



**Dalmia Cement (Bharat) Limited**  
**Proposed Expansion of**  
**Kallakudi & Kovandakurichi Limestone Mines (ML-I) under GO No. 76**  
**Extent : 166.005 Ha**  
**Minerals : Limestone & Marl**

**Production Enhancement from 2.00 MTPA to 6.97 MTPA (ROM)**  
**SF Nos. 39/8, 40,41/1, 47/1,4 7/3, 47/11, 49, 50, 51, 52, etc. of Kallakudi Village,**  
**SF Nos. 54/1, 54/2, 55, 56, 57, 60, 75,81/1B, etc. of Kovandakurichi Village and**  
**SF No. 32 of Venkatachalapuram Village, Lalgudi Taluk, Trichy District, Tamil Nadu**

**ML Validity : 01.09.2004 to 31.03.2030 as per MMDR Amendment Act, 2015**  
**Modification in Modified Mining Plan & PMC Plan Approval by**  
**IBM, Chennai vide Letter No. TN/TCR/LST/MMP-2088.MDS dated 19.08.2022**  
**(Plan Period 2019-20 to 2023-24; Balance Period 2023-24)**

**Environmental Clearance under EIA Notification 2006**  
**Schedule SI. No. 1(a) & Category 'B' (<250 Ha)**

**Draft Environmental Impact Assessment Report**

**(after TOR for Public Hearing)**

**Awarded TOR : SEIAA-TN/F.No.9739/SEAC/ToR-1420/2023 dated 03.04.2023**

**May 2023**

**EIA Consultant**

**ABC Techno Labs India Private Limited, Chennai**

**Accreditation Certificate : NABET/EIA/1922/RA0155**

**Validity extended till 20.07.2023 vide Letter QCI/NABET/ENV/ACO/23/2742 dated 21.04.2023**

**(SI. No. 3 of QCI/NABET List dated 08.05.2023)**

**Lab NABL Certificate No. TC-5770 dated 03.04.2022 valid till 02.04.2024**

**Lab Recognition : MoEF&CC vide Letter F. No. Q-15018/04/2019-CPW dated 14.10.2019**  
**with 5 years validity**

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*newthink! cement! sugar! refractories! power!*

### **Project Proponent Declaration**

[in compliance with MoEF Office Memorandum No. J-11013/41/2006-IA.II (I) dated 04.08.2009]

We, **M/s. Dalmia Cement (Bharat) Limited (DCBL)**, have applied for Environmental Clearance of Production Enhancement of Kallakudi & Kovandakurichi ML-I under GO No. 76 from 2.00 MTPA to 6.97 MTPA over an Extent 166.005 Ha in Survey Nos. 39/8, 40,41/1, 47/1,4 7/3, 47/11, 49, 50, 51, 52, etc. of Kallakudi Village, Survey Nos. 54/1, 54/2, 55, 56, 57, 60, 75,81/1B, etc. of Kovandakurichi Village and Survey No. 32 of Venkatachalapuram Village, Lalgudi Taluk, Tiruchirapalli District of Tamil Nadu vide Online Proposal No. SIA/TN/MIN/414894/2023 on 17.01.2023. The Proposal under Sl. No. 1(a), Category B1 was deliberated in the State Level Expert Appraisal Committee-Tamil Nadu (SEAC-TN) in its 361<sup>st</sup> Meeting held on 10.03.2023 and in 607<sup>th</sup> SEIAA-TN Meeting held on 03.04.2023. Terms of Reference (TOR) has been awarded vide **Letter SEIAA-TN/F.No.9739/SEAC/ToR-1420/2023 dated 03.04.2023 with Public Hearing** for preparing Environmental Impact Assessment (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 vide Certificate NABET/EIA/1922/RA-0155 with validity extended till 20.07.2023 vide Letter QCI/NABET/ENV/ACO/23/2646 dated 21.04.2023 (Sl. No. 3 of QCI/NABET List dated 08.05.2023). ABC Techno Labs India Private Limited Laboratory is accredited by NABL vide Certificate No. TC-5770 dated 03.04.2022 with validity till 02.04.2024.

The Environmental Impact Assessment (EIA) Report and the Summary Environmental Impact Assessment Reports have been prepared as per the generic structure proposed in EIA Notification 2006 and in compliance with the awarded TORs and submitted. The data submitted in the EIA Report are factually correct.

Date : 24.05.2023

**For Dalmia Cement (Bharat) Limited**

sd./

**K.Vinayagamurthi  
Unit-Head**

Place : Dalmiapuram

*Registered Office : Dalmiapuram, Dist. Tiruchirapalli, Tamil Nadu-621 651, India  
A Dalmia Bharat Group company, [www.dalmiabharat.com](http://www.dalmiabharat.com)*



### **EIA Consultant Undertaking**

[in compliance with MoEF Office Memorandum No. J-11013/41/2006-IA.II (I) dated 04.08.2009]

**M/s. Dalmia Cement (Bharat) Limited (DCBL)** have applied for Environmental Clearance of Production Enhancement of Kallakudi & Kovandakurichi ML-I under GO No. 76 from 2.00 MTPA to 6.97 MTPA over an Extent 166.005 Ha in Survey Nos. 39/8, 40,41/1, 47/1,4 7/3, 47/11, 49, 50, 51, 52, etc. of Kallakudi Village, Survey Nos. 54/1, 54/2, 55, 56, 57, 60, 75,81/1B, etc. of Kovandakurichi Village and Survey No. 32 of Venkatachalapuram Village, Lalgudi Taluk, Tiruchirapalli District of Tamil Nadu vide Online Proposal No. SIA/TN/MIN/414894/2023 on 17.01.2023. The Proposal under Sl. No. 1(a), Category B1 was deliberated in the State Level Expert Appraisal Committee-Tamil Nadu (SEAC-TN) in its 361<sup>st</sup> Meeting held on 10.03.2023 and in 607<sup>th</sup> SEIAA-TN Meeting held on 03.04.2023. Terms of Reference (TOR) has been awarded vide Letter SEIAA-TN/F.No.9739/SEAC/ToR-1420/2023 dated 03.04.2023 with Public Hearing for preparing Environmental Impact Assessment (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 vide Certificate NABET/EIA/1922/RA-0155 with validity extended till 20.07.2023 vide Letter QCI/NABET/ENV/ACO/23/2646 dated 21.04.2023 (Sl. No. 3 of QCI/NABET List dated 08.05.2023). ABC Techno Labs India Private Limited Laboratory is accredited by NABL vide Certificate No. TC-5770 dated 03.04.2022 with validity till 02.04.2024.

The Environmental Impact Assessment (EIA) Report and the Summary Environmental Impact Assessment Reports have been prepared as per the generic structure proposed in EIA Notification 2006 and in compliance with the awarded TORs and submitted. The data submitted in the EIA Report are factually correct.

For ABC Techno Labs India Private Limited

sd./

Date : 24.05.2023

Place : Chennai

Authorised Signatory



#### **ABC TECHNO LABS INDIA PRIVATE LIMITED**

(Accredited by NABL, NABET, Approved by FSSAI, APEDA & Agmark, Recognized by MoEFACC, BIS)

(An ISO 9001, ISO 14001, ISO 45001 & ISO 22000 Certified Company)

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**MEMBER SECRETARY**

**STATE LEVEL ENVIRONMENT IMPACT  
ASSESSMENT AUTHORITY-TAMILNADU**

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**TERMS OF REFERENCE (ToR)**

**Lr No.SEIAA-TN/F.No.9739/SEAC/ToR-1420/2023 Dated: 03.04.2023**

**To**

The Unit Head,  
M/s. Dalmia Cement Bharat Limited,  
Dalmiapuram, Lalgudi Taluk,  
Tiruchirappalli District - 621 651.

