



The Ramco Cements Limited

Proposed Maravarperungudi Lime Kankar Quarry Lease-I & Vadakkunatham Lime Kankar Quarry Lease-V (in Cluster)

Details	Quarry Lease-I	Quarry Lease-V
Extent	498.87.0 Ha	123.26.5 Ha
Proposed Production	ROM @ 1.333 MTPA or Clean Kankar @ 0.6 MTPA & Clay-others @ 0.06 MTPA	ROM Lime Kankar @ 0.5 MTPA & Clay @ 0.025 MTPA
Village	Suddhamadam	Vadakkunatham
Taluk	Aruppukottai	Aruppukottai
District	Virudhunagar	Virudhunagar
State	Tamil Nadu	Tamil Nadu

Environmental Clearance under EIA Notification 2006
Schedule SI. No. 1(a); Category 'B' as per MoEF&CC Notification SO 1886(E)
dated 20.04.2022 (Minor Mineral Quarries in Cluster)

Summary Environmental Impact Assessment Report (after TOR for Common Public Hearing)

Awarded TORs (by MoEF&CC)

QL-I : F. No. J-11015/39/2019.IA.II(M) dated 15.05.2019

QL-V : F. No. J-11015/40/2019.IA.II(M) dated 14.05.2019

August 2022

EIA Consultant

ABC Techno Labs India Private Limited, Chennai

Certificate No.: NABET/EIA/1922/RA0155 validity extended to 07.11.2022

(SI. No. 3 of QCI/NABET List dated 05.07.2022)

The Ramco Cements Limited
 Proposed Maravarperungudi Lime Kankar Quarry Lease-I &
 Vadakkunatham Lime Kankar Quarry Lease-V (in Cluster)
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 Fiber 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 Ramco Cements Limited (RCL) (formerly M/s. Madras Cements Limited), under Ramco Group, is one of the reputed Cement Companies in India. The Company is the Second Largest cement producer in South India and sixth largest manufacturer of cement in the Country. The cement production of RCL is about 17.70 million tons per annum (MTPA) from their **Cement Plants** in India.

- ❖ Ramasamy Raja Nagar near Virudhunagar, Tamil Nadu (established in 1961) - 2.0 MTPA (2 Lines) and being expanded with 3rd Kiln - 2.7 MTPA cement.
- ❖ Kumarasamy Raja Nagar, near Jaggayapeta, Andhra Pradesh (1986)-3.65 MTPA (3 Lines).
- ❖ Alathiyur near Vriddhachalam, Tamil Nadu (1997): 3.0 MTPA (2 Lines).
- ❖ Mathod near Chithradurga, Karnataka : 0.3 MTPA (2000; not in operation now).
- ❖ Govindapuram near Ariyalur, Tamil Nadu-5.5 MTPA (2009) (2 Lines).
- ❖ Kolimigundla, Andhra Pradesh (Clinker Capacity -3.15 MTPA).

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

- ❖ Kolaghat (2.0 MTPA) in West Bengal.
- ❖ Kattuputtur (0.75 MTPA) near Chennai, Tamil Nadu.
- ❖ Valapadi (2.0 MTPA) near Salem, Tamil Nadu.
- ❖ Vizag (2.0 MTPA) near Anakapalli, Andhra Pradesh.
- ❖ Haridaspur (0.9 MTPA), Jajpur District, Odisha.

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

RCL is producing Ordinary Portland Cement (OPC), Portland Pozzolana Cement (PPC), Slag Cement (PSC), Composite Cement (CC), Masonry Cement (MC), etc. The cement produced by RCL is marketed in the brand name of 'RAMCO'. The market centers are mainly in Tamil Nadu, Andhra Pradesh, Telangana, Kerala, Karnataka, Odisha and West Bengal States.

RCL which has always been striving for Total Quality, possesses International Certificate **ISO:9001, ISO:14001, ISO:45001 and ISO:50001**. The company has achieved various awards for '**Best Performance**' in the Cement Industry.

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 RCL Corporate Office is :

Shri.M.Srinivasan,
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 is operating its Ramasamy Raja Nagar (RR Nagar) Cement Plant for 2.0 Million Tonnes per Annum (MTPA) (being expanded to 2.7 MTPA) cement capacity at Tulukkappatti, Thammanayakkanpatti and Vachchakkarappatti Villages, Taluk & District Virudhunagar. Its Limestone requirements are met from Captive Limestone Mines in Pandalgudi Region. These Captive Mines are located at a distance of 17-32 km in southeast direction from RR Nagar Cement Plant. The Common Centralised Crushing Plant with Optical Ore Sorting Facility (2.0 MTPA Throughput capacity) are located at Pandalgudi.

The Contact Information of RR Nagar Cement Plant is :

The President (Mfg.),
The Ramco Cements Limited,
Ramasamy Raja Nagar Post,
Virudhunagar District,
Tamil Nadu-626 204.
Tel. Nos. : 04562-256201 to 256203; Fax-04562-256268
Email : srl@ramcocements.co.in

1.2 Project Profile

RCL has recently received Precise Area Communications for Five (5) Nos. Lime Kankar Quarry Leases (Minor Mineral) in Virudhunagar District from the State Government which have about 22.42 Million Tonnes Kankar Reserves. These Lime Kankar Deposits, are shallow occurring secondary origin, formed due to capillary rise of the Lime bearing rocks in solution cavities.

Lime Kankar is suitable as a sub-grade mineral for addition in the Raw Mix in Cement manufacturing. ROM Kankar is occurring with impurities of Siliceous Clay and Quartz. It has low quality sub grade mineral with 25% Silica (max.) and 32% CaO. Thus, Lime Kankar (ROM) has to be Upgraded/Beneficiated for its quality as with Silica at 12-15% and CaO at 41-44%. Accordingly, RCL has proposed Pandalgudi Lime Kankar Beneficiation Plant (Throughput Capacity 2.00 MTPA) as a centralised Stand Alone Facility near centralized Crusher.

The existing Captive Limestone Mines at Pandalgudi and Kankar Mine at Maravarperungudi are nearing Conceptual Stage. RR Nagar Cement Plant has to sustain by blending the Limestone with low grade Lime Kankar. Thus, RCL is proposing Lime Kankar Quarrying from awarded Leases in Pandalgudi Region. Accordingly, RCL now proposes the following **2 Kankar Quarry Leases which are (homogeneous Mineral) in Cluster** i.e. located at 0.1 km distance between them:

1. **Maravarperungudi Lime Kankar Quarry Lease-I - Extent 498.870 Ha; Proposed Production – Run-Off Mine (ROM) @ 1.333 MTPA or Clean Kankar @ 0.6 MTPA after Beneficiation and Clay (Others) @ 0.06 MTPA.**
2. **Vadakkunatham Lime Kankar Quarry Lease V - Extent 123.265 Ha; Proposed Production – ROM Lime Kankar 0.5 MTPA & Clay (Black Cotton Soil) 0.025 MTPA.**

Maravarperungudi Lime Kankar Quarry Lease-I (QL-I) of 498.870 Ha **Own Patta Land** falls in S.F. Nos. Parts of 14, 15, 19 to 22, 30 to 33, 40, 41, 43, 44, 54, 55, 56, 58, 59, 62, 63, 65, 66, 79, 80, 84, 86 to 91, 93 to 101, 103 to 109, 111 to 122, 124, 130, 202, 205 to 218, 222 to 224, 227 to 229, 232 to 240, 244 to 248, 253 to 257, 263, 295 to 305, 340, 349, 352, 353, 356 to 358, 362 to 373, 376, 377, 398, 403, 404, 409 to 411 & 414 to 417 of Suddhamadam village, Aruppukottai Taluk, Virudhunagar District.

