF NATURE OF PROJECT

HCIL plans to develop a cement plant of 4 MTPA capacity at Balana village in Jafrabad Taluk, Amreli district of Gujarat. The limestone to be used for cement production will be sourced from captive mines adjacent to the plant. The obtained mining lease extends over an area of 891.72 hectares of land. Mining reserve is estimated over an area of 891.72

hectares. Mineable reserves of 117 million tons were estimated from the top of the surface which is +26m to '0'm from Mean Sea level (MSL).

Limestone shall be mined using a combination of surface miners and blasting. The mined material shall be dozed and then loaded onto dumpers for further transport. The dumpers shall unload the material to a dump hopper feeding a secondary crusher (for size reduction of oversize material, if any) and then conveyed to the cement plant with the help of belt conveyors.

Mining process of the surface miner has a lower disturbing impact, which shall be used while mining in areas close to the populated villages. Low levels of dust and noise emissions and also very low vibration have been considered for the project.

2.3. NEED FOR THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY AND OUR REGION

Cement is essential for growth of infrastructure in a developing country like India and the demand for the same has always exhibited a steady growth. India's cement industry is a vital part of its economy, providing employment to more than a million people, directly or indirectly. Ever since it was deregulated in 1982, the Indian cement industry has attracted huge investments, from both Indian and foreign investors, making it the second largest in the world. The industry is currently in a turnaround phase, trying to achieve global standards in production, safety, and energy-efficiency.

India has a lot of potential for development in the infrastructure and construction sector and the cement sector is expected to largely benefit from it. Some of the recent major government initiatives such as development of 100 smart cities are expected to provide a major boost to the sector.

Expecting such developments in the country and aided by suitable government foreign policies, several foreign players have already invested in the country in the recent past. A significant factor which aids the growth of this sector is the ready availability of the raw materials for making cement, such as limestone and coal. A large number of new foreign players are also expected to enter the cement sector in the coming years, owing to the profit margins, constant demand, and right valuation. With help from the government in terms of friendlier laws, lower taxation, and more infrastructures spending, the sector will grow and will take India's economy forward along with it.

The cement industry had always kept pace with the rapidly expanding Indian economy and had consistently grown at a CAGR (compounded annual growth rate) of around 8.7% for nearly a decade from year 2000. Even the global crisis of late 2008 did not trip up the growth and the industry kept up the pace of growth in 2009.The average ratio of cement demand growth to GDP (gross domestic product) growth had been 1.1 times.

However, subsequently, the growth slowed down and the cement demand growth was at its slowest pace of around 6% CAGR in the last four years (2010-2014). This is the slowest pace in last two decades for four consecutive years. It is believed that the growth has bottomed out in FY14 with the demand growth being lowest since FY02 even below the GDP growth. This is attributed to sluggish housing activity; steep cut in government's spending on infrastructure weak investment cycle.

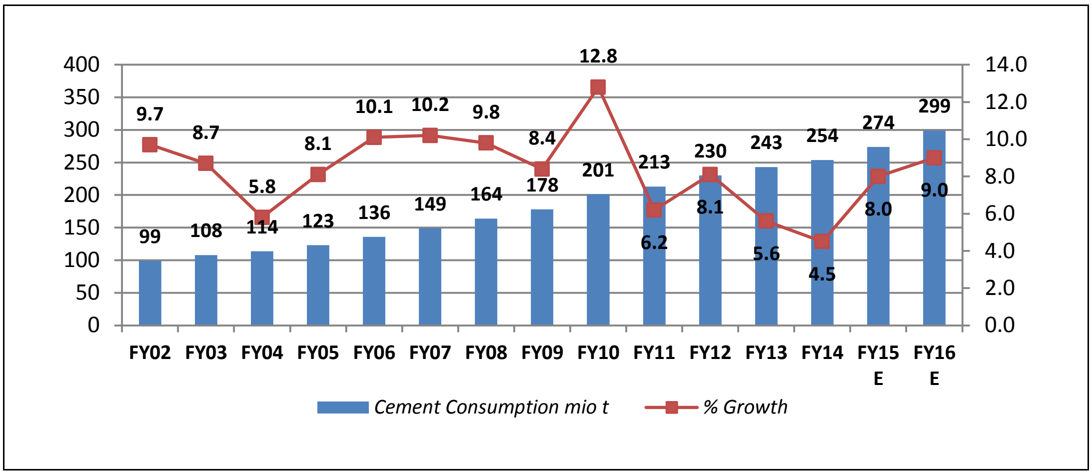

Figure 1 : Growth in Cement Consumption

The trend of low cement demand is expected to reverse on back of stable and decisive new central government. The cement demand is closely linked to the overall economic growth, particularly the housing and infrastructure sector. With highest importance being given by central and state governments for development of infrastructure in country i.e., highways, rural road network, housing sector, canal network for irrigation etc. the demand of cement is expected to be increase in the years to come.

