



Madras Cements Ltd.
Ramasamyraja Nagar Cement Plant
Expansion of Captive Power Plant
(from 7 MW to 32 MW by Addition of 25 MW CTPP)
Thammanaickenpatti, Virudhunagar Taluk & District, Tamil Nadu

Environmental Clearance under EIA Notification 2006
Category 'B' Project

Summary Environmental Impact Assessment Report



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1.0 Project Description

Project Proponent : Ramco Group is one of the leading, highly reputed and Second Largest Group in South India. It is well diversified in the fields of Cement, Ready Mix Concrete, Cement Fibre Products, Cotton and Synthetic Yarn, Software Systems, Wind Farms, Research & Development, Dry Mortar Plants, Cotton Textiles and Surgical. The total employees are about 8,500 and the Turnover of the Group is Rs.3,500 crores. The main companies of the Group are :

M/s. Madras Cements Ltd.
M/s. Rajapalyam Mills Ltd.
M/s. Ramco Industries Ltd.
M/s. Ramco Systems Ltd.

M/s. Madras Cements Ltd. (MCL) is one of the reputed Cement Companies in India. The cement production of MCL would be about 17 million tons per annum (MTPA) from their cement plants in South India viz:

- i. **Ramasamyraja Nagar** near Virudhunagar, Tamil Nadu (established in 1959) : 2.0 MTPA.
- ii. Kumarasamy Raja Nagar, Jayanthipuram near Vijayawada, Andhra Pradesh (1986) : 3.65 MTPA
- iii. Alathiyur near Vridhachalam, Tamil Nadu (1997) : 3.0 MTPA (2 Lines).
- iv. Mathodu near Chithradurga, Karnataka : 0.3 MTPA (since 2000).
- v. Govindapuram near Ariyalur, Tamil Nadu : 5.5 MTPA (2 Lines; Line-I from 2009).

MCL is also having Cement Grinding Units at Kattuputtur (0.75 MTPA) near Chennai, Valapadi (1.0 MTPA; expansion proposed for 2.0 MTPA) near Salem in Tamil Nadu and Kolaghat (1.0 MTPA) in West Bengal. A cement packing plant (0.5 MTPA) is at Aralvoimozhi near Nagercoil in Tamil Nadu.

MCL is producing Ordinary Portland Cement (OPC) and Portland Pozzolana Cement (PPC). The cement produced by MCL is marketed in the brand name of 'RAMCO'. The brand name RAMCO SUPER GRADE is very popular PPC cement brand. The market centres are mainly in Tamil Nadu, Andhra Pradesh, Kerala and Karnataka States.

MCL has been constantly upgrading the technology and has been the trend setter for the rest of the industry in the country. MCL which has always been striving for Total Quality, possesses International Certificate **ISO:9001**, **ISO:14001** and **ISO:18001**. The company has achieved various awards for '**Best Performance**' in the Cement Industry and also **Green Rating Project Award 4 Leaves** from Centre for Science and Environment for the Year 2005.

MCL Ramasamyraja Nagar (R R Nagar) was established in the Year 1959 and started the commercial production from the Year 1962. The Cement Plant is located in an extent of 37.47 Ha in SF Nos. 4-16 Parts of Tulukkappatti Village, Virudhunagar Taluk & District of Tamil Nadu State (**Fig. 1.1**). There are 450 direct employees working in the Plant. Its Township is located in an extent of 25.98 Ha in SF Nos. 1-5 Parts of Tulukkappatti Village and in SF Nos. 112 & 113 Parts of Vachchakkarappatti Village. Township includes 434 Quarters of various categories, Guest Houses, Schools, Community Hall, etc. The total land extent is 63.45 Ha.

Wet Process to Dry Process conversion was carried out in the Year 1977 with commissioning of India's First Dry Process Kiln of 1200 TPD capacity. An additional Line of 650 TPD Kiln (Line-II) was commissioned in Year 1994 which was upgraded to a 1000 TPD Kiln in the Year 2001. Recently (in 2009-10), Plant has been expanded from 0.71 MTPA Clinker and 1.0 MTPA Cement production (@ 3102 TPD) to 1.09 MTPA Clinker and 2.0 MTPA Cement (@6200 TPD). The production of R R Nagar Cement Plant is detailed in **Table 1.1**. Imported Clinker/Clinker from MCL's other Plants @ 0.28 MTPA is also used for the cement manufacturing.