Vadakkunatham Lime Kankar Quarry Lease-V (QL-V) of 123.265 Ha **Own Patta Land** falls in S.F. Nos. parts of 7 to 15, 17 to 32, 34, 40, 101 to 103, 107 to 109, 113, 118, 124 to 130, 132, 138 to 139 & 213 to 215 of Vadakkunatham village, Aruppukottai Taluk, Virudhunagar District of Tamil Nadu State (**Fig. 1.1**). There is no Rehabilitation & Resettlement (R&R) issue due to the Proposals. There is **no litigation/pending case** against the Proposals.

Lease details are given in **Table 1.1**.

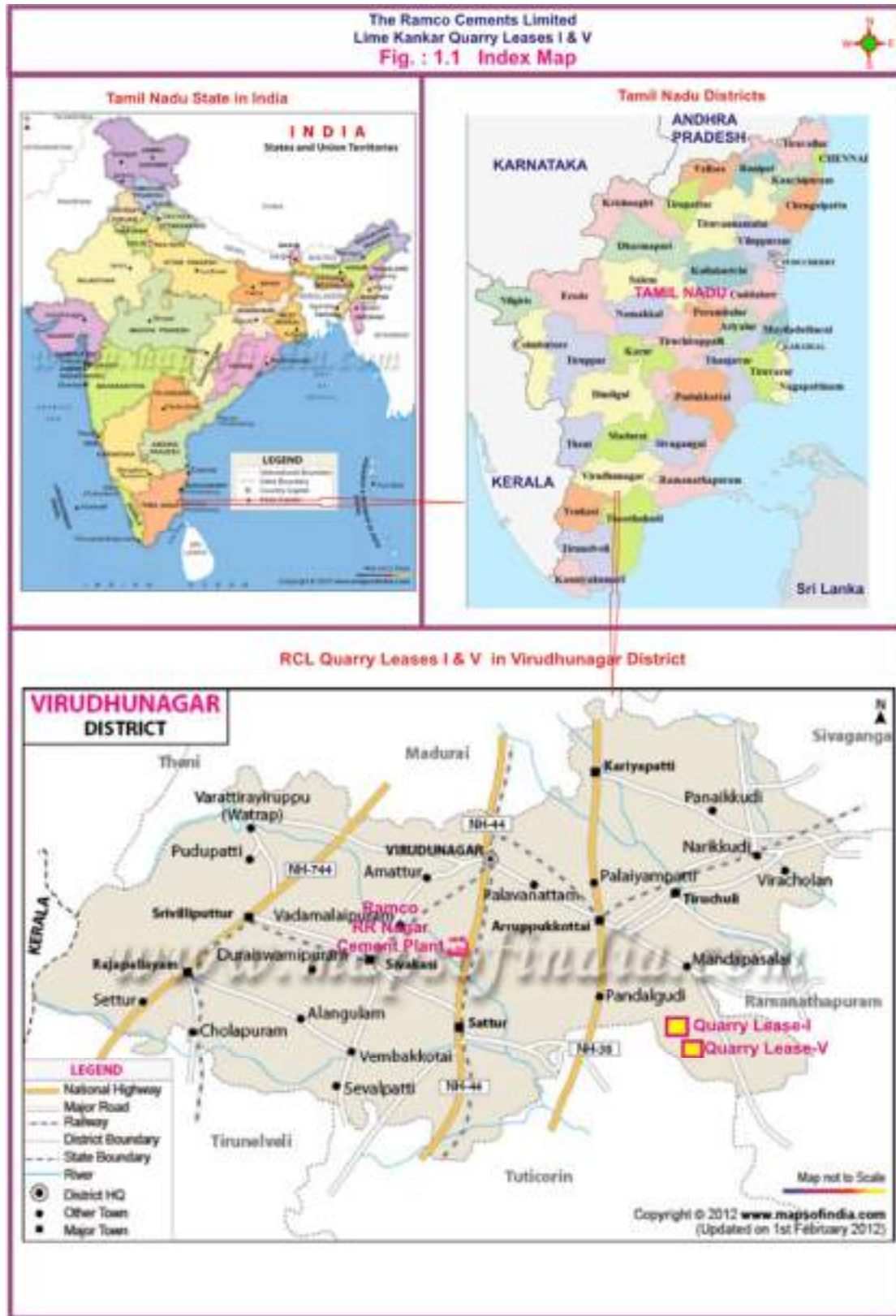


Table : 1.1 Quarry Lease Details

Quarry Lease	QL Extent, Ha	Mineral to be Quarried	Precise Area Communication (PAC) Reference	Validity of QL	Mining Plan Approval Letters
Maravarperungudi Lime Kankar Quarry Lease-I	498.870 (Own Patta land)	Lime Kankar and Clay (Others)	TN State Industries Dept Lr. No. 14547/MMC.2/2016-1 dated 21.04.2017	10 years	Department of Geology & Mining, Govt. of Tamil Nadu Letter No. 7012/MM10/2016/LK / Vnr dated 11.05.2018
Vadakkunatham Lime Kankar Quarry Lease-V	123.265 (Own Patta land)	Lime Kankar and Clay (Black Cotton Soil)	TN State Industries Dept. Lr. No. 2169/MMC.2/2018-1 dated 02.04.2018	10 years	Department of Geology & Mining, Govt. of Tamil Nadu Letter No. 584/MM10/2018/LK/ Vnr dated 08.06.2018

The Kankar bed of 1.0-1.5 m thick is overlain by 0.4 m thick of nodular Kankar intermixed with clay and in turn by around 1.25-1.5 m thick block cotton soil. **Non-Conventional Mechanized Opencast Quarrying (without Drilling & Blasting)** is proposed. The deposits will be quarried by a simple system of simultaneous development, production and backfilling called **Strip Mining**. Excavators will be deployed for quarrying in 8 m wide and 25 m long strips. The maximum depth of **Quarrying will be only upto 3.0 m** below ground level (BGL). **Quarrying will not intersect the Ground Water-table**. The ratio of ore (clean Kankar) to OB works out to be 1:2. Simultaneous reclamation activities will be continued till the end of quarrying. Thus, **there will be no Solid Wastes and Dump** as entire OB will be backfilled in the quarried out Strips simultaneously. Quarry Profiles are given in **Table 1.2**. Quarry Layouts are given as **Plates I & II**.

RCL has initially proposed a Wet Beneficiation Plant (1.85 MTPA Throughput) over an extent of 29.0 Ha in QL-I, dropped it and proposed a Centralised Kankar Beneficiation Plant at Pandalgudi. Till the Kankar Beneficiation Plant is commissioned, existing practice of simple **Dry Screening/Sizer**, as in Maravarperungudi Mines, will be continued to screen-off the interstitial Clay. The **Screener @ 330 TPH and Sizer @ 115 TPH will be established** in the QL-I. In the Screening/Sizer Plant, ROM Lime Kankar shall be fed to the receiving Hopper. The sized ore shall be crushed to required size in a Twin Shaft Sizer @ 115 TPH using auxiliary feed equipments such as Wobbler Feeder, Apron Feeder and Belt Conveyors. Crushed product will be fed to a Dry Screen for size separation. Bag Filters will be provided for the Sizer and Dry Screen to control **PM Emission <30 mg/Nm³**. The Screened Mineral will be dispatched to the Wet Beneficiation Plant and R R Nagar Cement Plant for Cement manufacturing.