The new government formed in India has emphasized the development of many cities into smart cities which includes the up-gradation and enhancement of new infrastructure, irrigation projects and housing colonies etc. In the recently launched budget, the corporate taxes have announced to be progressively reduced to encourage investment on new projects and industries. Over the past one year, many foreign investors have shown interest to invest in the Indian market. Hence, it is evident, that in the near future the cement demand shall further pick-up. According to CII studies, India's cement demand is expected to touch 550-600 million tonnes per annum by 2025

Keeping the above in view and to take advantage of the growing demand of cement in the country, M/s. Heidelberg Cement proposes to install a state-of-art 4.00M TPA greenfield cement plant at village Balana, Amreli District in Gujarat. This shall help the country and the region in meeting the future demand of cement. Thus it can be assured that India and the region can maintain their self-sufficiency in meeting the requirements of cement and no import of cement from other countries or other regions within the country shall be required. Moreover, the project shall also exploit the advantage of being located adjacent to the western sea cost for economic transportation of materials. Accordingly, a captive jetty shall also be constructed as part of the project. This also opens up an opportunity to export cement which shall further advance the interests of Make in India initiative of new Central Government of India.

The predominantly rural area around the proposed site of the project shall also be immensely benefited by generation of huge employment opportunities due to the project, better infrastructure in the region, potential for self-employment through ancillary units and facilities to support the project etc. This is expected to lead to economic up-liftment of the entire region and betterment of livelihood of the surrounding population.

The installation of state-of-art and power efficient equipment for cement manufacturing , limestone extraction , the installation of captive power plant, the usage of water ways as one of the modes of material transport, usage of high proportion of additives in cement etc. shall assure a low cost of production and a highly competitive plant. The spread of financial charges, fixed overheads etc. over a higher volume of production and sales shall help in achieving large scale economics.

The usage of modern pollution control equipment, installation of sewage treatment plant as per requirement, usage of high proportion of additives, proposal to utilize surface mines for limestone mines shall contribute a lot in conserving, protecting and furthering the interests of environment conservation also.

2.4. DEMAND SUPPLY GAP

The Indian cement industry is the second largest market after China accounting for about 8% of the total global production. It had a total capacity of over 360 m tonnes (MT) as of financial year ended 2013-14. Cement is a cyclical commodity with a high correlation with GDP. The cement market in India is expected to grow at a compound annual growth rate (CAGR) of 8.96 percent during the period 2014-2019.

In India, the housing sector is the biggest demand driver of cement, accounting for about 67 per cent of the total consumption. The other major consumers of cement include infrastructure at 13 per cent, commercial construction at 11 per cent and industrial construction at nine per cent.

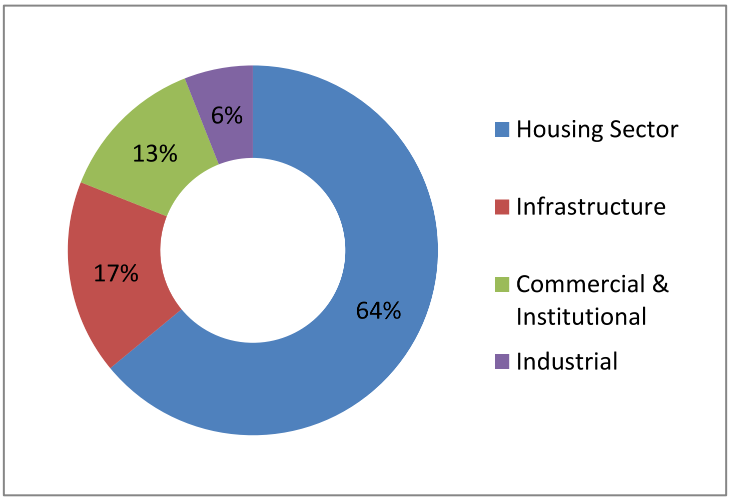

Figure 2 : Major Cement Demand Drivers

To meet the rise in demand, cement companies are expected to add 56 million tonnes (MT) capacity over the next three years. The cement capacity in India may register a growth of eight per cent by next year end to 395 MT from the current level of 366 MT. It may increase further to 421 MT by the end of 2017.

A total of 188 large cement plants together account for 97 per cent of the total installed capacity in the country, while 365 small plants account for the rest. Of these large cement plants, 77 are located in the states of Andhra Pradesh, Rajasthan and Tamil Nadu. The Indian cement industry is dominated by a few companies. The top 20 cement companies account for almost 70 per cent of the total cement production of the country.

The sizeable capacity additions in the last five years coupled with weak demand has resulted in a low capacity utilisation of around 71% in FY14, the lowest levels since 1990. The capacity utilisation levels started falling from FY11, wherein effective capacity grew by 19% against demand growth of around 6%. Effective capacity during FY10-14 grew 9.6%, around ~ 1.6x the growth in demand. While capacity utilization in FY14 was seventy one percent (75%), it is expected to grow upto eighty five percent (85%) by year 2017.

Though overcapacity and slow demand growth would continue to be a damper in the near term, it is believed that, the pressure would ease with improved demand and slowing pace of capacity addition. Consumption is expected to grow at a 2-year CAGR (FY14-16) of 7.5%, higher than 5.3% growth in effective capacity addition. This would result in improvement in capacity utilisation factor. In fact it is expected that demand grow That 8 per cent would outpace supply additions at 6.7 per cent in FY16.

Moreover, the per capita consumption of cement in India still remains substantially low at below 200 kg when compared with the world average which stands at about 573 kg in 2014.It is expected that the Indian per capita consumption of cement shall grow up to 385 - 415kg in 2025.

