

**Environment Impact Assessment Report
for
setting up of Cement Grinding Unit (0.95 MTPA)
at
Auj (Aherwadi), near Solapur**

Executive Summary

Project Proponent

Zuari Cement Limited,
No. 1, 10th Main, Jeevanbhima Nagar,
Bangalore – 560075.

Prepared by

**M/s Environmental System Consultants & Ambient Lab Solutions
Private Limited, Chennai - 600078.**

Summary of Environmental Impact Assessment Report

1.0 Project Description

1.1 Project Proponent

M/s. Zuari Cement Ltd. (ZCL) is part of the Italcementi Group, the fifth largest cement producer in the world and the biggest in the Mediterranean Region. The Group companies combine the expertise, knowhow and cultures of 21 countries in 4 Continents, boasting an industrial network of 55 cement plants, 10 grinding centers, 8 terminals, 491 concrete batching units and 91 aggregates quarries. In 2011, Italcementi Group had sales amounting to over 4.7 billion Euros and a capacity of 74 million tonnes.

Italcementi Group has entered the Indian market in January 2001, through the acquisition of Yerraguntla Cement Plant, located in the southern part of Andhra Pradesh State. In January 2002, ZCL has taken over another Cement Company, Sri Vishnu Cement Ltd. (SVCL) located at Sitapuram near Hyderabad. A captive power plant with a capacity of 43 MW is already in operation at Sitapuram Works.

The existing production of ZCL Cement Plants are :

- ❖ Yerraguntla in Kadapa District, Andhra Pradesh - 4.70 million tons per Annum (MTPA) clinker & 3.80 MTPA cement (on expansion).
- ❖ Sitapuram in Nalgonda District, Andhra Pradesh - 1.10 MTPA clinker & 1.50 MTPA cement (proposed to expand for 3.00 MTPA clinker & 4.50 MTPA cement).
- ❖ Chennai Grinding Unit, Tamil Nadu – 1.0 MTPA cement.

Zuari Cement is marketed under the brand name 'Zuari Cement' in Andhra Pradesh, Tamil Nadu, Pondicherry, Karnataka, Kerala, Orissa and Goa through a wide network of dealers. Zuari Cement is on a leadership position in the South India market. With over 5% market share in the South Indian cement market and sales of about Euro 220 million in 2011, ZCL has chalked out ambitious plans for the future. This includes strengthening its presence in the Maharashtra, Orissa and West Bengal markets. While technology is just one of its strengths, there are many other factors that contribute equally to ZCL's success.

The contact details of the ZCL are:

The Deputy General Manager – Projects / The Deputy General Manager – Civil /
The Vice President (Projects),
Zuari Cement Ltd.,
No. 1, 10th Main, Jeevan Bhima Nagar,
Bengaluru - 560 075.
Ph: 080 - 4119 4408
Fax: 080 - 4030 2887
Email: R.NAGESH@zcltd.com / S.DILIP@zcltd.com / S.SUNDARAM@zcltd.com

1.2 Need for the Project

Maharashtra is the largest cement consumer in India which account for around 11% of the total pan-India cement consumption in 2010-11. The Compound Annual Growth Rate (CAGR) of GSDP of 9% is shown for the cement consumption in the Western Region of the Country which includes major consumption centres as Maharashtra and Gujarat. The market potential is further 50% more than the current demand & supply. Also the new capacity addition in 2010-11 is indicated as about 1.0 million tons only which further indicates a scope of shortage of cement capacity in the Region.

India's largest Power Company NTPC is setting up a Thermal Power Plant of 1320 MW capacity near Hotgi in Solapur District. The Power Plant will produce about 5,500 TPD Fly Ash which will be utilised by the Solapur Cement Grinding Unit (which requires about 900 TPD Fly Ash).

Thus, in tune with the Govt. of India Policy of encouraging Cement Grinding Units near the raw material sources and marketing centers, ZCL has proposed the Solapur Cement Grinding Unit.

1.3 Project Profile

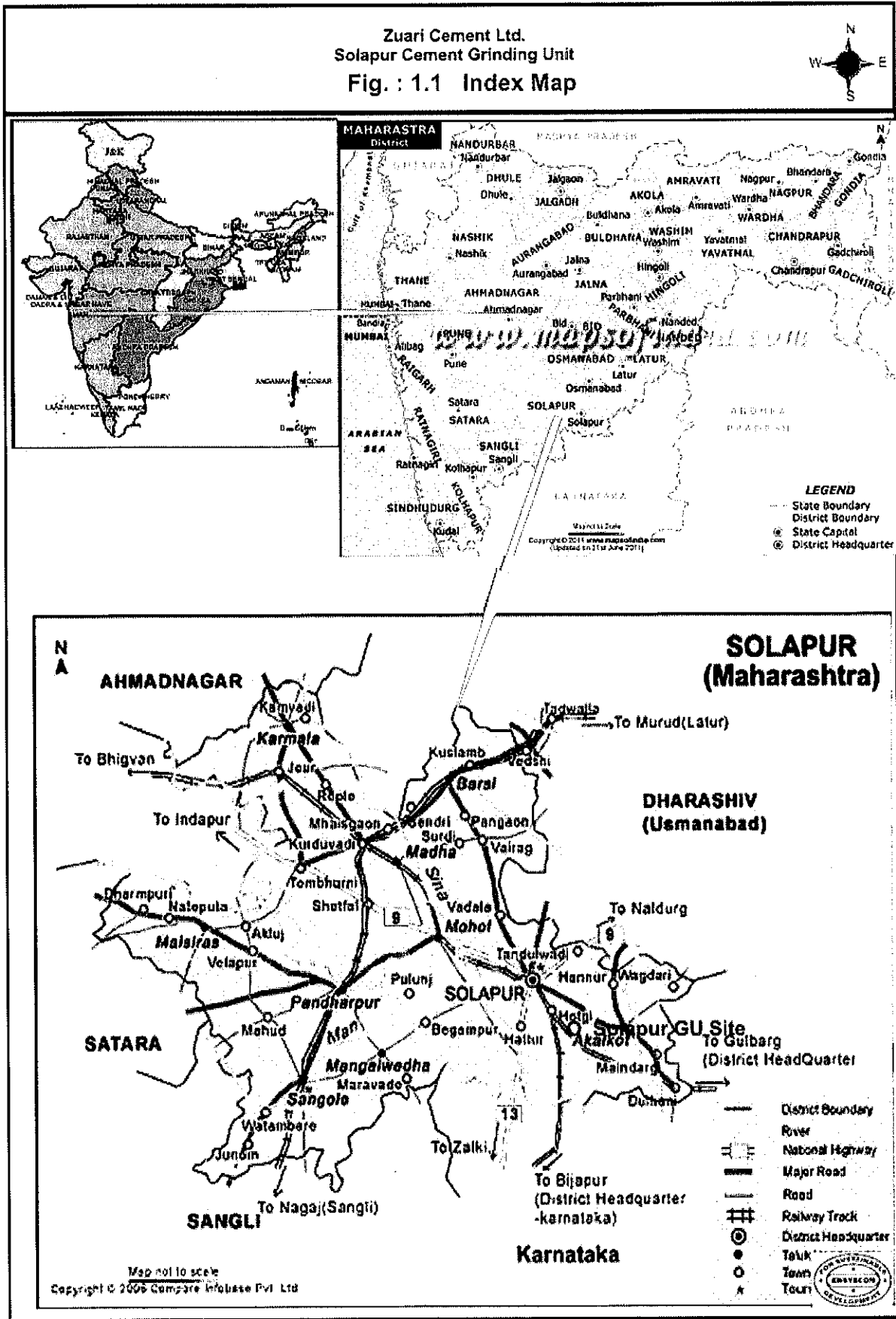
ZCL has identified a site with an extent of 50.54 Ha in SF Nos. 37-38, 51-52, 101-108, 134-139, 141-142, 144, parts in Auj village, SF nos. 139-140 parts in Shingadgaon village (near Hotgi) of South Solapur Taluka, Solapur District in Maharashtra State (Fig. 1.1) for setting up the 0.95 MTPA Cement Grinding Unit. The proposed site is at about 21 km in southeast from Solapur Town.