RCL has its **own black top road** from existing nearby Maravarperungudi Kankar Mine to Pandalgudi Crusher & Plant. The same road will be extended to these Leases for transport of the Mineral.

Table : 1.2 Quarry Profiles

Particulars		Quarry Lease-I		Quarry Lease-V	
Total Extent	Safety Barrier, Ha	498.870	127.295	123.265	35.020
	Effective Quarry Area, Ha		371.575		88.245
Proposed Green Belt & Afforested Area, Ha		120.00 (24.05%)		45.00 (36.50%)	
Reserves	Lime Kankar, Tonnes	102,18,313		33,89,788	
	Clay/BC Soil, Tonnes	91,96,481		25,88,565	
Recoverable / Usable Reserves	Lime Kankar, Tonnes	45,98,241		24,26,738	
	Clay/BC Soil, Tonnes	4,59,824		18,53,145	
Proposed Production (max.), MTPA		ROM @ 1.333 MTPA or Clean Kankar @ 0.6 MTPA after Beneficiation & Clay (Others) @ 0.06 MTPA Sizer @ 115 TPH		ROM Kankar @ 0.5 MTPA & Clay (Black Cotton Soil) @ 0.025 MTPA	
Ore:OB Ratio		1:2		1:0.75	
Life of Quarry, Years		8		10	
No. of working days/annum		300 (3 shifts)		300 (3 shifts)	
Pit Configuration	Strips Size, m	25 (L) x 8 m (W)		25 (L) x 8 m (W)	
	Bench Height, m	No Benches		No Benches	
	Bench Width, m	Not Applicable		Not Applicable	
	Bench Slope, Deg.	Not Applicable		Not Applicable	
Ultimate Quarrying Depth (BGL), m		3.0		3.0	
Ground Water-table (BGL), m		20-25		20-25	
Ground Water-table Intersection		No		No	
Water Demand, KLD		5+50 (for GB)		5+50 (for GB)	
Water Source		Nearby Captive Mines		Nearby Captive Mines	
Direct & Indirect Employment		30 & 50		30 & 30	
Project Cost		Rs.6.00 Crores		Rs.4.20 Crores	
CER Budget		Rs.12,00,000/-		Rs.8,40,000/-	

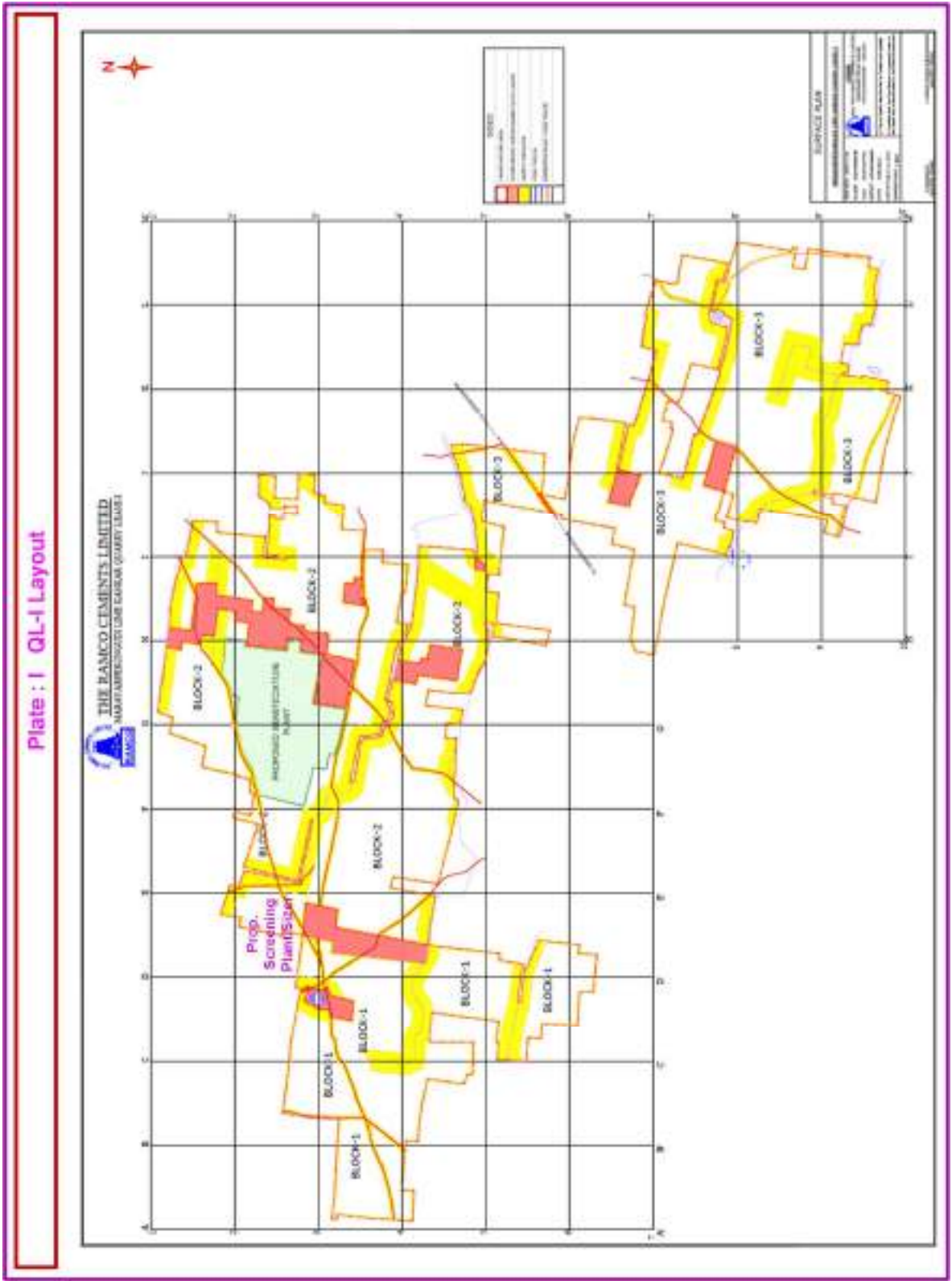
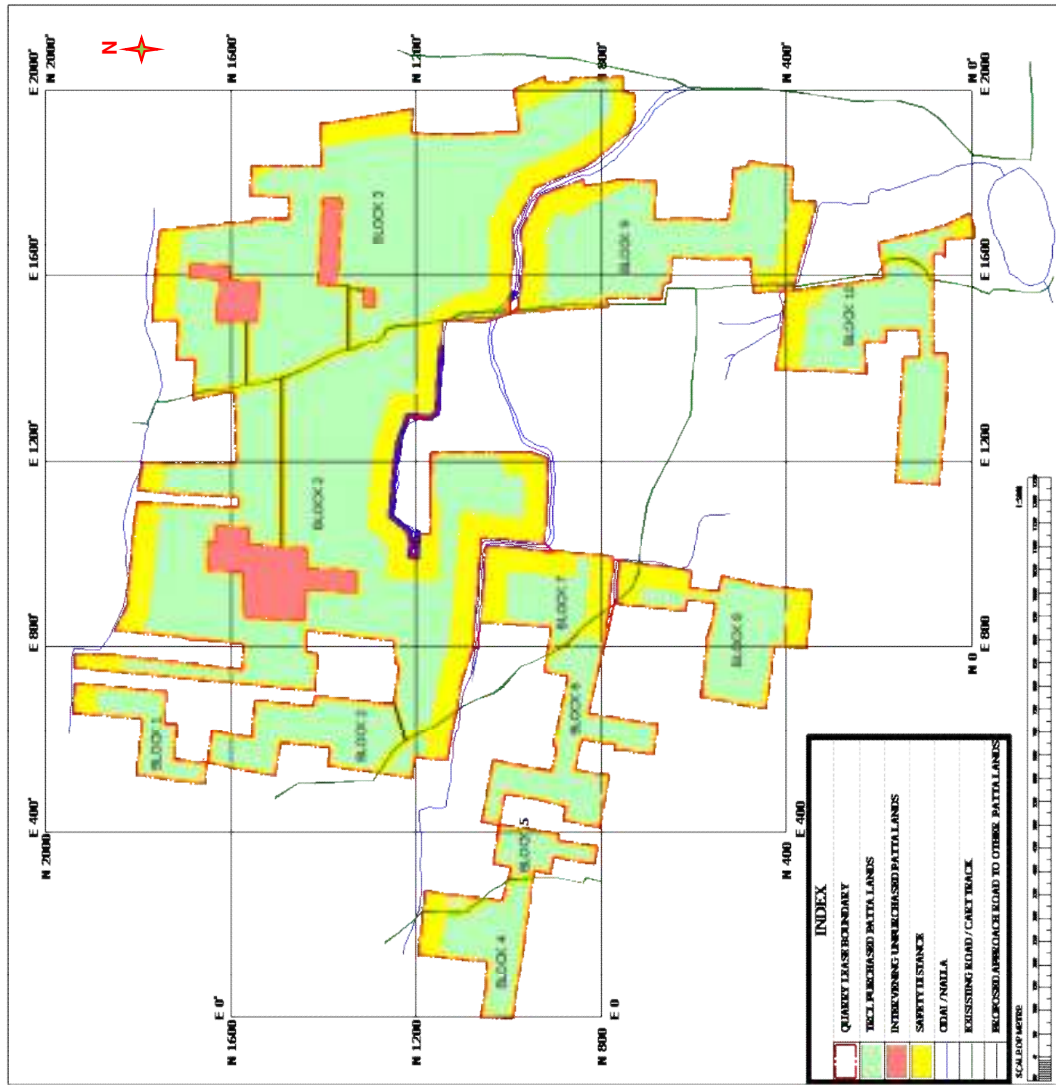


