



The Ramco Cements Limited

Maravarperungudi Lime Kankar Quarry Lease-II
Maravarperungudi Village, Aruppukottai Taluk,
Virudhunagar District, Tamil Nadu

New Captive Quarry Lease
Minor Minerals: Lime Kankar & Clay (Others)

Extent of 23.29.0 Ha
Proposed Production :-
Lime Kankar @ 0.254 MTPA & Clay (Others) @ 0.011 MTPA

Environmental Clearance under EIA Notification 2006
Schedule SI. No. 1(a)
Category 'B' (Minor Minerals Mining in <25 Ha)

Summary Environmental Impact Assessment
(for Public Hearing)
TOR awarded by SEIAA-TN/F.No.6717/SEAC/TOR-670/2019 dated 19.11.2019

January 2020

EIA Consultant

ABC Techno Labs India Private Limited
Chennai
(Sl. No. 4 of QCI/NABET List dated 20.01.2020)

The Ramco Cements Limited
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Summary Environmental Impact Assessment

1.0 Introduction

1.1 Project Proponent

Ramco Group is one of the leading, highly reputed and Second Largest Industrial 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 15,700 and the Turnover of the Group is Rs.8,000 Crores. The main companies of RAMCO Group are:

- ❖ **M/s. The Ramco Cements Limited (formerly M/s. Madras Cements Limited)**
- ❖ M/s. Rajapalyam Mills Ltd.
- ❖ M/s. Ramco Industries Ltd.
- ❖ M/s. Ramco Systems Ltd.

The Ramco Cements Limited (RCL) is one of the reputed Cement Companies in India. The cement production of RCL is about 17.70 million tons per annum (MTPA) from their **Cement Plants** in India. The company is the second largest cement producer in South India and sixth largest manufacturer of cement in the Country.

- ❖ Ramasamy Raja Nagar near Virudhunagar, Tamil Nadu (established in 1961) : 2.0 MTPA (2 Lines) and going for an expansion with 3rd Kiln in 2020.
- ❖ Kumarasamy Raja Nagar, Jayantipuram near Vijayawada, Andhra Pradesh (1986) : 3.65 MTPA (2 Lines) (being expanded with 3rd Kiln).
- ❖ Alathiyur near Viridhachalam, Tamil Nadu (1997): 3.0 MTPA (2 Lines).
- ❖ Mathodu near Chithradurga, Karnataka: 0.3 MTPA (since 2000).
- ❖ Govindapuram near Ariyalur, Tamil Nadu: 5.5 MTPA (established in 2009) (2 Lines).

RCL is operating **Cement Grinding Units** at:

- ❖ Kolaghat (0.95 MTPA; expanded to 2.0 MTPA) in West Bengal.
- ❖ Kattuputtur (0.75 MTPA) near Chennai, Tamil Nadu.
- ❖ Valapadi (2.0 MTPA) near Salem, Tamil Nadu.
- ❖ Vizag (0.95 MTPA; being expanded to 2.0 MTPA) near Anakapalli, Andhra Pradesh.

It is also operating a **Packing Plant** at Nagercoil.

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

RCL which has always been striving for Total Quality, possesses International Certificate **ISO:9001, ISO:14001, ISO:18001 and IS/ISO:50001**. The company has achieved various awards for '**Best Performance**' in the Cement Industry and also **Green Rating Project Awards 4 Leaves** from Centre for Science and Environment for the Year 2005.

RCL has the well laid down Safety, Health and Environmental (SHE) Policy approved by the CMD. The units are having their **Integrated Management System (IMS)** Policy. The Environmental Management Plan (EMP) Cell is functioning under the Unit Head and Corporate Social Responsibility (CSR) Committee is functioning under the Corporate Office. There is a Hierarchical System in the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions. The Contact information of the Corporate Office is :

The Executive Director (Operations),
The Ramco Cements Limited,
5th Floor, Auras Corporate Centre,
No. 98A, Dr.Radhakrishnan Road,
Mylapore,
Chennai-600 004.
Tel. No. : 044-28478666/28478661/28478656
Fax No. : 044-28478676
e-Mail : ramcoenv@ramcocements.co.in

RCL **Ramasamy Raja Nagar** (R R Nagar) Cement Plant was established in the Year 1961 at Tulukkappatti Village, Virudhunagar Taluk & District of Tamil Nadu State. The Plant has 25 MW coal based Captive Power Plant (**since 2012**) and 7 MW furnace oil based PP & 14 MW DG sets for standby operation within the Campus.

RCL Township, Guest Houses, Schools, Community Hall, and an **Occupational Health Centre**, for Emergency Care and Ambulance with well equipped emergency handling facilities, are available (in the Campus).

The Cement Plant & CPP Plant operations are in compliance with MoEF&CC Environmental Clearances and TNPCB CTOs conditions. Also, RCL Cement Plant operations are complying with **Charter on Corporate Responsibility for Environmental Protection (CREP) Guidelines**.

RR Nagar Cement Plant's Limestone requirement (1.630 MTPA Limestone) are met from Captive Limestone Mines in Pandalgudi Region viz. Pandalgudi, Maravarperungudi (Lime Kankar Mine), Sivalarpatti and Melvenkateswarapuram Mines. These **Mines are in operation since 1976**. EC Quantity of Run-Off Mine (ROM) Production from these Mines is about 2.9388 MTPA of different Grades.

The Centralised Crusher & Beneficiation Plant is located in an extent of 31.89 Ha, with 2.0 MTPA Crushing/Beneficiation capacity, at the Pandalgudi which is **in operation since 1980**. There are 2 colonies for the Mine Employees and Workers along with a Middle School and a Community Hall located at Pandalgudi.

These Mines and also Pandalgudi Crusher with R R Nagar Cement Plant (18 km in WNW direction) are connected with **RCL's own Tar Road for transportation of Limestone**. Mines to Crusher road is of 14 km each from Melvenkateswarapuram Mine and Maravarperungudi Mine. There is a **Road-over-Bridge on the NH-38** for the dedicated Mine Road.

Cement Plants require both cement grade Limestone and Lime Kankar. Kankar is required for blending with high/low grade limestone to meet the cement grade raw material to the Cement Plant. The existing Captive Limestone Mines of RCL in Pandalgudi Region are nearing Conceptual Stage and the Limestone grade varies constantly. Existing Maravarperungudi Lime Kankar Lease only supplies about 0.64 MTPA Lime Kankar and Clay for blending in the Cement Plant which is also at Conceptual Stage.

As there is no limestone deposit nearby, the Plant has to sustain with the help of low grade Lime Kankar both by upgrading its quality by beneficiation and suitable blending with the residual reserves of Limestone. Thus, RCL is proposing other Lime Kankar Quarry Leases in Pandalgudi Region. Recently, **RCL has been awarded with Five (5) Nos. Lime Kankar Quarry Leases** (Minor Minerals) out of 6 Quarries in Virudhunagar District. **Maravarperungudi Lime Kankar Quarry Lease QL-II is one of the Quarry Leases proposed** for Captive Consumption of the Cement Plants.

