JSW CEMENT LIMITED

Pre-Feasibility Report

For setting up 1.2 MTPA Portland Slag Cement (PSC) and Ground Granulated Blast Furnace Slag (GGBS) Grinding Unit at Pottaneri, M. Kalipatti Village, Salem, Tamil Nadu.

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EXECUTIVE SUMMARY

1.	**Name of the project**	**1.2 MTPA Portland Slag Cement (PSC) and Ground Granulated Blast Furnace Slag (GGBS) Grinding Unit at Pottaneri, M. Kalipatti Village, Salem, Tamil Nadu.**
2.	S. No. in the Schedule	3 (b)
3.	Registered Address	JSW Cement Ltd., JSW Centre, MMRDA Ground, BandraKurla Complex, Bandra (East) MUMBAI 400 051
4.	Name of the Applicant	JSW Cement Limited
5.	Present Business	Cement manufacturing at Nandyal (AP), Vijaynagar, Bellary (Karnataka) and Dolvi, Raigad (Maharashtra)
6.	Area of plant	Approx. 32 acres
7.	Toposheet No.	58 E/9
8.	Latitude Longitude	Latitude: 11o 48’ 16”N to 11o 49’ 2”N Longitude: 77o 54’ 17”E to 77o 55’ 43”E
9.	Capacity	1.2 MTPA Portland Slag Cement (PSC) and Ground Granulated Blast Furnace Slag (GGBS)
10.	Cost of Project	350 Crore
11.	Manpower Requirement	185 persons
12.	Power Requirement	The power requirement for the project will be 15 MVA and will be will be sourced from the Tamilnadu state grid (TSEB).
13.	Water Requirement	500 M^3/day and the total water required for operation the Cement Grinding Unit will be fulfilled by the JSWSL’s groundwater reservoir

		under an agreement subject to approval from the concerned regulatory authorities.
14.	Nearest Railway Station/Airport alongwith distance in kms.	Mecheri Road – 2 km, Omalur Junction – 20 km, SALEM Airport – 22 km
15.	Nearest town, City, District Head quarters along with distance in kms.	Mecheri – 4 km, Salem - 35 km District Head quarter Salem - 35 km
16.	Village Panchayats, ZillaParishad, Municipal corporation, Local telephone nos. to be given) body (complete postal addresses with telephone nos to be given)	Taluk - Mettur District- Salem, Tamil Nadu -636453

1.0 Introduction

1.1 Identification of project and project proponent

O. P. Jindal Group is the Principal/ Promoter shareholder in JSW CEMENT LIMITED, an Indian based registered company, in Mumbai.

JSW Cement has an integrated cement manufacturing plant in Nandyal, A.P,India. The group has two cement grinding units in Vijayanagar, adjacent to JSW steel plant near Bellary, Karnataka and in Dolvi, Maharashtra.

The Units have a combined capacity of 6 Million Tons Per Annum (MTPA). JSW Cement is leading the way in promoting PSC variant of cement in India. Portland Slag Cement (PSC) also known as green cement as it generates least amount of CO_2 during production and also generates least heat during concreting.

PSC (Portland Slag Cement) produced by JSW Cement, can be used as replacement to Ordinary Portland Cement (OPC) during concreting and is being widely used in the coastal cities. PSC can replace OPC in use which also makes economic sense for the RMC manufactures.

JSW CementLimited, an Indian based registered company at Mumbai,evaluated the feasibility of establishing a cement grinding plant at Pottaneri, M. Kalipatti Village, near Mecheri,Mettur – Taluk, District - Salem, Tamil Nadu. JSW Cement intends to set-up a Cement Grinding Plant with capacity of 1.2 MTPA,at Pottaneri, M. Kalipatti Village, Salem District in Tamil Nadu.

JSW Cement wishes to produce GGBS & PSC and also considering PPC/OPC as per the market demand.

1.2 Project Concept

M/s JSW Steel Limited (hereinafter referred to as 'JSWSL'), is currently operating 1 MTPA steel manufacturing unit located at M.Kallipatti and Pottaneri Village of Mettur taluk, Salem district, Tamilnadu state. The plant is under sxpansion from 1 mtpa to 1.3 mtpa. The total granulated blast furnace slag at present is around 3,50,000 Tons/Year which will increase to 4,00,000 tonnes per annum after completion of expansion.

In order to utilize the granulated blast furnace slag generated as by-product from the steel manufacturing process, M/s JSW Cement Limited (JSWCL) to set up a cement grinding facility of 1.2 MTPA PSC and GGBS as an ancillary unit within its Steel Plant premises located at Pottaneri, M.Kalipatti Village, Salem, Tamil Nadu.

Since, JSW Cement Limited is proposing to set a 1.2 mtpa cement grinding unit for producing PSC and GGBS for which slag requirement will be more than what JSWSL, Salem can supply, JSWCL will procure the balance quantity of blast furnace slag from JSW Steel Limited, Tornagallu, Bellary (Karnataka).

Total water required will be fulfilled by the JSWSl's groundwater reservoir subject to approval from the concerned regulatory authorities. Water will be taken from the above source under agreement with M/s JSWSL.

Similarly, approx 15 MVA of electrical power required for the operation of the cement plant will be sourced from TSEB.

The project concept is based on the following factors:
Availability of Slag and Gyspum - the principal in put materials for the project.

The cement industry is growing steadily through the projection period and also infrastructure developments growing across the country and the requirements of the export market. The growth in demand is met with a planned increase in production capacity. JSW has the opportunity to reduce the gap in supply and to compete with current producers to increase the market share in these areas through its low cost of production and reduced transport cost.

The success of a cement project is facilitated by the simultaneous occurrence of "pull" and "push" factors. The demand drivers, discussed above, constitute the "pull" factors, which appear to be favorably oriented. The business acumen, cement experience and financial strength of the

project promoters constitute the“ push” factor. As described in the next section, the credentials of the JSW appear extremely favorable in ensuring this.

1.3 Employment Generation

It is estimated that the total employment generation due to the proposed expansion project will be 185 in numbers.

2.0 Project Description

2.1 Location

The proposed project will be located within the existing plant premises of JSWSL At- Pottaneri, M.Kalipatti Village, Salem District of Tamil Nadu State under Survey of India toposheet no. 58 E/9. The Latitude and Longitude of the site are as below:

Latitude: 11o 48’ 16”N to 11o 49’ 2”N

Longitude: 77o 54’ 17”E to 77o 55’ 43”E

2.2 Site Selection Criteria

The plant site is located within the existing plant premises of JSWSL at- Pottaneri, M.Kalipatti Village,Salem District of Tamil Nadu State. The site has following facilities:

- Existing steel plant and land already under possession of JSW and hence no R&R issues
- Proximity to the sources of raw material such as slag and Gypsum
- Availability of common Infrastructure facilities / utilities (water / power etc.),
- Availability of land, approach roads & accessibility
- Suitable topography of land and geological aspects
- Proximity to rail head, sea port and transport logistics
- Safe from site flooding possibility
- Suitable seismic zone
- No archeologically important heritage monuments are located within 10 km radius.
- No declared biodiversity parks/sanctuaries are in the surroundings ofsite.

2.3 Size / magnitude of operation

The plant will be designed to produce 1.2 MTPA Portland Slag Cement (PSC) and Ground Granulated Blast Furnace Slag (GGBS).

2.4 Project description

The Plant will adopt most modern Roller Press/Ball Mill Combination Technology with high efficiency separator with the state of art technology in the whole process of PSC / GGBS production line. Modern high technology features will ensure high quality product, high yield in energy savings, environmental protection, as well as large- scale automation.

The technical performance and equipment to be installed will be comparable to the best cement grinding plants in existence in other parts of the world.

2.5 Process Flow Diagram of PSC and GGBS manufacturing

The cement grinding process involves the following steps/ activities:

a) Clinker& Gypsum received through trucks/railway wagons are unloaded by truck/wagon-tippler and transported through belt conveyor system for storage in Clinker silo& Gypsum covered sheds respectively. Slag will be coming from JSWSL site by Belt Conveyor.

b) Clinker and Gypsum in a definite proportion are ground for the production of Ordinary Portland Cement (OPC) in the Roller Press.

c) The Roller Press mill consists of Rollers and grind Clinker and Gypsum to produce OPC, whereas Slag alone is ground to produce GGBS.

d) Both the OPC as well GGBS are stored in separate Silos.

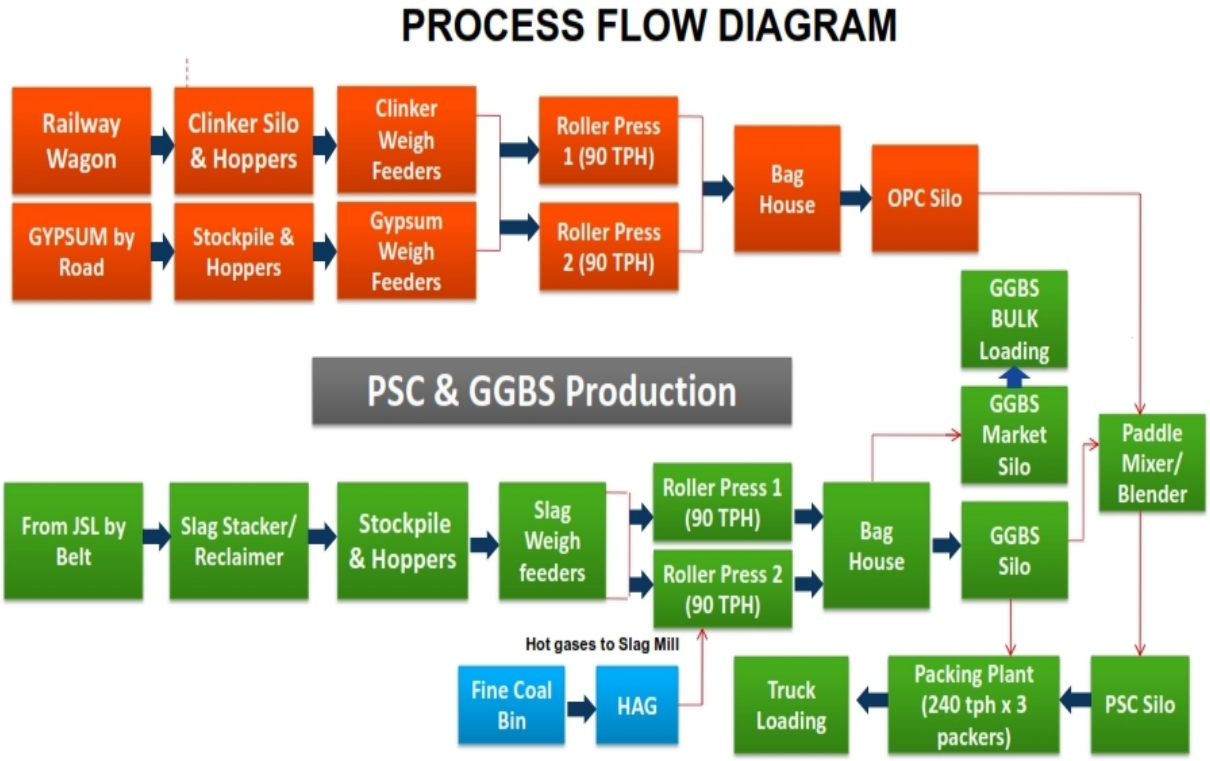
e) For the production of Portland Slag Cement, GGBS and OPC are extracted from the respective silos and blended in definite proportion in paddle mixer and stored in PSC silo.

f) In Cement Silos, the cement is homogenized by fluidization method (for blending) and then extracted through specific equipments installed and fed to Electronic Roto-Packing Machine for packing in bags.

g) After packing in bags, the cement bags are transported by means of belt conveyor and loaded in Trucks by Truck Loading machines for onward dispatch to the customer.

h) High pressure roll press for grinding of PSC and GGBS enables us to achieve increase in capacity up to 200% and savings in power consumption to the extent of 30 to 40% compared to conventional ball mills.