Plate : II QL-V Layout



Tables 1.3-1.4 shows the production and development Quantity for the Plan period.

Table : 1.3 Proposed Development & Production of QL-I

Year	Development, (OB Removal) Tonnes	Production, Tonnes		Mineral Rejects, Tonnes	Clay Consumption, Tonnes	Developmental Rejects, Tonnes	Total Wastes (OB and Mineral Rejects), Tonnes	Clean Ore: Waste Ratio
		ROM	Clean Kankar					
I	12,00,000	13,33,333	6,00,000	7,33,333	60,000	11,40,000	18,73,333	1:3.12
II	12,00,000	13,33,333	6,00,000	7,33,333	60,000	11,40,000	18,73,333	1:3.12
III	12,00,000	13,33,333	6,00,000	7,33,333	60,000	11,40,000	18,73,333	1:3.12
IV	12,00,000	13,33,333	6,00,000	7,33,333	60,000	11,40,000	18,73,333	1:3.12
V	12,00,000	13,33,333	6,00,000	7,33,333	60,000	11,40,000	18,73,333	1:3.12
Total	60,00,000	66,66,665	30,00,000	36,66,665	3,00,000	57,00,000	93,66,665	1:3.12

Table : 1.4 Proposed Development & Production of QL-V

Year	Development (OB Removal), Tonnes	Lime Kankar ROM, Tonnes	Clay Consumption from Development, Tonnes	Balance Developmental Qty. for Backfilling, Tonnes	Ore: OB Ratio
I	1,87,688	2,50,250	25,000	1,62,688	1:0.75
II	1,87,688	2,50,250	25,000	1,62,688	1:0.75
III	1,87,688	2,50,250	25,000	1,62,688	1:0.75
IV	3,75,375	5,00,500	25,000	3,50,375	1:0.75
V	1,87,688	2,50,250	25,000	1,62,688	1:0.75
Total	11,26,125	15,01,500	1,25,000	10,01,127	1:0.75

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

With Precise Area Notification and approved Mining Plan for the Leases, RCL has to apply and obtain prior Environmental Clearances (ECs) for Lease Grant and its Execution. Initially, Minor Mineral Quarry Leases (and also in Cluster) of >100 Ha falls under Sl. No. 1(a), Category A of EIA Notification 2006 (as amended) and requires EC from the Ministry of Environment, Forest and Climate Change (MoEF&CC). Accordingly, RCL have applied Online to the Ministry vide Application No. IA/TN/MIN/99682/2019 dated 18.03.2019 for QL-I and Application No. IA/TN/MIN/99698/2019 dated 18.03.2019 for QL-V.

The Proposals were deliberated in 4th Expert Appraisal Committee (EAC) Meeting held during 23-24.04.2019 as Agenda Sl. No. 2.7 (QL-I) and Sl. No. 2.6 (QL-V). The Hon'ble Committee

awarded the Terms of References (TORs) for conducting Environmental Impact Assessment (EIA) Study with Public Hearing vide Letters **F. No. J-11015/39/2019.IA.II(M) dated 15.05.2019 for QL-I** and **F. No. J-11015/40/2019.IA.II(M) dated 14.05.2019 for QL-V** stating that **“Single EIA/EMP needs to be prepared for mining leases in cluster. Single Public Hearing needs to be conducted for the mining lease in cluster”**.

On account of Corona Virus Disease (COVID-19) Pandemic, Baseline Data (BLD) was collected during **July-September 2021** (Premonsoon Season for this Region) for the EIA Study. **Single EIA Report (for both Quarry Leases QL-I & QL-V)** has been prepared and submitted as per awarded TORs. Summary EIA Reports (both in English and Tamil) along with Draft EIA Report are also submitted for Public Consultation & Public Hearing.

Meanwhile, MoEF&CC has notified 'All mining lease area in respect of **minor mineral mining leases** and ≤ 250 ha mining lease area in respect of major mineral mining lease other than coal' under **Category 'B'** for obtaining prior EC from SEIAA vide Notification SO 1886(E) dated 20.04.2022. Thus, **the Proposals now fall under Category 'B' for obtaining prior Environmental Clearance from State Level EIA Authority-Tamil Nadu (SEIAA-TN).**