**Sir / Madam,**

**Sub:** SEIAA, Tamil Nadu – Terms of Reference with Public Hearing (ToR) for the Proposed production enhancement from 2.00 MTPA to 6.97 MTPA (ROM) in existing lime stone quarry (GO No.76) over an extent of 166.005 Ha at SF Nos. 39/8, 40, 41/1, 47/1, 47/3, 47/4, 47/11, 49, 50, 51, 52, 53/1, 55/1 (P), 55/15, 101, 102/20, 104/1A, 104/15, 104/24, 110/2, 110/3, 110/4, 110/15, 111/1, 111/2, 112/1, 112/8, 112/11B, 112/12, 112/14A, 112/15, 113/1, 113/3, 114/1, 114/6, 114/7, 114/11, 114/12, 114/13, 114/14, 114/15, 114/17A, 114/17B, 114/18, 114/19, 115/1, 115/3, 115/4, 115/6, 115/7, 115/9, 115/10, 116/1, 116/2, 116/3, 117/1, 117/2, 117/3, 117/4, 117/5, 117/6, 117/7, 117/8, 118/1, 118/3A, 118/3C, 118/5, 118/10, 119/1, 119/19B, 120, 121/1, 121/7A, 121/18, 121/19, 122, 135/1, 135/2, 136/1, 136/3, 136/7, 136/10, 136/11, 136/12, 136/13, 136/14, 137/1, 137/2, 137/3, 137/6, 137/7, 138/1, 138/2, 139/1, 139/2, 139/3, 139/4, 139/5, 139/6, 139/7, 140/1, 140/2, 140/3, 140/4, 140/6B, 252, 254/4, 254/7, 254/8, 254/9, 254/10, 254/11, 254/12, 254/13, 258/1, 259/6, 260/3, 260/7, 260/9, 260/13, 260/16, 260/18, 268/1(P), 403 of Kallakudi Village, SF Nos. 54/1, 54/2, 55, 56, 57, 58(P), 59/1B(P), 60, 61/8, 72/1,

**MEMBER SECRETARY  
SEIAA-TN**

72/3(P), 73/1, 73/3, 73/5, 74/1, 75, 77/4(P), 78/5(P), 78/7(P), 78/8A, 79/1A(P), 79/1B, 79/2, 79/6, 80/1, 81/1B, 81/3, 81/4, 82, 83, 85/2, 86/1, 87, 88/1, 89/1, 92(P), 93/1D, 94/7(P), 95/8(P), 140A/1, 147/1 of Kovandakurichi Village and SF No. 32 of Venkatachalapuram Village, Lalgudi Taluk, Trichy District, Tamil Nadu by M/s. Dalmia Cement (Bharat) Limited - under project category - "B1" and Schedule S.No.1(a) - ToR issued along with Public Hearing - preparation of EIA report - Regarding.

- Ref:**
1. Online proposal No. SIA/TN/MIN/414894/2023, dated 17.01.2023.
  2. Your application submitted for Terms of Reference dated: 19.01.2023.
  3. Minutes of the 361<sup>st</sup> SEAC meeting held on 10.03.2023.
  4. Minutes of the 607<sup>th</sup> SEIAA meeting held on 03.04.2023.

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Kindly refer to your proposal submitted to the State Level Impact Assessment Authority for Terms of Reference.

The proponent, M/s. Dalmia Cement (Bharat) Limited has submitted application for Terms of Reference (ToR) on 19.01.2023, in Form-I, Pre-Feasibility report for the Proposed production enhancement from 2.00 MTPA to 6.97 MTPA (ROM) in existing lime stone quarry (GO No.76) over an extent of 166.005 Ha at SF Nos. 39/8, 40, 41/1, 47/1, 47/3, 47/4, 47/11, 49, 50, 51, 52, 53/1, 55/1 (P), 55/15, 101, 102/20, 104/1A, 104/15, 104/24, 110/2, 110/3, 110/4, 110/15, 111/1, 111/2, 112/1, 112/8, 112/11B, 112/12, 112/14A, 112/15, 113/1, 113/3, 114/1, 114/6, 114/7, 114/11, 114/12, 114/13, 114/14, 114/15, 114/17A, 114/17B, 114/18, 114/19, 115/1, 115/3, 115/4, 115/6, 115/7, 115/9, 115/10, 116/1, 116/2, 116/3, 117/1, 117/2, 117/3, 117/4, 117/5, 117/6, 117/7, 117/8, 118/1, 118/3A, 118/3C, 118/5, 118/10, 119/1, 119/19B, 120, 121/1, 121/7A, 121/18, 121/19, 122, 135/1, 135/2, 136/1, 136/3, 136/7, 136/10, 136/11, 136/12, 136/13, 136/14, 137/1, 137/2, 137/3, 137/6, 137/7, 138/1, 138/2, 139/1, 139/2, 139/3, 139/4, 139/5, 139/6, 139/7, 140/1, 140/2, 140/3, 140/4, 140/6B, 252, 254/4, 254/7, 254/8, 254/9, 254/10, 254/11, 254/12, 254/13, 258/1, 259/6, 260/3, 260/7, 260/9, 260/13, 260/16, 260/18, 268/1(P), 403 of Kallakudi Village, SF Nos. 54/1, 54/2, 55, 56, 57, 58(P), 59/1B(P), 60, 61/8, 72/1, 72/3(P), 73/1, 73/3, 73/5, 74/1, 75, 77/4(P), 78/5(P), 78/7(P), 78/8A, 79/1A(P), 79/1B, 79/2, 79/6, 80/1, 81/1B, 81/3, 81/4, 82, 83, 85/2, 86/1, 87, 88/1, 89/1, 92(P), 93/1D, 94/7(P), 95/8(P), 140A/1, 147/1 of Kovandakurichi Village and SF No. 32 of Venkatachalapuram Village, Lalgudi Taluk, Trichy District, Tamil Nadu.

  
MEMBER SECRETARY  
SEIAA-TN

**Discussion by SEAC and the Remarks:-**

Proposed production enhancement from 2.00 MTPA to 6.97 MTPA (ROM) in existing lime stone quarry (GO No.76) over an extent of 166.005 Ha at SF Nos. 39/8, 40, 41/1, 47/1, 47/3, 47/11, 49, 50, 51, 52, etc. of Kallakudi Village, SF Nos. 54/1, 54/2, 55, 56, 57, 60, 75, 81/1B, etc. of Kovandakurichi Village and SF No. 32 of Venkatachalapuram Village, Lalgudi Taluk, Trichy District, Tamil Nadu by M/s Dalmia Cement (Bharat) Limited - for Terms of Reference.

The proposal is placed in this 361<sup>st</sup> meeting of SEAC held on 10.03.2023. The details of the project furnished by the proponent are available in the website (parivesh.nic.in).