1.2 Project Profile

RCL has applied and obtained the Precise Area Notification (PAC) for Maravarperungudi Quarry Lease-II **for quarrying Lime Kankar and Clay (Others)** over an extent of **23.29.0 Ha** in S.F. Nos. 109/1, 2A, 2B, 3A, 3B & 4, 110/1A, 1B, 2A, 2B & 3, 111/1, 2A, 2B, 3, 4, 5A & 5B, 113/1, 2, 4, 5 & 6, 114/2, 3, 4, 5, 6, 7 & 8, 115/2 and 119/1A, 1B & 1C of Maravarperungudi village, Aruppukottai Taluk, Virudhunagar District of Tamil Nadu State (**Fig. 1.1**). The area covered under mining is non-forest type. The entire area applied for Quarry Lease is **patta land owned by RCL and there is Govt. Land or Forest Land involved**.

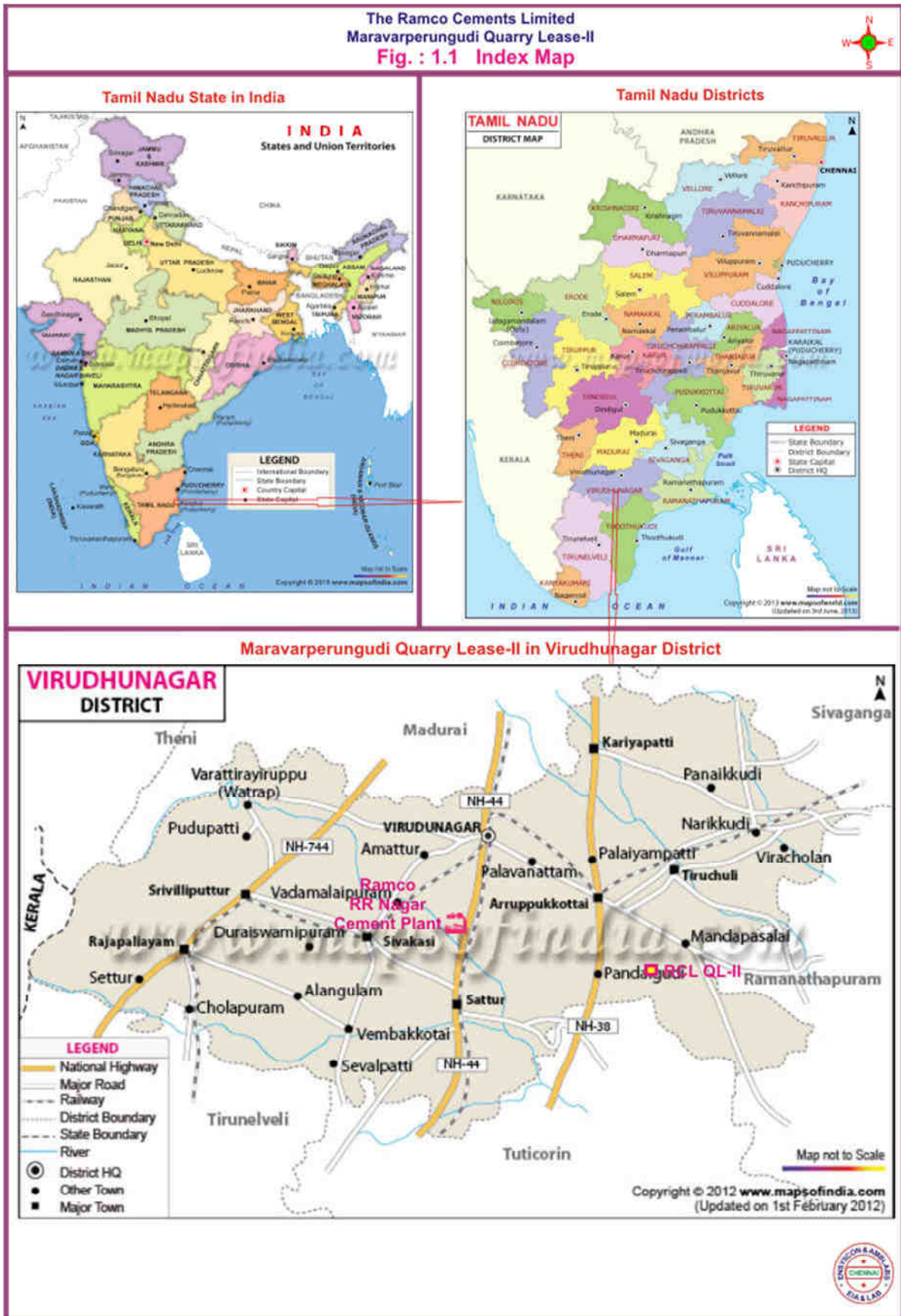
Precise Area Communication (PAC) has been issued by the Tamil Nadu State Industries Department vide Letter No/14546/MMC.2/2016-1, dated 21.04.2017 **for a period of 5 years. Mining Plan has been approved** by the Department of Geology and Mining, Govt. of Tamil Nadu, Chennai **vide Letter No. 7011/MM10/2016/LK/Vnr dated 10.05.2018**.

In the total QL area of 23.29.0 Ha, about **19.250 Ha is only available for effective mining** after leaving the prescribed safety barrier. **Non-Conventional Mechanized Opencast Strip Mining (without Drilling and Blasting)** is proposed to quarry the Kankar bed. The deposit will be mined by a simple system of **simultaneous development, production and refilling** by the same excavator called **Strip Mining** (8 m wide and 20 m long strips). Thus, the **maximum depth of the Mine will be of 3.0 m BGL only**.

As per the Approved Mining Plan, the proposed production would be about **Lime Kankar @ 0.254 MTPA and Clay (Others) 0.011 MTPA**. The mineral Lime Kankar & Clay (Others) will be utilized as raw material for Cement manufacture by blending with limestone from Pandalgudi, Melavenkateswarapuram and Sivalarpatti Mines which is marginally plus cement grade quality.

Initially, a long trench like excavation for a sufficient length on black cotton soil will be made to expose the Kankar and then the Kankar will be quarried by the same excavator. The next strip, just adjacent to the previous strip, will be mined in the similar manner but the black cotton soil will be side-casted to the exhausted adjacent strip. Thus, the refilling will be done simultaneously along with development. Finally, part of the Quarry Area will be converted as Water Reservoir and the refilled/reclaimed area will be afforested with native species.

Only a meager quantity of Clay (Others) will be used for quality corrections in the Cement Plant and balance Clay will be backfilled in the Lease area. Thus, **there will be no Top Soil/OB Dump**.