Figure- 1.1 Process Flow Diagram



2.6 Raw Material requirement

TABLE No. 1.1.RAW MATERIAL REQUIREMENT

S. No.	Raw material	TPA	Source	Distance /Mode of Transportation
1.	Clinker	6,08,475	Imported from Thailand, China and Indonesia	Sea route& Rail/Road
2.	Slag	6,40,500	Jindal Stainless Limited	Belt Conveyor
3.	Gypsum	32,025	Fertilizer industries/ Imported	62 KM Erode/ Road
4.	Coal	12810	Imported coal from open market	Road

2.7 Water & Power Requirement

The total requirement of fresh water for the proposed cement grinding unit is 500 m^3/day. The total water requirement will be met from the existing water intake well of M/s JSWSL subject to

permission from the concerned authorities. Power required for the operation of cement Plant will be 15 MVA and the same will be sourced from TNEB.

2.8 Solid waste/ Waste water generation

Main features of the solid waste management plan conceived for the project is as follows:

- Approx. 1300 - 1400 mtpa (4.0 to 4.5 MT per day) of ash will be generated from the combustion of coal used in HAG and the entire quantity will be sold to outside parties. Proper ash handling system will be provided to ensure no dust generation during handling, filling and transportation.
- Dust collected by the bag filters will be automatically recycled in the system.
- Other solid waste will be in the form of rejected conveyor belts, torn/ damaged cement bags, paper/ wooden/ plastic waste etc. which are not hazardous in nature and will be sold to recyclers on regular basis.

2.9 Waste Water generation & Management

Around 8 m3/day of domestic waste water is expected to be generated from the proposed project and the same will be treated in septic tanks followed by soak pits. Thus the proposed project will cause no substantial contribution to water pollution.

3.0 SITE ANALYSIS

3.1 Connectivity

The site is well connected by road and rail. The project site is located about 35 km South-West of Salem city. Mettur town is located at 12 km in SW direction. NH 7 passing at 22 km away from plant site. The nearest railway station is Salem at a distance of 35 km and nearest airport is Bangalore at a distance of 200 km. The nearest seaport is at Nagapattinam is about 310 km from the project site.

Road connectivity map is shown in **Figure 1.2**:

Figure- 1.2 Road Connectivity Map

The proposed cement grinding unit will be located within the premises of M/s JSW Steel Ltd., Salem works. Selection of the site for any project is the most important aspect for its successful operation & better economic viability. Proximity to Raw material source, assured supply of slag and other infrastructural support are required to be essentially examined while selecting the site of the plant. The following basic requirements are necessarily required to be fulfilled.

- Easy access to Raw Material such as Slag, Gypsum etc.
- Availability of water
- Power supply
- Access to road and rail and sea route

The proposed site has the following preliminary advantages:

- The site is situated in Pottaneri, M.Kalipatti Village, Salem in the state of Tamil Nadu.
- Water is available from the existing groundwater wells of M/s JSWSL subject to permission from the concerned competent authorities..
- The site is already well connected with Road as well as Rail. Thus the approach is excellent.
- Soil condition of the site is also favorable.

3.2 Land Form, Existing Land Use & Land ownership

The proposed project site is located within the existing facilities of JSW Steel works Salem and the proposed area is plain land. The land, approx. 32 acres, earmarked for cement grinding unit is neither vegetated nor having any buildings. Hence, site clearing activities like clearing the vegetation or demolition exiting building are not contemplated.

The site is located in the interior part of Salem district, which is spread from southwest to northeast and is situated on the eastern side of Tamilnadu state. The district is 11° 14' and 12°53' north latitude and 77° 44' and 78° 50' east longitude. This district is bounded by Dharmapuri district on the north, Erode district on the west, Namakal and Tiruchirapalli districts on the south, and Perambalur and Villupuram districts on the east and the proposed project site is not attracted by any other statutory act like CRZ. No national park, ecosensitive area are identified within 15 km radius study area.

3.3 Topography

The site is mostly flat. However the surrounding area is undulated with hills and hillocks. The following reserve forests along with the directions with respect to project site are observed in 15 km surrounding area.

i. Vanavasi Reserve Forest in SW
ii. Gonur and Solappadi reserved forest in NW
iii. Parigam reserved forest in N
iv. Ramasamy reserved forest in NE
v. Elattur reserved forest in ENE

No environmentally sensitive area is located nearby. The Stanley reservoir is located in west direction. The important crops grown are paddy, groundnut, fodder, sugarcane, maize, cholam, ragi, cumbu, cotton, and turmeric. The main source of irrigation is from bore wells and dug wells.

3.4 Existing Infrastructure

The site is well connected by road and rail. Presently the site is connected by a metal road. The site is located at about 26 km from NH-7 which is passing in eastern direction. The nearest railway station is Salem situated at about 35 km.

3.5 Soil Classification

3.5.1 Site geology

Salem is located on the high grade Precambrian terrain of south India with a network of shear zones of Neo to Early Proteorozoic age. The Salem-Attur shear zone, an extension of Moyar-Bhavani shear zone passes through this area. Charnockite, pyroxene granulite, magnetite quartzite, Khondalite, calc, granulite and younger granitoidare other rock units exposed in the area.

The district is endowed with rich mineral resources such as Magnesite, Bauxite, Quartz, Felspar, Limestone, Soapstone, Dunite, Roughstone, Granites. (Source-District website of Salem)

3.5.2 Soil classification

The soils can be broadly classified into 6 major soils types viz., Red insitu, Red Colluvial Soil, Black Soil, Brown Soil, Alluvial and Mixed Soil. Major part of the district is covered by Red insitu and Red Colluvial soils. Block soils are mostly seen in Salem, Attur, Omallur and sankari taluks. Brown Soil occupies major portion of Yercaud and parts of Salem and Omallur taluks and the Alluvial Soil is seen along the river courses in Omallur and Sankari taluks. Mixed soil is occurring only in Attur taluk. The proposed site is located on black cotton soil.

3.6 Climate data from secondary source

The district receives the rain under the influence of both southwest and northeast monsoons. The northeast monsoon chiefly contributes to the rainfall in the district.

Rainfall data from six stations over the period 1901-2003 were utilized and a perusal of the analysis shows that the normal annual rainfall over the district varies from about 800 mm to 1600 mm. It is the minimum around Sankari (800 mm) in the southwestern part of the district. It gradually increases towards north, northeast and east and attains a maximum around Yercaud (1594.3 mm) in the northern part.

The district enjoys a tropical climate. The weather is pleasant during the period From November to January. Mornings in general are more humid than the afternoons, with the humidity exceeding 75% on an average. In the period June to November the afternoon humidity exceeds

60% on an average. In the rest of the year the afternoons are drier, the summer afternoons being the driest. The hot weather begins early in March, the highest temperature being reached in April and May. Weather cools down progressively from about the middle of June and by December, the mean daily maximum temperature drops to 30.2°C, while the mean daily minimum drops to 19.2°C and 19.6°C in January in Salem and Mettur Dam respectively.

Climatic data from secondary sources

- Annual rainfall – 1185.4 mm
- Temperature
    - Winter – 15.6^{0}C to 32.1^{0}C
    - Summer – 22.3^{0}C to 43^{0}C
    - Monsoon – 25.3^{0}C to 32.5^{0}C
    - Post monsoon – 19.3^{0}C to 32.4^{0}C
- Average wind speed – 6.4 km/hr
- Humidity
    - Winter – 46 to 78%
    - Summer – 47 to 74%
    - Monsoon – 68 to 84%
    - Post monsoon – 60 to 79%
    - Source - IMD

4.1 Social infrastructure available

Population

The total population of Salem dist. As on 2001 is about 30.16 lakh and Mechieri block constitute about 10.87 lakh. The population growth rate during 2001 – 2011 is about 15.44% of salem district. The density of the population of Salem is i.e., 665/sq. km The literacy rate of Salem is about 72.86 % as per 2001 census.

The Salem district is well supported with social infrastructure facilities like Hospital (10 No's), Dispensaries (14 No's), Primary health centers (75 No's), Health sub-centers (348 No's) and other medical institutions (20 No's).

5.0 PLANNING BRIEF

5.1 Planning concept

The plant will be located interior part of Salem district in Tamilnadu. Already M/s. JSW has installed a steel plant of capacity 1.0 MTPA in the proposed project site. The proposed project is an expansion project.

5.2 Population projection

Project will be creating considerable employment opportunities for local people during construction phase. During recruitment preference will be given to local as per employment guideline of the State. However, priority will be given to the nearby village people after testing their skills and abilities. The Villages falling in the study area of 10 km radius are shown in the **Table 1.1**.

Table 1.2

Villages falling within 10km radius from the project site

Sl. No.	Name of the Village
1.	Mecheri
2.	Karappatti
3.	Pudu Kuttappatti
4.	Kuttappatti
5.	Ervadi
6.	Palakkaranur
7.	Kanakkappatti
8.	Nangavalli
9.	Malamanur
10.	Kuvundanur
11.	Amarattanur
12.	Errappareddiyur
13.	Malaiyanur
14.	Kudiraikkaranur
15.	Mallamooppampatti
16.	Chinna Seeragapadi

Source: Census of India 2011

5.2 Land use planning

The proposed site is admeasuring about 32 acres. The proposed land use is as follows:

Table 1.3

Proposed Land Use

S. No.	Land Use	Area (Acres)	Area (%)
1.	Area required for Factory Godown/ Office Building, Roads and other open spaces.	21.35	66.7
2.	Garden/ Greenbelt	10.65	33.3
	Total	**32.0**	**100.0**

5.3 Seismology

The site is located in zone II of seismic zoning map of India as per IS 1893-2012 which is associated with low seismic potential. The detailed geological and seismological investigations revealed that the site is outside the range of capable fault within 5 km from the project site. The design basis seismic parameters are evaluated based on geological seismological information.

5.4 Assessment of infrastructure demand

The proposed plant will be located near to Mecheri village. The project site is fenced with compound wall. Inside the plant all the required infrastructure like internal roads, water supply, storm water drains are already developed and the same will be expanded further to meet the expansion requirement.

5.5 Amenities/facilities

The site is well connected by road and rail. Presently the site is connected by a metal road from NH-7. The site will be made physically isolated from the surroundings by rubble masonry wall on all sides. Other physical protection measures (security) have also been adopted for the site.

6.0 PROPOSED INFRASTRUCTURE

6.1 Industrial Area

The setting up of 1.20 mtpa cement grinding unit would require approx. 32 acres of land which is available within the existing plant premises of M/s JSWSL. The existing road and rail network will be utilized for raw material and final products transportation. The site is equipped with all other necessary infrastructure.

6.2 Green Belt

33% of the project area (approx. 10.65 acres) will be developed into greenbelt in line with the CPCB guidelines for greenbelt development. Polygamy plantation will be done while growing mostly native species which are more adaptive to the local climate and surroundings.