**The SEAC noted the following**

1. The Project Proponent, M/s Dalmia Cement (Bharat) Limited has applied for Terms of Reference for the Proposed production enhancement from 3.MTPA to 6.97MTPA in existing lime stone quarry (Go.No.76) over an extent of 166.005 Ha at S.F.No. SF Nos. 39/8, 40,41/1, 47/1,4 7/3, 47/11, 49, 50, 51, 52, etc. of Kallakudi Village, SF Nos. 54/1, 54/2, 55, 56, 57, 60, 75,81/1B, etc. of Kovandakurichi Village and SF No. 32 of Venkatachalapuram Village, Lalgudi Taluk, Trichy District, Tamil Nadu.
2. The proposed quarry/activity is covered under Category "B1" of Item I(a) "Mining Projects" of the Schedule to the EIA Notification, 2006.
3. Modification in Modified Mining Plan along with Progressive Mine Closure (PMC) Plan for balance Period 2022-23 & 2023- 24 for 6.97 MTPA has been approved by the Regional Controller of Mines, IBM, Chennai vide TN/TCR/LST/MMP2088.MDS dated 19.08.2022.
4. The necessary permission has been granted by the competent authority in the above Modified Mining Plan to operate the leases simultaneously in contiguous manner.
5. The Mine lease is valid from 1.9.2004 to 31.8.2024 for a period of 20 years initially but however the 'Extension of lease tenure' is granted from 01.09.2024 to 31.03.2030 based on the MMDR Amendment Act, 2015 vide the letter obtained from the Industries Dept (G.O), dated. 26.07.2018.
6. The scheme of mining plan is approved for 2 years. The production for 2 years not to exceed 8.97 Million T (ROM) including 472529 Million T of OB, 1248441 Million T of sub grades & 1561861 Million T of Gniess.
7. The mining method involves the non-conventional method of deploying surface miners, rock breakers and rippers as the mine is in close proximity to habitation, worship places,

  
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etc and hence no drilling & blasting operations are carried out during the life of the project.

8. The PP has furnished the required documentations for the Certified Compliance Report obtained from the IRO, MoEF & CC, dated. 09.09.2022.
9. As the awarded EC for Expansion of 2.0 MTPA is covering all Pits and to be worked simultaneously for achieving the EC/consented production quantity of 2.0 MTPA, the PP has clarified its submission for the observed Non-Compliance.
10. Further, the PP had explained the reasons for expansion programme of the mine from 2 MTPA to 6.97 MTPA which is purely based on the detailed exploration programme in accordance with the UNFC Guidelines as indicated by the Ministry of Mines, GoI.
11. Consents to Operate Orders (CTOs) are being granted by Tamil Nadu Pollution Control Board (TNPCB) which are also periodically renewed. Existing CTOs are 1908121917156 (Water Act) and 1908221917156 (Air Act) dated 13.09.2019 for 2.00 MTPA Limestone are valid upto 31.03.2024.
12. The maximum Production achieved was 19,89,200 Tonnes (1.99 MTPA) during 2012-13 and Dispatched 19,92,752 Tonnes. All yearly productions from 2008-09 to 2021-22 were within the Consented Quantity.
13. Royalty amount of Rs.167.73 Crores was paid by the PP for the production from this ML-I during 14 years Period during 2008-09 to 2021-22.
14. Karaivetti Bird Sanctuary, Notified Eco Sensitive Area (ESA) vide S.O. 1909(E) dated 31.05.2019, is at a distance of 8.7 km in east direction.
15. Thachankurichi Reserved Forests (RF) is at a distance of 9.0 km in west from KVK Pit No. 4.

Based on the presentation made by the proponent, SEAC decided to recommend grant of Terms of Reference (TOR) with Public Hearing subject to the following additional TORs, in addition to the standard terms of reference for EIA study for non-coal mining projects and details issued by the MOEF & CC to be included in EIA/EMP Report:

1. The PP shall furnish the technical reasons for necessity of expanding the production capacity from 2 MTPA to 6.97 MTPA with detailed exploration programme as approved by the competent authority.
2. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.

  
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3. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.
4. Since the existing depth of mine working is exceeded 40 m and proposed to work beyond 45m below ground level, the Project Proponent (PP) shall carry out the scientific studies to assess the slope stability of the existing benches and also the proposed quarry working benches for ensuring the safety of men & machinery deployed with suggested slope monitoring system as per the provisions given in the DGMS Tech Circular No.02, 09.01.2020, by involving any of the reputed Research and Academic Institution such as CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, IIT-Madras, IIT-Kharagpur, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus, etc. during the time of appraisal for obtaining the EC.
5. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry will not be carried out in the mine.
6. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.
7. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,
  - a. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?
  - b. Quantity of minerals mined out.
  - c. Highest production achieved in any one year
  - d. Detail of approved depth of mining.
  - e. Actual depth of the mining achieved earlier.
  - f. Name of the person already mined in that leases area.
  - g. If EC and CTO already obtained, the copy of the same shall be submitted.
  - h. Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
8. All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).

  
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9. The PP shall carry out Drone video survey covering the cluster, Green belt, fencing etc.,
10. The PP shall furnish the revised manpower including the statutory & competent persons as required under the provisions of the MMR 1961 for the prosed quarry based on the volume of rock handled & area of excavation.
11. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same.
12. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.
13. The Project Proponent shall conduct the hydro-geological study to assess the quality & quantity of the ground water due to impacts of proposed quarrying operation and to prepare a ground water modelling, by involving any of the reputed Research and Academic Institution such as CSIR-Central Institute of Mining and Fuel Research / Dhanbad, NIRM, IIT-Madras, NIT-Dept of Mining Engg, Surathkal, Anna University Chennai-Dept of Geology, CEG Campus, and University of Madras -Dept of Geology, Chennai etc considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.
14. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.
15. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.

  
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16. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.
17. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
18. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.
19. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.
20. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
21. Impact on local transport infrastructure due to the Project should be indicated and possibility of exploring the alternative transportation system such as electric vehicles shall be provided for environmental protection.
22. The PP shall obtain the NOC from the competent authority for working below the Ground Water Table and also stipulate the
23. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.
24. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.
25. Public Hearing points raised and commitments of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project and to be submitted to SEIAA/SEAC with regard to the Office Memorandum of MoEF& CC accordingly.
26. The Public hearing advertisement shall be published in one major National daily and one most

  
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circulated vernacular daily.

27. The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.
28. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.
29. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the **appendix-I** in consultation with the DFO, State Agriculture University and local school/college authorities. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.
30. Taller/one year old Saplings raised in appropriate size of bags, preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site-specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner
31. A Disaster Management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
32. A Risk Assessment and Management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.
33. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
34. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
35. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible,

  
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- quantitative dimensions may be given with time frames for implementation.
36. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
  37. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
  38. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.
  39. The PP shall prepare the EMP for the entire life/lease of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.
  40. Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.

#### Appendix

##### List of Native Trees Suggested for Planting

1. *Aegle marmelos* – Vilvam
2. *Adenaanthera pavonina* - Manjadi
3. *Albizia lebbeck* – Vaagai
4. *Albizia amara* - Usil
5. *Bauhinia purpurea* - Mantharai
6. *Bauhinia racemosa* - Aathi
7. *Bauhinia tomentosa* – Iruvathi
8. *Buchanania axillaris* - Kattuma
9. *Borassus flabellifer* - Panai
10. *Butea monosperma* - Murukka maram
11. *Bobax ceiba* – Ilavu, Sevvilavu
12. *Calophyllum inophyllum* - Punnai
13. *Cassia fistula* - Sarakondrai
14. *Cassia roxburghii*- Sengondrai
15. *Chloroxylon sweitenia* - Purasa maram
16. *Cochlospermum religiosum* – Kongu, Manjal Ilavu