Cement Grinding is the final stage of the cement production known as Finish Milling. The Clinker is ground with other materials (which impart special characteristics to the finished product) into a fine powder. Up to 5% gypsum and/or natural anhydrite are added to regulate the setting time of the cement.

It is proposed to grind and produce Ordinary Portland Cement OPC or Portland Pozolana Cement (PPC) or Portland Pozolana Slag Cement (PSC) of 0.95 million tons per Annum (MTPA) @ 3,000 Tons per day (TPD) or 79200 Tons per Month (TPM) from this Grinding Unit. OPC cement is produced by grinding 95% clinker and 5% gypsum, PPC is produced by grinding 65% clinker, 5% gypsum and 30% fly ash and PSC cement is produced by grinding 45% clinker, 5% gypsum and 50% slag in the Cement Mill. The raw materials requirement is as follows:

Material	Requirement, MTPA		
	OPC	PPC	PSC
Clinker	0.95	0.65	0.45
Gypsum	0.05	0.05	0.05
Fly Ash	-	0.30	-
Slag	-	-	0.50

Clinker from ZCL Cement Plants will be brought to the Grinding unit by covered railway wagons and unloaded with the help of wagon tippler and stored in a Clinker silo. Fly ash from nearby Thermal Power Stations will be received in completely enclosed Bowsers and pneumatically pumped to the fly ash silo.

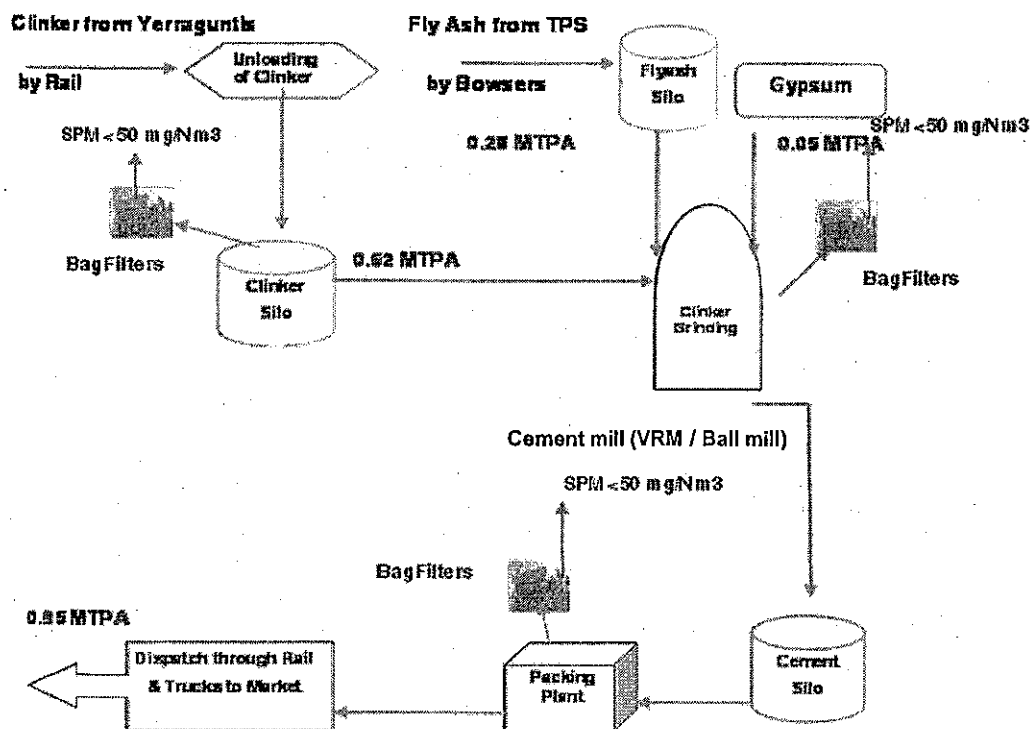


The gypsum will be received in covered trucks and stored in a closed shed. Slag will be received from Steel Plants by railway wagons, unloaded and stored in a closed shed.

Clinker is extracted from clinker silo and stored in Mill feed hoppers by means of Belt conveyor. Gypsum is also brought to mill feed hoppers by means of Belt conveyor. Clinker, along with additives, is ground in a Cement (grinding) mill. It is proposed to install a Horizontal / Vertical Grinding Mill which has rollers and will crush the clinker & other raw materials together to produce the final cement product i.e. OPC/PPC/PSC.