Overall layout of the proposed 1.2 MTPA Cement Grinding unit is shown in **Fig. 1.3**

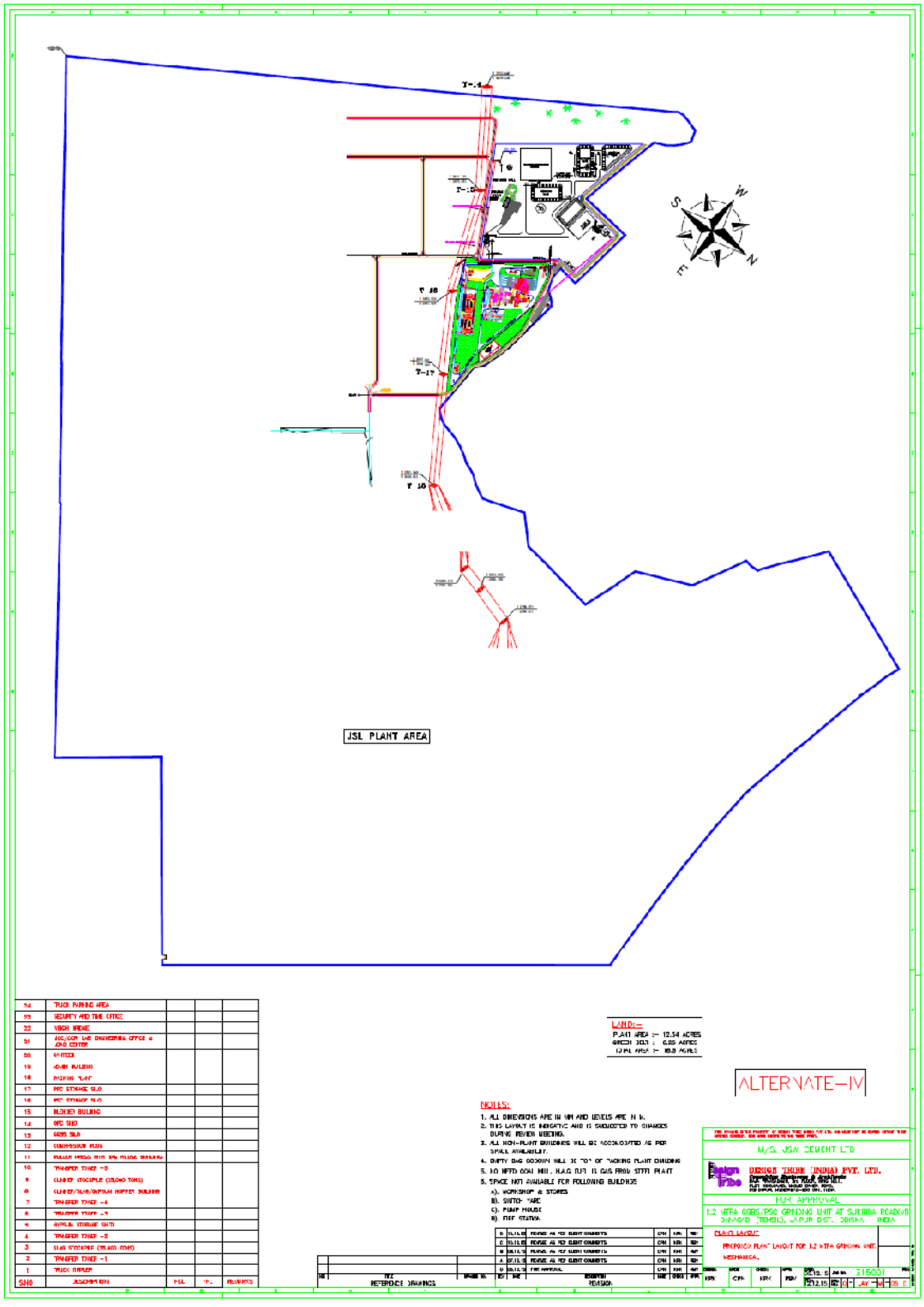


Figure 1.3, Plant layout with Greenbelt

7.0 REHABILITATION & RESETTLEMENT (R & R) PLAN

- The proposed cement grinding unit will be located within the existing facilities of M/s JSWSL and will be built using the existing available land, hence there will be no displacement of residents.
- Local people will be engaged for construction and operation activities. Surrounding area has all the infrastructure facilities, hence no housing colony/township is envisaged.

8.0 PROJECT SCHEDULE & COST ESTIMATES

8.1 Project Schedule

An implementation schedule of 14 months from the date of receipt of Environmental clearance from the State Level Environment Impact Assessment Authority & Tamil Nadu State Pollution Control Board.

8.2 Project Cost

An indicative estimated capital cost of the proposed cement grinding unit is Rs.350 Crore including the preoperative expenses, contingency and interest during construction.

9.0 ANALYSIS OF PROPOSAL

The socio-economic benefits of the proposed project are as follows:

As JSW strongly believes that it is a part of the larger community where it operates, the company has taken cognizance of the cultural ethos and socio economic environment of the locality where its plants are located. With this approach, JSW shall consider the following general measures for the socio – economic upliftment / welfare of the nearby villages:

- Local infrastructure development
- Social Afforestration
- Extending support to games, sports and culture to local community
- Health and medical facilities
- Social awareness program will further improve the quality of life and standard of living such as sanitation and hygiene, HIV Prevention Program etc.
- Implementation of adult education and female education program in the villages surrounding the project area.
- Financial assistance to talented and poor students for higher studies. (Management /Engineering / Medical studies etc.)

CHAPTER-02

INTRODUCTION

2.1 Introduction

JSW Cement proposes to set up a 1.2 MTPA Portland Slag Cement (PSC) and Ground Granulated Blast Furnace Slag (GGBS) Grinding Unit at Pottaneri, M. Kalipatti Village, Salem, Tamil Nadu.

2.2 Identification of Project and Project Proponent

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JSW Cement Limited, an Indian based registered company at Mumbai, evaluated the feasibility of establishing a cement grinding plant at Pottaneri, M.Kalipatti Village, Mettur –Taluk, District - Salem, Tamil Nadu. JSW intends to set-up a Cement Grinding Plant with capacity of 1.2 MTPA, at Pottaneri, M.Kalipatti Village, Salem District in Tamil Nadu. JSW wishes to produce GGBS & PSC and also considering PPC/OPC as per the market demand.

The promoters' objectives in investing in the cement grinding plant are:

- To increase revenue by increasing production levels and products offered; the JSW project provides a great investment opportunity with a good IRR of29.63% and a payback period of 6.77 years.
- The proposed cement grinding plant; constitute an estimated investment outlay of above 318 Crores of Rupees. The Debt: Equity ratio being considered is:70:30. Funding of debt is

proposed to be obtained through syndicated debt/loan programme with international and local lending institutions.

2.3 Cement grinding Process:

The cement grinding process involves the following steps/ activities:

a) Clinker& Gypsum received through trucks/railway wagons are unloaded by truck/wagon-tippler and transported through belt conveyor system for storage in Clinker silo& Gypsum covered sheds respectively. Slag from JSWSL by Belt Conveyor to Stock yard.

b) Clinker and Gypsum in a definite proportion are ground for the production of Ordinary Portland Cement (OPC) in the Roller Press.

c) The Roller Press mill consists of Rollers and grind Clinker and Gypsum to produce OPC, whereas slag alone is ground to produce GGBS.

d) Both the OPC as well GGBS are stored in separate silos.

e) For the production of Portland Slag Cement, GGBS and OPC are extracted from the respective silos and blended in definite proportion in paddle mixer and stored in PSC silo.

f) In Cement Silos, the cement is homogenized by fluidization method (for blending) and then extracted through specific equipments installed and fed to Electronic Roto-Packing Machine for packing in bags.

g) After packing in bags, the cement bags are transported by means of belt conveyor and loaded in Trucks by Truck Loading machines for onward dispatch to the customer.

h) High pressure roll press for grinding of PSC and GGBS enables us to achieve increase in capacity upto 200% and savings in power consumption to the extent of 30 to 40% compared to conventional ball mills.

2.4 Description of the nature of Project

The Promoters propose to setup a Cement Grinding Plant Pottaneri, M. Kalipatti Village, Mettur Taluk, Salem, Tamil Nadu with a production capacity of 1.2 million metric tons per annum of GGBS/PSC cement. After the initial studies and investigations, the Promoters considered that a viable slag based cement grinding plant could be located in the area. Apart from Clinker and Gypsum, Slag is available from JSWSL plant, thus reducing the cost of transportation. The plant is expected to be commissioned by 2017.

Production of PSC and GGBS has the following environmental benefits compared to OPC and PPC production:

- Lower specific dust emission
- Lower GHG emission intensity (approx. 0.40 t CO2/ t cement as against 0.90 & 0.63 t CO2/ t cement for OPC & PPC respectively)
- Lower sp. Energy consumption (approx. 65 kWh/t cement as against 85 & 70 kWh/t cement for OPC & PPC respectively)
- Lower Sp. Water Consumption (approx. 0.040 M3/t cement including Clinkerization as against 0.11 & 0.08 M3/t cement for OPC and PPC respectively)
- Lower consumption of mined out raw materials viz. Limestone, Laterite, Iron Ore, Coal etc. (approx. 0.68 ton raw material extraction per ton cement as against 1.42 and 1.05 tons of raw material extraction per ton cement for OPC and PPC respectively):

Table 1.4 – Comparative Analysis of Slag and Fly Ash addition in Cement

OPC Substitution rate	**Slag Cement (50%)**	**Fly Ash (20%)**
CO_2 emission savings	**53%**	**30%**
Energy Savings	**30%**	**14%**
Reduction in the consumption of *extracted* raw material	**53%**	**25%**

Percentage listed for savings in CO_2, Energy and raw material are based on 100% OPC systems compared with systems containing slag cement or Fly Ash substitution.

- Generation of lesser hazardous waste: Unlike ball mills, Roller Press mills don't have Girth Gears that require continuous injection of grease for lubrication which is continuously discharged out from the gearbox as hazardous waste (category 5.2 of HW Rules, 2008)

2.5 Need of the project and its importance to the country and/or region

The project activity has significant sustainable development benefits in terms of supporting India's economy with more cement for the building industry, reduction of greenhouse gas (GHG) emissions, energy and fuel oil conservation, decreased environmental destruction and enhanced restoration and economic and social prosperity through job creation among others as outlined below:

Vision 2020 - Supporting India's economy with more cement for the building industry and infrastructural development The Company will mainly provide PSC cement , which is not only more cost effective but also more environmental friendly.

The project is expected to provide approximately 185 jobs of varying skill levels for the cement grinding plant. There will also be indirect job creation in the Jajpur region due to this project, e.g. restaurants, supermarkets and relevant infrastructure.

Social Economic Benefits: With the implementation of the project, the Jajpur area will open up, resulting in the development of modern infrastructure such as schools, roads, health center, sports facilities center, clean water etc. meeting the objectives of the Millennium Development Goals and poverty eradication program. There will be development of rural trading center(s) selling items of daily use/basic necessities. Further, this will create a market for other special foods for consumption by the employees of the company, as they will have higher purchasing power.

Technology Transfer: The project introduces the state of art technology in Cement & GGBS manufacturing which is more energy-efficient and effective. In particle size reduction and distribution as a means of achieving the required particle size reduction (fineness) and distribution making it much more suitable for Slag blending.