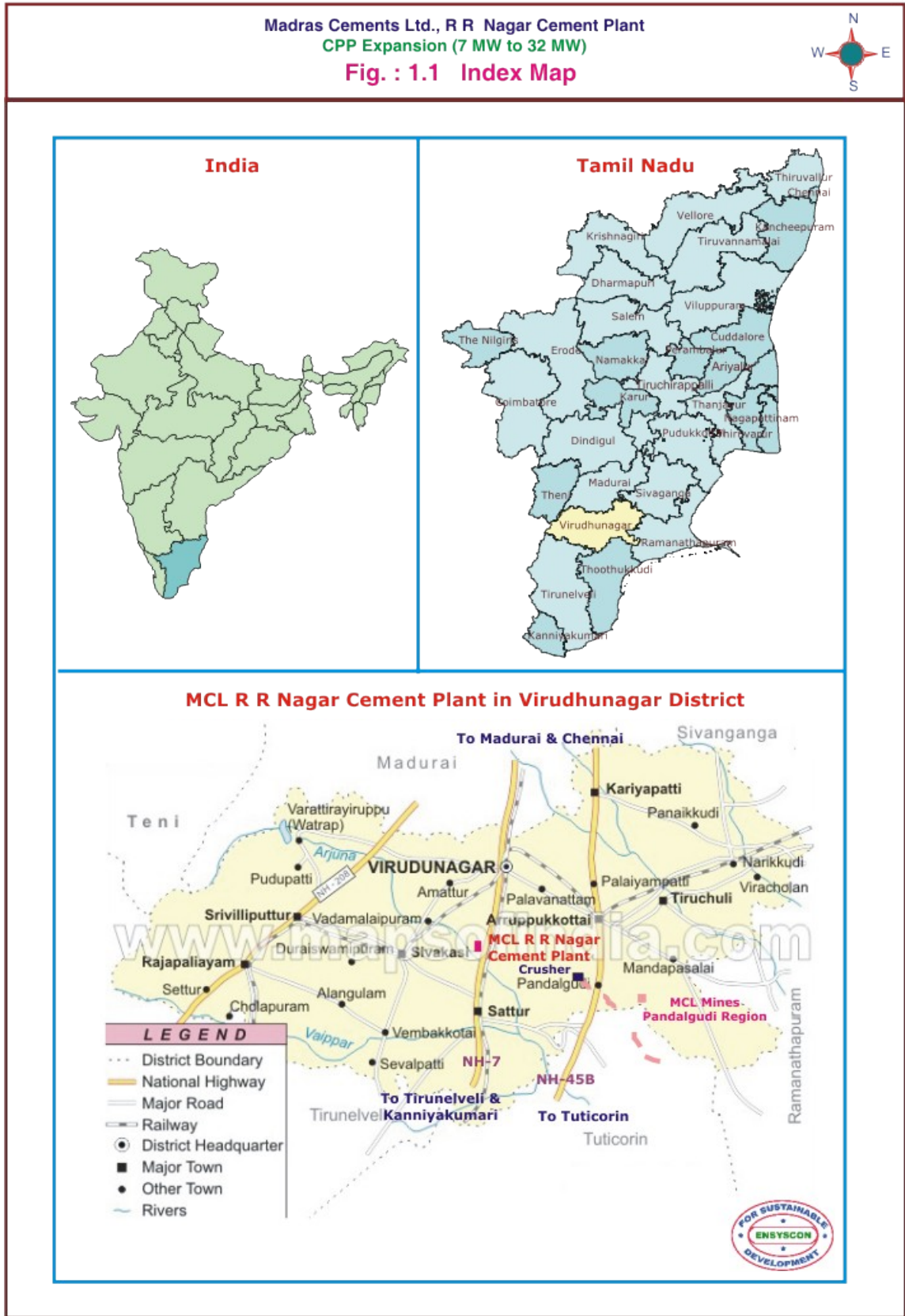
The Cement Plant's Limestone requirements are met from Captive Limestone Mines in Pandalgudi Region. The Mine Blocks produces 1.909 MTPA which is adequate for the expanded Plant (**Table 1.2**). MCL is **having its own road for transportation of limestone** from Mines to Crusher and to Cement Plant.

Table : 1.1 R R Nagar Cement Plant Production

Line	Kiln Capacity, TPD	Clinker Production, MTPA	Clinker Sourced, MTPA	Cement Production, MTPA	Remarks
Line-I	1800	0.61	-	0.90	
Line-II	1400	0.48	-	0.70	
Others	-	-	0.28	0.40	Imported / MCL's other Units
Total	3200	1.09	0.28	2.00	

Table : 1.2 Captive Mines and their Production

Sl. No.	MCL Mine	Extent, Ha	Existing Production, MTPA	Clearance/Consent Reference	Proposed Production on Expansion, MTPA
1	Pandalgudi (3 Pits) (in operation since 1961)	203.655	0.420	TNPCB Consent Orders 7253 (Air) & 10115 (Water) dated 27.04.2007	0.477 EC awarded J-11015/544/2007/ IA. II (M) dated 26.03.2009
2	Maravarperungudi (Limestone Kankar)	207.38	0.460	J.11015/185/2005/ IA. II (M) dated 07.10.2005	0.640 (in 198.515 Ha) EC awarded J-11015/69/2008/ IA. II (M) dated 26.03.2009
3	Sivalarpatti	150.10	0.690	J.11015/192/2005/ IA. II (M) dated 02.02.2006	- (0.690)
4	Melvenkateswarapuram (Clearance along with S'patti for 0.406 MTPA)	103.54	0.102	J.11015/6/99/ IA. II (M) dated 22.11.1999	- (0.102)
Total		664.675	1.672	-	1.909



About 40-45% of cement produced from RR Nagar Cement Plant is being dispatched to the marketing centres in Southern Districts of Tamil Nadu and about 55-60% to the marketing centres in South Kerala including Trivandrum.

For the expansion quantity, the **Environmental Clearance** has been obtained from the Ministry of Environment and Forests (MoEF) vide Letter F.No. J-11011/119/2009 IA.II (I) dated 06.07.2009. Also, the **Consents to Operate** from the Tamil Nadu Pollution Control Board (TNPCB) have been obtained vide its Orders 18354 (Air Act) and 22318 (Water Act) dated 03.01.2011.

R R Nagar Cement Plant operation is in 100% compliance with MoEF Environmental Clearance and TNPCB Consents conditions. The environmental quality parameters are being monitored periodically and the status reports are being submitted to the statutory Authorities.

Compliance to CREP Conditions : MCL is in full compliance of the Action Points of the Charter on Corporate Responsibility for Environmental Protection (CREP).