The finished product is transferred to Cement storage Silos using bucket elevators and airslides. The cement will be extracted from the silos through an extraction system and metering devices. The extracted cement will be conveyed to the Packing Machine through Bucket Elevator. 4 nos. Rotary Packer of 240 Tons per hour each are proposed and the cement will be loaded into the Wagons/Trucks through belt conveyors and loading stations in bulk or in 50 kg multiwalled paper / HDPE bags. Then, it is transported to the marketing centres in the Western Region.

Flow Chart OPC / PPC (0.95 MTPA)



All point sources and material transfer points are provided with Bag Filters to control SPM emission $< 50 \text{ mg/Nm}^3$. The proven emission level of bag Filters is $< 50 \text{ mg/Nm}^3$. The dust collected from the Bag Filters will be recycled in the PPC Cement manufacturing process.

Emphasis has been given for an optimum Layout. The total built-up area will be about $80,000 \text{ m}^2$. No Township is proposed. An effective Green Belt will be developed in 33% of total area.

Soil Quality To assess the soil quality 5 monitoring stations were identified. The pH of the samples collected in the study area, were found in neutral range. Electrical Conductivity of the samples were ranging from 0.98-1.72 mmhos/cm. NPK values were found to be present in significant concentrations. Organic content was monitored in the range 0.64-0.96%. The soil texture was silty loam in nature. There was no heavy metals intrusion/leaching into the ground strata. In general, the soil in the study area would support vegetation if modified suitably.

The findings of baseline environmental status of the study area are summarized below :

- ❖ The collected meteorological data during this season represented the local weather phenomena.
- ❖ The monitored ambient air quality in the study area was found to be in compliance with the revised National Ambient Air Quality (NAAQ) Norms for Industrial, Residential, Rural and other areas.
- ❖ Ambient equivalent noise levels (Leq) during day and night times were found to be well within the MoEF Norms.
- ❖ The water quality of surface waters were found to be in compliance with IS/CPCB norms except for Total Coliforms.
- ❖ The ground water quality was found to be in compliance with the IS:10500 Norms.
- ❖ The soil in the study area would very well support vegetation after amending it suitably.
- ❖ There is no Wild Life Sanctuary or National Park or Biosphere or Hotspots within the study area of 10 km radius.
- ❖ Domesticated animals and common fauna only exist in the study area.
- ❖ The area is thinly populated.
- ❖ The basic amenities exist at all villages.

Thus, there is **adequate buffer** for the proposed Project in the physical, biological and edaphic environments of the study area.

3.0 Anticipated Environmental Impact and Mitigation Measures

The proposed Project would create impact on the environment in two distinct phases :

- ❖ Construction Phase which may be regarded as temporary and short term &
- ❖ Operation Phase which would have long term effects.

3.1 Impacts during Construction Phase

Land Use : There is no rehabilitation and resettlement involved in the project. Apart from the change in land use pattern within the site area, there will not be any adverse impact on the surrounding land use during the construction period. Also, the construction activities will not result in any adverse impact on the surrounding areas.

Transportation : In an average, 30-40 Truck loads/day (for transporting all construction materials) will be visiting the site in a day during the construction period and will not having any impact to the existing traffic volume of 1057 vehicles/day plying in the area.

1.3 EIA Study

As per Environmental Impact Assessment Notification 2006 [SO 1533 (E) dated 14.09.2006], all the Stand Alone Grinding Units have been kept at Sl. No. 3 (b) under Category 'B' for the Environmental Clearance from the State EIA Authority with applicability of General Conditions. The Ministry of Environment and Forests (MoEF) is considering the Stand Alone Cement Grinding Unit of <1 MTPA capacity as Category 'B2' Project with out Public Consultation & Public Hearing with EIA-EMP.

ZCL has entrusted the EIA Study on M/s. Environmental System Consultants & Ambiente Lab Solutions Private Limited, Chennai. The EIA Consultant has been provisionally accredited for the Sectors 1 (Mining), 9 (Cement Plants) and 31 (Industrial Estates/SEZs) – Category 'A' by the National Accreditation Board for Education & Training (NABET), Quality Council of India vide its Letter NABET/EIA/03/12/012 dated 30.03.2012 (Sl. No. 52 in the List of Consultants with Provisional Accreditation).

The EIA Report has been prepared as per Appendix III of EIA Notification 2006 and also covering the applicable Terms of References devised by MoEF for Cement Plant Projects.