The plant will not only take in to consideration the environment protection aspects but also the energy savings. The cement plant offered to JSW will contain most modern VRM or Roller Press/Ball Mill Combination Technology or Ball mill with high efficiency separator. Bag House for de-dusting Cement mill exit gases and individual bag filters to de-dust all the transfer points in the plant to make the entire plant dust free. In addition, every attempt will be made to reduce CO_2 emissions.

2.6 Cement Industry and market analysis

Cement production and consumption has been increasing over the decade in line with the rapid growth in the building and construction industry. Further, the per capita consumption has been increasing over the decade, as demand for cement continues to be widely used in civil construction activities.

The demand projections are based on two models that use different but related assumptions to arrive at average projections. The models are:

Generic Growth Model; under this model, an annual demand growth rate of 9.14% is used to make projections for the period 2010-2020. This growth trend is assumed to continue over the

projection period, driven by the growth in infrastructure, expansion in the construction sector and investments as a result of favorable investment climate in the country.

The Indian cement industry analysis above shows there will be significant growth in the construction sector in India. This coupled with the reduced barriers over Tamilnadu borders will grow demand for cement considerably.

Infrastructure development in Tamilnadu especially in Salem Region has lagged behind other parts of the country. This is due to rugged terrain, and isolation.

Establishing a Cement grinding Plant in the region will have significant effects on development of infrastructure facilities and consumption of cement in Tamilnadu. The Company will manufacture GGBS and various grades of cement, thus increasing access to construction.

The large Tamilnadu region has a population of more than 72 million people thus providing a huge market potential given that there is no other cement factory in the region and the per capita cement consumption is projected to increase in the future.

Establishment of a cement company in this region will give JSW, the logistical advantages over its competitors.

2.7 Human Reosurces

2.7.1 Introduction

Establishment of the project will lead to employment of various cadres of personnel. There will be need for unskilled labour, semi-skilled labour, skilled personnel and professionals in the fields of engineering, processing, finance and management in general. Creation of jobs is in line with the current Government's policy for employment and improvement of the economy. The JSW project is expected to provide direct employment for 185 people. The unskilled and semi-skilled (if available) shall be recruited from the local areas. The skilled and professionals are not available locally, hence they will be recruited from within the country (to the extent possible) and other countries. Employment in the factory complex will be typical in terms of numbers and skills levels for the Cement industry as detailed in other sections of the report. Employment in this area will improve the general economic and social status of Mecheri and the surrounding environment.

2.7.2 Managerial and Technical Assistance

A full Board of Directors representing all the shareholders will be appointed to establish corporate management, related policies and to make decisions on major issues in addition to

ensuring that the company's management is performing its job correctly. The Board will appoint a Management Committee, such committee will report to the Board on month-month basis and or as required in the interest of the Company. Under the guidance of the Board of Directors, the technical and financial management will be looked after by the main promoter, O. P. Jindal Group who will be responsible in appointing "the Managers". The Managers will have well-established management team or recruit experienced and competent persons to manage the proposed project.

2.7.3 Managerial and Administration team

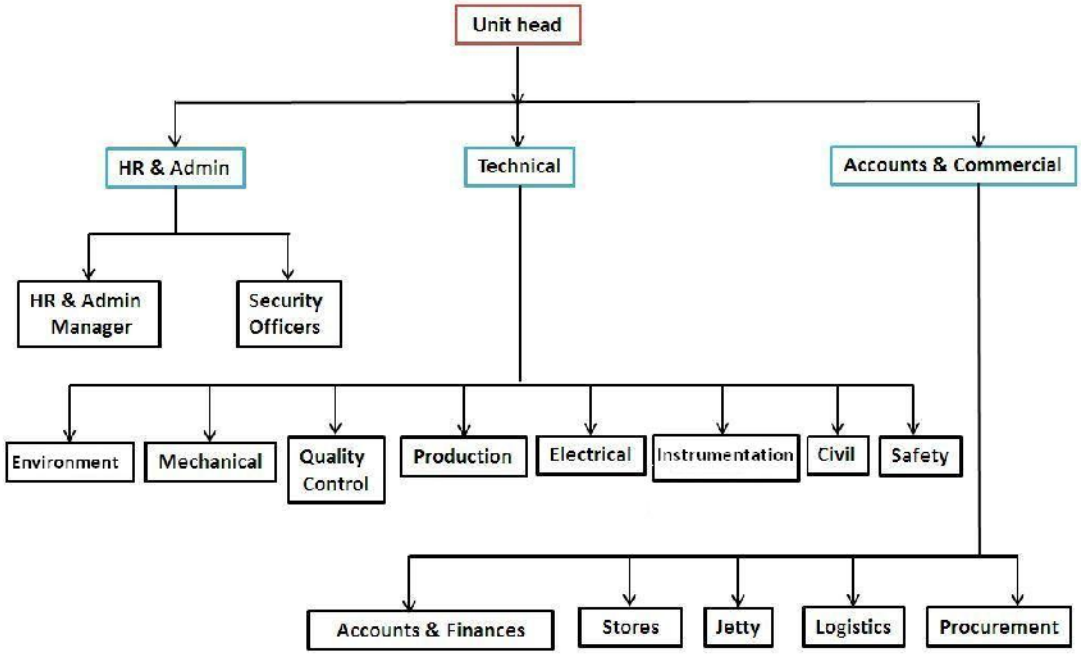
It is envisaged that in addition to the General Management and Strategic Department, the company's would be functionally categorized in various departments as follows:

Operations and maintenance department - Plant Operation, plant maintenance, workshop, laboratory and Quality Assurance etc. Finance and Accounting department - Managing all financial matters

Commercial department - responsible for the procurement, personnel and administration Department (Human Resources), security services etc.

Marketing Department - responsible for marketing GGBS /PSC. The proposed management and administration team has been structured to be as cost effective as possible and will be responsible for the cement plant. The proposed management structure is shown in figure 2.1.

Figure 2.1: Management Structure



CHAPTER - 03

PROJECT DESCRIPTION

3.1 TYPE OF PROJECT

1.2 MTPA Portland Slag Cement (PSC) and Ground Granulated Blast Furnace Slag (GGBS) Grinding Unit at Pottaneri, M.Kalipatti Village, Salem, Tamil Nadu.

3.2 LOCATION OF THE PROJECT

The proposed project will be located within the existing plant premises of JSWSL At- Pottaneri, M.Kalipatti Village, Salem District of Tamil Nadu State under Survey of India toposheet no. 58 E/9. The Latitude and Longitude are 11° 48’ 16”N to 11° 49’ 2”N and 77° 54’ 17”E to 77° 55’ 43”E respectively.