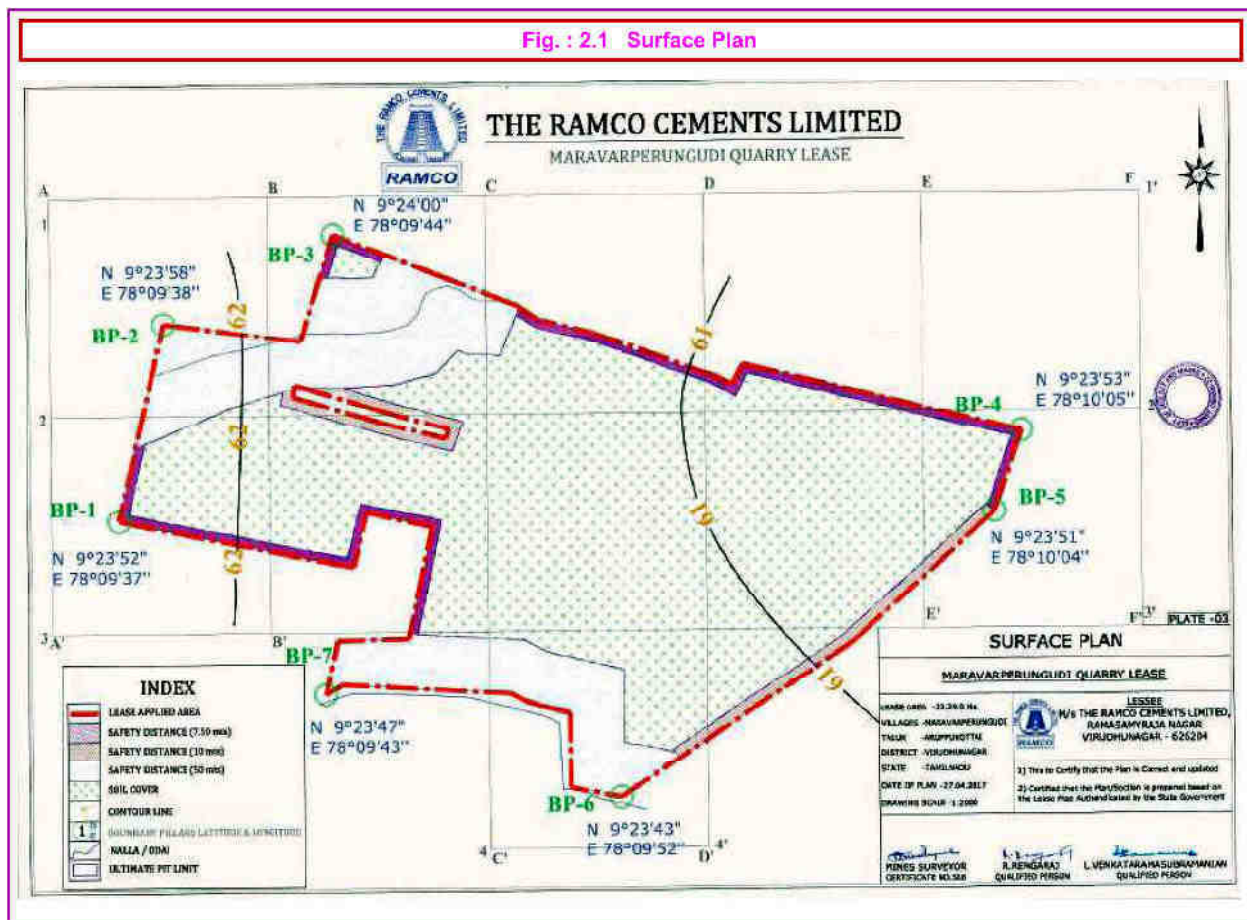


Since the mine is shallow in nature and the **mining will not intersect water table**. RCL has its own **black top road** for 14 km from existing Kankar Mine nearby to the centralized Crusher at Pandalgudi. Existing RCL Haulage Road will be extended to this Lease for transport of the Minerals.

Quarry Profile :

Proved Lime Kankar Reserves	:	0.529 Million Tonnes
Proposed Max. Production	:	0.254 MTPA + 0.011 MTPA Clay (Others)
Ore : OB Ratio	:	1 : 0.9
Life of the Mine	:	5 years
No. of working days/annum	:	330 (3 shifts)
Pit Configuration	:	20 m x 8 m strips
Bench height	:	-
Bench width	:	-
Bench slope	:	-
Ultimate Pit Limit-Conceptual	:	3 m (bgl); Top RL 62 - 60 m & Bottom RL 59 - 57 m
Ground Water-table at	:	20 m bgl (Post monsoon) & 25 m (Premonsoon) 42 m RL (Post monsoon) & 37 m RL (Pre monsoon)

Quarrying will not intersect the ground water-table.



It is assessed that about 4,76,438 Tons of OB will have to be removed in the Plan Period to win 5,29,375 Tonnes of Lime Kankar. The ratio of Ore to OB works out to be **1: 0.9**. About 23,000 Tonnes of Interstitial Clay will be utilized for cement manufacturing and balance 4,53,438 Tons OB will be refilled simultaneously in the Lease. There will be no Top Soil/OB Dump as the entire Top Soil will be refilled in the mined out pit simultaneously.

Mineral (Screened) Rejects of 2,91,156 Tons will be dumped separately on the mineral exhausted area within the Lease. Mineral Reject Dump Dimension at Conceptual Stage will be 140x90x9 m (height). About 2,38,219 Tonnes of Lime Kankar will be transported to Pandalgudi Crusher for further beneficiation and transportation to the Cement Plant. **Table 1** shows the production and development Quantity for the plan period.

Table : 1 Proposed Development & Production

Year	Development (OB Removal), Tons	Lime Kankar, Tonnes	Interstitial Clay Consumption from OB, Tonnes	Balance OB for Refilling, Tons	Kankar Qty, after Screening, Tonnes	Mineral (Screened) Rejects for Dumping, Tons
I	2,28,938	2,54,375	11,000	2,17,938	114468.8	1,39,906
II	61,875	68,750	3,000	58,875	30937.5	37,813
III	61,875	68,750	3,000	58,875	30937.5	37,813
IV	61,875	68,750	3,000	58,875	30937.5	37,813
V	61,875	68,750	3,000	58,875	30937.5	37,813
Total	4,76,438	5,29,375	23,000	4,53,438	2,38,219	2,91,156

The entire deposit will be exhausted in 5 years. The total area of the Lease is 23.29.0 Ha. At Conceptual Stage, 12.75.0 Ha will be the quarried area which will be backfilled, 4.04.0 Ha will be in Safety Barriers, 5.00.0 Ha Green Belt and 1.50.0 Ha is under Mineral Reject dump. The total Green Belt Area (including 4.00 Ha Safety Barrier Areas) will be about **9.00.0 Ha with 38.64% coverage**. About **3,600 Trees** (@ 400 Trees/Ha) will be planted. Predominantly, local species viz. Neem, Naval, Tamarind, Teak, Aval Vagai, Kodikai, Nettiingam, Pungai, Mangium, Arasan, Seetha, Vanni, Yellow Arali, etc. will be planted and maintained.

About 50 KVA industrial supply for lighting is required which will be met from TANGEDCO Grid. HSD @ 750 lits./day for quarrying equipments which will be stored in 200 Lits. barrels in the Lease Area. There will be **no standby DG** set for the QL operations. Screening Plant is presently being operated with 150 KVA from TANGEDCO Grid and is having its own standby 1x150 KVA DG Set.

Other than the Quarrying area, the site services include Quarry Office, **Rest Shelter**, First Aid Center, Store Room, Water Tank, Toilets, Security Shed, etc. All the above structures are of semi-permanent / permanent in nature. **No Township** is proposed as RCL is having a Colony at Pandalgudi. RCL is operating an Occupational Health Centre at the Factory and at Pandalgudi for supporting the health care needs of employees and their families as well as local Public on emergency. Periodic Health tests (Pulmonary test, Audiometric test, blood test, chest x-ray examination etc.) are being conducted every year for the employees.

The Mine will not have permanent installations of machine, but only mobile mining equipments. All the machinery including Screening Plant will be disposed-off or shifted to other operating mines on need based.