Need for the Expansion : R R Nagar Cement Plant requires about 21 MW power and another 1 MW for Township and Lighting arrangements. The overall power requirement is 22 MW. MCL is generating Wind Power to the tune of 186 MW from 260 Towers installed in Muppandal, Uthumalai areas of Tirunelveli District and Poolavadi, Udumalaipet areas of Coimbatore District in TN and also in Karnataka. Wind Power of 18 MW is now being utilized for the Plant operations.

The sources of power for the Plant are :

Cement Plant	: 21 MW
Township and Lighting	: 1 MW
Wind Power/TNEB supply	: 18 MW (being adjusted against banked windmill units)
Captive Power (standby)	: 1 x 7 MW CPP (Furnace Oil) DGs 1 x 6 MW + 2 x 4 MW (standby use; furnace oil)

The wind power is not stable and TNEB supply is curtailed to an extent of 20%. During peak hour restrictions for 4 hours, no TNEB supply should be utilized and thus MCL has to depend on standby CPP fully for the plant operations. For best utilization of the available power, optimization is being practiced now by stopping the non-critical equipments such as coal mill, coal mill fans, cement grinding and also reducing the kiln feed during the power restriction period. Thus, the target production is affected and MCL is incurring a loss in cement production due to increased plant stoppage.

To overcome these power constraints, MCL proposes a coal based Captive Thermal Power Plant of 25 MW capacity at R R Nagar in addition to the existing 7 MW CPP.

Power demand	:	22 MW
Thermal Power plant auxiliary	:	3 MW (self consumption 12%)
Proposed Power Plant	:	25 MW

The Proposal : The proposed Captive Power Plant will be a conventional Rankine Steam Cycle Thermal Power Plant with Fluidised Bed Combustion Boiler. The 25 MW Captive Thermal Power Plant will have a boiler of 110 TPH capacity with the steam turbine of 89 ATA and a temperature of 515 +/- 5° C. The boiler will be of AFBC type. The turbine capacity will be 25 MW supplied by Siemens. The power plant is designed for 100% coal, 100% pet coke and 100% imported coal or in any ratio between these three. **Air cooled condensers** are proposed for cooling, which will reduce water demand.

MCL has engaged the Power Division of Thermax Limited for the preparing the Feasibility Report and execution of the Project on Engineering, Procurement and Construction (EPC) basis. The proposed Captive Power Plant (CPP) is configured with :

- ❖ one no. 110 TPH AFBC Boiler capable to generate steam at 89 ata 515±5 °C.
- ❖ one no. 25 MW Steam Turbine Generator with generating capacity of 25 MW (maximum).
- ❖ one no. Air-cooled Condenser with extruded aluminium fins to condense the exhaust steam from turbine.
- ❖ one no. Coal Handling System of 50 TPH Capacity.
- ❖ Dense Phase pneumatic Ash Handling System for conveying the Bed Ash and Fly Ash generated in the boilers to respective Concrete Ash silos.
- ❖ Water System includes Raw water & firewater system, Auxiliary Cooling Water system and Water Treatment Plant.
- ❖ Electrical System includes the Generator, 11kV CPP HT switchgear, LT Switchgear. DC System, AC UPS System, Lighting system, Grounding and lightning system, Illumination system.
- ❖ Distributed Control System (DCS) is envisaged for the operation and monitoring of main power plant equipment.

Coal shall be received by rail/trucks and unloaded into a dump hopper with the help of truck tippler and wagon tippler. From the dump hopper, a vibrating feeder feed the material to the stacker belt conveyor through crusher to coal storage yard.

The boiler together with its associated auxiliaries would produce superheated steam at 89 kg/cm² and 515 °C. The super heated steam would be taken to the steam turbine generator, air cooled condensers and associated auxiliaries. The steam will be used for running the turbine generator to produce total 25 MW electricity.

Air cooled condensers will be used to condense the steam at 0.20 kg/cm² with an inlet temperature of 35 °C. Forced draft fans shall be used to supply cooling air. The generated electricity will be connected to the Cement Plant by the existing cable network. Power plant has been designed for 8000 hrs. of operation in a year and for a minimum satisfactory life span of 20 years.

On Expansion, mainly imported coal will be used and the ash generation will be **34.5 TPD**. Out of this, **29.3 TPD (85%)** is Fly Ash to be collected from boiler EP/Economiser/Air heater and rest **5.2 TPD (15%)** shall be Bed Ash. Fly ash shall be **transported pneumatically with the help of dense phase pneumatic pumps to the cement plant**. This shall be further used in the manufacturing of Portland Pozzolana Cement.

The Unit has been permitted for the drawl of 1500 KLD from the nearby Arjuna River vide Tamil Nadu State Government GO dated 04.10.1975. Existing cement plant requires 900 KLD water only (MoEF EC & TNPCB Consent Quantity). Proposed fresh water demand of the Power Plant is 280 KLD which will be sourced from Cement Plant supply. A separate Water Treatment Plant is proposed for the Power Plant.

There will be an addition of 30 employees to the existing 450 employees. There will be indirect employments to about 50 persons due to the project. Existing Township is adequate for operational workers on Expansion.

EIA Scoping : All Thermal Power Plants are listed under Sl. No. 1(d) in the Schedule of EIA Notification 2006. The proposed Project is falling under **Category 'B'** (<500 MW) of EIA Notification 2006 and needs the Environmental Clearance (EC) from the Tamil Nadu State EIA Authority (TNSEIAA). Thus, MCL has applied to TNSEIAA on 15.10.2010 for obtaining EC for the proposed CPP Expansion.