2.4.1. Demand Supply Dynamics in Western Region of India

The Indian cement industry generally considers 5 regions - North, East, South, West and Central for cement consumption in the country. The regional distribution of cement consumption (Source: Cement Industries India Article) is as shown in *Figure 3 : The Regional Distribution of Cement Consumption* below:

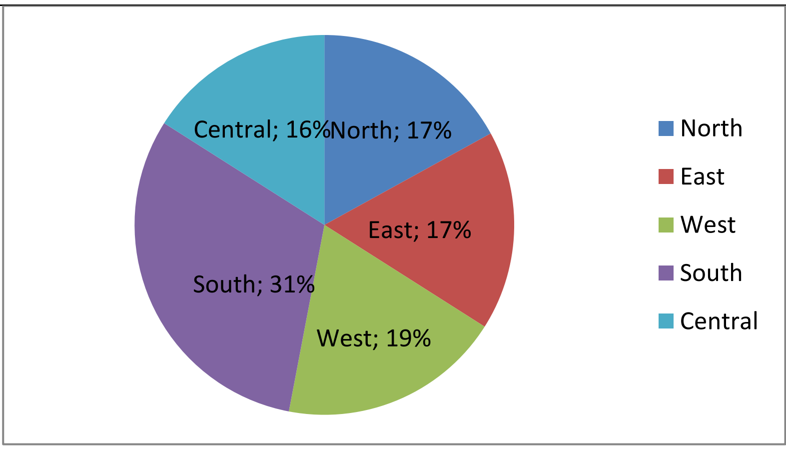

Figure 3 : The Regional Distribution of Cement Consumption

Rajasthan is one of the states with largest cement manufacturing capacity while Maharashtra remains one of the highest consumers of cement in the middle western region of India. In Gujarat the current scenario leaves the market with 28% of surplus goods with a per capita consumption of 307 kg.

Cement sales in Gujarat is expected to grow at a CAGR (Compound Annual Growth Rate) of nine percent (9%) for next three financial years. Infrastructure projects like up gradation of highways, metro rail, etc. are also boosting the demand for cement. Ahmadabad is the largest consumer of cement in Gujarat accounting for 26% of the overall sales in Gujarat followed by Surat (19%)

The companies in the western region are expected to add 10 million tones per annum (18 per cent of the existing capacity) during FY14-FY16, and thus, the capacity utilisation in this region is expected to remain stable at the current level of 73 per cent.

Gujarat is one of the states in India which benefit from a constant and a steady growth in the cement production and consumption. The total cement production facilities installed in the state uptoFY14 is 25.5 million tones. The state ranks fifth in the country in cement production which is preceded in the ranking table by Maharashtra and followed by Madhya Pradesh (Sources: As per CMA India Statistical Data).

2.5. IMPORT Vs INDIGENEOUS PRODUCTION

India is self-sufficient to meet the demands of the cement market. The cement market with in the country is stable in terms of demand and supply with sufficient potential for increasing domestic capacity utilization and therefore no imports are foreseen. The excess demand in supply deficient states can be met with those of less demand/ excess supply state markets. The interstate trading discourages the requirements of imports

Further, Indian consumers being relatively aware and quality conscious, the cheaper low quality cement available from some other countries have not been able to penetrate the market.

2.6. EXPORT POSSIBILITY

The mined limestone will be used completely for cement manufacturing process in the proposed cement plant and will not be exported.

The Indian cement industry has come a long way with regard to exporting. In FY 1989-1990, the industry was exporting only 0.16 million tons, but by FY 2004-2005 the 10 million tons threshold had been crossed. Subsequently the manufacturers had struggled to keep up with domestic demand in India, which has been easier to capture. In the years that followed, there was a persistent downward trend in the export of cement and clinker, which was halted in the recent years due to low demand in the domestic market.

Exports are only used as a balancing factor in India (mainly to balance low demand periods within the domestic market). Most of India's exports are from Western India (92.4 per cent of total exports, of which Gujarat holds a share of 76 per cent) and major export markets are Sri Lanka, Nepal, Africa and the Middle East. However, this trend is expected to change in the near future. In the coming years, India is expected to become one of the main exporters of clinker and gray cement to the Middle East, Africa, and other developing nations of the world. Cement plants near the ports, shall have an added advantage for exports and shall logistically be well armed to face stiff competition from cement plants in the interior of the country

2.7. DOMESTIC/ EXPORT MARKETS

The project is largely intended to cater to the domestic market only. However, the potential to export is available due to its strategic location and the possibility shall be exploited during low domestic demand seasons.

Domestically the project is expected to cater to markets of Gujarat, Rajasthan, Madhya Pradesh and Maharashtra. Further, the project shall also tap markets along the coastal belts of Maharashtra, Karnataka and Kerala. The markets have been identified based on location of other supplying clusters, demand-supply situation in these markets and also economic transportation distance,

2.8. EMPLOYMENT GENERATION DUE TO THE PROJECT

An approximate of 80 personnel shall be needed to run the mining operations efficiently-

- Mining Manager
- Mining Engineers
- Geologist
- Mines Foreman
- Mines surveyor

- Mining mates / blasters
- Magazine incharge
- Record keeper
- Electrical & Mechanical engineers for maintenance activities
- HEMM operators
- Drill Operators
- Crusher & Stacker operators
- Fiters,Welders & electricians
- Helpers

3. PROJECT DESCRIPTION

3.1. TYPE OF PROJECT INCLUDING INTERLINKED AND INTERDEPENDENT PROJECTS, IF ANY

The proposal of HCIL is to undertake mining of limestone from its limestone mine falling in the 891.72 hectares at Jafrabad.

The project is linked to the proposed Greenfield cement plant of 4.0MTPA cement production capacity at Amreli district in Gujarat, with approx.70 MW thermal captive power plant, a captive jetty with approx. dimension of 300x30 m, and housing colony to accommodate working personnel.