The Lime Kankar and Clay (Others) to be mined out from this Quarry are **Minor Minerals in an extent of 23.29.0 Ha** (<25 Ha) and falls in **Category B2 (without Public Hearing)** of Sl. No. 1(a) of EIA Notification 2006, as amended for prior Environmental Clearance (EC) from the State Level Environment Impact Assessment Authority-Tamil Nadu (SEIAA-TN). Thus, RCL had applied for prior EC on 31.01.2019 and Online Proposal No. is SIA/TN/MIN/93587/2019. However, the Authority has sought EDS and returned the Proposal on 24.04.2019 with direction to apply for TOR in compliance with a NGT Order. As directed, RCL has again submitted the TOR Application as Category B1 Proposal along with Form-1, Proposed TOR, Project Feasibility Report, Approved Mining Plan and DSR to the Authority to determine TOR for the EIA Study. The Proposal was deliberated by the State Level Expert Appraisal Committee-Tamil Nadu (SEAC-TN) as Item No. 25 in its 137th Meeting held on 18.10.2019 and recommended the TOR with Public Hearing. TOR for carrying out the EIA Study has been awarded by SEIAA-TN vide SEIAA-TN/F.No.6717/SEAC/TOR-670/2019 dated 19.11.2019.

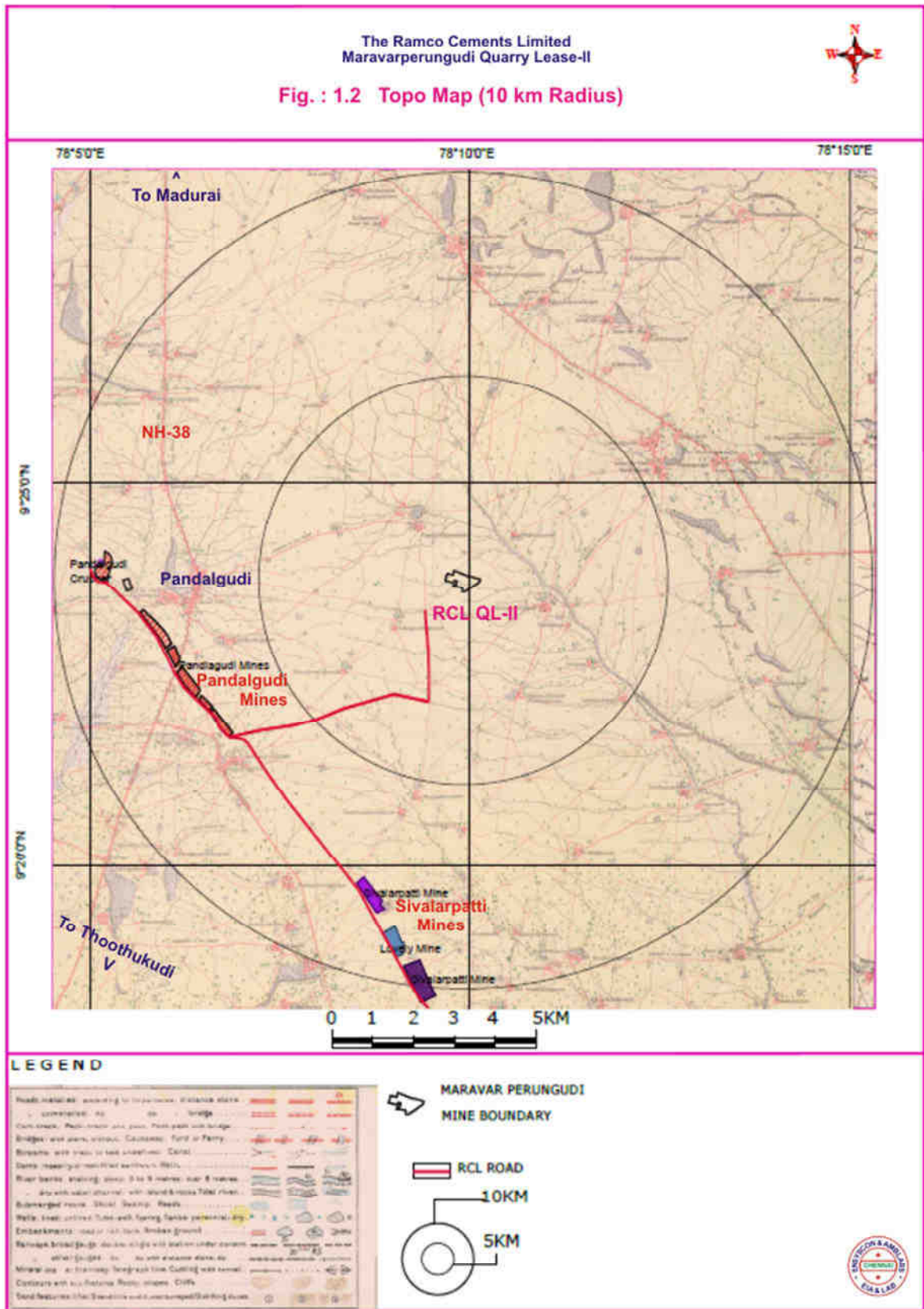
As informed the Authority and as per MoEF&CC OM dated 29.08.2017, the Baseline Data generated during **Mar.-May. 2019 (Summer Season)** are utilised for the EIA Report. The EIA Consultant, M/s. ABC Techno Labs India Private Limited, Chennai has been accredited for various Sectors including Sector-1 (Mining Projects) for Category 'A' by the National Accreditation Board for Education & Training (NABET), Quality Council of India (Sl. No. 4 of QCI/NABET List dated 20.01.2020). The ABC Techno Labs India Private Limited Laboratory is accredited by the National Accreditation Board for Testing and Calibration Laboratories (NABL) and also recognised by MoEF&CC. The services of M/s.Environmental System Consultants & Ambiente Lab Solutions Private Limited, Chennai are utilised for the coordination of the Study on behalf of RCL. The **EIA Report has been prepared and submitted as per awarded TOR** and also as per the generic structure proposed in EIA Notification 2006. The Summary EIA Reports (both in English and Tamil) along with Draft EIA Report have been submitted for conducting the Public Consultation/Public Hearing.

2.0 Description of the Environment

2.1 Environmental Setting

The Maravarperungudi Lime Kankar Quarry Lease II is located in Maravarperungudi village between the Coordinates 9°23'43" - 9°24'00" N Latitudes and 78°09'37- 78°10'05" E Longitudes; Survey of India Topo sheet No.58 K/3 (**Fig. 1.2**). The site is free from seismic effects (Seismic Zone III). There is no environmental issue about the Quarry location. 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 site boundary.**

The general elevation of the QL area is 60-62 m aMSL. Seasonal **Uppu Odai** drains the region (flows at 0.9 km in Northeast). Seasonal Vaippar River flows at a distance of 20.5 km in Southwest. Gulf of Mannar is at 41.0 km in SE and Gulf of Mannar Marine National Park is at 47.0 km distance in SE. Thus, the Quarry Lease **does not fall in CRZ Area**. Also, there is no Inter-State Boundary within 5 km radius.



Single crop (dry) occupies larger part of the study area. The current land use of the proposed QL area is predominantly rainfed one season dry crop and undeveloped/barren land. The distance of the nearest village Koppuchitampatti is about 1.1 km in northwest and Maravarperungudi is at 1.3 km in east-southeast from the Lease boundary. Pandalgudi is at 5.2 km in W. Taluk Headquarters Aruppukottai Town is at 13.0 km in north-northwest and District Headquarters Virudhunagar is at 28.5 km in NW direction from the Lease Area.

Madurai-Thoothukudi Section of NH-38 passes at a distance of 5.0 km in the West. A road from Pandalgudi is passing through the Lease Area to Koppuchithampatti and Maravarperungudi villages which is also connected to the RCL dedicated Mine Haulage Road. Southern Railway Line of Virudhunagar-Aruppukottai-Manamathi Section runs at 14.2 km distance in N from the Lease Area. Madurai Airport is at 48.0 km in NNW direction, Thoothukudi Airport is at 75.0 km in SSW and Chennai Airport is at 452 km in NE. VOC Port at Thoothukudi is at 70.0 km in S direction from the Lease Area.