3.3 LOCATION MAP

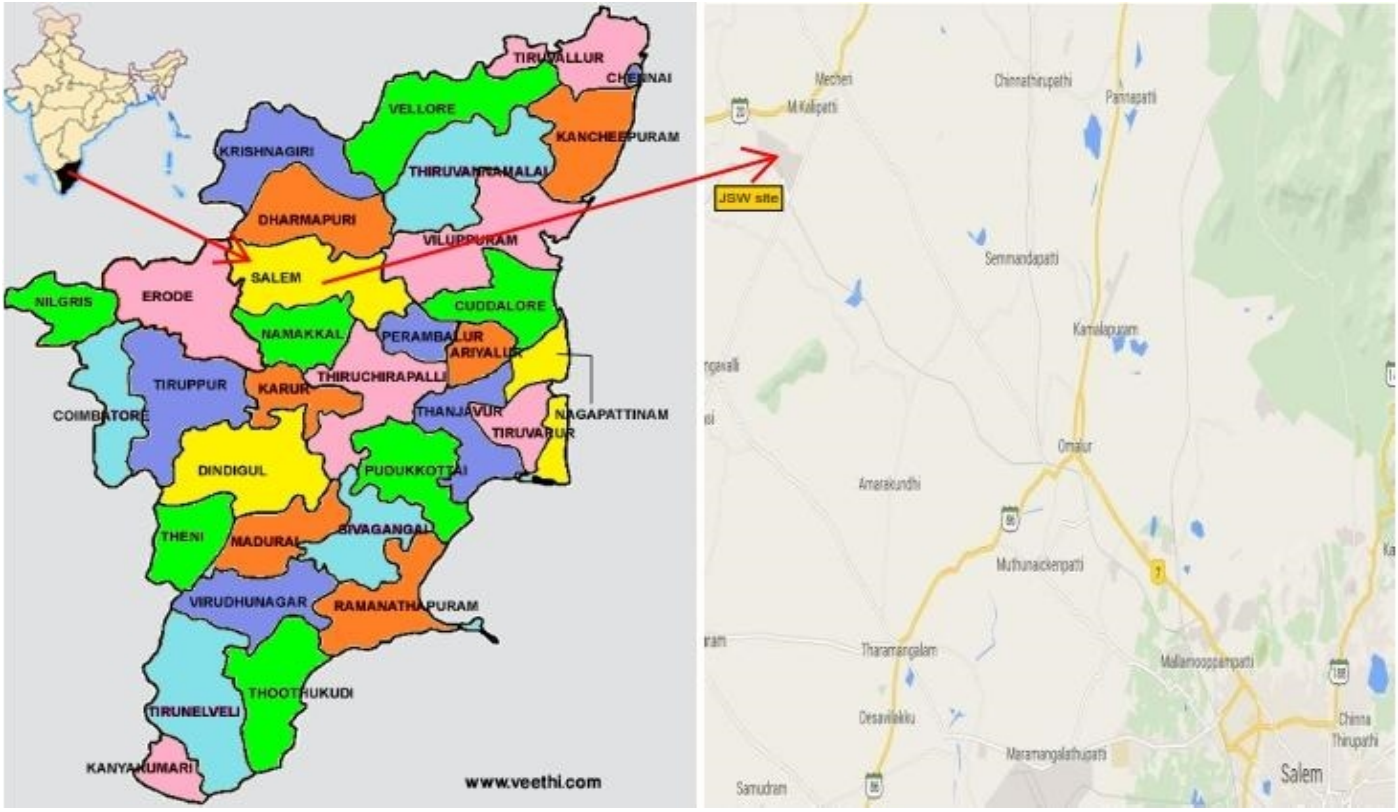


Figure 3.1 Location Map

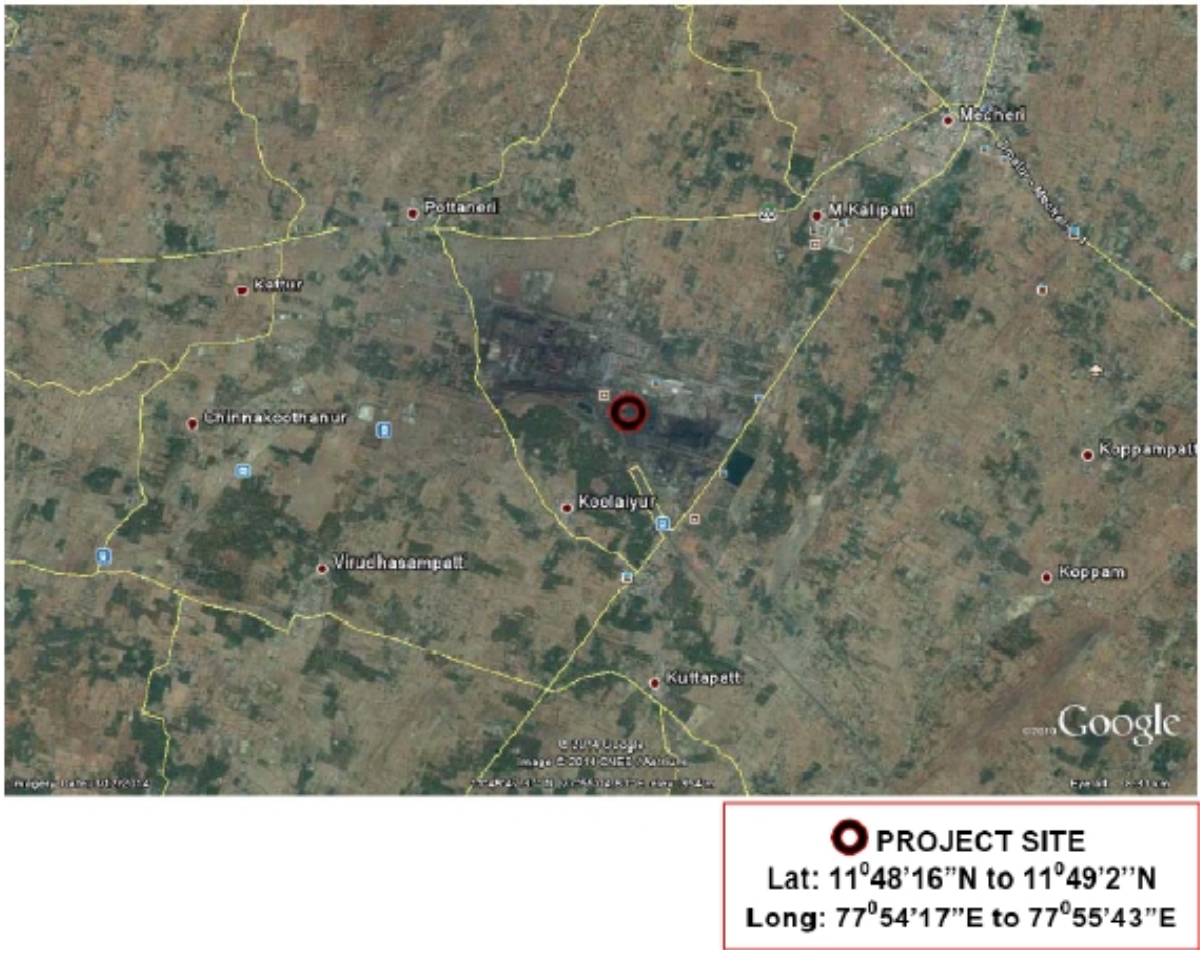


Figure 3.2 Satellite Map of the project site

3.4 LAND REQUIREMENT

Total extent of land required will be 32 acres and it is proposed to enter into an agreement (MOU) with M/s JSW Steel Ltd, Salem for the land and other infrastructure.

Table 3.1 Land Use Break-up

S. No.	Land Use	Area (Acres)	Area (%)
1.	Area required for Factory Godown/ Office Building, Roads and other open spaces.	21.35	66.7
2.	Garden/ Greenbelt	10.65	33.3
	Total	**32.0**	**100.0**

3.5 PLANT LAYOUT

The layout of the plant, when developed will have the following features:

1. Process departments will be consolidated into comprehensive production units
2. The major utilities and service facilities will be centrally located
3. Sufficient space will be provided for ease of operation and maintenance.
4. The lengths of power cables will be minimized by suitably locating load distribution centers in respect to process departments.
5. Outward movements of materials from customers/suppliers will be segregated from internal plant traffic.
6. Sufficient space for storage of raw materials, finished products and solid waste disposal.
7. 33% area will be developed into green belt.

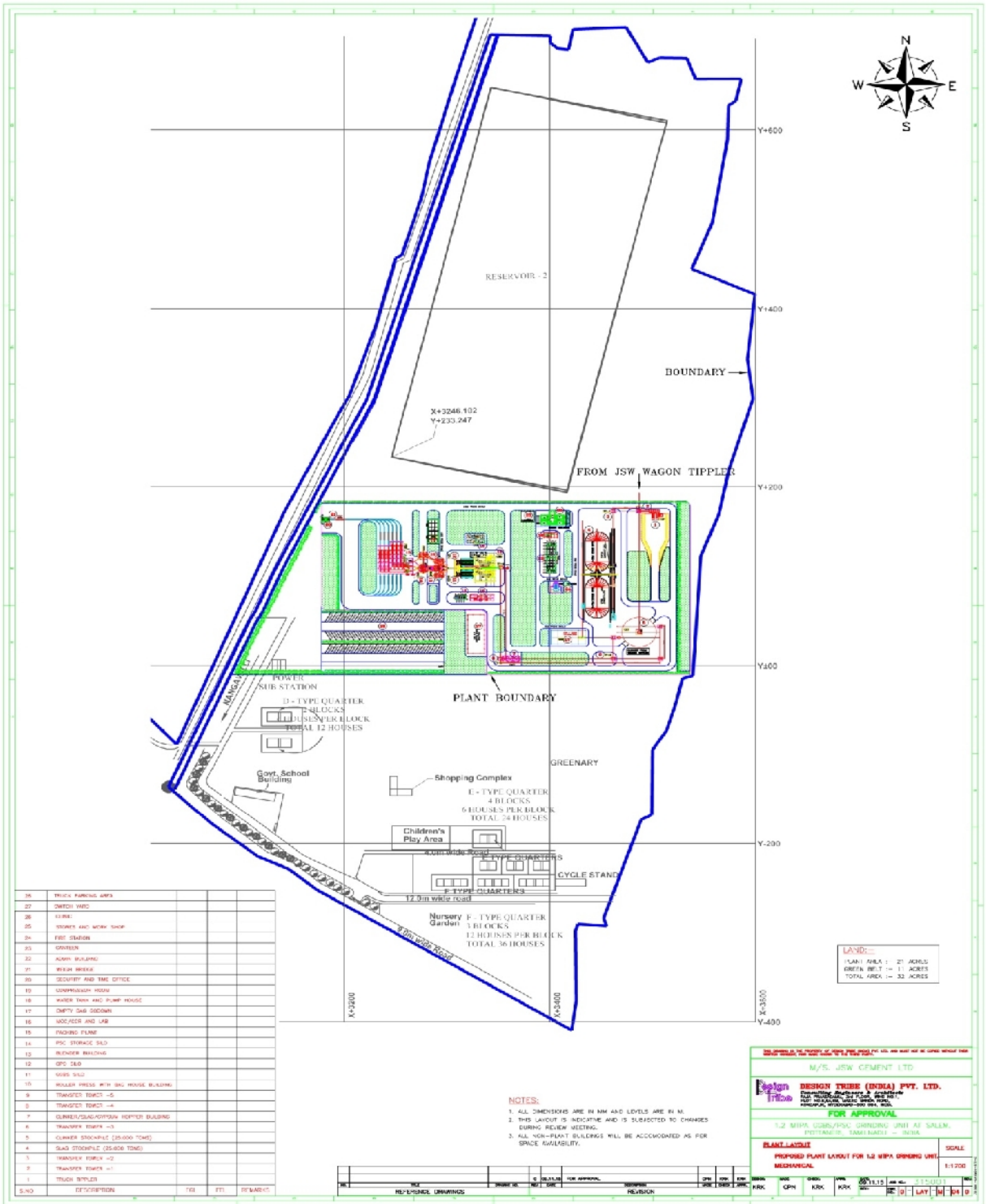


Figure 3.3 – Plant Layout

3.6 DESCRIPTION OF PLANT & EQUIPMENT

3.6.1 Plant size and Capacity

JSW Cement intends to set up a cement grinding plant of capacity 1.2 MTPA at M. Kalipatti & Pottaneri village, Mettur Taluk, Salem district, Tamilnadu.

To enhance the environmental effectiveness of the project, it is proposed to use increasing quantities of Slag, sourced from JSW Steel plants located at Salem as well as Tornagallu, Bellary (Karnataka). This, obviously, would result in a reduction in the specific greenhouse gas emission per ton of cement.

In order to achieve the dual objectives of proactive environmental effectiveness and enhanced project profitability, more and more usage of Slag is proposed. However looking at the location of plant and its marketing strategy, Slag availability and its transportation was reviewed vis-à-vis transport logistics of the finished product.

1. Slag availability: Large quantity of slag available from JSW's own Steel Plants located at Salem and Tornagallu (Bellary).
2. For Slag grinding at the grinding unit, it is proposed to use close circuit Most modern VRM or Roller Press/Ball Mill Combination Technology or Ball mill with high efficiency separator.
3. The Cement mills will have a Slag grinding capacity of approximately 170 TPH mills (both) or any suitable capacity as per the requirement and availability.
4. Taking into account the maximum volumes of GGBS/PSC cement required to be produced and dispatched, equipment and storage sizing are derived from 1.2 MTPA GGBS/PSC Cement production.

3.6.2 Hot Air Generator (HAG)

Hot air required for the purpose of drying of wet Slag shall be generated through coal fired Hot Air Generator (HAG). The HAG shall meet the drying heat requirement of Slag mill. The temperature of hot air at HAG outlet shall be 400 – 450 °C. The coal required for HAG shall be 1600 kg/h (maximum).

3.6.3 Fuel for HAG

Coal will be used as fuel in Hot Air Generator (HAG). The firing system HAG shall include required oil pumps, filters, pipes, valves, safety instruments, fans, dampers, etc.,. grounded coal will be used for slag drying.

Characteristics of coal proposed to be utilized are as follows:

Table 3.2 Coal Characteristics

Parameters	**Composition**
Carbon	68-72
Nitrogen	1.46 – 1.70
Hydrogen	3.70 – 3.94
Sulphur	0.35 – 0.66
Oxygen	3.0 – 3.60
Ash	11-12
Moisture	8-10
Gross Calorific Value (kcal/kg)	6500 – 6800

3.6.4 Stack details of HAG

During regular operation of Slag Mill, the hot gases from HAG will be vented out by the Slag Mill main stack whereas during start up and emergency conditions of HAG operation, the gases will be vented out through a separate stack of 38 m height. The stack will have necessary platform, portholes etc. for emission monitoring. The details of stack are as follows:

1. Stack height of Slag Mill (2 Nos.): 50 m
2. Exit Diameter of stack: 2800 mm
3. Exit gas velocity : 10-15 m/s
4. Flue gas temperature : 85 deg C

3.6.5 Product Mix

JSWCL envisages the production of GGBS and PSC. Depending upon Slag and other raw materials availability, the expected capacity of unit shall be 1.2 MTPA.

The details of proposed product mix are as given below:

Table 3.3 Product Mix of Portland Slag Cement

Product	Mix Proportion, % by weight	
	OPC	GGBS
PSC	50	50

Table 3.4 Product Mix of Ground granulated Blast Furnace Slag

Product	Mix Proportion, % by weight
	Blast Furnace Slag
GGBS	100

3.6.6 Mass Balance

Table 3.5 Mass Balance for GGBS & PSC

Mass Balance for GGBS					
Input			Output		
Item	MTPA	%	Item	MTPA	%
Slag	640500	98.0	**GGBS**	640500	98.04
Coal	12810	2.0	Ash	1383	0.21
			Loss (Moisture in coal and slag @ 10% + carbon and other volatile matters of coal)	7248	1.75
Total	**653310**	**100.0**		**653310**	**100.0**

Mass Balance for PSC				
Input		Output		
Item	MTPA	Item	MTPA	%
Clinker	602995	**PSC**	1276133	
Gypsum	31761			
GGBS	640500			
Ash	1383			
Total	**1276639**		**1276639**	**100.0**

3.7 SIZING NORMS FOR MAIN MACHINERY AND STORAGES

Sizing has been based on the norms & practices adopted for similar plants in the Indian cement industry, operating practices of JSWCL and Design Tribe's long experience in the industry.