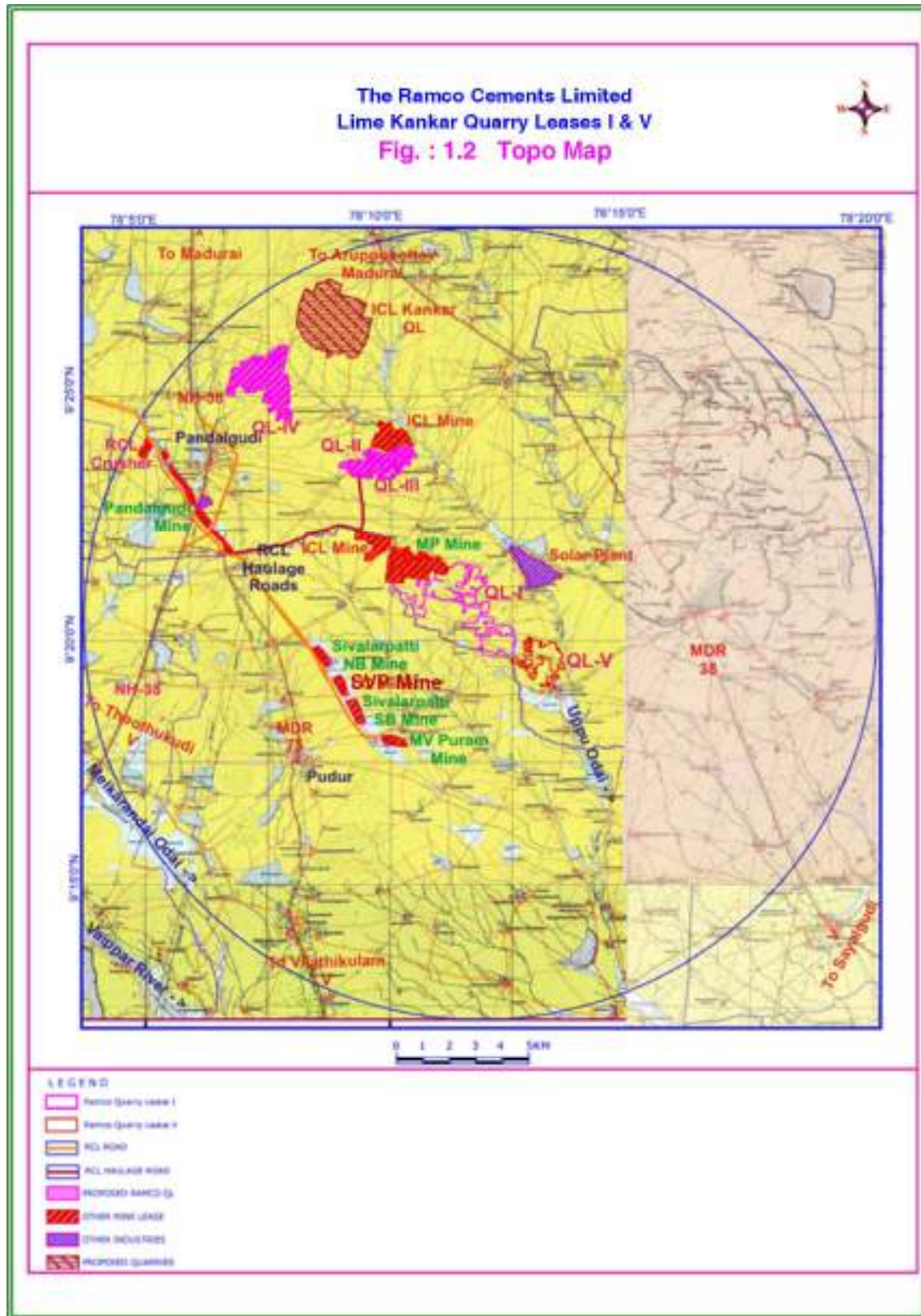
EIA Consultant engaged, M/s. ABC Techno Labs India Private Limited, Chennai has been accredited for various Sectors including Sector-1 (Mining Projects) for Category 'A' by the National Accreditation Board for Education & Training (**NABET**), Quality Council of India vide Certificate NABET/EIA/1922/RA 0155 validity extended till 07.11.2022 (Sl. No. 3 of QCI/NABET List dated 05.07.2022). ABC Techno Labs India Private Limited Laboratory is accredited by the National Accreditation Board for Testing and Calibration Laboratories (**NABL**) vide Certificate No. TC-5770 dated 03.04.2020. The Lab is also recognised by the Ministry of Environment, Forest and Climate Change (**MoEF&CC**) vide Letter F. No. Q-15018/04/2019-CPW dated 14.10.2019 with validity of 5 years.

2.0 Description of the Environment

2.1 Environmental Setting

Maravarperungudi Lime Kankar Quarry Lease-I is located in Suddhamadam village between the Coordinates 09°19'42" - 09°21'38" N Latitudes and 78°10'03 - 78°12'39" E Longitudes. Vadakkunatham Lime Kankar Quarry Lease is located in Vadakkunatham village between the Coordinates 9°19'04" - 9°20'07" N Latitudes and 78°12'32- 78°13'38" E Longitudes; Survey of India Topo sheet No.58 K/3 (**Fig. 1.2**).

There is no environmental issue about the Mines 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 site is free from seismic effects (Seismic Zone III). General elevation of QL area is 60-65 m aMSL. Seasonal **Uppu Odai** drains the region (flows at 1.1 km in E). Seasonal Vaippar River flows at a distance of 17.5 km in Southwest. Gulf of Mannar is at 33.0 km in SE and Gulf of Mannar Marine National Park is at 38.0 km distance in SE. Single crop (dry) occupies larger part of the study area.

The distance of nearest village from QL-I Krishnapuram is about 0.2 km in south and Thavasilingapuram is at 0.8 km in South-southwest from Lease boundary. Suddhamadam is at 1.0 km in NE and Maravarperungudi is at 3.0 km in North-northwest. Pandalgudi is at 7.6 km in northwest. Taluk Headquarters Aruppukottai Town is at 17 km in North-northwest and District Headquarters Virudhunagar is at 31 km in NW direction from the Lease Area.

The distance of the nearest village Vadakkunatham is about 0.15 km from QL-V in south and Suddhamadam is at 1.6 km in north-northwest from the Lease boundary. Pandalgudi is at 13.0 km in NW. Taluk Headquarters Aruppukottai Town is at 22 km in North-northwest and District Headquarters Virudhunagar is at 37.0 km in NW direction from the Lease Area.

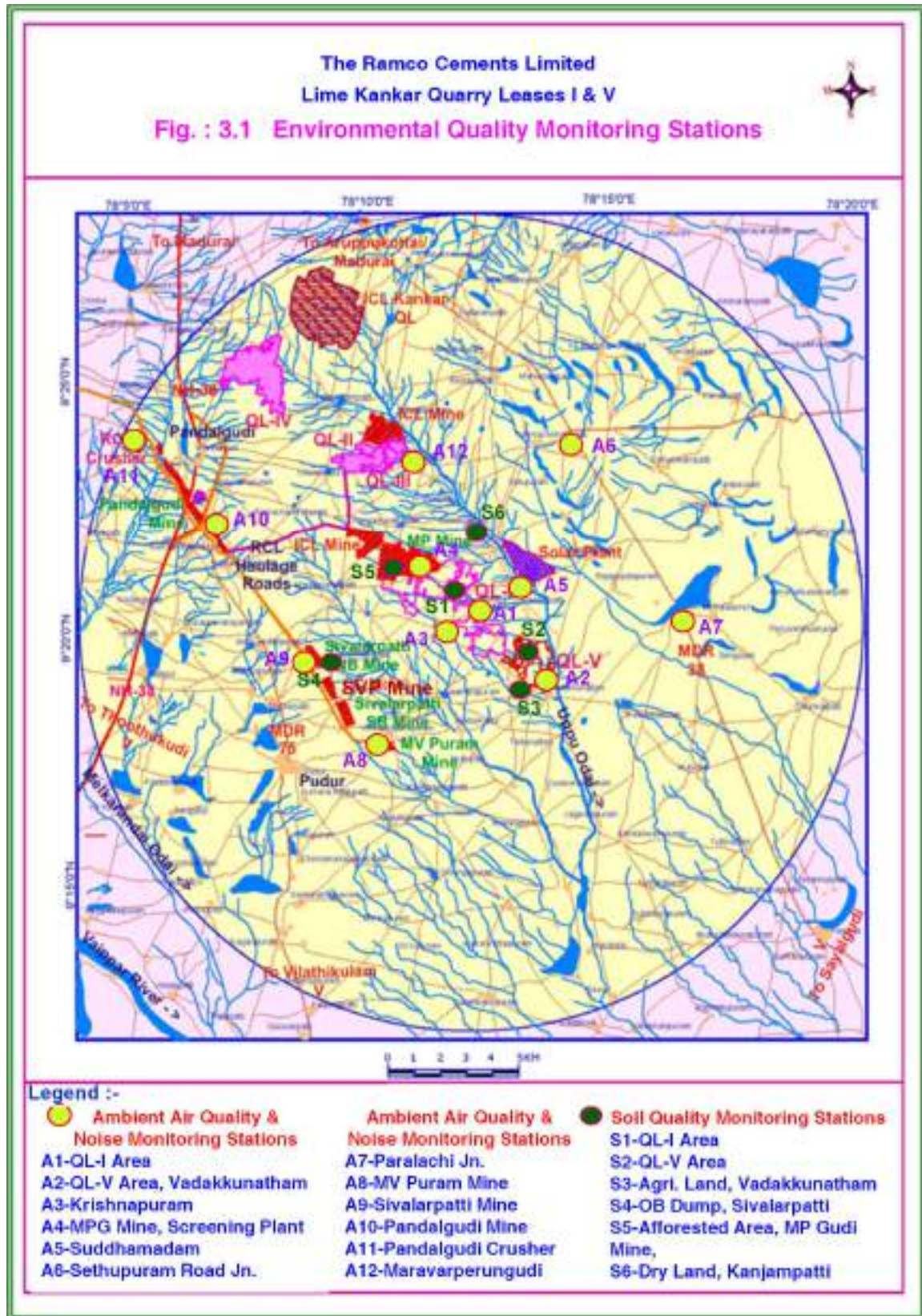
Madurai-Thoothukudi Section of NH-38 passes at a distance of 7.0 km in WNW. A road from Pandalgudi is passing through the Lease Area to Koppuchithampatti and Maravarperungudi villages which is also connected to RCL's dedicated **Mine Haulage Road**.