On the applied Application and Presentation, the project was considered by the Honourable TN State Expert Appraisal Committee (EAC) during its 24th SEAC Meeting held on 10th & 11th February 2011. The Committee has also prescribed the Terms of References (TORs) for preparing draft EIA Report as per the generic structure of the EIA notification 2006. The finalised TORs are communicated vide Letter **SEAC/TNF No. 410/M-XXIV/TOR-86/2011 dated 01.03.2011**.

MCL has entrusted the EIA-EMP Study on **M/s. Environmental System Consultants (Ensyscon) & Ambiente Lab Solutions Pvt. Ltd., Chennai** (EIA Consultant applied to QCI/NABET with Sl. No. 200).

2.0 Description of the Environment

Site & its Environmental Setting : R R Nagar Cement Plant and Township are located in a total extent of 63.45 Ha with a Green Belt coverage of 22.00 Ha (34.67%). MCL is proposing the 25 MW CPP in the vacant space of 7.53 Ha falling in **SF Nos. 192, 194, 195, 196 Parts** in Thammanayakkanpatti, Virudhunagar Taluk & District of Tamil Nadu (within the existing Industry Premises Fig. 1.2).

The propose site is Industrial Land owned by MCL (since 1959) and there is no Forest/Govt. Land envisaged. No nallah crossing is also at the site. There is no Resettlement & Rehabilitation issue. There is no litigation pending against the Project and/or any direction/ order passed by any Court of Law.

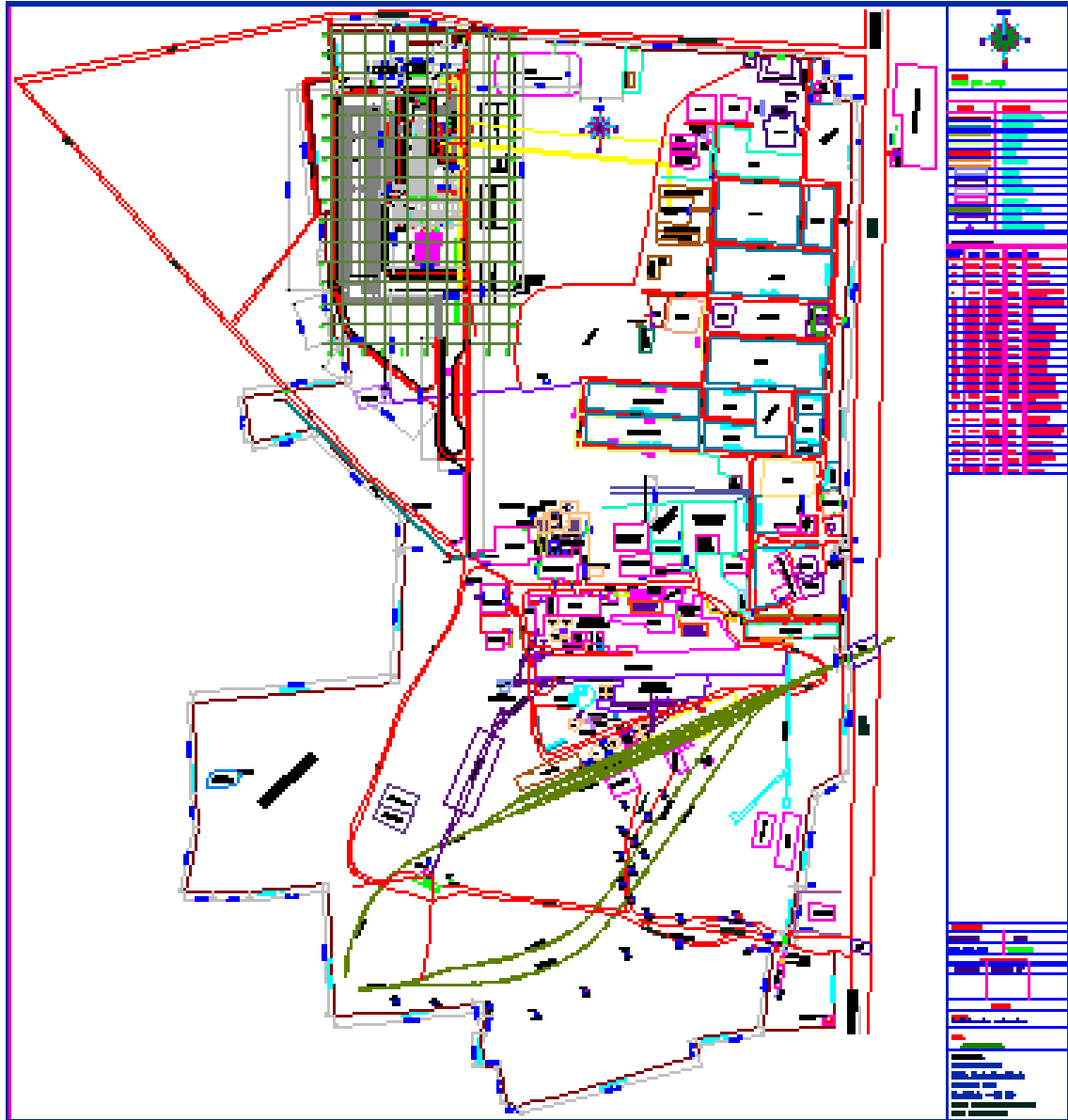
The site for proposed CPP falls inbetween the following coordinates :

Latitude	:	N 09°27'33" to 09°27'44"
Longitude	:	E 77°55'33" to 77°55'47".

The elevation of the site area ranges from 82 m to 84 m above MSL.

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 Plant/site (Fig. 1.3). Also, no grazing, forest land, etc. exist in the study area. The region falls in Seismic Zone II.