These norms are summarized in Tables 5.1 and 5.2 for "Main Machinery" and "main Storages" respectively.

Table 3.6: Operating Norms: Main Machinery

Sr.	Department		Operating		Design
		hr/day	days/year	hr/year	Factor
1.	Slag, Clinker & Gypsum	20	330	6,600	1.25
2.	Cement Mill	21	330	6,930	1.15
3.	Packer and bulk	15	330	4,950	1.25-1.50
4.	Coal Mill	20	330	6,600	1.15

Table 3.7: Operating Norms: Main Storage

Sr. No.	Raw material	Storage Quantity
1	Slag (Open storage)	2 x 12,500 MT or more
2	Clinker Silo x 1 No's	1 x 12,500 MT or more
3	Gypsum	3,000 MT or more
4	Coal	1,000 MT or more

For storage, norms are generally depending on the following factors that vary from plant to plant:

- Lead distance/ delivery time from the source to the plant
- Ownership/ operation of source i.e. owned & operated, owned & contracted and purchased
- Transportation logistics and impediments, if any
- Cost of material and inventory costs
- Operator's comfort

3.8 Raw Material Requirement

Table 3.8 Raw Material Requirement & Source

Raw Material	Qty. (MTPA)	Source	Distance /Mode of Transportation
Clinker	6,08,475	Domestic/ international markets	Sea route/ road
Slag	6,40,500	JSWSL, (same location) & JSWSL, Tornagallu (Bellary)	By Belt Conveyor & Road/ Rail

Gypsum	32,025	Chemical/ Mineral Gypsum	65 Km, Erode
Coal	12810	Imported coal from local market	Road

3.8.1 Chemical Characteristics of Raw Materials

Table 3.9 Chemical Analysis of Input Raw Materials

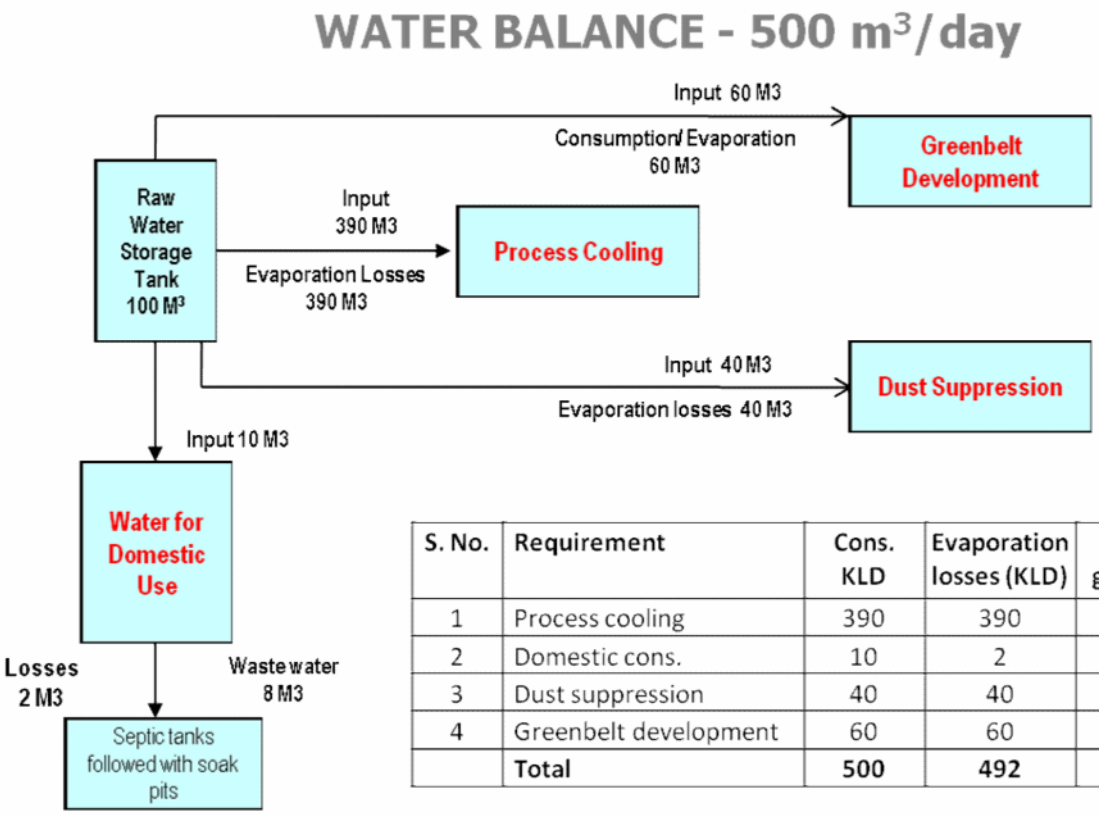
	Coal Ash	**Clinker**	**BF Slag**	**Gypsum**
Moisture	0	0.5 - 1.0	8.0 - 10	4 - 20
LOI%	0.1 - 0.2	0	0.00	10-12
SiO2%	55.0 - 57.0	21.8 - 23.0	35.5 - 38.0	
Al2O3%	24.0 - 26.0	5.5 - 6.5	18 - 20	
Fe2O3%	0.5 - 0.7	3.8 - 4.5	0.5 - 0.6	
CaO%	0.4 - 0.7	64.5 - 65.5	35.0 - 38.0	
MgO%	0.4 - 0.6	0.8 - 1.0	5.0 - 6.0	
SO3%	2.20 - 2.60	0.4 - 0.6	0.4 - 0.6	45 - 50
Na2O%	0.3 - 0.50	0.2 - 0.40	trace	0.3 - 0.50
K2O%	0.4 - 0.6	0.4 -0.7	trace	0.5-0.8
Total Alkalies as Na2O%	0.6 - 0.80	0.6 - 0.80	0.34	-

3.9 Water Requirement

The total water requirement for the plant will be approx. 500 m3/day and the same will be met from the existing water intake well of M/s JSWSL at Kaveri river under an infrastructure sharing agreement with M/s JSWSL.

Breakup of water used for different activities and water balance is as under:

Table 3.10 & Figure 3.4 Water Requirement & Water Balance



S. No.	Requirement	Cons. KLD	Evaporation losses (KLD)	Waste water generation (KLD)
1	Process cooling	390	390	0
2	Domestic cons.	10	2	8
3	Dust suppression	40	40	0
4	Greenbelt development	60	60	0
	Total	**500**	**492**	**8**

3.10 Waste Generation

3.10.1 Waste Water Generation

Waste water generation from a cement plant is generally low compared to other process industries. Wastewater in cement plants results mainly from surface run off. For the proposed project, the chance of generation of surface run off is minimal since clinker will be stored in silo and slag and gypsum will be stored under covered shed. Around 8 m^3/day of domestic waste water is expected to be generated from the proposed project and the same will be properly disposed in septic tanks followed by soak pits. Thus the proposed project will cause no substantial contribution to water pollution.

3.10.2 Solid Waste Generation

Main features of the solid waste management plan conceived for the project is as follows:

- Approx. 1300 - 1400 mtpa (4 to 4.5 MT per day) of ash will be generated from the combustion of coal used in HAG and the entire quantity will be sold to outside parties. Proper ash handling system will be provided to ensure no dust generation during handling, filling and transportation.
- Dust collected by the bag filters will be automatically recycled in the system.
- Other solid waste will be in the form of rejected conveyor belts, torn/ damaged cement bags, paper/ wooden/ plastic waste etc. which are not hazardous in nature and will be sold to recyclers on regular basis.

3.10.3 Hazardous Waste Generation

Approx. 5 KL per annum of Spent Oil/ Used grease will be generated as a result of replacement of gear box oil. The used oil/ grease will be sold to the authorized vendors as per the Hazardous Wastes (Management and Handling) Amendment Rules, 2008.

3.11 Noise Pollution Control

The noise generation can be broadly categorized into two type's viz. Area and Point sources. All the equipment used can be categorized as point sources and the vehicular traffic movement can be treated as area source. All the equipments are designed to comply with the stipulated norms. The main source of noise generation from the plant will be cement mill, compressors/ blowers and cement loading site (railway siding & truck loading).

All these noise generating equipment will be within the buildings and the presence of workers at these equipment is either not required or Intermittent. People required for intermittent work near high noise generating equipment will be provided with earplugs and their working hours in these areas will be regulated. The noise levels at the periphery of the plant will be well within the stipulated norms of noise pollution.

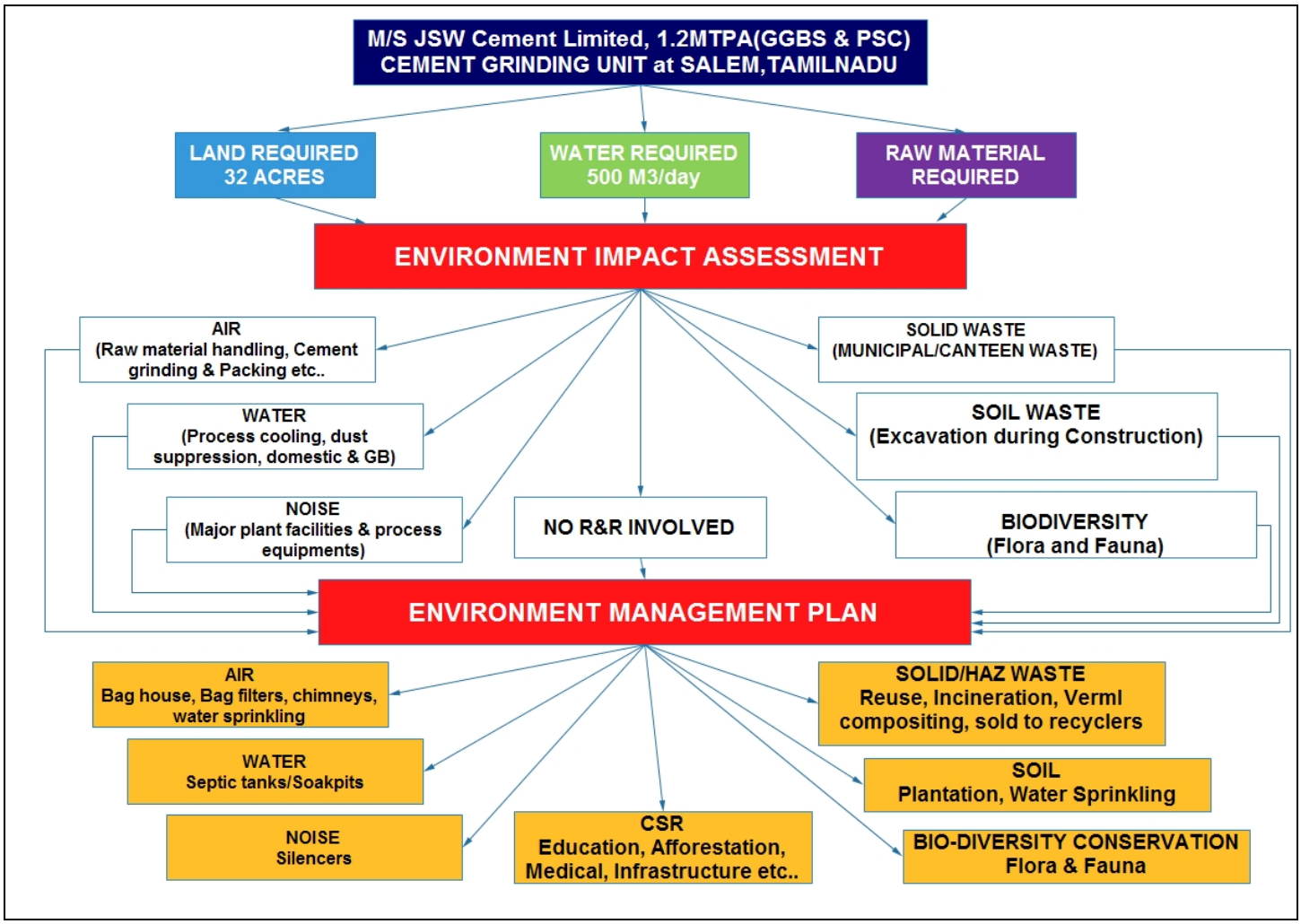
Measures proposed for control on Noise pollution:

1. Sound barriers/ walls to be provided wherever feasible
2. Compressors will be installed within enclosed rooms
3. Thick greenbelt around the plant acts as a natural sound barrier and prevents propagation of noise waves from spreading into external environment.
4. Regular preventive maintenance of plant and machinery by competent staff.
5. Regular noise level monitoring to determine where actions are needed.