Southern Railway Line of Virudhunagar-Aruppukottai-Manamathurai Section runs at 19.8 km distance in NNW from the Lease Area. Madurai Airport is at 53 km in NNW direction, Thoothukudi Airport is at 69.5 km in SSW and Chennai Airport is at 455 km in NE. VOC Port at Thoothukudi is at 62 km in S direction from the Lease Area.

2.2 Baseline Environmental Status

The study area of 10 km radius (**Fig. 3.1**) has been considered for assessing the baseline environmental status. 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. Sri Parameswari Spinning & Textile Mills are located at Pandalgudi. Gulf of Mannar is at 45.0 km and the Area **does not fall in CRZ Area**. Project Area **does not fall in Critically Polluted Industrial Clusters** listed by CPCB. Considering environmental setting of the project, activities and their interaction, environmental regulations and Standards, following Environmental Attributes have been included in EIA Study:

- ❖ Site specific Micrometeorological 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 12 locations on 1/8/24-hourly basis, continuously for 2 days in a week for 4 weeks in a month for 3 months in the Season for all 12 parameters as per NAAQ Norms revised as per GSR 826(E) dated 16.11.2009.



- ❖ Noise Level Measurements at 12 stations for Leq, Lday and Lnight values once in the season.
- ❖ Water Quality Monitoring – grab sampling once in the Season for Surface Waters (8 locations) as per CPCB Norms & Ground Waters (8 Locations) as per IS:10500 Norms.
- ❖ Soil Quality Monitoring at 6 locations for Textural & Physical Parameters and Nutrients.
- ❖ Land use pattern based on Satellite Imagery.
- ❖ Biotic Attributes for : Flora & Fauna.
- ❖ Socio-Economic Profile, based on 2011-Census and also Household Survey once in the study period.

The summary of baseline status is given in **Table 2.1**.

Table : 2.1 Environmental Baseline Status

Envl. Component	Main Parameters	Minimum	Maximum	Mean	Desirable Norms
Ambient Air Quality, ug/m ³	PM2.5	10	36	18.9	60
	PM10	16	68	35.4	100
	SO ₂	6	21	9.9	80
	NO _x	6	24	11.7	80
Ambient Noise, dB(A)	Leq-Day	40.7	46.5	43.3	55
	Leq-Night	39.8	44.5	41.5	45
Surface Waters	TDS, mg/l	420	450	-	500/2100
Ground Waters	TDS, mg/l	270	940	-	500-2000
Soil Status	EC, mmhos/cm	1.16	2.21	-	0.2-0.5
	SAR	2.09	3.41	-	<5

Legend : PM2.5-Particulate Matter size less than 2.5 um; PM10- Particulate Matter size less than 10 um; SO₂-Sulphur dioxide; NO_x-Oxides of Nitrogen; Leq-Day & Leq-Night - Equivalent Noise Levels during Day & Night Times; TDS-Total Dissolved Solids; EC-Electrical Conductivity & SAR-Sodium Absorption Ratio.

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 National Ambient Air Quality (NAAQ) 24-hourly Norms for Industrial, Residential, Rural and other areas.
- ❖ **Study Area is falling under Low Pollution Category** as monitored Pollutant Levels were <0.5 Exceedance Factor.
- ❖ Ambient equivalent Noise Levels (Leq) during day and night times were found to be well within the MoEF&CC Norms for Residential Areas.
- ❖ The water quality of surface waters were found to be in compliance with CPCB/BIS 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.
- ❖ There is no eco sensitive area exists in the study area and only domesticated animals exist.
- ❖ **Schedule-I Fauna**, Peafowl are found inhabiting the Study area. Accordingly, the Peafowl Conservation Plan has been prepared and submitted
- ❖ 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**. 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 Quarry Project, it **does not involve any major establishment or construction**. A small Mine Office will be constructed on **temporary structures**. Also, the Screening / Sizer Plant (mainly Structural) will be established in the QL-I area. Electrical Building will be the main construction. Others will be mainly Structural (upto +25 m above Ground Level) like Hoppers, Conveyors, Twin Shaft Sizer, etc. will be installed.

Required water demand of 2 KLD during establishment will be sourced from existing exhausted Mine Pits in Pandalgudi Region. As local labourers to be engaged during establishment, there will be no domestic sewage generation during Construction Phase. Also, there will not be any solid wastes generation and its disposal during that period.

3.2 Operation Phase

Land Use : About 50-55 Ha in QL-I and 15-20 Ha in QL-V will be quarried in a Year. At Conceptual Stage, there will not be any open Pit in Quarries QL-I & QL-V. An area of **28.490 Ha will be used for dumping the Rejects** and balance area will be backfilled. Green Belt will be developed in 60 Ha in QL-I and 30 Ha in QL-V. The **total Green Belt/Afforested Area in the Region will be 671.860 Ha (51.94%)**.

Pandalgudi, Sivalarpatti, Melvenkateswarapuram Mines and Maravarperungudi Kankar Mine are in Conceptual Stage and existing Reserves will be exhausted in another 7-8 years. QL-I & QL-V are new Captive Leases 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 deposits will be exhausted in 8-10 years. **There will be no Top Soil/OB Dump as entire OB will be backfilled in the quarried out pits simultaneously.** Mineral reject waste will be dumped on the mineral exhausted area within the quarry lease.

Traffic Impact : The Captive Mines deploy 30 Tons Tippers for the transportation of Limestone from Mines to Crusher. About 223 Trips/day (one way) i.e. **446 Trips/day** is the Traffic Volume due to all existing Mines to Crusher. About 157 Trips/day (one way) i.e. **314 Trips/day** is the Traffic Volume from Crusher to Cement Plant. Thus, **760 Trucks/day** is the Traffic Volume at Pandalgudi Crusher. It is proposed to Quarry **1.393 MTPA ROM** (including Clay) **from QL-I and 0.525 MTPA ROM from QL-V** (worst case scenario) @ **6393 TPD**. The 30 Tons Tippers will be deployed for the transportation of Kankar from these Quarries. Thus, 213 Tirps/day in one way and 426 Trips/day in 2-ways is the resultant traffic volume due to these quarries.