Fig. : 7.2 R R Nagar Cement Plant & Proposed GTFF





The Cement plant is well connected by Road and Rail networks. Madurai is the nearest Airport (50 km in the north). National Highway-7 (4-Lane Madurai-Kanyakumari Section) and Southern Railway BG Line (Chennai-Madurai-Kanyakumari) run parallel to the Plant. A Road Under Pass has been made for the Plant vehicular traffic. The Railway siding for the Plant is from Tulukkapatti Railway Station (0.5 km in the east). Thus, no additional infrastructure is needed for the existing as well as proposed activities.

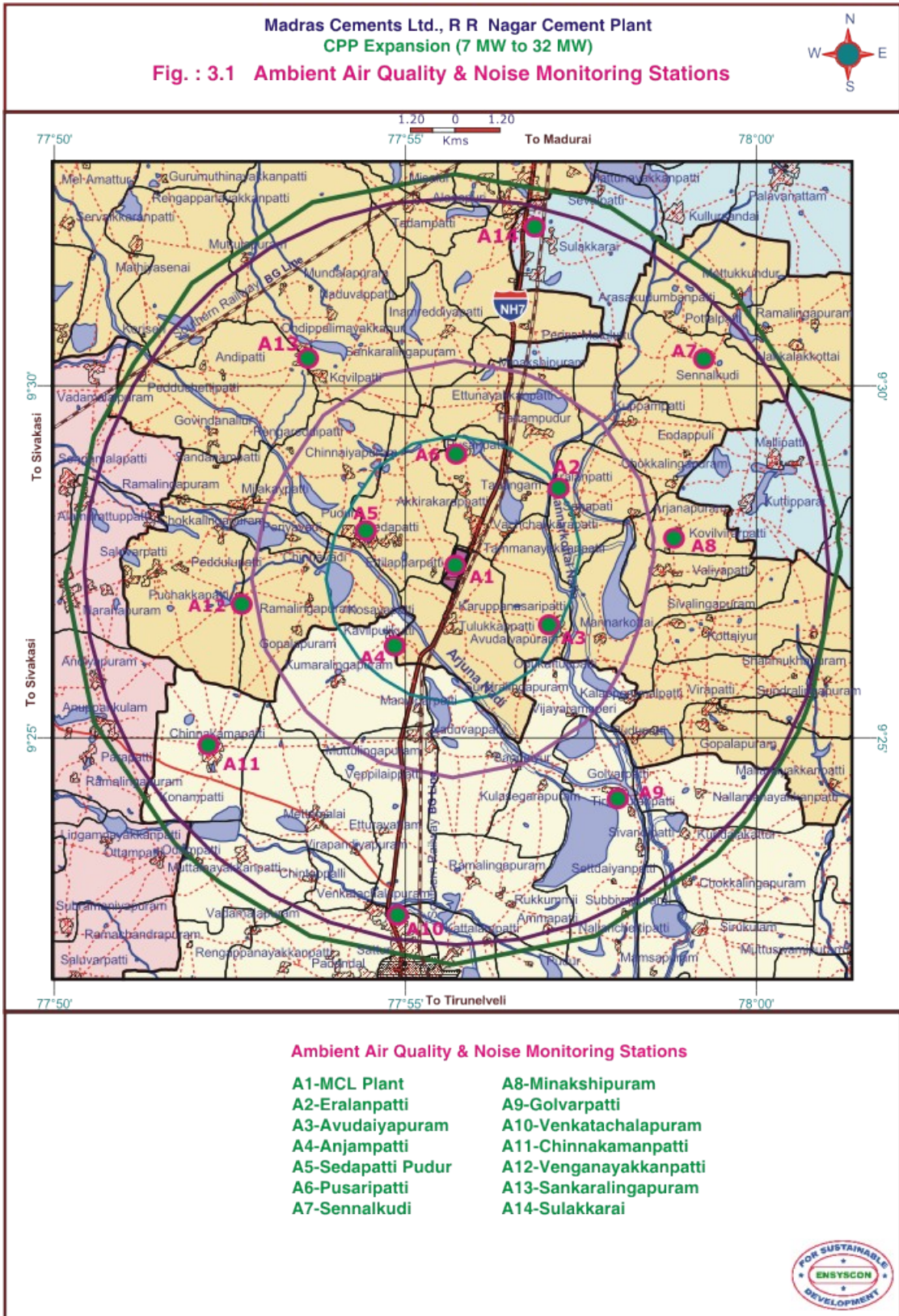
The general elevation of the study area ranges from 55 m to 150 m above MSL. The elevation contour indicates the area is sloping towards southeast. The structural features mostly control the drainage of the study area. There is no perennial river in the study area. The **seasonal nallahs Arjuna River and Mannarkottai Nalla** are flowing near the Plant and confluences into River Vippar. The streams are flowing towards south.

Considering the Environmental setting of the project, project activities and their interaction, environmental regulations and Standards, following Environmental Attributes have been included in EIA Study.

- ❖ Site specific Micrometeorological Data for the parameters Wind Speed & direction, Temperature, Humidity, Cloud Cover and Rainfall.
- ❖ Ambient Air Quality (at 14 locations; **Fig. 3.1**) for the parameters : PM2.5, PM10, SPM, SO₂, NO_x, CO, HC & Particulate Lead.
- ❖ Noise Level Measurements at 14 Locations for both Leq-Day and Leq-Night values.
- ❖ Water Quality-both Surface Waters (6 Locations) and Ground Waters (8 Locations) for IS:10500 Norms.
- ❖ Soil Quality (5 Locations) for Textural & Physical Parameters, Nutrients, etc.
- ❖ Present & Post-project Land Use Pattern based on Satellite Imagery.
- ❖ Biotic Attributes : Flora & Fauna -Core zone & Buffer zone-Diversity Index.
- ❖ Socio-Economic Profile (2001 Census) : Total Population, Household Size, Age, Gender Composition, SC/ST, Literacy Level, Occupational Structure, etc.