3.12 Green Belt Development

33% of the total area equivalent to 10.65 acres will be developed into greenbelt in line with CPCB guidelines. Native species will be preferentially planted and polygamy plantation will be adopted.

Figure 3.5 Schematic Representations of the Feasibility Drawing relating to Information of EIA Purpose.



CHAPTER – 4

SITE ANALYSIS

4.1 General

JSW Cement proposes to install the 1.2 mtpa PSC and GGBS grinding unit at Pottaneri, M.Kalipatti Village, SalemDistrict, Tamil Nadu.

4.2 Connectivity

The site is well connected by road and rail. The project site is located about 35 km South-West of Salem city. Mettur town is located at 12 km in SW direction. NH 7 passing at 22 km away from plant site. The nearest railway station is Salem at a distance of 35 km and nearest airport is Bangalore at a distance of 200 km. The nearest seaport is at Nagapattinam is about 310 km from the project site.

The proposed cement grinding unit will be located within the premises of M/s JSW Steel Ltsd, Salem Works (JSWSL). Selection of the site for any project is the most important aspect for its successful operation & better economic viability. Proximity to Raw material source, assured supply of slag and other infrastructural support are required to be essentially examined while selecting the site of the plant. The following basic requirements are necessarily required to be fulfilled.

- Easy access to Raw Material such as Clinker, Gypsum etc.
- Availability of water
- Power supply
- Access to road and rail and sea route

The proposed site has the following preliminary advantages:

- The site is situated in Pottaneri, M.Kalipatti Village, Salem in the state of Tamil Nadu.
- Water is available from water intake well of M/s JSWSL with due permission from the concerned competent authorities
- The site is already well connected with Road as well as Rail. Thus the approach is excellent.
- Soil condition of the site is also favorable.

4.3 Land Form, Existing Land Use & Land ownership

The proposed project site is located within the existing facilities of JSW Steel works Salem and the proposed area is plain land. The land, approx. 32 acres, earmarked for cement grinding unit is neither vegetated nor having any buildings. Hence, site clearing activities like clearing the vegetation or demolition exiting building are not contemplated.

4.4 Topography

The site is mostly flat. However the surrounding area is undulated with hills and hillocks. The following reserve forests along with the directions with respect to project site are observed in 15 km surrounding area.

i. Vanavasi Reserve Forest in SW
ii. Gonur and Solappadi reserved forest in NW
iii. Parigam reserved forest in N
iv. Ramasamy reserved forest in NE
v. Elattur reserved forest in ENE

No environmentally sensitive area is located nearby. The Stanley reservoir is located in west direction. The important crops grown are paddy, groundnut, fodder, sugarcane, maize, cholam, ragi, cumbu, cotton, and turmeric. The main source of irrigation is from bore wells and dug wells.

4.5 Existing land use pattern

The site is located in the interior part of Salem district, which is spread from southwest to northeast and is situated on the eastern side of Tamilnadu state. The district is 11° 14' and 12°53' north latitude and 77° 44' and 78° 50' east longitude. This district is bounded by Dharmapuri district on the north, Erode district on the west, Namakal and Tiruchirapalli districts on the south, and Perambalur and Villupuram districts on the east and the proposed project site is not attracted by any other statutory act like CRZ. No national park, ecosensitive area are identified within 15 km radius study area.

4.6 Existing infrastructure

The site is well connected by road and rail. Presently the site is connected by a metal road. The site is located at about 26 km from NH-7 which is passing in eastern direction. The nearest railway station is Salem situated at about 35 km.

4.7 Climatic data from secondary sources

The district receives the rain under the influence of both southwest and northeast monsoons. The northeast monsoon chiefly contributes to the rainfall in the district.

Rainfall data from six stations over the period 1901-2003 were utilized and a perusal of the analysis shows that the normal annual rainfall over the district varies from about 800 mm to 1600 mm. It is the minimum around Sankari (800 mm) in the southwestern part of the district. It gradually increases

towards north, northeast and east and attains a maximum around Yercaud (1594.3 mm) in the northern part.

The district enjoys a tropical climate. The weather is pleasant during the period From November to January. Mornings in general are more humid than the afternoons, with the humidity exceeding 75% on an average. In the period June to November the afternoon humidity exceeds 60% on an average. In the rest of the year the afternoons are drier, the summer afternoons being the driest. The hot weather begins early in March, the highest temperature being reached in April and May. Weather cools down progressively from about the middle of June and by December, the mean daily maximum temperature drops to 30.2°C, while the mean daily minimum drops to 19.2°C and 19.6°C in January in Salem and Mettur Dam respectively.

Climatic data from secondary sources

- Annual rainfall – 1185.4 mm
- Temperature
    - Winter – 15.6^{0}C to 32.1^{0}C
    - Summer – 22.3^{0}C to 43^{0}C
    - Monsoon – 25.3^{0}C to 32.5^{0}C
    - Post monsoon – 19.3^{0}C to 32.4^{0}C

- Average wind speed – 6.4 km/hr
- Humidity
    - Winter – 46 to 78%
    - Summer – 47 to 74%
    - Monsoon – 68 to 84%
    - Post monsoon – 60 to 79%

  Source - IMD

CHAPTER – 05

PLANNING BRIEF

5.1 Planning Concept

JSW Cement proposes to install the 1.2 MTPA PSC and GGBS grinding unit at Pottaneri, M.Kalipatti Village, SalemDistrict, Tamil Nadu. The plant will be located within the premises of JSW Steel Limited, Salem works.

5.2 Population Projection

5.2 Population projection

Project will be creating considerable employment opportunities for local people during construction phase. During recruitment preference will be given to local as per employment guideline of the State. However, priority will be given to the nearby village people after testing their skills and abilities. The Villages falling in the study area of 10 km radius are shown in the **Table 5.1**.

Table 5.1

Villages falling within 10km radius of the project site

Sl. No.	Name of the Village
1.	Mecheri
2.	Karappatti
3.	Pudu Kuttappatti
4.	Kuttappatti
5.	Ervadi
6.	Palakkaranur
7.	Kanakkappatti
8.	Nangavalli
9.	Malamanur
10.	Kuvundanur
11.	Amarattanur
12.	Errappareddiyur
13.	Malaiyanur
14.	Kudiraikkaranur
15.	Mallamooppampatti
16.	Chinna Seeragapadi

Source: Census of India 2011

5.3 Land Use Planning

The proposed site is admeasuring about 32 acres. The proposed land use is as follows:

S. No.	Land Use	Area (Acres)	Area (%)
1.	Area required for Factory Godown/ Office Building, Roads and other open spaces.	21.35	66.7
2.	Garden/ Greenbelt	10.65	33.3
	Total	**32.0**	**100.0**

5.4 Amenities/ Facilities

The site is well connected by road and rail. Presently the site is connected by a metal road from NH-7. The site will be made physically isolated from the surroundings by rubble masonry wall on all sides. Other physical protection measures (security) have also been adopted for the site.

5.4.1 Water System

Source of Water

Total water required will be fulfilled by the water sourced for the existing plant of JSWSL from Kaveri River. Water will be taken from the above source under agreement with M/s JSWSL. with due permission from the concerned regulatory authorities.

Plant Water Requirement

Total fresh water requirement for the proposed Cement grinding unit is 500 m^3/hr.

Proposed water system

The average water requirement of the plant is estimated at 500 m^3/hr. The proposed water systems comprise of Cooling water system, drinking/sanitary water system, fire-fighting water system and the waste water systems (domestic affluent).

Fire Water System

The Cement plant will utilize the firewater hydrant system of M/s JSWSL to meet pressurized water demand in case of fire in the plant. The system has a dedicated fire water storage tank, one electric

motor driven pump, one diesel engine driven pump, two jockey pumps, firewater ring main, numbers of fire hydrants with hoses couplings and water spray nozzles.

Dust Suppression System

Water will be sprinkled at the raw material storage areas and on the unpaved roads around the storage areas.

Distribution System

The distribution system of make-up, drinking, fire-fighting and re-circulating water will be through pipelines of mild steel/GI welded/screwed construction, laid underground and duly protected against corrosion. In shops, the pipes will generally be taken overhead. Valves and other appurtenances will be provided on the pipelines system to facilitate control and proper distribution of water.

5.4.2 Instruments & Control

The requisite instruments and control as well as audiovisual alarms and safety interlocks will be provided for safe and efficient operation of the water system which will be complete with necessary sensing devices, transmitters, actuators, control valves, instrument panel, cablings, piping and other accessories.

5.4.3 Air Condition & Ventilation System

The equipments for the electrical and control rooms would require to be maintained in controlled atmospheric conditions to obtain the best performance from them. The Central Control Room, Load Centres & PLC rooms will have adequate number of air conditioners. The sub-station premises with power boards/ transformer rooms shall have wall mounted axial fans with louvers to maintain positive pressure inside. Power for HVAC system shall be derived from local PDBs. Natural ventilation by installation of roof monitors, inlet louvers etc are envisaged for production buildings.

5.4.4 Fire Protection

Fire Detection & Alarm System (FDA)

An FDA system shall be housed in Main Control Room with smoke detectors installed in substation, PLC room, etc. Portable CO2 fire extinguishers, sand buckets etc. shall be provided in Main Control Room.

Fire Hydrant System: The Firewater stored in the firewater reservoir will be pumped to the ring main. Fire hydrants will be provided at suitable locations for providing pressurized water, from the ring main, for fire fighting.

Fire Extinguishers of different types and sizes will be installed in various areas of plant as per the relevant Indian standards. The portable fire extinguishers will generally be of the types and sizes given in the following Table:

Table.5.2 Fire Extinguishers

Type of Extinguishers	**Location**
CO_2 Type	Fuel Oil Station
DCP Type	Control Room
Foam Type	Offices
Fire Buckets	Offices, Shop Floors

CHAPTER-6

PROPOSED INFRASTRUCTURE

6.1 Plant & Machinery

The following major plant and equipments will be installed for production of cement:

Table 6.1 Major Plant & Equipment

S. No.	Major Equipment	Nos.	Capacity
1.	Roller Press grinding mill	2	90 TPH
2.	Packers	2	240 TPH
3.	Cement Storage Silo	3	5000 MT
4.	Hot Air Generator	1	75000 Nm^3/h @600$^{\circ}C$
5.	Clinker Silo	1	10,000MT
6.	Stacker and Reclaimer, etc.,	1	1500 &500 TPH
7	Wagon Tippler	1	1500 TPH

6.2 Green Belt

33% of the total area equivalent to 10.65 acres will be developed into greenbelt in line with CPCB guidelines. Native species will be preferentially planted and polygamy plantation will be adopted.