3.2. LOCATION

The project is proposed to be located near village Rohisa, Balana and Vadhera in Jafrabad Taluk, Amreli District of Gujarat and is as shown in Figure 4: Proposed Plant Location

The limestone deposit forms part of the Survey of India Topo sheet No. 41 P/5 (restricted). The area lies between the latitude of about N:20^0 49’00” to N:20^0 51’00 and the longitude of about E:71^0 13’00” to E:71^0 18’45” approximately.

The coastal stretch extending from Bhavnagar to Jamnagar comprises mainly of calcareous formations. These formations are of Quaternary period and comprise of Miliolitic Limestone, marl calcareous shale etc. These lithologies represent the Porbandar Beds and underlying these lihtologies are the Dwarka Beds comprising of Cherty Limestone, clay and silt. Variegated clay, marl, impure limestone and sandstone form part of the Gaj Beds which undlie the Dwarka Beds. The area under consideration bears formations representing the Porbandar and Gaj Beds. The Dwarka Beds are missing from the area. The Gaj Beds are underlain by the Deccan Traps comprising of Basaltic Rocks.

In the area of interest, the Miliotlitic Limestone of the Porbandar Beds are predominantly exposed. The Porbandar Beds are about 35 m in thickness and are overlain by a thin veneer of soil about 1 to 3 m in thickness. The thickest of these formations are seen towards the coast while the thickness diminishes inland. Part of the Porbandar beds is also covered by Wind Blown Sand of Recent Period.

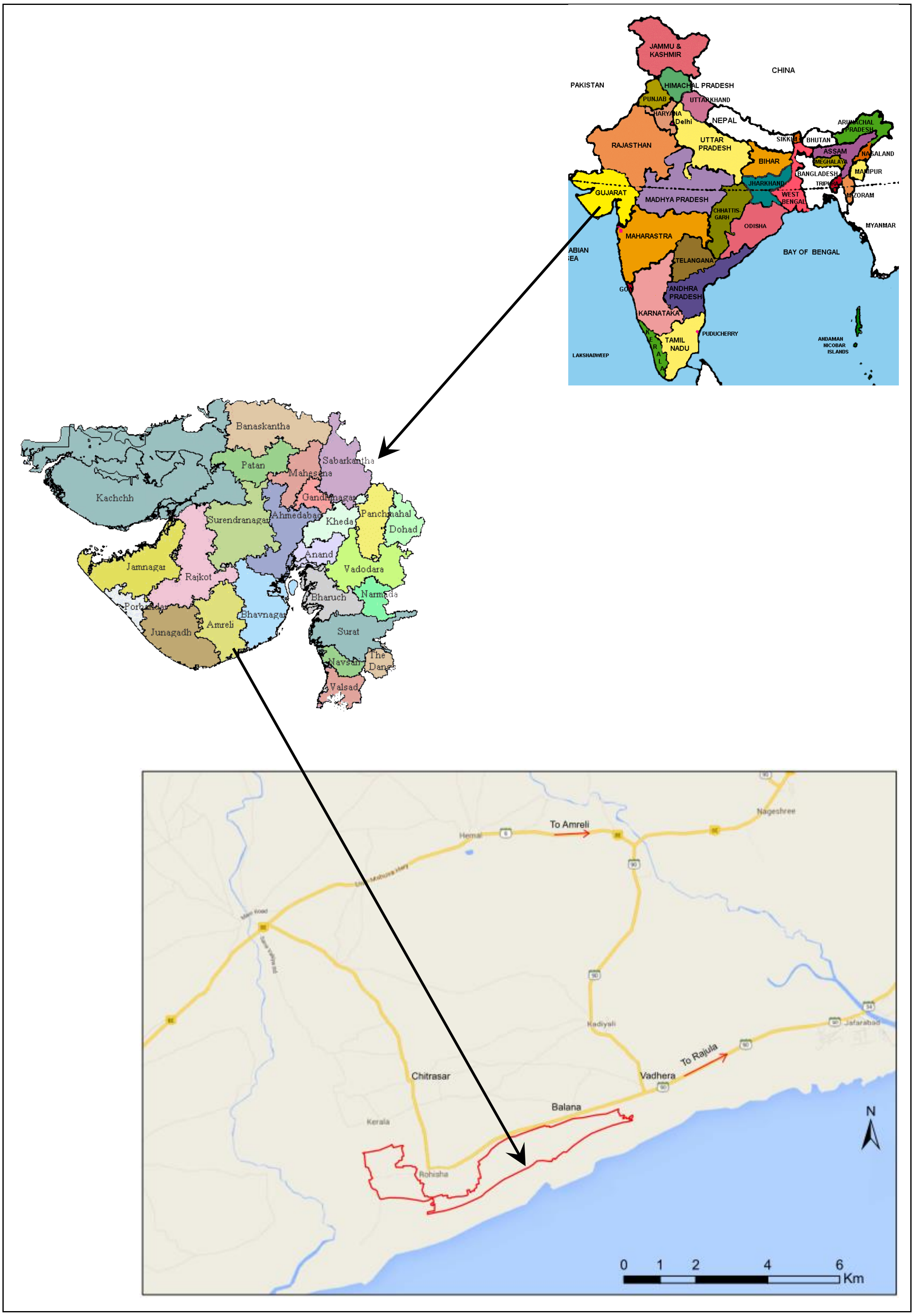

Figure 4: Proposed Plant Location

3.2.1. Limestone Mines

The limestone mine is spread over villages of Rohisha, Balana and Vadhera adjacent to the existing 5 m wide asphalted PWD road from the junction of State Highway No. 90 (SH-90) at village Vadhera. This PWD road is outside some portion of the mining area.