  
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17. *Cordia dichotoma* – Mookuchali maram
18. *Creteva adansonii* – Mavalingum
19. *Dillenia indica* – Uva, Uzha
20. *Dillenia pentagyna* – Siru Uva, Sitruzha
21. *Diospyros ebenum* - Karungali
22. *Diospyros chloroxylon* – Vaganai
23. *Ficus amplissima* – Kal Itchi
24. *Hibiscus tiliaceus* – Aatru poovarasu
25. *Hardwickia binata* – Aacha
26. *Holoptelia integrifolia* - Aayili
27. *Lannea coromandelica* - Odhiam
28. *Lagerstroemia speciosa* - Poo Marudhu
29. *Lepisanthus tetraphylla* - Neikottai maram
30. *Limonia acidissima* - Vila maram
31. *Litsea glutinosa* –Pisin pattai
32. *Madhuca longifolia* - Illuppai
33. *Manilkara hexandra* – Ulakkai Paalai
34. *Mimusops elengi* - Magizha maram
35. *Mitragyna parvifolia* - Kadambu
36. *Morinda pubescens* – Nuna
37. *Morinda citrifolia* – Vellai Nuna
38. *Phoenix sylvestre* - Eachai
39. *Pongamia pinnata* – Pungam
40. *Premna mollissima* – Munnai
41. *Premna serratifolia* – Narumunnai
42. *Premna tomentosa* - Purangai Naari, Pudanga Naari
43. *Prosopis cinerea* - Vanni maram
44. *Pterocarpus marsupium* - Vengai
45. *Pterospermum canescens* – Vennangu, Tada
46. *Pterospermum xylocarpum* - Polavu
47. *Puthranjiva roxburghii* – Puthranjivi
48. *Salvadora persica* – Ugaa Maram

  
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49. *Sapindus emarginatus* - Manipungan, Soapu kai
50. *Saraca asoca* - Asoca
51. *Streblus asper* - Piraya maram
52. *Strychnos nuxvomica* - Yetti
53. *Strychnos potatorum* - Therthang Kottai
54. *Syzygium cumini* - Naval
55. *Terminalia bellerica* - Thandri
56. *Terminalia arjuna* - Ven marudhu
57. *Toona ciliate* - Sandhana vembu
58. *Thespesia populnea* - Puvarasu
59. *Walsuratrifoliata* - valsura
60. *Wrightia tinctoria* - Veppalai
61. *Pithecellobium dulce* - Kodukkapuli

**Discussion by SEIAA and the Remarks:-**

The proposal was placed in the 607<sup>th</sup> Authority meeting held on 03.04.2023. The authority noted that this proposal was placed for appraisal in 361<sup>st</sup> SEAC meeting held on 10.03.2023. After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant **Terms of Reference (ToR) along with Public Hearing** under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions in addition to the conditions in '**Annexure B**' of this minute.

**Annexure 'B'**

**Cluster Management Committee**

1. Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.
2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.,
3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.

  
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4. Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.
5. The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.
6. The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.
7. The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.
8. The committee shall furnish the Emergency Management plan within the cluster.
9. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.
10. The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.
11. The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.

#### **Impact study of mining**

12. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following
  - a) Soil health & soil biological, physical land chemical features .
  - b) Climate change leading to Droughts, Floods etc.
  - c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people.
  - d) Possibilities of water contamination and impact on aquatic ecosystem health.
  - e) Agriculture, Forestry & Traditional practices.
  - f) Hydrothermal/Geothermal effect due to destruction in the Environment.
  - g) Bio-geochemical processes and its foot prints including environmental stress.
  - h) Sediment geochemistry in the surface streams.

#### **Agriculture & Agro-Biodiversity**

13. Impact on surrounding agricultural fields around the proposed mining Area.

  
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14. Impact on soil flora & vegetation around the project site.
15. Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.
16. The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.
17. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.
18. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.

#### **Forests**

19. The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.
20. The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.
21. The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.
22. The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.

#### **Water Environment**

23. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.
24. Erosion Control measures.
25. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.
26. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.

  
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27. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.
28. The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.
29. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.
30. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.

#### **Energy**

31. The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished.

#### **Climate Change**

32. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.
33. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.

#### **Mine Closure Plan**

34. Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.

#### **EMP**

35. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.
36. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.

#### **Risk Assessment**

37. To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.

  
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**Disaster Management Plan**

38. To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.

**Others**

39. The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.

40. As per the MoEF& CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.

41. The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.

**A. STANDARD TERMS OF REFERENCE**

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
- 4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).

  
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- 5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
- 6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
- 7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.
- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
- 9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
- 10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
- 12) Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to

  
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ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.

- 13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
- 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
- 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
- 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
- 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
- 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
- 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.

  
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- 20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- 21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.
- 22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.
- 23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
- 24) The water requirement for the Project, its availability and source should be furnished. A

  
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- detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
- 25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
  - 26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
  - 27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
  - 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
  - 29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
  - 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
  - 31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.
  - 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project

  
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Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.

- 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
- 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- 37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
- 38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
- 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
- 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
- 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 44) Besides the above, the below mentioned general points are also to be followed:-

  
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- a) Executive Summary of the EIA/EMP Report
- b) All documents to be properly referenced with index and continuous page numbering.
- c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
- d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
- e) Where the documents provided are in a language other than English, an English translation should be provided.
- f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
- g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
- h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the ToR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
- i) As per the circular no. J-11011/618/2010-IA.II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the Environment Clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
- j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

**In addition to the above, the following shall be furnished:-**

**The Executive summary of the EIA/EMP report in about 8-10 pages should be prepared incorporating the information on following points:**

1. Project name and location (Village, District, State, Industrial Estate (if applicable)).

  
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2. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
3. Measures for mitigating the impact on the environment and mode of discharge or disposal.
4. Capital cost of the project, estimated time of completion.
5. The proponent shall furnish the contour map of the water table detailing the number of wells located around the site and impacts on the wells due to mining activity.
6. A detailed study of the lithology of the mining lease area shall be furnished.
7. Details of village map, "A" register and FMB sketch shall be furnished.
8. Detailed mining closure plan for the proposed project approved by the Geology of Mining department shall be submitted along with EIA report.
9. Obtain a letter /certificate from the Assistant Director of Geology and Mining standing that there is no other Minerals/resources like sand in the quarrying area within the approved depth of mining and below depth of mining and the same shall be furnished in the EIA report.
10. EIA report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published February 2010.
11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.
12. The EIA study report shall include the surrounding mining activity, if any.
13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.
14. A study on the geological resources available shall be carried out and reported.
15. A specific study on agriculture & livelihood shall be carried out and reported.
16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.
17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of its acquisition, nearby (in 2-3 km.) water body, population, within 10km other industries, forest, eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
19. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.

  
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20. Likely impact of the project on air, water, land, flora-fauna and nearby population
21. Emergency preparedness plan in case of natural or in plant emergencies
22. Issues raised during public hearing (if applicable) and response given
23. CER plan with proposed expenditure.
24. Occupational Health Measures
25. Post project monitoring plan
26. The project proponent shall carry out detailed hydro geological study through intuitions/NABET Accredited agencies.
27. A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.
28. The proponent shall propose the suitable control measure to control the fugitive emissions during the operations of the mines.
29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.
31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

**Besides the above, the below mentioned general points should also be followed:-**

- a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
- b. All documents may be properly referenced with index, page numbers and continuous page numbering.
- c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
- d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry should also be followed.
- e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training

  
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(NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -11013/77/2004-IA-II(I) dated 2<sup>nd</sup> December, 2009, 18<sup>th</sup> March 2010, 28<sup>th</sup> May 2010, 28<sup>th</sup> June 2010, 31<sup>st</sup> December 2010 & 30<sup>th</sup> September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred.