MCL is periodically monitoring the environmental parameters and submitting them to the Statutory Authorities regularly. The data pertaining to the period **December 2010-February 2011** representing the **Winter 2010-11 Season** were utilized for the baseline data for EIA Study. 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 of 60 ug PM2.5/m³, 100 ug PM10/m³, 80 ug SO₂/m³ and 80 ug NO_x/m³ 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 BIS/CPCB Norms except for Total Coliforms due to sewage contamination. 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. No Reserve Forests exist.
- ❖ Domesticated animals and common fauna only exist in the study area.
- ❖ The area is thinly populated and basic amenities are available almost in all villages.

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

Table : 3.1 Ambient Air Quality Status

No. of Locations : 14

Sl. No.	Parameter	Pollutant Concentration, ug/m ³			
		PM2.5	PM10	SO ₂	NO _x
1	No. of Observations	336	336	336	336
2	Minimum	10	23	6	4
3	10 th Percentile Value	14	32	6	6
4	20 th Percentile Value	15	34	6	7
5	30 th Percentile Value	16	36	7	7
6	40 th Percentile Value	16	37	7	8
7	50 th Percentile Value	18	39	7	9
8	60 th Percentile Value	18	41	8	9
9	70 th Percentile Value	20	44	8	10
10	80 th Percentile Value	22	47	9	11
11	90 th Percentile Value	27	52	10	13
12	95 th Percentile Value	30	56	11	15
13	98 th Percentile Value	32	60	12	16
14	Maximum	34	65	14	18
15	Arithmetic Mean	18.8	40.6	7.7	9.1
16	Geometric Mean	18.5	40.2	7.5	8.7
17	Standard Deviation	5.1	7.9	1.7	2.9
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 ug/m³, 65 ug/m³ and 0.05 ug/m³ 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.

4.0 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.

Various impacts during the construction and operation phase on the environment have been studied to estimate the impacts on the environmental attributes and are discussed in the subsequent sections.

Impacts during Construction Phase

Land environment : The expansion activities are proposed within and around the Cement Plant. There is no additional land is envisaged. As the site being flat terrain, there is no leveling/filling, landscaping, etc. is required and soil losses will also be negligible. Apart from the change in land use pattern within the plant area, there will not be any adverse impact on land environment during construction period.

Ambient air quality : The monitored mean ambient air pollutants values were found to be very well within the Revised National Ambient Air Quality Norms for Industrial, Residential and Rural Areas. 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. The impacts of construction activities on air quality will be for short duration, confined locally and is expected to be negligible outside the plant boundaries. Also, there is adequate buffer in the ambient air pollutants' levels in the vicinity.

Noise levels : The proposed construction activities would increase the equivalent noise levels by another 2-3 dB(A). 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 machineries, etc. and confined locally.

Water quality : The construction water requirement of about 100 KLD will be met from the existing Plant water supply. As local labourers to be engaged for the construction activities, no sewage generation is anticipated. Thus, impact on water environment is insignificant.

Terrestrial ecology : Being proposed in existing industrial premises, there is no tree cutting or removal of plantations, etc. involved. No solid/hazardous wastes generation. There is no significant impact is anticipated on the land environment due to the construction activities.

Socioeconomics : About 100-125 persons/day will be pooled from the local public for the construction. Thus, provision of **additional sanitation facilities, fuel, rest room, etc. are not warranted**. The truck drivers have these facilities at the Truck Parking Area of the Cement Plant.

Transportation : In an average, 10 Truck loads/day (for transporting all construction materials) will be visiting the site in a day during the construction period.

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

Impacts during Operation Phase

The following activities related to the operational phase of the Project will have varying impacts on the environment and are considered for impact assessment :

Traffic Intensity : For the existing 2.0 MTPA Cement production activities, there are about 458 trucks plying in a day (@ 19.08 vehicles/hour) for transporting limestone, correctives, additives/fly ash, finished product cement, etc.

Due to the Expansion proposal, 16 trucks/day (@ 0.67 vehicles/hour) will be increasing. As the Plant is located on the National Highway-7 and 0.5 km from Southern Railways BG Lines, there will not be any significant impact anticipated due to the additional volume of traffic.

Air Environment : The Cement Plant is being operated for the **SPM Emissions <50 mg/m³** as per TNPCB Consent condition. The major pollutants expected from the Power Plant will be SPM, SO₂ and NO_x. An online stack monitoring system shall be provided. MCL is proposed an effective ESP of 99.98% to control the SPM emission <50 mg/m³.

Prediction modeling : 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. The predicted (cumulative of Cement Plant Lines and CPP) GLCs are tabulated in **Table 3.1**.

PM10 : 0.84 ug/m³ (computed from predicted SPM; occurs at a distance of 1 km near the Plant)
 SO₂ : 4.95 ug/m³ (at 2 km)
 NO_x : 6.80 ug/m³ (at 2 km).

Table : 3.1 Predicted GLCs

Sl. No.	Pollutant	Background Concentration (24-hly. Mean), ug/m ³	Maximum Predicted Ground Level Concentration, ug/m ³	Distance from the Plant, km	Total Concentration, ug/m ³	Revised NAAQ Norms, ug/m ³	Buffer Available in the Atmosphere, %
1	PM10	40.6	0.84	1.0	41.44	100	58.56
2	SO ₂	7.7	4.95	2.0	12.65	80	84.19
3	NO _x	9.1	6.80	2.0	15.9	80	80.13

Note : 1. Background concentration is the existing levels in the study area includes operations of Industrial Plants.