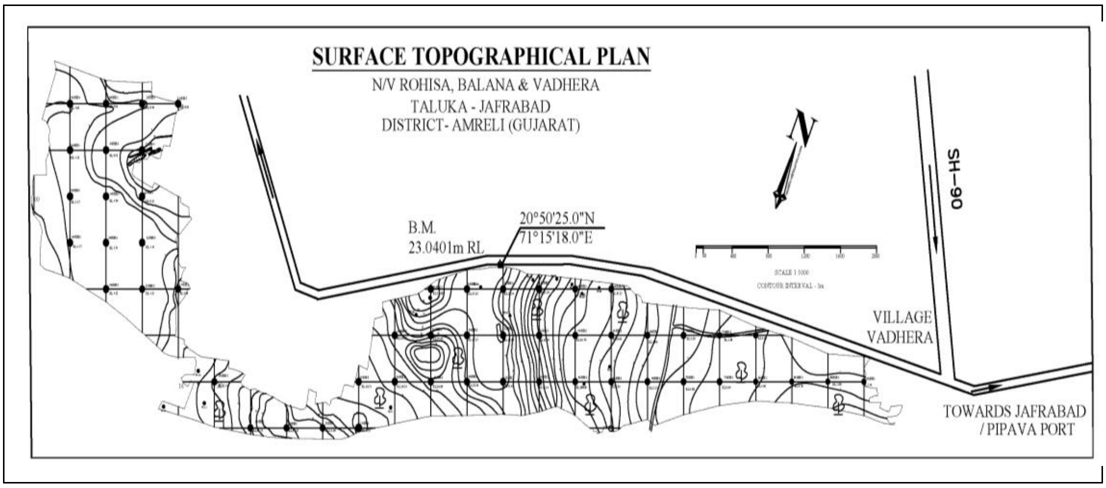

Figure 5: Mine Location

3.3. DETAILS OF ALTERNATES CONSIDERED

Limestone mine area was delineated after detailed prospecting studies and therefore different alternates were not considered for the location of mines. The area has been delineated based on availability of limestone reserves and technical feasibility to extract them.

3.4. SIZE OR MAGNITUDE OF OPERATION

Limestone requirement per day for Clinkerisation would be around 14000 tons per day approximately and about 4.2 MTPA on annual basis.

The cement of the plant is expected to be around 4.00 MTPA. HCIL proposes to manufacture OPC and PPC as per the market requirements. The plant shall also have potential to manufacture PSC.

The proposed capacity of captive power plant shall be approx. 70 MW to meet the requirements of electric power of all facilities being proposed.

Proposed capacity of desalination plant shall be approx. 3500 m3/day. This capacity shall be able to cater the requirements of plant and personnel.

3.5. PROJECT TECHNICAL DESCRIPTION

3.5.1. Limestone Mines

Approx. 4.2 million tons of limestone per annum will be produced by mechanized open cast method deploying a combination of surface miners and blasting. The mine will feed the linked 4 MTPA capacity cement plant adjacent to mines.

Mining reserve is estimated over an area of 891.72 hectares. Reserves were estimated from the top of the surface which is +26m to '0'm from Mean Sea level (MSL).It is envisaged only to utilize the deposit above MSL.

The reserve comprises of Limestone and Marl (Limestone with clay) together. Weighted average cut off considered for Limestone and Marl together is for CaO of 44% and above.

Reserve from +26m to ‘0’m from Mean Sea Level (MSL):

-Geological Reserves: 167.0 million tons (In-Situ Reserves)

-Mineable Reserves: 117 million tons

-Mining life: 28 Years approx. @4.2 MTPA Limestone production

The mineable reserve after blending is 117 million tons with following composition table based on the boreholes drilling data from 53 boreholes that were drilled and analysed.

Level	Mineable Reserve MT	LOI	SiO2	Al2O3	Fe2O3	CaO	MgO
Above MSL	117.0	37.07	12.50	2.62	2.32	44.03	0.43

Limestone and marl have been considered as ore while the soil occurring above limestone and the interstitial clay has been considered as overburden.

Geological Exploration

Geological exploration comprising of topographic survey, core drilling and chemical analysis of drill hole samples were carried out between the period November 2004 and January 2005.

In all 53 bore holes covering 1300 running meters were drilled on a grid interval of 400 m x 400 m. All the bore holes were drilled vertically to depths ranging from 20 m to 25 m from the surface of the ground.

262 number of samples were grouped together depending upon the lithology and ranging in thickness from 1 m to 10 m and analyzed for determination of LOI, SiO2, Al2O3, Fe2O3, CaO and MgO values.

Mining

Mechanized process of limestone mining is envisaged to be carried out a combination of surface miners and blasting. The mined materials shall be dozed and fed to a secondary crusher located at mines using dumpers. From the secondary crusher, the material shall be conveyed to the cement plant premises with the help of overland belt conveyors. The conveyed materials shall be received and stored in a storage yard located at the cement plant premises.