Based on the Survey, existing Traffic Volumes at Pandalgudi Junction is computed in **Passenger Car Units (PCUs)** and was found to be **1712.3 PCU/day @ 71.35 PCU/hour**. In the Post-Project Scenario, there will be an addition of 426 vehicles (937.2 PCU/day) to the existing traffic in the vicinity. **The net (cumulative) traffic volume will be 2,649.6 PCU/day only @ 110.4 PCU/hour**. Thus, **there will not be any significant impact on the existing baseline traffic volume due to the Proposal**.

The existing Haulage Road will also be adequate to handle the proposed addition of traffic volume. Adequate parking will be provided and **there will not be any outside Truck Parking**. Facilities for **drivers (rest room, toilet, etc.)** will also be provided.

Air Pollution : The mining/quarrying, loading and transporting activities would generate both fugitive dust emissions and smoke from HEM Machineries/Equipments and Transporting Tippers. Quantification of particulate emissions from these Mines is computed by the Emission Factor Technique. Stack Emissions from Existing Crusher & Proposed Screening/Beneficiation Plants are considered along with Mines/Quarries for Cumulative impact Assessment. In general, dust generation (Particulate Matter) in the mines are due to :

- ❖ Drilling & Blasting operation of existing Mines.
- ❖ Excavation in Mines & Quarries.
- ❖ Transportation of the Mineral.

AERMOD View Software is used for Predicting the maximum Ground Level Concentrations (**GLCs**) **including Transportation Impact**. The respective Input values are used for individual Mine and Quarry for running the Model. The predicted GLCs are given in **Table 3.1**. The predicted maximum GLC-PM10 for cumulative operation is 3.19 ug/m³ and found to be confined locally i.e.

within 0.6 km radius from the boundaries. Also, **adequate Buffer Level available (61.41%)** in the Air Environment for the Proposal.

Table : 3.1 Predicted GLC – PM10 – Cumulative (including Transportation)

Sl. No.	Pollutant	Background Concentration (24-hly. Avg.), ug/m ³	Max. Predicted Ground Level Concentration, ug/m ³	Distance from the Plant (max.), km	Total Concentration, ug/m ³	Revised NAAQ Norms, ug/m ³	Buffer Available in the Atmosphere
1	PM10	35.4	3.19	0.6	38.59	100	61.41

Noise Levels : 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/Sizer 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 MoEF&CC Norms for Residential and Rural Areas.

Water Environment :- The area is almost flat and plain terrain with a gentle slope towards southeast. The seasonal Uppu Odai drains the area. There are about 5 Nos. seasonal First and Second order streams originating from QL-I Area and join Uppu Odai in the east. A Pond is also located in QL-I near Suddhamadam village. About 4 Nos. seasonal First and Second order streams originating from QL-V Area join Uppu Odai in the east. A Pond is also located in southeastern boundary of QL-V. A safety distance of 50 metres has been provided on either side of Odais (Streams) flowing through the QL areas. As per PAC and approved Mining Plans, the water flow in the streams will be maintained as such.

The **Normal Rainfall of the Site is 726 mm**. Pre-Project and Post Project Surface Runoffs from the Quarry Areas are estimated as per Manual of Artificial Recharge of Ground Water (CGWB, 2007). Pre-Project Runoffs from these Quarry Areas will be **9,03,340 KL/Annum**.

Post-Project Runoffs :-

From QL-I	:	8,06,169 KL/Annum
From QLV	:	1,74,625 KL/Annum

Total	:	9,80,794 KL/Annum

There will be an excess water of 77,454 KL/Annum in the Post-Project Scenario and will be **harvested & utilized for recharging the ground water-table** in the vicinity through proposed Ponds and Reservoirs for the benefit of local villagers. Thus, **there will not be any impact on the Surface Water bodies.**

Each Quarry requires about 3 KLD drinking water for domestic consumption (total 6 KLD) which will be supplied from the RO Plant at Pandalgudi Mine. The Quarries will also require each about 2 KLD for Dust suppression measures and another 50 KLD for the development and maintenance of Green Belt (Total 104 KLD). The required water will be sourced from existing Captive Mine Pits in Pandalgudi Region. Thus, **there will not be any water drawl from Surface or Ground Water Sources** in the Lease Area. Also, there will be no Ground Water-table Intersection due to the Quarrying activities and thus, **no significant impact on the Ground Water regime.**

Domestic sewage generation from QLs I & V will be about 5 KLD (each 2.5 KLD) which will be biologically treated in Septic Tanks followed by a Dispersion Trenches of adequate size. **No workshop** is proposed and thus, **no effluent generation** from the Quarry.

Solid Wastes : For the ROM reserves quantity of 1,02,18,313 Tonnes in QL-I, OB generation will be 91,96,481 Tonnes. After consumption of Clay @ 4,59,824 Tonnes in the Cement Plant, balance 87,36,657 Tonnes OB will be backfilled simultaneously. With Screening/Sizing Plant operations in QL-I, Clean Kankar production with 45% Recovery will be 45,98,241 Tonnes and Rejects will be 56,20,072 Tonnes. The mineral rejects from Screening Plant/Sizer will be dumped in the Kankar exhausted area upto a maximum height of 10 m between grids G2-H2 and G3-H3 (420x390 m).

For quarrying quarriable 24,26,738 Tonnes of Lime Kankar as ROM in QL-V, 18,53,145 Tonnes of Clay (Black Cotton Soil) as OB will be generated. With consumption of 25,000 TPA in the Cement Plant, 16,03,145 Tonnes OB will be backfilled simultaneously.

Biological Environment : There is no Eco Sensitive Area/Zone (ESA/ESZ) in the Region. Only Native Flora and Fauna exists. 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 **Approved Conservation Plan for Indian Pea Fowl** has been prepared in consultation with the Forest Department and submitted. There is **no loss of forest cover** due to the Project and hence there is no need of compensatory afforestation.

Socioeconomics : There are 465 Direct Employees working in the Cement Complex. Indirect Employment to about 600 persons has been provided. 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-I will employ about 30 persons directly and 50 persons indirectly. QL-V Quarry will employ about 30 persons directly and 30 persons indirectly.

RCL is carrying out number of social activities in and around the villages of its Mines and Factory under the **Corporate Social Responsibility (CSR)** Budget. RCL has the CSR Committee as per the provisions notified by the Ministry of Corporate Affairs on February 27, 2014. Based on the CSR Committee and declared CSR Policy of the Company, CSR activities are covered and Reported.

Occupational Health : RCL is operating an **Occupational Health Centre at Factory and Mines** for supporting the health care needs of employees & their families. Periodic Health tests (Pulmonary test, Audiometric test, blood test, chest x-ray examination etc.) have been conducted every year for the employees. Supported by test observations, adequate and need based treatment has been offered to employees.

4.0 Environmental Monitoring Programme

Periodical monitoring of the Ambient Air Quality (at 4 locations) as per NAAQ Norms, Fugitive/Workzone Air Quality/emissions (4 locations), Noise Levels (Ambient & Workzone areas), Water (4 Surface & 4 Ground waters) and Soil Quality (3 Locations) shall be undertaken.

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 is a Mineral Conservation Measure.