From Maravarperungudi Quarry Lease II (23.29 Ha), Maravarperungudi Quarry Lease I (498.87 Ha) is located at a distance of 4.5 km in SE, Maravarperungudi Quarry Lease III is adjacent, T.Koppuchitampatti Quarry Lease IV (294.18.5 Ha) is at 3.1 km in WNW and Vadakkunatham Quarry Lease V (123.26.5 Ha) is at 8.7 km in SE direction.

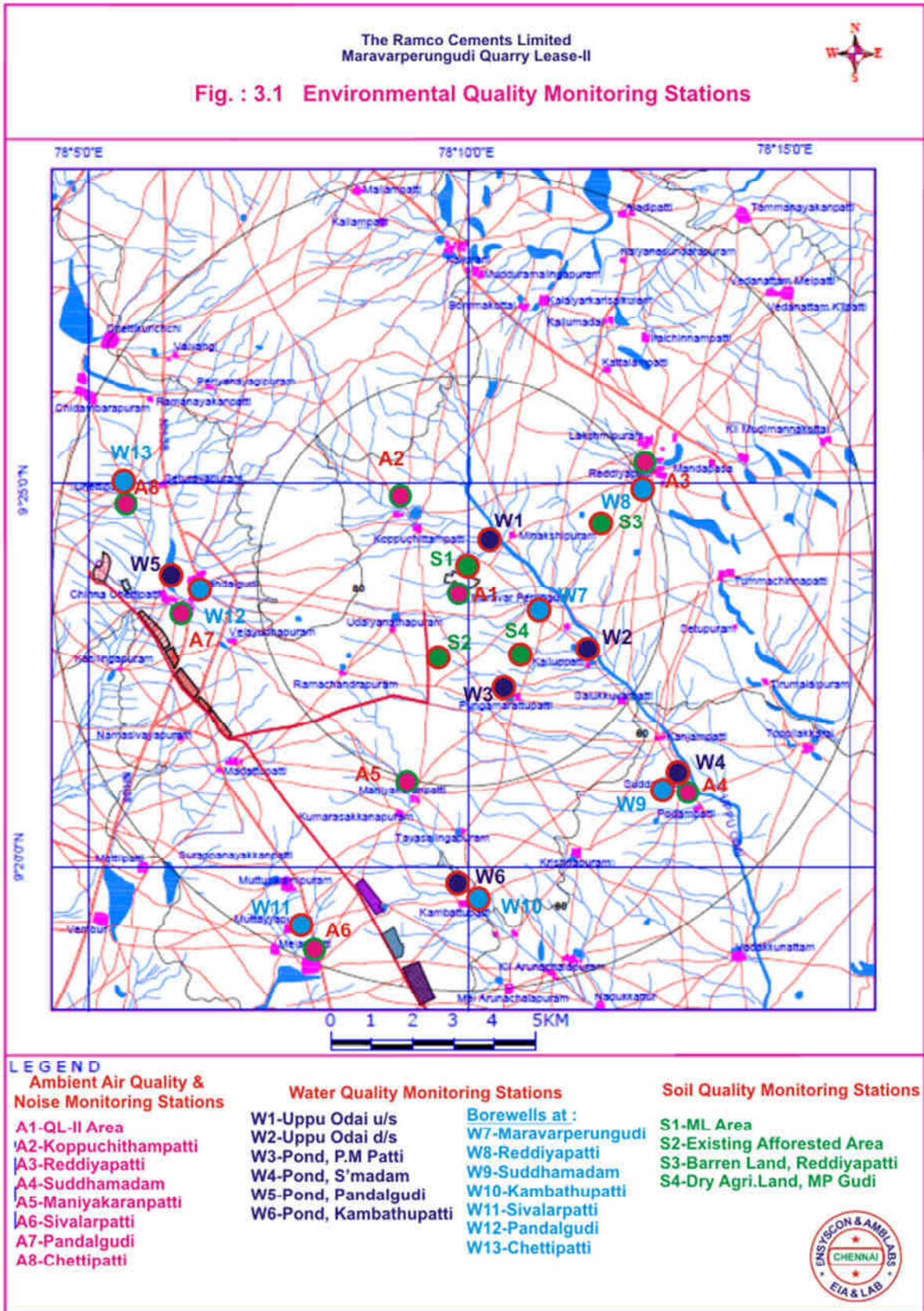
2.2 Baseline Environmental Status

The study area of 10 km radius (from QL boundary) (**Fig. 3.1**) has been considered for assessing the baseline environmental status. The Study Area falls in Virudhunagar, Thoothukudi and Ramanathapuram Districts of Tamil Nadu. Project **Area does not fall in Critically Polluted Industrial Clusters** listed by CPCB.

RCL Captive Mines are the main Industry in the region. These Captive Mines are located at a distance of 0.5 km to 14.0 km from the Pandalgudi Crusher. Sree Parameswari Spinning Mills is located at Pandalgudi. The India Cements Ltd. (ICL) was operating its Captive Mines at Maravarperungudi in Virudhunagar District and Maniakaranpatti in Thoothukudi District (now in Closure Stage). Other than the Captive Limestone Mines, **there are no major industries** in the Region. Suddhamadam Solar Power Project exists near the Quarry Lease (@5.5 km in SE).

The monitoring stations are selected in such a way that the baseline environmental data reflects the **Cumulative Impact of existing Industries/Mines** in the Study area.

The area is almost flat and plain terrain with a gentle slope towards southeast. There is no hillocks noticed in the study area. The general elevation of the QL area is **60-62 m aMSL**. There is no major River course in the Lease vicinity (10 km radius). Seasonal **Uppu Odai** drains the region (flows at 0.9 km in Northeast). **Seasonal first and second order streams** (North-East, South-West Odai and East-West odai) are originating from the QL Area and joins the Uppu Odai so as to confluence with Vaippar River in the south. As the seasonal streams flow 5-10 m below from the QL, there is **no flood risk** to the Lease. There are rainfed irrigation tanks and ponds in the study area.



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 Micro-meteorological Data from Core Zone for a Season on wind speed, wind direction (wind roses), temperature, humidity, cloud cover, atmospheric pressure, rainfall, etc.
- ❖ Ambient Air Quality Monitoring at 8 locations on 24-hourly basis, continuously for 2 days in a week for 4 weeks in a month for a season for the parameters PM_{2.5}, PM₁₀, SO₂, NO_x, CO, NH₃, O₃, Particulate Lead, etc. as per NAAQ Norms (**Revised as per GSR 826 (E) dated 16.11.2009** for Industrial, Residential, Rural and other Areas).
- ❖ Noise Level Measurements at all air quality monitoring station for Leq, L-day and L-night values once in the season.
- ❖ Water Quality Monitoring – grab sampling once in the Season for : Surface Water (6 locations) as per CPCB Norms; Ground Water (7 Locations) as per IS:10500 Norms & Existing Mine Pit Water (3 Mines).
- ❖ Soil Quality Monitoring at 4 locations once in the Season for: Textural & Physical Parameters; Nutrients.
- ❖ Land use pattern based on Satellite Imagery.
- ❖ Biotic Attributes for : Flora & Fauna - Core zone & Buffer zones
- ❖ Socio-Economic Profile, based on 2011-Census and also Household Survey, once in the study period for : Total Population / Household Size / Age, Gender Composition, S.C / S.T, Literacy Level, Occupational Structure, etc.