2.0 Description of the Environment

2.1 Environmental Setting

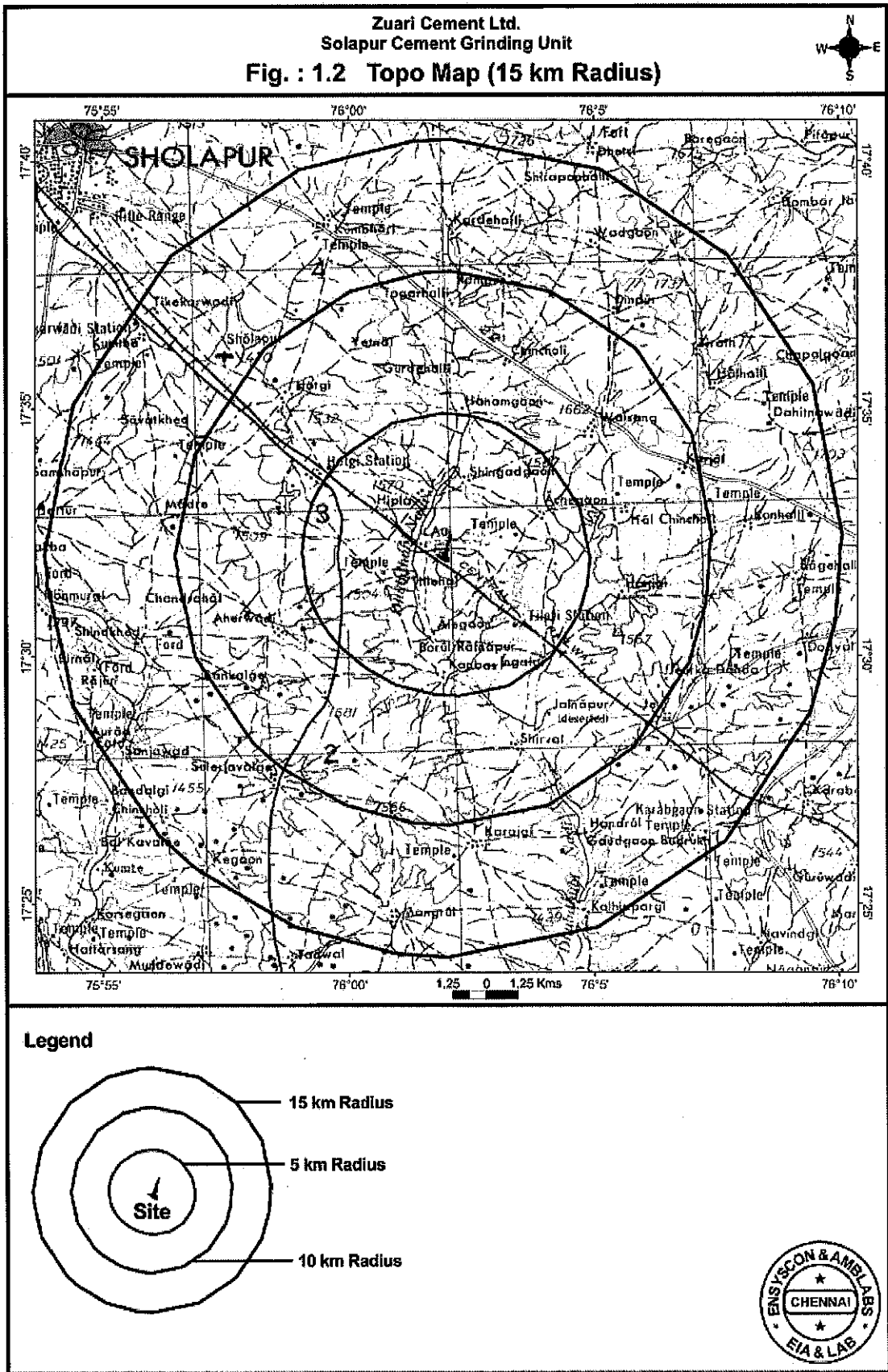
The Project Site falls in Survey of India Topo Sheet No. 56 C/2 (Fig. 2.1) bounded by the following co-ordinates :

Site Corner	North Latitude	East Longitude
Northeast	17°32'28"	76°02'04"
Southeast	17°31'56"	76°02'00"
Southwest	17°32'04"	76°01'47"
Northwest	17°32'29"	76°02'03"

No forest land is involved for the proposal. No Rehabilitation/Resettlement is also envisaged. There is no litigation/pending case against the proposal.

There are no eco sensitive areas like National Parks, Wildlife Sanctuaries, Biosphere Reserves, Reserved Forests, Elephant Corridor, Mangroves, Archaeological/Historical Monuments, Heritage sites, etc. within 10 km from the proposed site boundary. Environmental Setting of the Project Site is given as Fig. 2.1. Maldhok Sanctuary is located at a distance of 35 km in the northwest from the site. The nearest State Boundary (with Karnataka) is at 20 km in south and east.

The site is located in the southeast of the district headquarters Solapur at a distance of 18 km (arial) and 21 km by road. It is well connected by road from Solapur by the Major District Road (MDR) – 39 connecting Solapur and Gulbarga in the south adjacent to the site. National Highway – 9 connecting Hyderabad-Pune passes through Solapur. The State Highway – 151 (Akkalkot-Solapur Section) passes through the study area at a distance of 7.5 km in the north. The Central Railway BG Line connecting Mumbai-Chennai via ZCL Yerraguntla Plant runs near the site at a distance of 0.5 km in the south. Pune is the nearest Airport at a distance of 250 km in the northwest. Nearest Port is at Mumbai.



Auj Aherwadi village is the nearest settlement with a population of 1205 (with 633 males and 572 females) at a distance of 0.6 km in the west. Solapur Town is with a population of 8,72,478 as per 2001 Census. Grasim Hotgi Cement Grinding Unit (5.0 km in northwest) and Sri Siddheswar Sugar & Distillery Plant, Solapur (17 km in northwest) are the major industries in the Region. NTPC Thermal Power Project is coming up near Hotgi.

2.2 Baseline Environmental Status

Solapur is one of the urbanised district in the State having about one third population in urban areas. Agroclimatically, entire district comes under rain shadow area. The monsoon period is from second fortnight of June to end of September bringing rains from south-west monsoon. Due to scanty and nonuniform rains, scarcity conditions prevail in the district. An area of 296107 hectares is under irrigation in the district using various water sources.

The area lies in Seismic Zone III. The district in general has flat or undulating terrain. There is no important hill system in the district. Whole of the district is drained either by Bhima river or its tributaries. The soils of the district can broadly be classified into three types viz. black, coarse grey and reddish. Jawar, Bajra and Pulses are the main crops.