Social Benefits : QL-I will employ about **30 persons directly and 50 persons indirectly**. QL-V will employ about **30 persons directly and 30 persons indirectly**. A budget of 2% of the Project Cost will be allotted as Corporate Environment Responsibility (**CER**) Budget (**Rs.12,00,000/- for QL-I & Rs.8,40,000/- for QL-V**) for Suddhamadam and Vadakkunatham villages. In addition, for the mandatory **District Mineral Foundation (DMF) @ 30% of Seigniorage Fee (SF)** and **Green Fund contribution @ 10%** of Seigniorage Fee for each Tonnes of Kankar will also be contributed.

Financial Benefits : Improve the local and regional economy. Royalty and other Taxes to the Exchequer. The direct & indirect employment, CER & CSR activities, DMF Fund/SF, etc. will have a positive impact on the Socio-economic Structure of the area.

7.0 Environmental Management Plan

An Environmental Management Plan (EMP) is formulated for mitigation of adverse impacts and is based on present environmental status and impact appraisal.

7.1 Construction Phase

The following EMP measures shall be undertaken during the Construction Phase (Mine Office & Screening/Sizer Plant):

- ❖ It shall be ensured that no change due to the constructions to the natural drainage of the area.
- ❖ All the topsoil excavated shall be stored and maintained for use in Green Belt.
- ❖ Construction materials like sand, stone chips, etc. shall be obtained from approved quarries.
- ❖ High Speed Diesel with low sulphur content shall be used for construction machineries.
- ❖ Cement handling shall be supervised properly to check fugitive emissions. Empty cement bags, debris, etc. shall not be disposed of at the site.
- ❖ On completion of construction, all debris and extraneous materials shall be cleared off and no residuals should be left at the site.
- ❖ Periodical monitoring of environmental parameters shall be carried out during the Construction Phase as per TNPCB Norms to have a cross check and a data base.

7.2 Operation Phase

The following EMP measures shall be undertaken during the Operation Phase:

7.2.1 Land Use

- ❖ No. of **trees existing shall be numbered** and referenced for review.
- ❖ 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, catch pits in different combinations should be provided to prevent run offs 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 shall be restored to its

original conditions.

- ❖ An effective Afforestation (with predominantly native species) shall be done in the Backfilled areas.
- ❖ **Grazing Fields shall be developed** for utilisation by Local people.

7.2.2 Traffic Impact

- ❖ All Tippers are to be fully covered with Tarpaulin/closed to avoid any spillage on transportation.
- ❖ Restriction of over loading of Tippers shall be enforced.
- ❖ Speed restrictions shall be enforced.
- ❖ Restriction of Truck parking in the Highway and Public Roads shall be enforced.
- ❖ Regular and preventive maintenance of transport vehicles are to be ensured.
- ❖ **Carbon sequestration** is the long-term storage of carbon in oceans, soils, vegetation (especially forests) and geologic formations. Adequate Green Belt shall be developed around the project for carbon sequestration. As trees grow, they store carbon in woody tissues and soil organic matter.

7.2.3 Air Environment

- ❖ Eco friendly quarrying shall be adopted.
- ❖ Green belt shall be developed along the periphery, haul roads, waste dumps, etc.
- ❖ Stacks with adequate Bag Filters to control PM emission <math><30 \text{ mg/Nm}^3</math>.
- ❖ Periodical maintenance of APC Equipments like Bag Filters, etc.
- ❖ Fugitive emissions control during quarrying, loading, unloading and transportation activities shall be practiced.
- ❖ Water sprinklers shall be installed along the haul roads and operated to suppress the dusts.
- ❖ Regular and preventive maintenance of transport vehicles shall be undertaken.
- ❖ Transport vehicles shall be in compliance with emission norms.
- ❖ Periodical Air Quality and Fugitive Emissions shall be monitored.

7.2.4 Noise Levels

- ❖ Deploying quarrying equipments shall be with in-built mechanism for reducing noise.
 - ❖ Design features of Plant machineries shall ensure low noise levels in the working areas.
 - ❖ 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..
 - ❖ Ambient Noise Levels at boundaries shall comply MoEF&CC Norms for Residential Areas.
 - ❖ Periodical Noise Monitoring shall be carried out.
-

7.2.5 Water Environment

- ❖ Natural drains or nallas should not be disturbed.
- ❖ The existing Pre-mining Drainage Pattern should be maintained to the extent possible so that 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 catch pits or settling pits to remove suspended solids from flowing into storm water.
- ❖ Settling pits and Garland drains should be periodically desilted.
- ❖ The ground water recharge measures should be done.
- ❖ No trade effluent shall be discharged.
- ❖ Periodical Water quality shall be monitored.

7.2.6 Biological Environment

- ❖ Green Belt (33% Coverage) shall be developed and maintained effectively.
- ❖ Local species and fruit bearing trees shall be preferred.
- ❖ Afforestation in backfilled & reclaimed areas shall be undertaken.
- ❖ Approved Pea fowl Conservation Plan shall be implemented.
- ❖ Through the process of photosynthesis, plants assimilate carbon and return some of it to the atmosphere through respiration. The carbon that remains as plant tissue is then consumed by animals or added to the soil as litter when plants die and decompose. The primary way that carbon is stored in the soil is as ***soil organic matter (SOM)***.

7.2.7 Occupational Health

- ❖ RCL shall provide a safety & healthy working conditions and continually improve the occupational health and safety performance.
 - ❖ Its objectives shall be to achieve zero accident and safe work environment, to improve moral and health of all employees.
 - ❖ All employees undergo check-up on recruitment and periodically during employment.
 - ❖ Maintenance of Pre, during & Post Employment Records.
 - ❖ Provision of all Personal Protective Equipments for the employees at Mines.
 - ❖ Provision of illumination facilities at proper places for ease of working during night times.
 - ❖ Work comfort and its periodic review by a committee.
 - ❖ Provision of Rest Shelters at Quarries.
-

7.2.8 Social Measures

- ❖ As per the Companies Act 2013, Companies should spend at least 2% of the Profit after Tax of the previous year for CSR activities but not lower than 2% of average of previous three years Profit after Tax.
- ❖ RCL shall carry out various Social Measures for the local as well as regional populations as per CSR Norms.
- ❖ As per OM dated 30th Sept., 2020, & OM dated 20th Oct., 2020 Socio-Economic Developmental activities will be formulated on the basis of the issues raised during Public hearing which will be addressed and implemented in a time bound manner with the start of the industrial activities.

7.2.9 Plastic Waste Management

There will be ban on one time use and throw away Plastic usage in the Quarries in compliance with Tamil Nadu, Environment and Forests (EC-2) Department, G.O.(D) No. 84 dated 25.06.2018. RCL will encourage the use of eco friendly alternatives.

7.3 EMP Budget

QL-I : The capital cost of the Project is **Rs.6.00 crores** (Less Beneficiation Plant Cost declared in TOR Application). An amount of **Rs.10.00 Lakhs** has been earmarked as **Capital EMP Budget** and **Rs.20.00 Lakhs per Annum** is the **Operating Cost** towards EMP measures, Green Belt maintenance, Environmental Monitoring, etc.

QL-V : The capital cost of the Project is **Rs.4.20 crores**. An amount of **Rs.5.00 Lakhs** has been earmarked as **Capital EMP Budget** and **Rs.15.32 Lakhs per Annum** is the **Operating Cost** towards EMP measures, Green Belt maintenance, Environmental Monitoring, etc.

As approved by DFO, the proposed **budget for Peafowl Conservation Plan for QL-I & QL-V will be each Rs.15.80 Lakhs for the first ten years period.**