2. NAAQ Norms-National Ambient Air Quality Norm (24/8 hly.) stipulated by CPCB for Industrial, Residential and Rural Areas.

The predicted values were spatially distributed on the existing baseline status and the cumulative impacts was found to be confined locally i.e. within 2 km radius from the boundaries. While comparing the NAAQ Norms, there is no significant increase in the ambient air pollutants levels is anticipated due to the Project and **adequate buffer exists** in the study area for the operation of the Plant.

Noise Environment : Noise levels from turbine, fans, centrifugal pumps, electric motors etc, shall be kept below the permissible level of 85 dB (A) at 1m away from the source by proper design. The noise level within the plant at a distance of one meter from the sources are maintained at **less than 85 db(A)**. Noise level at the plant boundary were monitored to be <55 dB(A) during daytimes and <45 dB(A) during night times. Thus, the noise levels are found to be well within the permissible limits for residential areas.

Water Environment : Existing cement plant requires 900 KLD water only (MoEF EC & TNPCB Consent Quantity). Proposed fresh water demand of the Power Plant is 280 KLD which will be sourced from Cement Plant supply. Out of 280 KLD fresh water, 187 KLD will be treated and 180 KLD will be fed to **Stage-I RO** Plant while 7 KLD DM & UF Plants Rejects will be taken to **Stage-II RO** for further treatment and recycling. About 83 KLD fresh water along with 133 KLD treated effluent and thus total 216 KLD will be used for Cooling Tower Makeups. About 10 KLD fresh water will be used for domestic needs. Stage-I RO Plant permeate of 108 KLD will be used for Boiler Makeup and RO Reject of 72 KLD will be sent to Stage-II RO for further treatment and recycling. Boiler blowdowns of 74 KLD along with Cooling Tower Blowdowns of 70 KLD and quenching water 40 KLD (total blowdowns 184 KLD) will be treated in Stage-II RO and recycled.

Domestic Sewage to the tune of 9 KLD will be generated from the CPP. The sewage will be treated in the combined **200 KLD Sewage Treatment Plant** in the Plant which is treating 100 KLD sewage from the Cement Plant and Township. The existing STP is adequate to treat the additional quantity of 9 KLD from proposed CPP and the **Treated Sewage of 105 KLD** (after losses) will be used for Green Belt. Thus, the Plant is a **Zero Effluent Discharge Plant**.

Solid Wastes : The dust collected from the various Air Pollution Control Measures like Bag House/Filters, ESPs, etc. are **totally recycled** in the process for cement manufacturing. Due to Sewage Treatment, solid wastes from STP Plants @ 10 Tons/year are composted and used as manure for Green Belt. Spent Oil to the tune of 118.27 KL/Year are being collected, stored and disposed by firing into the kilns through a metered pumping system (**TNPCB Authorisation No. 2906/HWM/VNR/07** dated 04.07.2007 valid for 5 years).

On CPP Expansion, mainly the imported coal will be used with a gross calorific value 6000 kcal/kg and ash content 15%. The ash generation will be **34.5 TPD**. Out of this **29.3 TPD** (85%) is expected to be Fly Ash to be collected from boiler EP/Economiser/Air heater and rest **5.2 TPD** (15%) shall be Bed Ash. Fly ash shall be transported pneumatically with the help of dense phase pneumatic pumps to the cement plant for PPC manufacture

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

Biological Environment : MCL has earmarked about 22.00 Ha of land (about 34.67% 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.

4.0 Environmental Monitoring Programme

For effective implementations of Environmental Management Plan, MCL has the **Environment Monitoring Cell** comprising of Plant Engineers, Lab chemists, Mine Personnel and Horticulturists under the overall supervision of the Vice-President. Also, the quality of air, water, soil and noise levels are already being monitored at MCL as per specified norms and the reports are being submitted to MoEF and TNPCB on regular basis. The same practice will be continued during the Expansion period also.

The periodical monitoring results shall be in compliance with the stipulated CPCB/TNPCB Norms for all environmental components. The periodical status reports shall be submitted to TNPCB and as Half Yearly Status Reports to MOEF.

5.0 Additional Studies

Risk Assessment and DMP : Fire, electrical shock, natural calamities, etc. are the risks associated with the activities. Detailed assessment and mitigative measures are delineated and an effective Disaster Management Plan is also envisaged in the EIA Report.

6.0 Project Benefits

There will be an addition of 30 employees to the existing 450 employees. There will be indirect employments to about 500 persons due to the Plants. The following benefits are anticipated due to the expansion of CPP :

- ❖ The Project would generate direct & indirect employment and business opportunities in the region.
- ❖ The Project will be beneficial and important to the Society and the Country by :
 - Power demand
 - Royalty to the Exchequer.
 - Direct and indirect employments.
 - Improvement in direct and indirect means of livelihoods of local population.
 - Improved local and regional economy.