- After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.
- The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.
- The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29<sup>th</sup> August, 2017.

  
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**Copy to:**

1. The Additional Chief Secretary to Government, Environment, Climate Change and Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi - 110 032.
3. The Chairman, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.
4. The APCCF (C), Regional Office, MoEF & CC (SZ), 34, HEPC Building, 1<sup>st</sup> & 2<sup>nd</sup> Floor, Cathedral Garden Road, Nungambakkam, Chennai - 34.
5. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC, Paryavaran Bhavan, CGO Complex, New Delhi - 110 003.
6. The District Collector, Trichy District.
7. Stock File.



### Awarded TORs & their incorporation in EIA Report

Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
<b>Additional TORs by SEAC</b>		
1.	The PP shall furnish the technical reasons for necessity of expanding the production capacity from 2 MTPA to 6.97 MTPA to with detailed exploration programme as approved by the competent authority.	74 91
2.	The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing tress & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.	64-65
3.	The proponent shall carry out Bio diversity study through reputed institution and the same shall be included in EIA Report.	163-173
4.	Since the existing depth of mine working is exceeded 40m and proposed to work beyond 45m below ground level, the Project Proponent (PP) shall carry out the scientific studies to assess the slope stability of the existing benches and also the proposed quarry working benches for ensuring the safety of men & machinery deployed with suggested slope monitoring system as per the provisions given in the DGMS Tech Circular No.02, 09.01.2020, by involving any of the reputed Research and Academic Institution such as CSIR-Central Institute of Mining & Fuel Research/ Dhanbad, NIRM/Bangalore, IIT-Madras, IIT-Kharagpur, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus, etc. during the time of appraisal for obtaining the EC.	189-190
5.	The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry will not be carried out in the mine.	67
6.	The EIA Coordinates shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the state with video and photographic evidences.	53 61
7.	If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, the proponent shall furnish the following details from AD/DD, mines. a. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines? b. Quantity of minerals mined out c. Highest production achieved in any one year d. Detail of approved depth of mining. e. Actual depth of the mining achieved earlier. f. Name of the person already mined in that leases area. g. If EC and CTO already obtained, the copy of the same shall be submitted. h. Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.	Not Applicable; Existing Mine with all statutory clearances.
8.	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	62 75
9.	The PP shall carry out Drone video survey covering the cluster, Green Belt, fencing etc.,	Will be submitted

Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
10.	The PP shall furnish the revised manpower including the statutory & competent persons as required under the provisions of the MMR 1961 for the proposed quarry based on the volume of rock handled & area of excavation.	101-102
11.	The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment and the remedial measures for the same.	89-90
12.	The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of Mines Act' 1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.,	101-102
13.	The Project Proponent shall conduct the hydro-geological study to assess the quality & quantity of the ground water due to impacts of proposed quarrying operation and to prepare a ground water modelling, by involving any of the reputed Research and Academic Institution such as CSIR-Central Institute of Mining and Fuel Research / Dhanbad, NIRM/ IIT-Madras, NIT-Dept of Mining Engg, Surathkal, Anna university Chennai-Dept of Geology, CEG Campus, and University of Madras- Dept of Geology, Chennai etc. considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD/ TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.	146-153 191-193
14.	The Project Proponent shall furnish the base line data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	Chapter 3 112-188
15.	The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts and its mitigation measures. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.	189-210 221-223
16.	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	108-110
17.	Land use of the study area delineating forest area, agricultural land, grazing land, wild life sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phase and submitted. Impact, if any, of change of land use should be given.	160-162 103
18.	Details of the land for storage of Overburden/Waste Dumps(or) Rejects outside the mine lease area such as extent of land area distance from mine lease, its land use, R&R issues, if any, should be provided.	102-103 75

Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
19.	Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	112 68-69
20.	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project. If any, should be provided.	108-110
21.	Impact on local transport infrastructure due to the project should be indicated and possibility of exploring the alternative transportation system such as electric vehicles shall be provided for environmental protection.	195-197
22.	The PP shall obtain the NOC from the competent authority for working below the Ground Water Table.	Applied
23.	A tree survey study shall be carried out (Nos., name of the species, age, diameter etc..) both within the mining lease applied area & 300 m buffer zone and its management during mining activity.	110-111
24.	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site specific.	103-108
25.	Public Hearing points raised and commitments of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project and to be submitted to SEIAA/SEAC with regard to the Office Memorandum of MoEF&CC accordingly.	Will be complied
26.	The Public Hearing advertisement shall be published in one major National daily and one most circulated vernacular daily.	Will be complied
27.	The PP shall produce/display the EIA report, Executive summary and other related information with respect to public hearing in Tamil Language also.	Complied
28.	As part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.	Complied
29.	The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise gathered, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University and local school/college authorities. The plant species with dense/moderate canopy of native origin should be planted in a mixed manner.	110-111
30.	Taller/one year old saplings raised in appropriate size of bags; preferably eco-friendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner.	110-111
31.	A disaster management plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.	215-219
32.	A Risk Assessment and management plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till	213-214

Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
	the end of the lease period.	
33.	Occupational Health Impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of the pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The Project specific Occupational Health mitigation measures with required facilities proposed in the mining area may be detailed.	209-210
34.	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	209
35.	The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	173-188
36.	Details of litigation pending against the project, if any, with direction/order passed by the Court of Law against the Project should be given.	Nil 75
37.	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	87 220
38.	If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEF/TNPCB.	68-69 271-293
39.	The PP shall prepare the EMP for the entire life/lease of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.	221-223
40.	Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986.	Noted
<b>Additional TORs by SEIAA – Annexure B</b>		
	<b>Cluster Management Committee</b>	Not Applicable 47-48
1.	Cluster Management Committee shall be framed which must include all the proponent in the cluster as members including the existing as well as proposed quarry.	-
2.	The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantations, blasting etc.	-
3.	The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.	-
4.	Detailed Operational Plan must be submitted which must include the blasting frequency with respect in the form of route map and network.	-
5.	The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense	-

Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
	rain and the mitigation measures considering the inundation of the cluster and evacuation plan.	
6.	The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.	-
7.	The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.	-
8.	The committee shall furnish the Emergency Management Plan within the cluster	-
9.	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.	-
10.	The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.	-
11.	The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.	-
	<b><u>Impact Study of Mining</u></b>	
12	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following: a) Soil health & soil biological, physical land chemical features. b) Climate change leading to Droughts, floods etc. c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature & livelihood of the local people. d) Possibilities of water contamination and impact on aquatic ecosystem health. e) Agriculture, Forestry & Traditional practices f) Hydrothermal/Geothermal effect due to destruction in the Environment. g) Bio-geochemical processes and its foot prints including environmental stress. h) Sediment geochemistry in the surface streams.	189-193
	<b><u>Agriculture &amp; Agro-Biodiversity</u></b>	
13.	Impact on surrounding agricultural fields around the proposed mining area.	208
14.	Impact on soil flora & vegetation around the project site.	207
15.	Details of type of vegetations including no of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.	207-208
16.	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.	163-173
17.	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	207-208 194
18.	The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.	208
19.	<b><u>Forests :</u></b>	NA

Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
	The project proponent shall be detailed study on impact of mining on Reserve forests free ranging wildlife.	
20.	The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.	172-173
21.	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.	207-208
22.	The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and wildlife pathways, near project site.	172-173
	<b><u>Water Environment:</u></b>	
23.	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc, within 1 Km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it any clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	146-153 191-193
24.	Erosion control measures.	191-193
25.	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby villages, water-bodies/ rivers & any ecological fragile areas.	191-193
26.	The PP shall study impact on fish habitats and the food WEB/food chain in the water body and Reservoir.	163-173
27.	The Project Proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.	163-173
28.	The Project Proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archeological sites possible land form changes visual and aesthetic impacts.	163-173
29.	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	158-159
30.	The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.	NA
	<b><u>Energy:</u></b>	
31.	The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilize the Energy shall be furnished.	221-223
	<b><u>Climate Change:</u></b>	
32.	The Environmental Impact Assessment study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.	190-191
33	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	190-191
	<b><u>Mine Closure Plan:</u></b>	
34.	Detailed Mine closure plan covering the entire mine lease period as per	103-108

Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
	precise area communication order issued.	
	<b>EMP</b>	
35.	Detailed Environment Management Plan along with adaption, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.	221-223
36.	The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.	223
	<b>Risk Assessment:</b>	
37.	To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of mining.	213-214
	<b>Disaster Management Plan</b>	
38.	To furnish disaster management plan and mitigation measures in regard to all aspects to avoid /reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued.	215-219
	<b>Others</b>	
39.	The Project Proponent shall furnish VAO certificate with reference to 300m radius regard to approval habitations, schools, Archaeological sites, structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.	59 60
40.	As per the MoEF & CC coffee memorandum F.No. 22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.	Will be complied
41.	The Project Proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecologist risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported.	223
	<b>A. Standard Terms of Reference</b>	
1.	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	69 71
2.	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	Doc-1 237
3.	All documents including approve mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	Complied
4.	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ Topo sheet, Topographic sheet, geomorphology and geology of th area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	62 75 76

Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
5.	Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	76
6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	66
7.	It should be clearly stated whether the proponent company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances/ violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.	55
8.	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	213-214
9.	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine/ lease period.	112 113
10.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	160-162 103
11.	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	102-103 75
12.	Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area.in the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department assist the Expert Appraisal Committees.	77
13.	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	Not Applicable
14.	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006should be indicated.	Not Applicable



Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
15.	The vegetation in the RF/PF areas in the study area, with necessary details, should be given.	
16.	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	Not Applicable
17.	Location of National parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wild Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	75-77
18.	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conversation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	163-173
19.	Proximity to areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	112
20.	Similarly for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL,HTL,CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	112
21.	R&R Plan/ compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view, In respect of SCs/STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programs prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) including their R&R and Socio-Economic aspects should be discussed in the Report.	75
22.	One season (non-monsoon) [i.e, March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2019, water quality, noise level, soil and flora and fauna shall be collected	Complied Winter 2022-23 Season

Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
	and the AAQ and other data so compiled presented date-wise in the EIA and EMP report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	Data are utilized Chapter 3 112-188
23.	Air quality modeling should be carried out for prediction of impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	198-203
24.	The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be indicated.	108-109
25.	Necessary clearance from the competent authority for drawl of requisite quantity of water for the Project should be provided.	Applied
26.	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	109-110
27.	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	204-205
28.	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. Incase the working will intersect groundwater table, a detailed hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of groundwater should also be obtained and copy furnished.	Will intersect GWT 146-153 191-193
29.	Details of any stream, seasonal or otherwise, passing through the lease area and modification/ diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	NA Existing Mine
30.	Information on site elevation, working depth, groundwater table etc. should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	75
31.	A time bound progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local value native species and the species which are tolerant pollution.	110-111

Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
32.	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	195-197
33.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	108
34.	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	103-108
35.	Occupational health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The Project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	209-210
36.	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	209
37.	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	208-209
38.	Detailed Environment Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed project.	221-223
39.	Public hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the project.	Will be complied
40.	Details of litigation pending against the project, if any, with direction/order passed by any Court of Law against the Project should be given.	Nil 75
41.	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	84
42.	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	215-219
43.	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	87 220
44.	Besides the above, the below mentioned general points should also be followed:-	
(a)	Executive summary of the EIA/EMP Report.	Complied with Chapter 11
(b)	All documents may be properly referenced with index and continuous page	Complied with

Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
	numbering.	
(c)	Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.	Complied with
(d)	Project Proponent shall enclose all the analysis/testing reports of water, soil, noise, etc. using the MoEF&CC/NABL accredited laboratories. All the original/testing reports should be available during the appraisal of Project.	Complied with
(e)	Where the documents provided are in a language other than English, an English translation should be provided.	Complied with
(f)	The Questionnaire for environmental appraisal of mining projects as prescribed by the Ministry shall also be filled and submitted.	Complied with
(g)	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. NO. J-11013/41/2006-Ia.II(I) dated 4 <sup>th</sup> August, 2009, which are available on the website of this Ministry, should be followed.	Complied with 7-8
(h)	Changes, if any made in the basic scope and project parameters(as submitted in Form-I and the Feasibility Report for securing the TOR) should be brought to the attention of MoEF&CC/SEIAA with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the PH process) will entail conducting the PH again with the revised Documentation.	Complied with
(i)	As per the circular no. J-11011/618/2010-IA.II(I) dated 30.05.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as many be applicable.	Not Applicable
(j)	EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	Complied with 76 77 78
	<b>In addition to the above the following shall be furnished:-</b>	
	<b>Executive Summary of EIA/EMP Report in about 8-10 pages should be prepared incorporating the information on following points:</b>	
1	Project name and location (Village, District, State, Industrial Estate (if applicable)).	Submitted as separate volume
2	Process description brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.	
3	Measures for mitigating the impact on the environment and mode of discharge or disposal.	
4	Capital cost of the Project, estimated time of completion.	
5	The Proponent shall furnish the contour map of the water table detailing the number of wells located around the site and impacts on the wells due to mining activity	
6	A detailed study of the Lithology of the mining lease are shall be furnished	
7	Details of Village Map, 'A' Register and FMB Sketch shall be furnished.	
8	Detailed mining closure plan for the proposed project approved by the Geology & Mining Department shall be submitted alongwith EIA Report.	

Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
9	Obtain a letter / certificate from the Assisstant Director of Geology and Mining stating that there is no other Minerals / resources like sand in the quarrying area within the approved depth.	
10	EIA Report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published in February 2010.	
11	Detailed Plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.	
12	The EIA Study report shall include the surrounding mining activity, if any.	
13	Modelling study for Air, Water and Noise shall be carried out in this field and incremental increase in the above study shall be substantiated with Mitigation Measures.	
14	A study on the geological resources available shall be carried out nad reported.	
15	A specific study on agriculture & livelihood shall be carried out nad reported.	
16	Impact of soil erosion, soil physical, chemical and biological changes may be assumed.	
17	Site selected for the project – Nature of land – Agricultural (single/double crop), barren, Govt / Private Land, status of its acquisition, nearby (in 2-3 Km.) water body, population, within 10 Km other industries, forest, eco-sensitive zones, accessibility, (note – in case of industrial estate this information may not be necessary).	
18	Baseline environmental data - air quality, surface and groundwater quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population.	
19	Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.	
20	Likely impact of the project on air, water, land, flora-fauna and nearby population.	
21	Emergency preparedness plan in case of natural or in plant emergencies.	
22	Issues raised during public hearing (if applicable) and response given.	
23	CSR plan with proposed expenditure.	
24	Occupational health measures.	
25	Post project monitoring plan.	
26	The Project proponent shall carry out detailed hydrogeological study through institutions / NABET Accredited agencies.	
27	A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.	
28	The proponent shall propose the suitable control measures to control the fugitive emissions during the operations of the mines.	
29	A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.	
30	Reserve funds should be earmarked for proper closure plan.	
31	A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and Forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment	