The project has opted for surface mining technology because of the softness of stone and topography. Mining process of the surface miner has a lower disturbing impact, which shall be used while mining in areas close to the populated villages. Drilling (when needed in areas away from inhabited areas) shall be deep hole type using latest techniques with adequate controls to minimize vibrations and other surface impacts. Low levels of dust and noise emissions and also very low vibration have been considered for the project.

The following machinery will be required for achieving the planned production target.

- Surface Miners
- Drills
- Dumpers
- Dozers

- Loaders
- Water tankers
- Tractors
- Service Van for maintenance of HEMM in Mines
- Forks lift truck etc.

A small workshop will be setup for day to day maintenance and repair of the mining machinery.

Developing Ultimate pit

The ultimate pit has been developed for block modelling using following parameters:

- Barrier zone from lease boundary: 7.5 m
- 200 m radius around the temple
- Southern area falling in CRZ
- Losses due to bench width at the time of abandonment(6m)
- Ramp width 12m with gradient of 1: 16
- Areas where operating width is not available
- Bench height: 6 m
- Bench width :6m;Total width 12m including 6m of closing width of bench
- Gradient: 45°

Based on the above defined criteria when the pit boundaries were overlain on the block model it was observed that the width of the leasehold area gets too narrow (<30m) at coordinates X 10600 and Y11780 and this will not allowed mining of the entire leasehold in one continuous block. Creation of two pits for mining is therefore necessary as shown in Appendix I: Surface topographical plan of the proposed mining area.

Stripping Ratio

The overburden soil is soft and can be easily removed. The average ore: waste stripping ratio for total recoverable reserves of the deposit is 1:0.09. Limestone & marl have been considered as ore while the soil occurring above limestone and the interstitial clay has been considered as overburden.

Resources optimization/ recycling and reuse envisaged in the project

Use of diesel and lub oil in HEMM will be optimized for efficient use. Water used for wet drilling, crusher spray and haul road spray will be optimized by providing efficient jet atomized spray system. Workshop water generated from washing of HEMM will be used for spray in crusher after removal of oil contents. The inter burden of mine will be stacked at earmarked place for back filling.

ENVIRONMENTAL MANAGEMENT PLAN

Air Pollution Control

The drilling machines will be equipped with wet drilling arrangements to prevent dust from getting air borne. Large capacity excavators are used with dumpers. The haul roads will be kept wide to support two-way traffic. The roads will be properly maintained by road compactor and regular water spraying will be done during work hours to prevent generation of dust from vehicular movement. Waste dumping sites will be vegetated by suitable plantation to prevent air pollution during stormy winds. Gaseous emissions generated from HEMM and blasting will be kept within limits by proper maintenance of all machineries and controlled blasting with suitable explosives. In order to reduce air pollution in the surrounding, Green Belt will be developed around mine office, approach roads, pit peripheries and waste dump yards and along the boundary. Periodic air quality survey will be carried and the records will be maintained properly.

Solid Waste Generation

The waste available in the mining area shall be backfilled and spared all around the water reservoir for safety purpose. This shall strengthen the banks of the water reservoir and shall be used for plantation after spreading top soil over it.

Waste Water Management

Garland drains along with de-silting pit will be constructed all around the OB dumps. Waste water generated from the office toilets will be disposed of in soak pit via septic tank. Waste water generated from the work shop will be used in crusher for dust suppression after oil and grease separation.

Noise Pollution Control

To maintain the noise level well within the prescribed limit inside the plant (85 dB (A) and at the plant boundary (day time 75 dB (A) and Night Time 70 dB (A) the following measures will be taken:-

- Proper maintenance and lubrication of plant machineries
- Plantation in the lease area
- Sharp drill bit with wet drilling arrangements
- Use of personal protective equipment's like ear plug and ear muffs to all working persons at the site.

Hazardous Waste Management

Used oil is generated as hazardous waste from the plant which will be sold to GPCB authorized dealer.

Socio Economics Measures

Heidelberg cement is committed to contribute in the development of basic needs of the local area like education, Health & family welfare, women empowerment, Natural resource management, water conservation, roads etc. For socio-economic development of the nearby village, we will survey the basic infrastructure needs of the villagers like education, medical, drinking water for human beings and animal, roads, plantation and rain water harvesting etc and accordingly financial assistance will be provided by the company to the local authority.

3.6. RAW MATERIALS AND FINISHED GOODS

3.6.1. Estimated Requirements and Source

A number of corrective materials, especially the aluminous and ferruginous clays and the black cotton soil derived from the weathering of Deccan trap basalts occur locally (within a radius of 20 to 30 km approx. from the deposit) and these have been considered for the use as correctives.

3.6.2. Marketing Area of Final Products

The limestone excavated will be moved to the proposed cement plant adjacent to the mine area through belt conveyors. Limestone will not be exported through jetty. Cement produced from the plant is expected to be consumed within India. The project is expected to cater the markets of Gujarat, Rajasthan, Madhya Pradesh and Maharashtra. Further, the cement project shall also tap markets of Kerala and Karnataka coastal belt through the coastal route. Project also has provision to export cement through its own captive jetty or through nearby commercial ports.

3.7. RESOURCE OPTIMISATION/ RECYCLING AND REUSE ENVISAGED IN THE PROJECT

Mining Plan shall be prepared prior to the plant operation to optimize the usage of limestone. The limestone from different pits shall be suitably blended, based on the requirement, to achieve desired quality as well increase the life of limestone mine.

The process selected envisages re-cycling all the material collected in the pollution control equipment. All the water consumption units like cooling tower, circulating water systems, boiler etc. are designed to work under closed circuit and hence considerably reducing the consumed power and water.