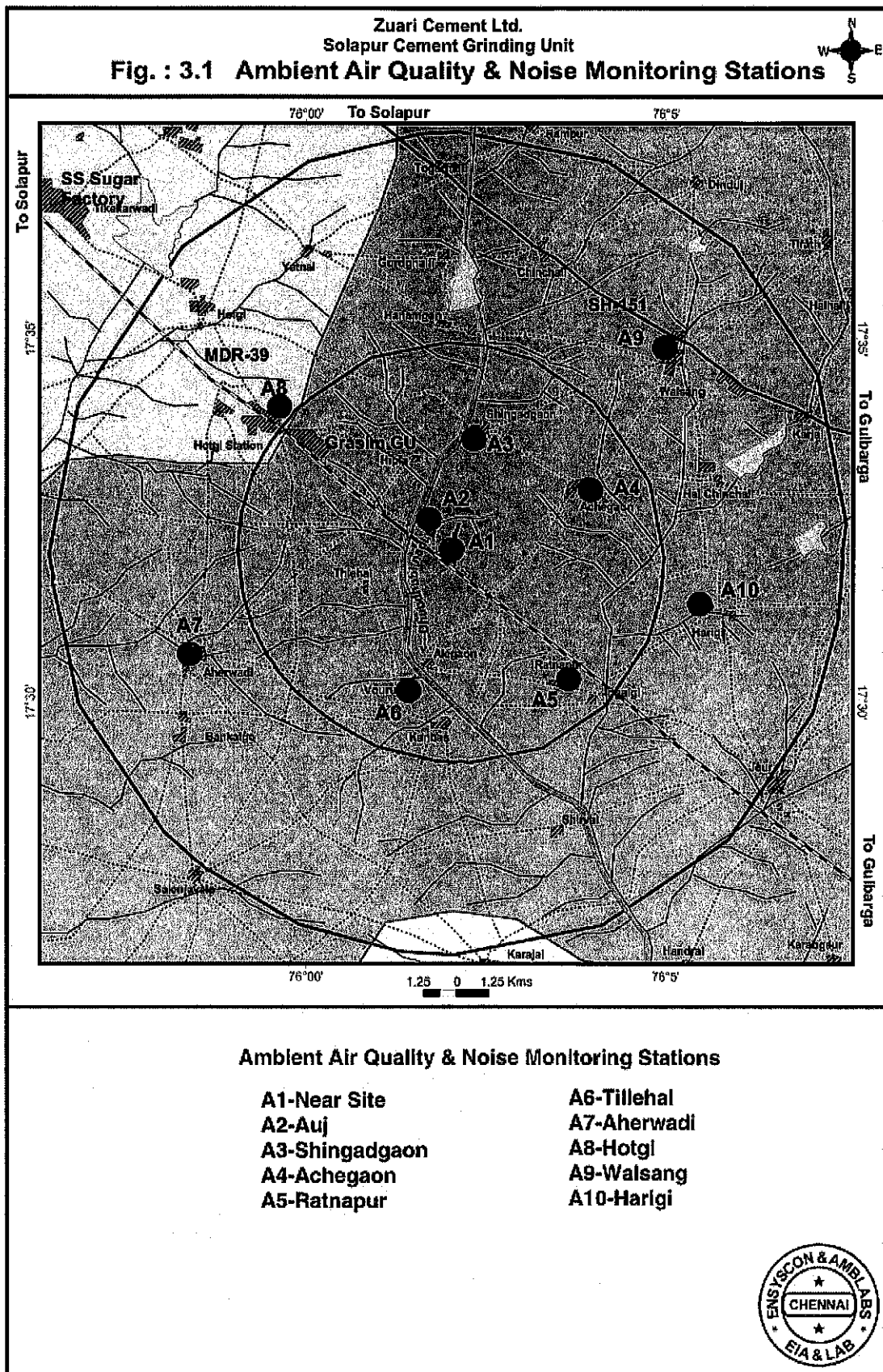
Solapur is famous as a textile town and is the home of Handloom and Powerloom weaving industry which provides employment to a large number of workers. Beedi industry is the second important industry. Grasim's Hotgi Cement Grinding Unit (5.0 km in northwest) and Sri Siddheswar Sugar & Distillery Plant, Solapur (17 km in northwest) are the major industries in the Region. NTPC is setting up a Thermal Power Plant of 1320 MW capacity near Hotgi.

The study area is thinly populated. The study area of 10 km radius (from boundary) (Fig. 3.1) has been considered for assessing the baseline environmental status. The Project Area does not fall in Critically Polluted Industrial Clusters listed by CPCB.

The elevation of the study area is in the range 420-540 m above mean sea level (aMSL). The site is located in the elevation range of 460-470 m aMSL. There is no marked riverine system in the study area. There are seasonal nallahs/streams like Harni Nadi, Palas Nadi, Adita Nadi, etc. in the study area which joins the Sina Nadi in the southeast. The seasonal Dhubdhubi Nallah drains the site area which flows at a distance of 1.3 km in the west. The nallahs are ephemeral in nature and run off is generated in heavy rainfall period only.

The baseline environmental monitoring was carried out during fair weather periods in March-April 2012 (Premonsoon Season). The services of M/s. Ekdant Enviro Services (P) Ltd., Chennai, an accredited Laboratory (T-1575 with validity upto 15.05.2013) by the National Accreditation Board for Testing and Calibration Laboratories (NABL), were utilised for the physic-chemical environment baseline monitoring.

Ambient Air Quality Status : The study area represents the Industrial, Residential, Rural and other Areas with respect to Revised National Ambient Air Quality (NAAQ) Norms stipulated by CPCB.



On the synthesized data of 240 values (224 values for PM2.5), the following observations are made :

- ❖ PM2.5 values were monitored in the range 10-34 $\mu\text{g}/\text{m}^3$ with the mean value of 18.9 $\mu\text{g}/\text{m}^3$ against the NAAQ Norm value of 60 $\mu\text{g}/\text{m}^3$.
- ❖ PM10 levels were ranging from 18 $\mu\text{g}/\text{m}^3$ to 63 $\mu\text{g}/\text{m}^3$ with the mean value of 35.8 $\mu\text{g}/\text{m}^3$ against the NAAQ Norm value of 100 $\mu\text{g}/\text{m}^3$.
- ❖ SO₂ levels were ranging from 6 $\mu\text{g}/\text{m}^3$ to 12 $\mu\text{g}/\text{m}^3$ with the mean value of 6.9 $\mu\text{g}/\text{m}^3$ against the NAAQ limit value of 80 $\mu\text{g}/\text{m}^3$.
- ❖ NO_x levels were ranging from 4 $\mu\text{g}/\text{m}^3$ to 14 $\mu\text{g}/\text{m}^3$ with a mean value of 7.3 $\mu\text{g}/\text{m}^3$ against the NAAQ limit value of 80 $\mu\text{g}/\text{m}^3$.
- ❖ CO and HC levels were monitored below detectable limits viz.114.5 $\mu\text{g}/\text{m}^3$ and 65 $\mu\text{g}/\text{m}^3$ respectively.
- ❖ Particulate Lead was found to be below the respective detectable limit of 0.05 $\mu\text{g}/\text{m}^3$.

While comparing with the National Ambient Air Quality (NAAQ) Standards revised as per GSR 826(E) dated 16.11.2009, all monitored PM2.5, PM10, SO₂, NO_x, CO and Particulate Pb values were found to be well within the respective limit values for 24-hourly periods.