The summary of baseline status is given in **Table 2**.

Table : 2 Environmental Baseline Status

Envl. Component	Parameters	Minimum	Maximum	Mean	Applicable Norms
Ambient Air Quality (24-hly), ug/m ³	PM2.5	10	24	13.8	60
	PM10	16	46	24.6	100
	SO ₂	6	14	8.2	80
	NO _x	6	18	9.4	80
Ambient Noise, dB(A)	Leq-day	39.3	43.7	41.0	55
	Leq-night	37.2	40.8	38.5	45
Surface Waters, mg/l	TDS	420	510	-	500/2100
Ground Waters, mg/l	TDS	470	590	-	500-2000
Soil Status	Texture	-	-	Silty Loam	-
	EC, mmhos/cm	1.08	1.56	-	0.2-0.5
	SAR	2.14	3.08	-	<5

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) 24-hourly Norms of 60 ug PM_{2.5}/m³, 100 ug PM₁₀/m³, 80 ug SO₂/m³ and 80 ug NO_x/m³ for Industrial, Residential, Rural and other areas.
- ❖ The Baseline Air Quality in the Study Area is to be having GOOD AQI Index.
- ❖ 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 CPCB Norms. The ground water quality was found to be in compliance with the IS:10500-2012 Norms.
- ❖ The soil in the study area would very well support vegetation after amending it suitably.
- ❖ 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.

3.0 Anticipated Environmental Impacts

Any Project would create impact on the environment in two distinct phases viz. Construction Phase which may be regarded as temporary & short term and Operation Phase which would have long term effects. The impacts have been divided into two categories, viz. **Localised and Cumulative**. Localised impact is confined to the area of influence of the project and is not transmitted beyond its area. On the other hand, cumulative impact is the aggregate impact of a number of projects on any component. **Cumulative impacts** can result from individually minor but collectively significant actions taking place over a period of time. The impacts have been assessed for the Project assuming that the **pollution due to the existing mining activities has already been covered under baseline environmental status** and continue to remain same till the operation of the project.

3.1 Construction Phase

Being a Mine Project, it **does not involve any major establishment or construction**. A small Mine Office will be constructed on **temporary structures**. Also, the existing screening system established in the currently operating mining lease will be shifted to this quarry lease area, as such till the Wet Beneficiation is commissioned. Required water demand of 2 cu.m/day during establishment will be sourced from existing exhausted Mine Pits in Pandalgudi Region. As local labourers to be engaged during establishment period, there will be no domestic sewage generation in Construction Phase. Also, there will not be any solid wastes generation and its disposal during that period.

3.2 Operation Phase

Land Use : Maravarperungudi Lime Kankar Quarry Lease-II is a new Captive Lease with quarrying proposed upto a depth of 3.0 m BGL (shallow quarry). **Non-Conventional Opencast Mechanized Strip Mining, without Drilling and Blasting**, will be adopted. The entire deposit will be exhausted in 5 years. The deposit will be mined by a simple system of **simultaneous development, production and refilling** by the same excavator. Thus, **there will be no Top Soil/OB Dump as the entire OB will be refilled in the mined out**

pit simultaneously. Mineral reject waste will be dumped on the mineral exhausted area within quarry lease. The entire deposit will be exhausted in 5 years.

Mitigating Measures :

- ❖ Earthen bunds shall be provided along the boundaries to arrest wash-offs.
- ❖ **Garland drains** shall be constructed around the Lease.
- ❖ **Maintenance of garland drains** at foot of dump shall be done.
- ❖ Green Belt shall be developed and maintained along the Lease boundaries and foot & unused slopes of the Reject Dump to arrest / prevent erosion.
- ❖ Simultaneous backfilling of developmental wastes shall be done, Topsoil shall be spread as top capping in the reclaimed areas and afforested.
- ❖ The balance part of excavated quarry shall be converted into a water reservoir.
- ❖ The **water reservoir would be used for Rain Water Harvesting** for the benefit of nearby villagers.

Traffic Volume : All the vehicles using NH-38 are plying through Pandalgudi Bypass and the entry & exit to Pandalgudi Village are restricted ones. The existing traffic volume in the Project vicinity was found to be 619 PCU/day. In the Post-Project Scenario, there will be an addition of 74 vehicles to the existing traffic in the vicinity. **The net increase (cumulative) will be 568 Vehicles and 651 PCU/day only.** The existing Haulage Road is adequate to handle the proposed addition of traffic volume. Adequate parking are provided and **there will not be any outside Truck Parking.** Facilities for **drivers (rest room, toilet, etc.)** is also provided.

Mitigating Measures :

- ❖ Ore transporting Tippers to be fully covered with Tarpaulin.
- ❖ Green Belt with thick foliage along the haul roads.
- ❖ Regular wetting of haul roads to arrest the fugitive emissions.
- ❖ Restriction of over loading.
- ❖ Speed restrictions.
- ❖ Security Guards shall be placed at the Public Road-Mine Haulage Road Junction to handle the inward and outward vehicles.
- ❖ Restriction of Truck parking in the Public Road.
- ❖ Regular and preventive maintenance of transport vehicles.
- ❖ Compliance to 'Pollution under Control' Certification.

Air Quality : The Baseline Air Quality in the Study Area is to be having GOOD AQI Index. These Mines Development Quantity will be about 14,620 TPD and the Production will be about 8,200 TPD. Fugitive emissions have been predicted by using standard equations given in "Indian Mine and Engineering Journal" and suggested by USEPA (Emission Factors as referred in AP-42) for mining & allied activities.

Prediction Modelling : AERMOD View Software is used for the Prediction Modelling. These models are used extensively to assess pollution concentration and deposition from a wide variety of sources. The respective Input values are used for individual Mine and Quarry for running the Model. The maximum GLC (Cumulative) predicted PM is 28.96 ug/m³. The **maximum incremental GLC of PM10 due to Cumulative Operations of all operating Mines is 2.90 ug/m³.** As per the prediction, **Adequate Buffer (72.50%) for PM10 exists** in the Air Environment for the proposed QL Production activity. The predicted value will

not have any significant impact on the Air Environment. Other pollutants SO₂ and NO_x emissions due to mining activities will be insignificant. The predicted Ground Level Concentrations (GLCs) (cumulative impact) of PM10 due to Transportation is **6.66 ug/m³**. Thus, the Transport/Traffic Impact due to these Mining operations are insignificant.

Mitigating Measures : Fugitive Dust generation in the Lease areas shall be controlled by :

- ❖ Water sprinkling on the surface mining, loading point, haul roads, etc.
- ❖ Wetting of haul roads periodically.
- ❖ Green belt development along the periphery, haul roads, waste dumps, etc.
- ❖ Avoiding over loading of trailers/tippers.
- ❖ Covering of trailers/tippers with tarpaulin during transportation.
- ❖ Periodical maintenance of trucks/trailers.
- ❖ Periodical check up of vehicles for 'Emission Under Control' measures.
- ❖ Periodical maintenance and replacement of worn out accessories in the mine equipments.