7.0 Environmental Management Plan

Air Environment :

- ❖ All sources of dust generation in the Cement and Power Plants shall be well designed for producing minimum dust and shall be provided with high efficiency Bag Filters.
- ❖ SPM emission level in exhaust air shall be <math><50 \text{ mg/Nm}^3</math>.
- ❖ For collecting the ground material from AFBC boiler and dedusting of vent air, a suitably sized **ESP** shall be considered.
- ❖ SO_2 concentration shall be negligible and the stack height will be 82 m for CPP.
- ❖ The periodical evaluation for the efficiency performance of ESPs and Bag Filters shall be carried out.
- ❖ For controlling fugitive dust, in dump hopper, reclaimers, belt conveyor discharge, silos etc., bag filters shall be installed.
- ❖ Fugitive emissions due to storage, transportation, etc. and the leakages and spillages shall be continuously monitored and controlled.
- ❖ Water conservation measures shall be undertaken for effective implementation. Cooling water is put into closed circuit to minimize the evaporation losses.
- ❖ Thermal insulation is provided wherever necessary to minimize heat radiation from the equipment, piping etc, to ensure protection of personnel.
- ❖ Insulation thickness is so selected that the covering jacket surface temperature does not exceed the surrounding ambient temperature by more than 15 °C. The effect of thermal pollution of air is negligible considering the atmosphere as the ultimate heat sink and no other industry being located in the vicinity.
- ❖ As far as gaseous pollution is concerned, the impact of carbon monoxide (CO) emission is negligible in view of the firing technique of keeping a positive oxygen balance.
- ❖ Generation of NOx gases depends to a great extent on the combustion temperature. A well designed burner system is installed and limiting the temperature to a reasonably low value of NOx generation.

Noise :

- ❖ The design features of machineries shall be provided to ensure low noise levels in the working areas.
- ❖ All rotating items are well lubricated and provided with enclosures as far as possible to reduce noise.
- ❖ Extensive vibration monitoring systems are provided to check and reduce vibrations. For all fans, compressors etc. vibration isolators are provided to reduce vibration and noise.
- ❖ Noise generating items such as fans, blowers, compressors, pumps, motors etc. shall be running with speed less than 1500 rpm and reduce noise levels. Static and dynamic balancing of equipment are being done regularly.
- ❖ Provision of silencers are made wherever possible.
- ❖ Green Belt proposed in the Plants and Township are also act as noise reducers.
- ❖ Layouts, equipment foundations and structures are designed keeping the requirement of noise abatement in view.
- ❖ Necessary enclosures are also provided on the working platform/areas to provide local protection in high noise level areas.
- ❖ All heavy earthmoving equipment is kept in a well maintained condition.

- ❖ Proper lubrication and house keeping are maintained to avoid excessive noise generation.
- ❖ In case where the operation of the equipment warranted the presence of operators in close proximity to equipment, the operator provided with the necessary safety and protection equipment like ear plugs, ear muffs etc.

Water Environment :

- ❖ Water control measures shall be undertaken.
- ❖ No trade effluent shall be discharged from the Plants.
- ❖ Cooling water is put into closed circuit to minimize the evaporation losses.
- ❖ The domestic sewages from the Cement Plant, Power Plant and Township shall be treated in the Sewage Treatment Plant to meet the Statutory Discharge Norms and the treated sewage shall be used for Green Belt.
- ❖ No percolation of treated water to the deep ground water table is done.
- ❖ Periodical monitoring for specific parameters shall be done regularly.
- ❖ MCL shall maintain the rain water harvesting structures and the roof tops of Plants as well as Township areas shall be harvested to supplement the water supply.

Land Environment :

- ❖ It should be ensured that there is no industrial solid waste from the Plants.
- ❖ The fly ash and bottom ash from CPP shall be utilized fully in the Cement Plant for PPC manufacture.
- ❖ Solid wastes from STP Plant shall be used as manure for Green Belt.
- ❖ Waste Oil shall be collected and sold to the MoEF/TNPCB authorised Agency for further treatment & disposal.
- ❖ The municipal wastes from Township shall be collected, transported, treated in a landfill (composting) within the Plant vicinity to make use of it as manure for Green Belt.
- ❖ The land fill sites are clearly demarcated indicating the period during which they have been filled.

Social Measures :

- ❖ MCL is presently carrying out various Socio Measures for the local as well as regional populations in the Cement Plant and Mines locations which shall be continued for the new Project area also.

Occupational Health Measures :

- ❖ MCL shall provide a safety & healthy working conditions and continually improve the occupational health and safety performance.
- ❖ MCL's objectives shall be to achieve zero accident and safe work environment, to improve moral and health of all employees and to maintain the emission levels below the norms.
- ❖ MCL shall provide ergonomic support in work comfortness with periodical review.

Green Belt :

- ❖ The already developed Green Belt shall be maintained with the guidance of DFO.
- ❖ 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.

Rain Water Harvesting :

- ❖ Rainwater harvesting shall be continued.
- ❖ Maximum quantity of rainwater shall be harvested and utilised.

Project Cost & EMP Budget

Project Cost of the existing Cement Plant is Rs.410.00 crores. Project Cost of the proposed 25 MW CPP is Rs.150.00 crores. Thus, the **total cost is Rs. 560.00 crores**. EMP Budget would be as follows :

Description	Rs. Crores			
	Cement Plant (Old Lines)	On Recent Expansion	Proposed CPP Expansion now	Total
Project Cost	233.00	177.00	150.00	560.00
Capital Cost for EMP Measures	3.00	1.50	4.50 (2.54%)	9.00
Recurring Cost per Annum	2.30	0.50	0.50	3.30
Occupational Health Budget per Annum	0.15	0.10	0.15	0.40
CSR Budget per Annum	0.50	0.50	0.10	1.10
CSR Budget (for Plant Life of 30 yrs.)	15.00	15.00	3.00	33.00 (5.90%)

A budget of 2.54% of Expansion Project Cost has been earmarked for EMP Measures and 5.90% of total Project Cost has been earmarked for CSR Activities.