Table : 3.1 Ambient Air Quality Status

No. of Locations : 10

Sl. No.	Parameter	Pollutant Concentration, $\mu\text{g}/\text{m}^3$			
		PM2.5	PM10	SO ₂	NO _x
1	No. of Observations	224	240	240	240
2	Minimum	10	18	6	4
3	10 th Percentile Value	13	25	6	5
4	20 th Percentile Value	15	28	6	5
5	30 th Percentile Value	16	30	6	6
6	40 th Percentile Value	17	32	6	6
7	50 th Percentile Value	18	35	6	7
8	60 th Percentile Value	20	38	7	8
9	70 th Percentile Value	21	41	7	9
10	80 th Percentile Value	23	44	8	9
11	90 th Percentile Value	25	48	9	11
12	95 th Percentile Value	26	51	9	12
13	98 th Percentile Value	29	56	10	13
14	Maximum	34	63	12	14
15	Arithmetic Mean	18.9	35.8	6.9	7.3
16	Geometric Mean	20.7	38.6	6.8	6.9
17	Standard Deviation	4.6	9.1	1.3	2.4
18	NAAQ Norms*	60	100	80	80
19	% Values exceeding NAAQ Norms	0	0	0	0

Legend : PM2.5-Particulate Matter size less than 2.5 μm ; PM10-Respirable Particulate Matter size less than 10 μm ; SO₂-Sulphur dioxide & NO_x-Oxides of Nitrogen.

Carbon monoxide, Hydro carbons and Particulate Lead levels were monitored below detectable limits viz.114.5 $\mu\text{g}/\text{m}^3$, 65 $\mu\text{g}/\text{m}^3$ and 0.05 $\mu\text{g}/\text{m}^3$ respectively.

* : NAAQ Norms-National Ambient Air Quality Norms-Revised as per GSR 826(E) dated 16.11.2009 for Industrial, Residential, Rural and other Areas.

National Ambient Air Quality Standard : The levels of air quality with an adequate margin of safety, to protect the public health, vegetation and property. Whenever and wherever two consecutive values exceed the limit specified above for the respective category, it would be considered adequate reason to institute regular/continuous monitoring and further investigations.

1. 24-hly./8-hly. values should be met 98% of the time in a year; however, 2% of the time it may exceed but not on two consecutive days.
2. Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24-hourly at uniform interval.

Noise Levels : The study area represents rural and residential areas in comparing with the MoEF Ambient Noise Norms. The findings of Noise Survey are summarised below:

- ❖ Ambient noise levels were ranging from 30.6 dB(A) to 97.9 dB(A) during day times and from 30.1 dB(A) to 94.4 dB(A) during night times on the monitoring days.
- ❖ The Leq (day) and Leq (night) values were found to be 40.6 dB(A) and 38.5 dB(A) respectively.

While comparing with the MoEF Ambient Noise Norms of for respective categories, the day and night time Leq values were found to be well within the limits.

Table: 3.2 Ambient Noise Statuses

Sl. No.	Monitoring Location	Representing Area	Noise Levels, dB(A)					
			Day Time (06:00-22:00 hrs.)			Night Time (22:00-06:00 hrs.)		
			Lmin.	Lmax.	Leq	Lmin.	Lmax.	Leq
1	A1-Site	Residential	32.4	80.2	40.0	30.8	75.9	38.2
2	A2-Auj	Residential	33.2	93.7	41.6	31.9	88.3	39.1
3	A3-Shingdgaon	Residential	32.0	80.6	39.8	30.7	80.5	38.0
4	A4-Achegaon	Residential	32.1	90.3	40.1	31.6	84.7	38.7
5	A5-Ratnapur	Residential	31.7	84.9	39.2	30.1	80.4	37.5
6	A6-Tillehal	Residential	31.5	84.3	40.2	30.2	81.2	38.0
7	A7-Aherwadi	Residential	31.6	85.6	40.3	30.1	81.4	37.8
8	A8-Hotgi	Residential	34.0	95.1	41.8	32.1	90.8	39.7
9	A9-Walsang	Residential	33.6	97.9	42.3	31.4	94.4	39.9
10	A10-Harigi	Residential	30.6	88.2	40.3	30.1	80.6	38.4
Study Area			30.6	97.9	40.6	30.1	94.4	38.5
MoEF Norms* for Residential Areas			-	-	55	-	-	45

Legend : Lmin.-Minimum Level; Lmax.-Maximum Level & Leq-Equivalent Noise Level.

* : MoEF Norms-Ministry of Environment and Forests' Ambient Noise Norms (Leq) for Residential Area; Day time is reckoned in between 6 a.m and 10 p.m. and Night time is reckoned in between 10 p.m. and 6 a.m.

Note : A warning limit value of **85 dB(A)** may be set as the level below which very little risk to unprotected ear of earring impairment exists for 8-hour exposure.

Water Quality : To assess the water quality, 8 surface water and 8 ground water locations were identified. The following observations are made based on the analytical data :

- ❖ Surface Waters were monitored with agreeable colour, taste and odour. pH value was monitored in the neutral range. TDS value and Chloride values were found to be in the range of 390-540 mg/l and 108-154 mg/l respectively. DO content was found to ranging between 4.2-4.8 mg/l. Low BOD/COD levels were indicating the good quality surface water. The water quality was found to be in compliance with the IS:10500 Norms for Drinking Water Quality except Total Coliforms.
- ❖ Ground Waters were monitored with agreeable colour, taste and odour. pH value was monitored in the range 7.53-7.67. TDS values were ranging from 490 mg/l to 620 mg/l. Chloride values were ranging from 124 mg/l to 172 mg/l. Iron content was monitored in the low range. COD values were monitored in lower levels. There was no significant bacteriological contamination of these sources. In general, the ground water quality was found to be in compliance with IS:10500 Standards for Drinking Waters (in the absence of an alternate source).

Soil Quality To assess the soil quality 5 monitoring stations were identified. The pH of the samples collected in the study area, were found in neutral range. Electrical Conductivity of the samples were ranging from 0.98-1.72 mmhos/cm. NPK values were found to be present in significant concentrations. Organic content was monitored in the range 0.64-0.96%. The soil texture was silty loam in nature. There was no heavy metals intrusion/leaching into the ground strata. In general, the soil in the study area would support vegetation if modified suitably.

The findings of baseline environmental status of the study area are summarized below :

- ❖ The collected meteorological data during this season represented the local weather phenomena.
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- ❖ The water quality of surface waters were found to be in compliance with IS/CPCB norms except for Total Coliforms.
- ❖ The ground water quality was found to be in compliance with the IS:10500 Norms.
- ❖ The soil in the study area would very well support vegetation after amending it suitably.
- ❖ There is no Wild Life Sanctuary or National Park or Biosphere or Hotspots within the study area of 10 km radius.
- ❖ Domesticated animals and common fauna only exist in the study area.
- ❖ The area is thinly populated.
- ❖ The basic amenities exist at all villages.