Noise & Vibration : **There is no Drilling and Blasting in this Quarry and thus, no vibration.** The source of noise are due to running of HEM Machineries, Screening Plant, loading and transportation of Kankar by Tarus Tippers. The noise levels due to the HEM operations would be maintained at <85 db(A) at a distance of 1.5 m from the sources. In general, noise generated by these sources will be within the limit of 90 dB(A) prescribed by Director General of Mines Safety (DGMS), Dhanbad. The work force will be exposed to <85 dB(A) levels during the 8-hours Shift. Ambient Noise level at the boundaries would be maintained <55 dB(A) during day times and <45 dB(A) during night times, well within the MoEF Norms for Residential and Rural Areas.

Mitigating Measures :

- ❖ Deploying HEM equipments shall be with in-built mechanism for reducing noise.
- ❖ Provision of silencers to modulate the noise generated by the machines.
- ❖ Providing sound proof operator's cabin of equipments.
- ❖ Provision of ear muffs/ear plugs to the Workers in higher noise zones.
- ❖ Green Belt with thick foliage along roads and around lease boundary to act as acoustic barriers.

Water Environment : As it is a shallow mining upto a depth of 3.0 m BGL and simultaneous refilling is proposed, **there will not be any water seepage in the quarry strips.** The Lease requires about 2 cu.m/day drinking water for domestic consumption which will be supplied from the RO Plant at Pandalgudi Mine. Domestic sewage generation will be about 1.8 cu.m/day which will be biologically treated in a Septic Tank followed by a Dispersion Trench. **No workshop** is proposed and thus, **no effluent generation** from the Mine. The Lease will also require about 2 cu.m/day for Dust suppression Haulage Road within the Pit Area and another 16 cu.m/day for the development and maintenance of Green Belt. The required water will be sourced from existing exhausted Captive Mine Pits in Pandalgudi Region.

Proposed Mitigating Measures :

- ❖ Construction of Bunds around the Lease and water drains to prevent soil erosion and uncontrolled descent of water.
- ❖ Maintenance of garland drains around quarry area with proper gradients to prevent rain water descent into active mine areas.

- ❖ Earthen banks shall be provided on non-operating side of Reject dump to arrest wash-off.
- ❖ Saplings shall also be planted along the foot and unused slopes to arrest / prevent erosion.
- ❖ The backfilled area will be afforested with native tree species. The rest of excavated area will act as water reservoir.

Biological Environment : There is no Eco Sensitive Zone (ESZ) in the Region. Only Native Flora and Fauna exists. Ecological Status of the area are covered in the EIA Report in detail. Schedule-I Species Indian Pea Fowl (*Pavo cristatus*) is commonly found in the region. The birds are observed to be socially moving in these areas along with the human population. The Conservation Plan for Indian Pea Fowl has been prepared in consultation with the Forest Department and submitted. About 186.950 Ha will be under Green Belt (coverage 27.73%) and Afforested Area at Conceptual Stage will be 97.805 Ha (14.50%). Thus, **total Green Belt in the Region will be 284.755 Ha (42.24%).**

Green Belt to an extent of 137.290 Ha has been developed and 125.140 Ha is to be developed and maintained at these Mines. The Green Belt Coverage ranges from 14.33% to 59.01% at these Mines and **38.43% overall**. Predominantly, local species are planted viz. Neem, Naval, Tamarind, Teak, AvalVagai, Mango, Guava, Kodikai, Nettiingam, Pungai, Arasu, Seetha, Vanni, Yellow Arali etc.

Mitigating Measures :

- ❖ Green Belt with native species shall be developed all along the boundaries, haul roads, waste reject dump, etc.
- ❖ Stabilization of reject dump and proper vegetation cover shall be done.
- ❖ Garland drains shall be provided around the dump to arrest soil erosion.
- ❖ Afforestation in the reclaimed areas, as proposed, shall be undertaken.

Occupational Health : The possible diseases likely to be associated with quarrying operations are :

- ❖ Mild silicosis which unattended, can turn into chronic type.
- ❖ Silico-tuberculosis
- ❖ Dust related pneumonia
- ❖ Eye diseases with irritation of eye, etc.

RCL is committed to provide a safety & healthy working conditions and continually improve the occupational health and safety performances. RCL's objectives are : 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. RCL is also providing the ergonomic support in work comfortness with periodical review. Adequate care will be exercised to detect early incidences of above diseases, if any, for prompt treatment and cure. Safety aspects are also ensured to reduce incidents, if any.

Proposed Mitigating Measures :

- ❖ All employees will undergo check-up on recruitment and periodically during employment. Maintenance of Pre, during & Post Employment Records.
- ❖ Standard operating procedures for all occupations and operations with respect to occupational safety and health will be provided.
- ❖ Provision of ergonomically designed seats for drivers/operators

- ❖ Provision of illumination facilities at proper places of mines for ease of working during night times.
- ❖ Work comfort and its periodic review by a committee.
- ❖ Provision of all Personal Protective Equipments for the employees at Mines.
- ❖ Provision of Rest Shelter at mines.
- ❖ Provision of cool drinking water (from RO Plant) in dining rooms.

Socioeconomics : These existing and proposed Mines in Pandalgudi Region provide Direct Employment to about 152 Persons and Indirect Employment to about 273 Persons. Out of 425 total Employees in these Mines, more than 80% are from local villages. QL-II will provide **direct employment to about 13 persons and 10 persons indirectly**. The Proposal will be beneficial and important to the Society and the Country by way of :

- ❖ Royalty to the Exchequer.
- ❖ Improved local and regional economy.
- ❖ Direct and indirect employments.
- ❖ Improvement in direct and indirect means of livelihoods of local population.

A budget of 2% of the Project Cost will be allotted as **CER Budget**. In addition, for the mandatory **District Mineral Fund (DMF @ 10% of Royalty Amount)** will also be contributed. The direct & indirect employment, CER & CSR activities, etc. will have a positive impact on the Occupational Structure of the area.

Mitigating Measures :In responses to the need based assessment study, the following social measures are proposed for the society :

- ❖ Joining Hands with District Administration in implementing Govt. Schemes and local developments.
- ❖ Committed for Infrastructure Facility in the Region.
- ❖ Financial support to Govt. Schools.
- ❖ Provision of Ambulance for the villages and other medical facilities.
- ❖ Contribution to Education in the area.
- ❖ Carrying out various welfare activities for the benefit of the local population.

4.0 Environmental Monitoring Programme

For effective implementations of Environmental Management Plan (EMP), RCL has the Environment Monitoring Cell under the overall supervision of the Unit Head. Mines Manager, Geologists and Horticulturists form part of the Cell. RCL has provided One Online Ambient Air Quality Monitoring Station for the existing Mine which is electronically linked with CPCB/CARE Air Centre of TNPCB.

The quality of air, noise, water, soil, etc. shall be monitored at the identified locations as per MoEF&CC/TNPCB Norms by appointing an accredited external agency. The status reports shall be submitted to MoEF&CC Monitoring Cell, IBM and TNPCB periodically.

5.0 Additional Studies

Detailed risk assessment and mitigative measures are delineated and an effective Disaster Management Plan, for natural and man-made disasters, is also submitted.

6.0 Project Benefits

Environmental Benefits : Effective utilization of Minor Minerals for blending with raw materials in Cement Manufacturing as Mineral Conservation Measure.

Financial Benefits : The Project will bring **Rs.0.90 Crores** investment to the Region. Improve the local and regional economy. Royalty and other Taxes to the Exchequer. Contribution to District Mineral Fund (DMF) @ 10% of Royalty.

Social Benefits : The mine will **employ about 13 persons directly and 10 persons indirectly**. The total Project Cost is Rs.0.90 Crores. A budget of 2% of the Project Cost will be allotted as **CER Budget**. In addition, for the mandatory **District Mineral Fund (DMF @ 10% of Royalty Amount)** will also be contributed. The direct & indirect employment, CER & CSR activities, etc. will have a positive impact on the Occupational Structure of the area.