Sl. No.	TOR Condition	Incorporation in EIA Report Page No.
	(Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.	
	<b>Besides the above, the below mentioned general points should also be followed:-</b>	
(a)	A note confirming compliance of the TOR, with cross referencing of the relevant / pages of the EIA report should be provided.	Complied with
(b)	All documents may be properly referenced with index, page numbers and continuous page numbering.	Complied with
(c)	Where data are presented especially in the tables, the period in which the data were collected and the sources should be indicated.	Complied with
(d)	While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4 <sup>th</sup> August, 2009, which are available on the website of Ministry should also be followed.	Complied with
(e)	The consultants involved in the preparation of EIA / EMP report after accreditation with Quality Council of India (QCI) / National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard the EIA / EMP reports prepared by them and data provided by other organization / Laboratories including their status of their of approvals etc. In this regard circular no F.No.J-11013/77/2004-IA-II(I) dated 2 <sup>nd</sup> December, 2009, 18 <sup>th</sup> March 2010, 28 <sup>th</sup> May 2010, 28 <sup>th</sup> June 2010 & 30 <sup>th</sup> September 2011 posted on the Ministry's website <a href="http://www.moef.nic.in">http://www.moef.nic.in</a> may be referred.	Complied with
	After preparing the EIA (as per generic structure prescribed In Appendix-III of the EIA Notification, 2006) covering the abovementioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIS Notification, 2006.	Noted.
	The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.	Noted.
	The TORs prescribed shall be valid for a period of three years from date of issue, for submission of the EIA / EMP report as per OMNo.J-11013/41/2006-IA-II(I)(Part) dated 29 <sup>th</sup> August, 2017.	Noted.

\*\*\*

**Dalmia**  
**cement**  
**FUTURE TODAY**

*cement! sugar! refractories! power!*

Our Ref.: DCBL/DPM/Mines/GO76/03-2023

27<sup>th</sup> April 2023

The Member Secretary,  
State Level EIA Authority - Tamil Nadu,  
Panagal Building,  
No. 1, Jeanis Road, Sakdapat,  
Chennai-600 015.

Respected Sir,

Sub : Expansion of Kallakudi & Kovandakurichi Limestone Mines (ML-I) under GO No. 76 - Extent : 166.005 Ha & Production Enhancement from 2.00 MTPA to 6.97 MTPA (ROM) at SF Nos. 39/8, 40,41/1, 47/1,4 7/3, 47/11, 49, 50, 51, 52, etc. of Kallakudi Village, SF Nos. 54/1, 54/2, 55, 56, 57, 60, 75,81/1B, etc. of Kovandakurichi Village and SF No. 32 of Venkatachalapuram Village, Laigudi Taluk, Trichy District, Tamil Nadu by M/s. Dalmia Cement (Bharat) Limited - Environmental Clearance under EIA Notification 2006 - Sl. No. 1(a); Category 'B1'-Applicability of Additional TORs & their Compliance for EIA Report – reg.

- Ref. : 1. SEIAA-TN File No. 9739/2023 .  
2. Online TOR Proposal No. SIA/TN/MIN/414894/2023 on 17.01.2023.  
3. Minutes of 361<sup>st</sup> SEAC Meeting held on 10.03.2023 (Sl. No. 30).  
4. Minutes of 607<sup>th</sup> SEIAA Meeting held on 03.04.2023.  
5. Awarded TOR vide Lr. No. SEIAA-TN/F.No. 9739/SEAC/ToR-1420/2023 dated 03.04.2023 as Published in Parivesh Portal.

Awarded TOR for our above Project has been published in the Portal and accordingly we thank you very much for the same and we are preparing the EIA Report for Public Hearing. We would like to inform to your good self that there are some typographical errors, project data difference, non-



**Dalmia Cement (Bharat) Limited**

Dalmiapuram, District-Trichy-621 651, Tamil Nadu, India  
T 91 4329235123, F 91 4329235111 W www.dalmiacement.com CIN : U05191TN1996PLC 035963  
Registered Office : Dalmiapuram, Dist. Tiruchirappalli, Tamil Nadu - 621 651, India  
A Dalmia Bharat Group company, www.dalmiabharat.com

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applicable Specific & General TORs, in the awarded TORs. The compliance to those TORs are considered for the EIA Study as detailed below:

Sl. No.	TOR No.	TOR Description	Applicability / Compliance considered by DCBL for the EIA Study
I	SEAC Notings :-		
1	Sl. No. 1	Production enhancement from 3.0 MTPA to 6.97 MTPA	Production enhancement from 2.0 MTPA to 6.97 MTPA
2	Sl. No. 6	The scheme of mining plan is approved for 2 years. The production for 2 years not to exceed 8.97 MTPA (ROM) including 472529 Million T of OB, 1248441 Million T of sub grades and 1561861 million T of gnesis.	The scheme of mining plan is approved for 2 years. The production for 2 years not to exceed 8.97 MTPA (ROM) in addition to 472529 T of OB, 1248441 T of sub grades and 1561861 T of gnesis.
II	Discussion by SEIAA	After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant Terms of Reference (ToR) along with Public Hearing under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions in addition to the conditions in 'Annexure B' of this minute	We are operating five Limestone bearing Mining Leases including this GO 76 Lease in 4 Pits in the vicinity. No other Leases exist nearby or within 500 m. Accordingly, the Additional TORs stipulated under Cluster Management Committee (Sl. No. 1 to 11) in Annexure 'B' would not be included/covered in the EIA Study & Report. However, the Cumulative impact of our all 5 Mining Leases will be studied and reported in the EIA Report.

This is submitted for your kind information and we would request your goodself to kindly consider the same during the grant of final Environmental Clearance.

Thanking you,

Yours faithfully,  
For Dalmia Cement (Bharat) Limited

  
(K. Vinayagamurthi)  
Plant Head & Authorized Signatory



## 1.0 Introduction

### 1.1 Purpose of the Report

M/s. Dalmia Cement (Bharat) Limited (DCBL) are operating Cement Plants at Dalmiapuram & Ariyalur in Tamil Nadu. The limestone requirement of both Cement Plants is being met from Captive Limestone Mines in Ariyalur and Trichy Districts. Kallakudi-Kovandakurichi (KLK-KVK) Mine Leases were granted under 5 Leases in 4 Pits (earlier 5 Pits which are renumbered as 4 now) viz. Kallakudi Pit No. 1, Kallakudi Pit No. 2, Kovandakurichi East & West Blocks as Pit No. 3 and Venkatachalapuram Pit as Pit No. 4. Kallakudi Mines are in operation since 1939 and Kovandakurichi Mine Pits are in operation since 1952.