Thus, there is **adequate buffer** for the proposed Project in the physical, biological and edaphic environments of the study area.

3.0 Anticipated Environmental Impact and Mitigation Measures

The proposed Project would create impact on the environment in two distinct phases :

- ❖ Construction Phase which may be regarded as temporary and short term &
- ❖ Operation Phase which would have long term effects.

3.1 Impacts during Construction Phase

Land Use : There is no rehabilitation and resettlement involved in the project. Apart from the change in land use pattern within the site area, there will not be any adverse impact on the surrounding land use during the construction period. Also, the construction activities will not result in any adverse impact on the surrounding areas.

Transportation : In an average, 3-5 Truck loads/day (for transporting all construction materials) will be visiting the site in a day during the construction period and will not having any impact to the existing traffic volume of 1057 vehicles/day plying in the area.

Facilities to Construction Labourers : About 50 persons / day (in an average) will be pooled from the local public for the construction. Thus, the provision of **sanitation facilities, fuel, rest room, etc. is not required.**

Ambient Air Quality : The main sources of emission during the construction period are the movement of construction materials and equipments at site and dust emitted during the construction related activities. However, the impact will be for short duration, confined locally and is expected to be negligible outside plant boundaries.

Noise Levels : There will be very less impact on the existing noise levels due to construction, traffic for loading and unloading, fabrication and handling of equipments and materials, etc. and confined locally.

Water Quality : The construction water requirement of about 10 KLD will be met from the existing dugwell at site. Impact on water quality during construction phase may be due to non-point discharges of solids and sewage generated from the construction workforce. As the work force will be distributed, the water requirements and wastewater generation during the construction period will be negligible.

Biological Environment : Project does not warrant any cutting of trees, clearing bushes, etc. It is barren land and requires minimum site preparatory works. Thus, there will not be any significant impact on the existing flora-fauna of the study area.

Thus, the overall impact on environment during construction phase due to the proposed Project would be short term and insignificant.

3.2 Impacts during Operation Phase

Traffic Intensity : Both raw & finished materials will be transported both by rail as well as road. There will be additional 68 trucks/day (2.8 Nos./hr) to the existing traffic volume due to the project. Adequate parking facilities to accommodate (these 68 trucks) is provided within the factory. These trucks will not be any parked outside the factory and there will not be any impact to the traffic network.

Table : 4.1 Traffic Impact

Material	Requirement, TPD			Source	Mode of Transport	No. of Trucks Trips/day
	OPC	PPC	PSC			
Clinker	2850	1950	1350	ZCL Cement Plants at Yerraguntla & Sitapuram (AP)	Covered Railway Wagons	-
Gypsum	150	150	150	Local Market	Covered Trucks (15 T)	10
Fly Ash	-	900	-	Solapur Power Plant (proposed) & Parli TPS, Maharashtra	Bowsers (40 T)	23
Slag	-	-	1500	Bellary (Steel Plants)	Railway Wagons	-
Cement	3000				70% by Rail 20% by 30 T Bowsers 10% by Covered Trucks (20 T)	35

Air Environment :The main pollutant expected from the Plant will be Particulate Matter, SPM. Pollutants SO₂ and NO_x emissions will not be in significant levels. The identified sources of dust are : Truck unloading, Clinker hopper, Clinker storage silo, Weigh feeders for Clinker, Gypsum and solid flow meter for flyash, Flyash storage silo, Clinker Grinding Mill, Cement Silos and Packing Machines. The emissions from these sources, other than Cement Mill, would be fugitive in nature and the proposed Bag Filters would be adequate to control SPM emission <50 mg/Nm³.

The Filter Bags are with specific weight of 600 g/m² instead of regular 550 g/m² to improve the filtering efficiency. Holes in the tube sheets will be made with laser technology for exact fitment of filter bags to avoid ingress of dust to the atmosphere through the gap between tube sheet and bags. The proven emission level of this type of Bag Filters is <50 mg/Nm³. The dust collected from the various pollution control equipments like Bag Filters will be recycled in the Cement manufacturing process.

Bag Filters Specifications

Designed Air Cloth Ratio, m ³ /min/m ²	1.0-1.35
Bag Size	1600 mm dia x 3660 mm length
DP across the Bag Filter	125 mm of wg
Efficiency (Guaranteed) :	99.98%
Outlet SPM emission	<50 mg/NM³

DG Emissions : The Unit will provide the stack of 15.0 m height for the standby DG Sets which will be adequate to control the fugitive emissions from it. The stack height for DG sets are calculated using the formula : $H = h + 0.2\sqrt{KVA}$ where H is the height of the stack from ground level in m and h is the height of the roof in m.

Stack Emissions : The stack characteristics of main stacks are furnished below :

Table : 4.2 Stack Characteristics

Stack Attached To	Stack Height, m	Stack Dia., m	Stack Temp., °C	Exit Velocity, m/s	Discharge, Nm ³ /hr.	SPM Conc., mg/Nm ³	SPM Emission Rate, g/sec
Cement Mill Bag Filter	46.5	1.00	100	15	33000	<50	0.204
Packing Plant	37.5	0.75	30	7	11000	<50	0.097

Prediction Modelling : Industrial Source Complex Short Term (ISCST3) model by USEPA was used for carrying out the prediction of maximum concentration, the direction and the distance of its occurrence from the project site. PM₁₀ value is computed from the resultant SPM values (@10% of SPM) and compared with the revised NAAQ Norms for Industrial, Residential, Rural and other Areas. PM_{2.5} value would be very low for the prediction modelling and thus excluded for the modelling.

Table : 4.1 Predicted GLCs

Sl. No.	Pollutant	Background Concentration (24-hly.), ug/m ³	Maximum Predicted Ground Level Concentration, ug/m ³	Distance from the Plant, km	Total Concentration, ug/m ³	NAAQ Norms, ug/m ³	Buffer Available in the Atmosphere, %
1	PM10	35.8	0.59	2	36.39	100	63.61

Note : 1. Background concentration is the existing levels in the study area. 2. NAAQ Norms-National Ambient Air Quality Norm (24/8 hly.) stipulated by CPCB for Industrial, Residential and Rural Areas.