Under plantation programme, green belt will be developed around the plant boundary. About 33% of the total land (10.65 acres) is proposed for green belt plantation during the initial five years. The species to be grown in the areas should be dust tolerant and fast growing species so that a permanent green belt is created.

The plants having following characteristics are chosen for plantation.

- Ability to tolerate and remove air pollutants.
- Ability to grow in the area.
- Rapid rate of growth.
- Evergreen habit
- Large crown volume
- Small leaves with smooth surface
- Should not have adverse effects on soil chemistry and ground water.

- Have aesthetic value.

All these traits are difficult to get in a single species. Therefore a combination of several species with all these traits is sought while planning a plantation. The plantation should be planted close to the source or close to the area to be protected to optimize attenuation within physical limits.

The areas that need special attention under plantation development are:

- Along plant boundary
- Along the side of roads
- Around offices and other buildings
- Stretches of open land at project site complex

The following species are having a better chance of survival in this region. Plantations are done at a spacing of 2 x 2 m. The expected rate of survival will be around 75%. The efforts to improve the survival of the saplings and their healthy growth will be taken up like watering, fencing, keeping watch and ward and seeking guidance from the local Forest Dept.

6.3 Connectivity

The site is well connected by road and rail. The project site is located about 35 km South-West of Salem city. Mettur town is located at 12 km in SW direction. NH 7 passing at 22 km away from plant site. The nearest railway station is Salem at a distance of 35 km and nearest airport is Bangalore at a distance of 200 km. The nearest seaport is at Nagapattinam is about 310 km from the project site.

6.4 Drinking Water & Sanitation facilities

Total fresh water requirement is 500 m3/day. The source of the raw water is down stream of river Cauvery. Water supply will be from the main supply line of about 16 km.

The workers at the plant during construction shall be provided with water for their requirement and for the construction activities. The construction labour will be provided with sufficient and suitable toilet facilities to allow proper standards of hygiene. These facilities would be connected to a septic tank and shall be maintained properly to have least environmental impact. Drinking water required for the workers will be met from exiting drinking water plant.

6.5 Sewerage System

A garland drain around the plant is envisaged to collect surface run-off during rainy season. Internal drainage system will be constructed to collect domestic and industrial effluent. A common basin will be constructed for the treatment of effluents the plant.

6.5.1 Run –off management

The rain water collected from the roof of buildings will be channelized through drains around the buildings and will be recharged into the ground by providing recharging pits. Overflow, if any, will be discharged to the nearby plant drainage. Also one rain water collection pond has been considered in the layout. All the plant storm water drains will be routed to the rain water collection pond and overflow, if any, from the pond will be discharged to any existing natural outfall outside the plant area. The rain water collection pond will be unlined.

A Rain Water Harvesting Pond has been contemplated to act as collection basin for rainwater. The collected water will be 100% reused in the raw water reservoir in dry season. The pond will be located at the lowest area of the plant so that it can effectively collect all the rainwater by gravity. The Tank shall be earthen. The pond will be lined at the bottom and sides with two layers of HDPE lining of appropriate thickness to prevent percolation of the harvested rainwater in to the ground. Figure below depicts schematically the proposed rainwater harvesting scheme for the proposed plant. The Rain Water Harvesting Pond is depicted below:

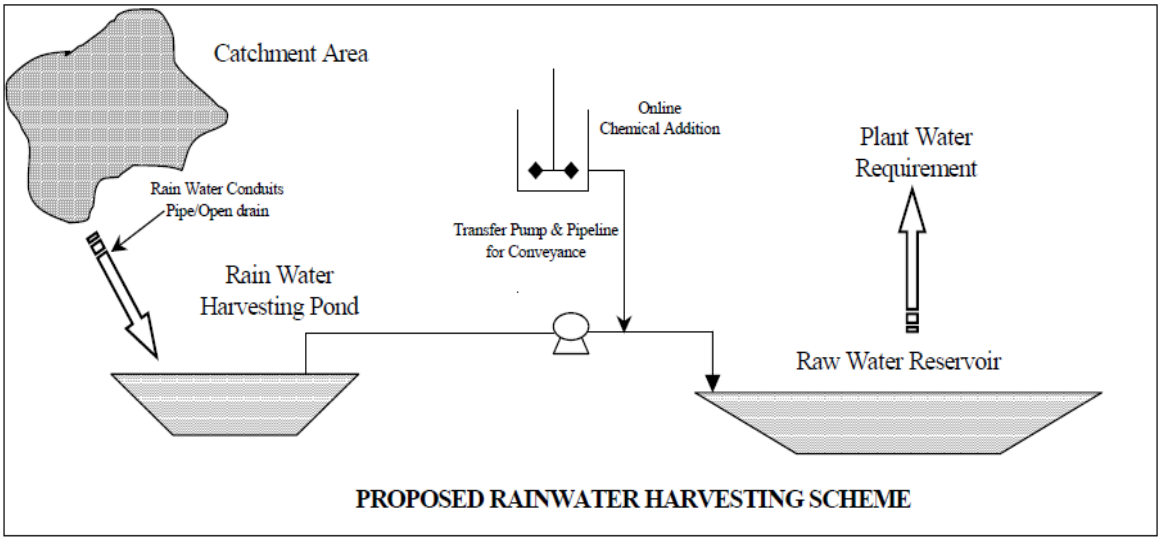


Figure 6.1 Proposed Rainwater Harvesting Scheme

Garland drain will be provided around raw material stock pile area. The run-off collected from these areas will be treated in adequate settling pond and will be taken to rain water harvesting pond.

Suitable pump house will be installed adjacent to the rain water collection pond so that the settled water from the collection pond can be pumped and supplied to the plant for meeting some of the daily requirement.

CHAPTER - 07

REHABILITATION AND RESETTLEMENT (R & R) PLAN

No rehabilitation or resettlement plan is proposed as the proposed cement grinding unit will be located within the existing plant premises of M/s JSWSL situated within the notified industrial area.

CHAPTER- 08

PROJECT SCHEDULE & COST ESTIMATES

8.1 Project Schedule

Any one or combination of any the following alternate modes of project execution will be adopted;

- Turnkey
- Semi Turnkey
- Packaged procurement mode

8.1.1 Planning of Activities

Careful planning of all the activities is one of the pre-requisite for timely completion of the project. The following activities will be given special attention:

8.1.2 Pre Project Activities

- Management approvals
- Selection of location
- Land acquisitions
- Statutory Clearances
- Financial Approvals and Tie ups
- Selection of Consultants
- Conceptual Design
- Preparation of main machinery tender
- Evaluation of tenders

8.1.3 Project Activities (Implementation Stage)

- Firm up basic design
- Main machinery order placement
- Detailed engineering of the project
- Statutory approval of Building plans
- Preparation of Tender, Evaluation of tenders received and order placement for balance machinery
- Completion of procurement activities on time
- Release of civil drawing for civil construction
- Civil construction
- Supply of mechanical & electrical equipment
- Inspection of major machinery at suppliers works
- Erection of all plant & machinery
- Commissioning of the plant

8.1.4 Project Schedule

An implementation schedule of 14 months from the date of receipt of Environmental clearance from the State Level Environment Impact Assessment Authority & Odisha State Pollution Control Board.

8.1.5 Strategies for Timely Execution of the Project

The following strategies would be adopted for smooth functioning as well as timely execution of the project:

- The task of implementing the project in time shall be achieved by ensuring a well coordinated project implementation task force in-house and from external agencies.
- A well chosen team of experienced personnel for project execution shall coordinate the implementation of the project from in-house.
- Experienced engineering consultants with proven track records shall be selected for detailed engineering of the project.
- Reputed and experienced contractors with adequate resources of finance, men, material and tools and tackles will be engaged for execution of the construction and erection work.
- Effective project monitoring including project planning schedule and monitoring shall be employed in this project. Timely execution and resources will be monitored using computer based

project monitoring tools. In case of deviations in project progress, suitable corrective actions will be implemented.

- The schedule may vary depending on the supply of material and other external factors.

8.2 Project Cost

An indicative capital cost of the proposed Plant is Rs. 350 Crore including pre-operative expenses, contingency and interest during construction.

A broad break-up of the indicative estimate of the Project capital cost is provided below:

Table 8.1 Project Cost

Sl. No.	Particulars	Amount (Rs. Lakhs)
1	Raw Material handling system including Dump Hoppers, Bag Filter ,Belt Conveyor, Tipper Conveyor, Clinker Storage Silo etc.	4395
2	Day Bins including Weigh Feeders, SFMs, Belt Conveyor, Bag Filter, Gates etc.	1684
3	Roller Press Complete Package	5250
4	Cement Storage System including Bucket Elevators, Air Slide systems, Storage Silos etc.	1159
5	Packing Plant including Bucket Elevator, Root Blowers, Air Slides, Blowers etc.,	957
6	Wagon Tippler Complete	2000
7	Electrical Items	4039
8	Civil & Structural	14309
9	Railway Line with Engine escape	1200
	Grand Total	**34993**

Table 8.2 Summary and cost estimates of Pollution Control Equipment: (It is included in the above Total Project cost)

S. No.	Particulars	Estimated cost in Rs. Lac	Recurring cost in Rs. Lac/Annum
1	Air pollution control	1027.5	38.14
2	Water Pollution & Reclamation	50.0	2.95
3	Occupational Health	9.0	4.5
4	Environmental Management	63.5	25.4
5	Green Belt Management	100.0	10.56
	TOTAL	**1250.00**	**81.55**

CHAPTER- 09

ANALYSIS OF PROPOSAL

9.1 Financial and Social Benefits

9.1.1 Socio-economic benefits of the proposed project:

As JSW strongly believes that it is a part of the larger community where it operates, the company has taken cognizance of the cultural ethos and socio economic environment of the locality where its plants are located. With this approach, JSW shall consider the following general measures for the socio – economic upliftment / welfare of the nearby villages:

- Local infrastructure development
- Social afforestation
- Extending support to games, sports and culture to local community
- Health and medical facilities
- Social awareness program will further improve the quality of life and standard of living such as sanitation and hygiene, HIV Prevention Program etc.
- Implementation of adult education and female education program in the villages surrounding the project area.
- Financial assistance to talented and poor students for higher studies. (Management /Engineering / Medical studies etc.)

9.1.2 Employment

It is estimated that the total requirement of manpower for the proposed cement grinding unit will be approx. 185.

Breakup and requirement of manpower during construction and operation phase of the plant will be as under:

Table 9.1 Phasewise Manpower Requirement

a) During construction phase:

S. No.	Type of manpower	No's
1.	Technical & Administrative	20
2.	Skilled	20
3.	Unskilled	35
	Total	**75**

b) During Operational phase:

S. No.	Type of manpower	No's
1.	Technical & Administrative	35
2.	Skilled	115
3.	Unskilled	35
	Total	**185**

9.2 Other Benefits

- Development of the local area in terms of an enlarged market.
- Besides above, indirect benefits shall also occur to the region by way of increase in industrial production.