3.8. AVAILABILITY OF WATER ITS SOURCE, ENERGY/ POWER REQUIREMENT

3.8.1. Water

The estimated requirement of water for mining activities would be around 150 m^3/day.

Water for drinking and washing purpose would be obtained from captive sources. Water would be mainly supplied by the desalination plant being built along with cement plant.

3.8.2. Power

Mining will have limited power requirement for lighting and project office. All machinery/ related vehicles engaged in the project will be fuel operated.

Power consumption at mine shall be less than 1 KWH/Ton (0.6 MW). The required power will be met from the proposed 70MW CPP being built with cement plant.

3.9. QUANTITY OF WASTE TO BE GENERATED AND SCHEME FOR MANAGEMENTS/DISPOSAL

The waste generated from the mining area shall be backfilled and spared all around the water reservoir for safety purpose. This shall strengthen the banks of the water reservoir and shall be used for plantation after spreading top soil.

3.10. SCHEMATIC REPRESENTATION OF THE FEASIBILITY DRAWING WHICH GIVE INFORMATION OF EIA PURPOSE

The surface topographical plan for the mine is provided **Appendix I** of this report.

4. SITE ANALYSIS

4.1. CONNECTIVITY

The proposed mine is located in village Balana, Rohisa and Vadhera of Jafrabad Taluk, District Amreli, Gujarat state.

The proposed site is presently approachable by an existing 5m wide asphalted PWD road which links all the villages' upto Dharbandhar with the State Highway No. 90 (SH-90) at village Vadhera.

S. No	Category	Description
1.	Nearest Major Towns / Places	Una- 30 km; Diu - 40 km; Jafrabad – 2.6 km; Rajula - 25 km; Pipava Port - 40 km
2.	Nearest Railway Station	Una – 30 kms; Rajula – 25kms; Amreli – 80kms
3.	Nearest Air Port	Diu – 40 kms;
4.	Nearest Commercial Port	Pipavav – Around 43 kms;

Table 1 : Connectivity of the Proposed Plant Site

4.2. LAND FORM, LAND USE AND LAND OWNERSHIP

The land use of the area is primarily agricultural land use followed by waste land. About 40% of the total land for mine is government land while the remaining land is private land. The area identified for cement plant is entirely private land.

The ownership of the land for the project fall with three villages, Vadhera (about 126 land parcels), Balana (37 land Parcels) and Rohisa (235 land parcels).

4.3. TOPOGRAPHY

The proposed area has topographical undulations across the entire stretch. Site leveling and terracing would need to be carried out to meet the requirements of various units. There is an elevated cliff of about 8m which separates the mine are from the sea coast.

4.4. EXISTING LAND USE PATTERN, WATER BODIES ETC

The land use of the project area can be defined as:

- Agricultural: about 58-60% Agricultural
- Grazing/ Gauchar land: 8-10%
- Undeveloped Wasteland: 30-33%

4.5. EXISTING INFRASTRUCTURE

There is no existing project infrastructure.

4.6. SOIL CLASSIFICATION

The soil in the area is classified as coastal alluvium. These are formed by deposition products of weathering of rocks from higher elevation and deposit them in the low-lying areas. The alluvial soils are immature and have weak profiles.

4.7. CLIMATE DATA FROM SECONDARY SOURCE

4.7.1. Temperature

The proposed area falls under the coastal zone. The minimum temperature at the proposed site is 12° C and the maximum temperature is 45 Deg C.

4.7.2. Rainfall

Annual rainfall of around 550 mm is being recorded in the zone of the proposed plant area.

4.7.3. Relative Humidity

Relative humidity of 60% to 70% exists in the zone of proposed plant area. This high range of humidity is experienced because of its vicinity to the coastal area.

4.7.4. Wind and Cyclone Hazard Risk Zone

The proposed project site falls under very high damage risk Zone B (v=50m/sec)

4.7.5. Seismic Zone

The proposed project site falls under Zone III seismic zone.

4.8. SOCIAL INFRASTRUCTURE AVAILABLE

As per the District Census Hand Book 2011 published by the Office of the Registrar General and Census Commissioner, India under the Ministry of Home Affairs, the following social infrastructures are available in the three villages of Balana, Rohisa and Vadera,

Schools

All three villages have a government primary school each. Rohisa has a private primary school as well. Vadera is the only village that has a government secondary school. In order to pursue education at the senior secondary level, students from Balana and Vadera villages have to travel a distance of 5 to 10 km while students from Vadera have to travel more than 10 km to the nearest facility.

Health Facilities

Rohisa and Vadera villages have a public health sub centre each. To avail health care at a hospital, patients from Balana and Vadera have to travel distance of 5 to 10 km while patients from Rohisa have to travel more than 10 km to the nearest health facility.

Veterinary Facilities

None of the villages have a veterinary facility. To avail veterinary care, the villagers from Balana and Vadera have to travel distance of 5 to 10 km while villagers from Rohisa have to travel more than 10 km to the nearest facility.

Community Centres

Rohisa is the only village amongst the three villages which has a community centre for the community.

5. PLANNING BRIEF

5.1. PLANNING CONCEPT

The proposed project shall be Greenfield installation.

5.2. POPULATION PROJECTION

As per the 2011 Census data, the total population of Balana village was 1701 with 867 males and 834 females respectively, while the total population of Rohisa village was 5604 with 2887 males and 2717 females and Vadera village was 4442 with 2247 males and 2195 females.