7.0 Environmental Management Plan

Environmental Management Plan (EMP) are suggested to mitigate the possible negative impacts that may be caused to the various attributes of environment due to the proposed quarrying operations.

7.1 Land Environment

Adopting suitable, site-specific, mitigation measures will reduce the degree of impact of quarrying on land which are described below :

- ❖ Implementing adequate protection and conservation plan to conserve Top Soil till its utilisation fully.
- ❖ Top Soil storage should be given minimum storage time to prevent nutrient loss.
- ❖ Planning & Identification of Waste Dump Area based on slope and runoff characteristics.
- ❖ External Dump shall be avoided.
- ❖ Earthen banks shall be provided on the periphery and non-operating side of dumps to arrest wash-offs.
- ❖ Siltation of agricultural land should be prevented. Garland drains with Check Dams shall be provided at the dump slopes to arrest/control soil erosion.
- ❖ Dump should be stabilized by mechanical and biological reclamation with suitable plantations.
- ❖ Non-mineral zones and open areas should be planted with trees.
- ❖ Run-offs from the Quarry and Waste Dump should be prevented to avoid being discharged to surroundings, particularly to agricultural land.
- ❖ Garland drains, ditches, catchpits in different combinations should be provided to prevent run off

affecting the surrounding agricultural land.

- ❖ Saplings shall also be planted along the foot of the dumps and unused slopes to arrest / prevent erosion.
- ❖ The solid wastes shall be backfilled in the quarried areas and the land will be restored to its original conditions.
- ❖ The topsoil will be spread as top capping in the reclaimed area to improve the growth of vegetation.
- ❖ An effective Afforestation (with predominantly native species) shall be done in the Backfilled areas.

7.2 Air Environment

- ❖ Eco friendly quarrying shall be adopted.
- ❖ Green belt (3 to 5 tiers) shall be developed along the periphery, haul roads, waste dumps, etc.
- ❖ Fugitive emissions control during mining, loading, unloading and transportation activities shall be practiced.
- ❖ Water sprinklers shall be installed along the haul roads and operated to suppress the dusts.
- ❖ Over loading of trucks shall be avoided.
- ❖ Ore shall fully be covered with Tarpaulin on transportation.
- ❖ Regular and preventive maintenance of transport vehicles shall be undertaken.
- ❖ Transport vehicles shall be in compliance with emission norms.
- ❖ Periodical maintenance and replacement of worn out accessories in the compressor and drill equipments.
- ❖ Personal Protective Equipments shall be provided to the Workers.

7.3 Noise Levels

- ❖ Deploying quarrying equipments shall be with in-built mechanism for reducing noise.
- ❖ Sound proof operator's cabin of equipments shall be provided.
- ❖ Ear muffs/ear plugs shall be provided to the Workers in higher noise zones.
- ❖ Green Belt with thick foliage shall be developed around lease boundary, haul roads, etc. to act as acoustic barriers.

7.4 Water Environment

- ❖ Natural drains or nallahs should not be disturbed.
- ❖ The existing Pre-mining Drainage Pattern should be maintained to the extent possible so that run Post Project Runoff distribution is not affected.
- ❖ Runoffs from the Quarry and Waste Dump should be regulated by constructing garland drains.
- ❖ All the garland drains should be routed through adequately sized catchpits or settling pits to remove suspended solids from flowing into storm water.
- ❖ The design of catchpits should be calculated on the basis of silt loading, slope, detention time required, etc.

- ❖ Settling pits and Garland drains should be periodically desilted.
- ❖ The ground water recharge measures should be done.
- ❖ The workshop wastewater, if any, should be suitably treated for suspended solids and oil and grease in compliance with TNPCB Norms and utilized for Green Belt development..

7.5 Biological Environment

- ❖ Greenbelt development as per the scheduled Plan should be reviewed every year.
- ❖ Post plantation status should also be regularly checked every season.
- ❖ Following plantation related data / information should be kept and compiled every year:
 - ✓ Area under plantation or afforestation.
 - ✓ Period of plantation
 - ✓ Type of plantation viz. Trees, Grass, any others.
 - ✓ Type of plant saplings/seedlings/grass species/scrub species planted.
 - ✓ Distance between plants and Coordinates.
 - ✓ Type & amount of fertilizer used
 - ✓ Interval of watering
 - ✓ Method and period of post plantation care
 - ✓ Survival Rate
 - ✓ Density of afforested area (i) Pre-mining condition (ii) Post-mining conditions.

Conservation Plan for Peafowl

Since the project is not falling within 10 km radius of any of the National Parks, Sanctuaries, Biosphere Reserves, etc., there is no need for obtaining clearance from the State Wildlife Board / National Wildlife Board. However, there is need for preparation and submission of the Peafowl Conservation Plan for Schedule I Fauna, Peafowl since the Peafowl are found inhabiting the proposed Study area. Accordingly, the Peafowl Conservation Plan has been prepared and submitted

Proposed Conservations : The following measures are proposed for conservation of the species:

- ❖ Control of Air Pollution, water pollution, noise and other environmental parameters.
- ❖ Habitat improvement,
- ❖ Conservation or Restoration of Water bodies,
- ❖ Garbage Management,
- ❖ Conservation Education.

Budget for Peafowl Conservation : The capital cost of the Project is Rs.0.90 crores. An amount of **Rs.4.00 Lakhs has been earmarked as Capital EMP Budget and Rs.3.00 Lakhs per Annum is the Operating Cost towards EMP** measures, Green Belt maintenance, Environmental Monitoring, etc. The proposed **budget for Peafowl Conservation Plan will be Rs.4.00 Lakhs** till the end of quarry life. This plan will be

executed and implemented through the Unit Head of RR Nagar Cement Plant and GM (Mines). Necessary guidance from Forest Department Officials will also be taken. After 5 years, the budget may be reviewed in the field based on rates prevailing at that time and other conditions. Proactive approach of The Ramco Cements Limited in these aspects will ensure habitat restoration, biodiversity conservation in the region.

7.6 EMP Budget

The total Project Cost is Rs.0.90 Crores. An amount of **Rs.4.00 Lakhs has been earmarked as Capital EMP Budget and Rs.3.00 Lakhs per Annum is the Operating Cost towards EMP** measures viz. Green Belt maintenance, Environmental Monitoring, etc. A budget of **2% of the Project Cost i.e. Rs.1,80,000/- will be allotted as CER Budget (Table 3).**

Table : 3 CER Budget

Name of the Village	Particulars	Amount
Maravarperungudi, Koppuchithampatti Suddhamadam	Education –Repairs and Maintenance of school buildings	Rs.1.80 Lakhs
	Up-gradation and support to Primary Health centres	
	Renovation by de-silting of water bodies & Water Supply for surrounding Villages	
	Maintenance of Village Roads, construction of shelter for Bus stops	
	Skill Development - Training of Village Women for self-employment, facilitating the educated youth to be supported through NEEM schemes.	
	Plantation in Villages	

In addition, for the mandatory **District Mineral Federation (DMF) @ 10% of Royalty Amount** will also be contributed. The **budget for Public Hearing issues** will also incorporated in the CER Budget.

The **Final Closure Plan** for Refilling, reclamation and afforestation activated (which are carried out simultaneously with quarrying) will be **Rs.2.65 Lakhs.**