The predicted impact was found to be confined locally. While comparing the NAAQ Norms, there is no significant increase in the ambient PM10 levels due to the Project and adequate buffer exists in the study area for the operation of the Plant.

Noise Environment : The noise level within the plant building at a distance of one meter from the source shall be maintained at less than 85 db(A). Noise level at the nearest plant boundary is expected to be about <55 dB(A) during day times and <45 dB(A) during night times. Thus, the noise levels will be well within the permissible limit for residential areas and as such no impact is envisaged.

Water Environment : As this is only a clinker grinding unit, water is mainly required for equipment cooling, domestic consumption and green belt.

Water demand for	Total Water Demand, KLD
Equipment Cooling	60
Domestic Use	10
Dust Suppression	5
Green Belt	25
Total	100

Thus, total water demand would be 100 KLD. The required water will be tapped from nearby Hotgi Reservoir on obtaining State Authorities permission. Alternatively, Ground Water will be tapped. There is no wastewater generation from the Process. Domestic sewage to the tune of 9 KLD is generated now which is biologically treated in a septic Tank followed by a Dispersion Trench.

Solid Wastes : As, the dust collected from various Bag Filters will be used as raw material in the process of Cement grinding, there would not be any solid/hazard wastes generation from the Unit.

Land Environment : As there is no solid wastes disposal from the Plant, there is no significant impact on the land environment during the Operation Phase.

Biological Environment : ZCL has earmarked about 34% of total area for developing the Green Belt and Lawns as per the existing Environmental Quality Policy of the Company. The proposed Green Belt will have significant long term impact during the Operation Phase.

Socioeconomic Environment : The projects would help in generation of direct and indirect employment for the local people. This would be a positive long term impact due to the Project. There will be a general upliftment of standard of living in the region.

Occupational Health : An industrial worker may be exposed to five types of hazards, depending upon his occupation : Physical, Chemical, Biological, Mechanical and Psychosocial hazards. Accidents are a common feature in most industries. All efforts will be taken and followed by ZCL, to avoid the accidents and have a good 'Occupational Environment'. Entry Level and Periodical Medical Examinations of the Employees will be undertaken by the Unit. The Medical Reports will be reviewed and evaluated for Occupational Health related problems.

4.0 Environmental Monitoring Programme

For effective implementations of Environmental Management Plan, ZCL shall have the **Environment Monitoring Cell** comprising of Engineers, Chemists and Horticulturists under the overall supervision of the Works incharge. Periodical monitoring of the ambient air quality (in 5 locations as per **Revised NAAQ Norms**), stack emissions, noise levels in and around the Plant, water once in a month and soil quality once in a season shall be undertaken as per the MoEF/CPCB/MSPCB Norms either departmentally or by appointing external agencies wherever necessary. The periodical monitoring results shall be in compliance with the stipulated TMSPCB/CPCB/MoEF Norms for all environmental components. The periodical status reports shall be submitted as Half Yearly Status Reports to MOEF.

5.0 Additional Studies

A detailed Risk Analysis and Disaster Management Plan for the facility has been delineated and submitted.

6.0 Project Benefits

The proposed Project will give employment to about 300 persons directly and indirectly. Due to the proposal, there will be a huge positive impact by way of employment, better socioeconomic conditions, improved local and regional economy, etc.

7.0 Environmental Management Plan

EMP is formulated for mitigation of adverse impacts and is based on present environmental status and impact appraisal. A series of industry specific interaction meetings had been organized to formulate the Charter on Corporate Responsibility for Environmental Protection (CREP) and action points were enlisted for the Cement Industry. **ZCL shall comply to the Action Points of CREP Guidelines for Cement Sector.**

The following environmental protection or pollution control measures are proposed for mitigation of impacts on the environment :

7.1 EMP for Air Environment

- ❖ Suction arrangements with suitably designed Bag Filters shall be provided at discharge points to conveyors, conveyor transfer points, feeding hopper, feeding point, fly ash discharge point, ash storage silo and its transfer point to the cement mill, cement storage silos, etc. to arrest the fugitive emissions.
- ❖ The Truck unloading shall be a closed shed with sides covered. Water spray arrangements shall also be provided.
- ❖ High efficiency Bagfilters, as proposed, shall be installed to reduce SPM level in the exhaust gas to <math><50 \text{ mg/Nm}^3</math>.
- ❖ The collected dust shall be taken back to the system.
- ❖ The emissions from the Unit shall comply with the Pollution Control Board's Stack Emission and Ambient Air Quality Norms.

7.2 EMP for Noise

- ❖ Though the total noise is expected to be well within the permissible limit at the boundary level, the plant personnel working near to higher noise sources like induced and forced draft fans will be provided with ear plugs/muffs.
- ❖ Noise generating sources would be maintained properly to minimise noise and vibrations.
- ❖ Control cabins/chambers would be made sound proof and automatic door closures would be provided for control cabins and plant laboratories.
- ❖ Noise barriers would be provided in the form of trees within the plant.

7.3 EMP for Water Environment

- ❖ No process effluent from the unit.
- ❖ The domestic sewage shall be treated in a Septic Tank followed by dispersion trench, as proposed ,to meet the MSPCB Discharge Norms and treated sewage, if any, shall be used for Green Belt.

7.4 Green Belt

- ❖ An effective Green Belt of about 33% of the total area shall be developed with trees having a thick canopy cover.
- ❖ A mixture of fruit, fuel, fodder and quick growing timber tree saplings, predominantly local flora/vegetations, are proposed to be planted keeping in view the agro-ecological and edaphic conditions of the areas.
- ❖ The maintenance contract shall be awarded to the Women Self Help Groups/Local Panchayats of the nearby villages.

7.5 Rain Water Harvesting

An effective rain water harvesting, as proposed, shall be implemented and realized water shall be used effectively.

ZCL shall carry out various Socio Measures for the local as well as regional populations such as:

- ❖ Direct & indirect employment opportunities to local people.
- ❖ Free Medical Camps.
- ❖ Extending Educational Facilities.

7.7 EMP Budget

The Project Cost would be in the range of Rs.500.00 crores. A budgetary allotment of Rs.3.00 crores has been made as Capital Cost for Pollution Control Measures and Rs.5.00 lakhs per annum towards Operating Cost. An amount of Rs.3.00 lakhs per annum has been earmarked for Occupational Health measures. CSR budget will be about Rs.10.00 lakhs per annum.