5.3. LAND USE PLANNING

The entire area under the mine will be mined during the lease period.

5.4. ASSESSMENT OF INFRASTRUCTURE DEMAND

The main infrastructure requirement envisaged for the project is housing colony along with social infrastructure such as recreational facilities, shopping facilities for daily needs etc.

A few of the notable auxiliary infrastructure expected to be provided for the proposed cement plant is as mentioned below:

- A housing colony with facility to accommodate 300 to 350 staff personnel for the industrial unit including mines staff.
- The housing colony shall also be provided with social infrastructure such as shopping facilities for daily needs recreational facilities etc.
- Guest house is also envisaged for visitors.
- A first aid clinic shall be provided at the cement plant.
- Required number of shift and sanitary units
- A canteen to serve food and beverages for the employees
- Adequate parking facilities shall be envisaged within the plant and truck parking spaces along with restrooms shall be facilitated outside the plant premises.

All the above facilities are planned to be provided as part of the project. The existing road infrastructure is considered adequate for connectivity and transport logistics and no new connecting roads are planned.

6. PROPOSED INFRASTRUCTURE

6.1. MINING AREA

Following additional infrastructure facilities have been planned for mines specifically -

First aid room shall be constructed as specified in the second schedule of mines rules. A qualified and experienced person shall be in charge of first aid room for attending to the persons in the event of any accident. In addition, first aid boxes containing equipment specified in the third schedule of mines rule shall be provided at the crushing plant and workshop.

Canteen and rest shelters shall be provided in the mines office premises for taking food and rest.

Drinking water outlet points shall be provided at workshop, mines office and canteen.

Sufficient number of toilets shall be provided at mines and workshop premises.

Adequate lighting arrangements shall be made at mine faces, along haulage roads, in and around workshop and crusher as per statutory requirement.

Other necessary infrastructure like lighting towers, office building, time office, vocational training centre, diesel storage tank shall be provided in mines.

6.2. RESIDENTIAL AREA

The residential area/ Housing colony are proposed to be located in vicinity to the plant area at a distance of approximately 1 km from the plant towards the eastern side of the plant as denoted in the *Figure 6: Location of Various Entities.*

6.3. SOCIAL INFRASTRUCTURE

HCIL has well defined CSR policy to Carryout social development and welfare measures in the surrounding villages. Under CSR activity, HCIL shall initiate community development projects, in the fields of health, education and environmental preservation, in the study area around the plant as is done in their existing units.

6.4. CONNECTIVITY

The existing 5 m wide road connecting the State Highway No. 90 (SH-90) at village Vadhera and subsequently to National Highway shall use for vehicle movements. A new approach road shall be constructed between the cement plant and the proposed captive jetty.

6.5. DRINKING WATER MANAGEMENT

The drinking water for the entire mines shall be supplied by captive sources. ie desalination plant for cement plant .

6.6. SEWERAGE SYSTEM

Sewage generation will be limited to the workers in the mining area. The toilets provided at site shall be provided with soak pit and septic tank arrangement.

6.7. INDUSTRIAL WASTE MANAGEMENT

Mining activity will not involve generation of any industrial waste. However waste oil/used oil and oil contaminated rags will be generated due to operation of mining machinery. Inferior limestone or rejects will be backfilled.

6.8. SOLID WASTE MANAGEMENT

Solid waste generated will be limited to waste generated by the workers at site, waste from machinery use (tyres, battery, etc.). Drums, sacks, and other packaging material shall also be generated.

6.9. POWER REQUIREMENT AND SUPPLY/ SOURCE

Power consumption at mine shall be less than 1 KWH/Ton (0.6 MW). The required power will be met from the proposed 70MW CPP being built with cement plant.

7. REHABILITATION AND RESETTLEMENT (R&R PLAN)

7.1. POLICY TO BE ADOPTED IN RESPECT OF THE PROJECT AFFECTED PERSONS INCLUDING HOME OUSTEES, LAND OUSTEES AND LANDLESS LABORERS

Land will be purchased directly from the land owners on willing buyer willing seller basis. Adequate compensation based on mutual negotiations will be paid for the land, standing crop and any other infrastructure affected by the procurement of land.

Revenue land falling in mine area will be obtained on lease from local authorities through proper procedures.

8. PROJECT SCHEDULE AND COST ESTIMATE

8.1. DATE OF START OF CONSTRUCTION AND COMPLETION

The cement project is expected to commission within thirty six to forty eight (36 - 48) months from contract signing date for cement machinery. The mining activity will commence 6-8 months prior to commissioning of the cement plant.

8.2. ESTIMATED PROJECT COST WITH ANALYSIS OF ECONOMIC VIABILITY OF THE PROJECT

Estimated project cost for all the facilities being proposed by HCIL for the project, except land cost, is approximately Rupees 60 Crores.

9. ANALYSIS OF PROPOSAL (FINAL RECOMMENDATION)

9.1. FINANCIAL AND SOCIAL BENEFIT

The social benefits would be in the form of Corporate Social Responsibility (CSR) activities that would be initiated by HCIL for the welfare of the communities residing in the villages of Balana, Rohisa and Vadera. A Needs Assessment Study to plan and implement the CSR activities would be undertaken during the Social Impact Assessment study of the project area.

APPENDIX I: SURFACE TOPOGRAPHICAL PLAN OF PROPOSED MINE AREA