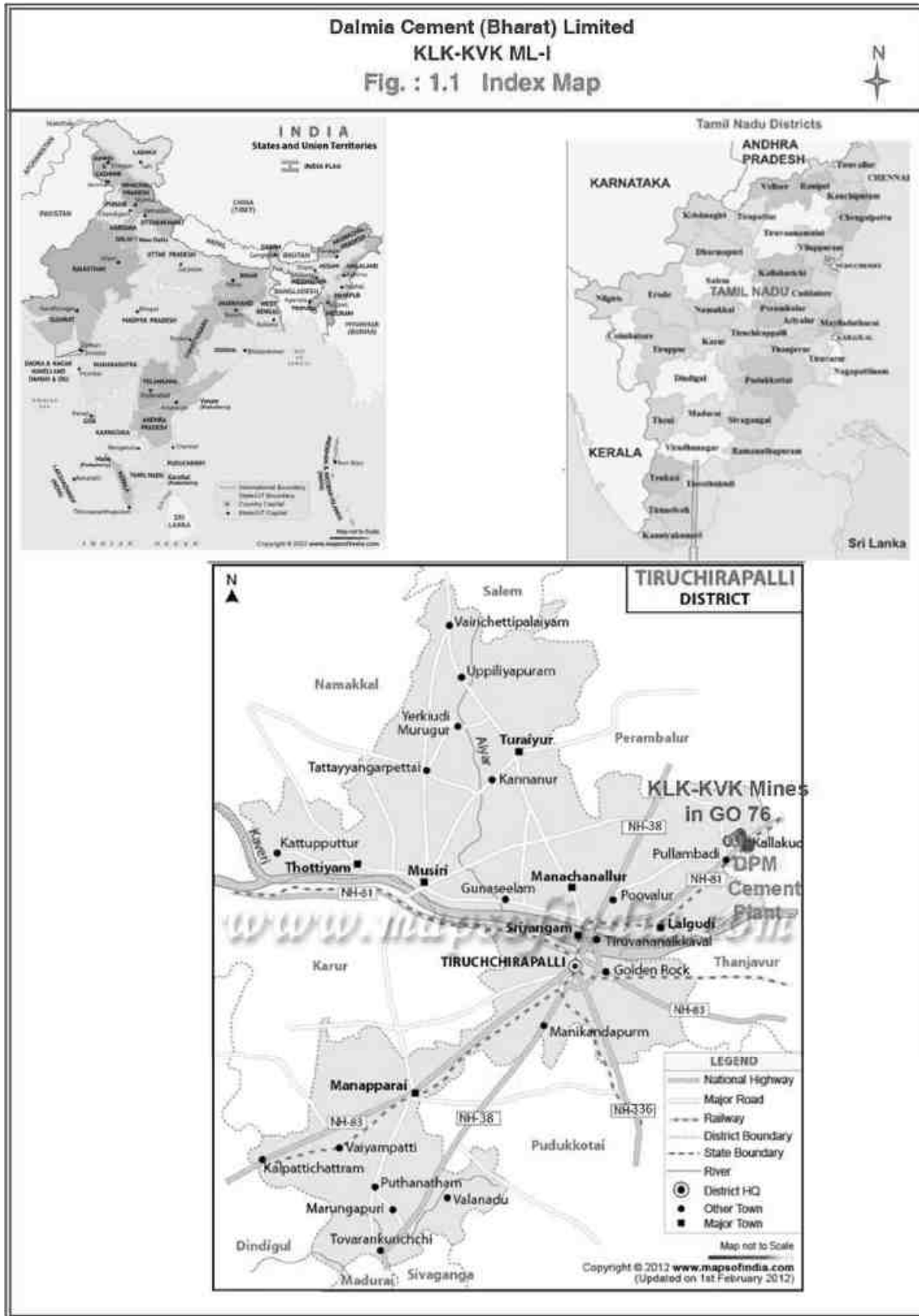
Kallakudi & Kovandakurichi Limestone **Mining Lease-I (KLK-KVK ML-I)** is having an extent of **166.005 Ha** falling in Survey Nos. 39/8, 40,41/1, 47/1,4 7/3, 47/11, 49, 50, 51, 52, etc. of Kallakudi Village, Survey Nos. 54/1, 54/2, 55, 56, 57, 60, 75,81/1B, etc. of Kovandakurichi Village and Survey No. 32 of Venkatachalapuram Village, Lalgudi Taluk, Tiruchirapalli District of Tamil Nadu (**Fig. 1.1**). The **non-mining area of 1.23 Ha in Venkatachalapuram Village** is now under the purview of State Government and the Lease grant has to be amended/updated accordingly.

ML-I Lease is accessible from Trichy-Chidambaram National Highway (NH)-81 at Kallakudi and is 38 km from Trichy. The Lease falls in all 4 Pits viz. Kallakudi Pit Nos. 1 & 2, Kovandakurichi Pit No. 3 (East & West Blocks) and Kovandakurichi Pit No. 4. **Limestone & Marl are the minerals** that are being mined out from the Lease. All the Pits are being worked by Non-Conventional Method of Mining using Rock Breakers, as the Lease is in close proximity to habitation.

EC for the Production Enhancement from 1.0 MTPA to 2.0 MTPA of ML-I has been obtained for 30 years vide MoEF&CC F No. J-11015/912/2007-1 A.II (M) dated 27.05.2008 (valid till 2038). Certified EC Compliance Status Report for ML-I has been issued by Integrated Regional Office (IRO), MoEF&CC, Chennai vide Letter EP 12.1/724/TN/966 dated 09.09.2022. Existing CTOs are 1908121917156 (Water Act) and 1908221917156 (Air Act) dated 13.09.2019 for 2.00 MTPA Limestone are valid upto 31.03.2024.

#### **ML-I : Existing Pits Dimension**

Pit ID	Length, m	Width, m	Depth (BGL), m	Top RL, m	Bottom RL, m
KLK Pit No. 1	238	236	32.7	88-84	55.06
KLK Pit No. 2	1389	420	45.0	97-83	49.40
KVK Pit No. 3 (East Block)	722	265	42.5	83-79.5	36.48
KVK Pit No. 3 (West Block)	606	335	64.0	80-72	13.12
KVK Pit No. 4	90	82	1.0	79-76	75.72



Expanded Cement Plants at Dalmiapuram & Ariyalur require about 9.0-10.0 MTPA Cement Grade Limestone. The production capacity of existing Captive Working Mines is about 7.05 MTPA and are in Conceptual Stage and will be completely exhausted in another 2-3 years period. Proved Mineable Reserves (111 Category) of KLK-KVK ML-I is **64,485,659 Tonnes** as on 01.04.2022. ML-I alone is having the Reserves to support the Cement Plants comfortably for another 10 years. Thus, the production level of ML-I Limestone Mine has to be enhanced.

Accordingly, the proposal is now for Production Enhancement of KLK-KVK ML-I Mine from 2.0 MTPA to 6.97 MTPA ROM within the existing Lease Area. Modification in Modified Mining Plan along with Progressive Mine Closure (PMC) Plan for balance Period 2022-23 & 2023-24 for 6.97 MTPA has been approved by the Regional Controller of Mines, IBM, Chennai vide TN/TCR/LST/MMP-2088.MDS dated 19.08.2022.

Mining will be continued to be carried out by Open Cast Mechanized Non-conventional Method using **Rock Breakers and Surface Miners. No Drilling and Blasting will be carried out.** The **Ultimate Pit Depth** at Conceptual Stage will be 118.5 m BGL in KLK Pit No. 2, 117 m BGL in KVK Pit No. 3 (East Block), 108 m BGL in KVK Pit No. 3 (West Block), 58.8 m BGL in KLK Pit No. 1 and 47.0 m BGL in KVK Pit No. 4.

Mine Profile :

Minerals	:	Limestone & Marl as ROM
Mineable Reserves	:	Proved (111) 64,485,659 Tonnes (01.04.2022) 35,089,690 T Limestone & 29,395,969 T Marl
Proposed Production	:	6.97 MTPA ROM @ 21100 Tons per day (TPD)
No. of working days	:	330 (3 shifts)
<b>Life of the Mine</b>	:	<b>9 years</b>
Ore:OB Ratio-Plan Period	:	1:0.27
Bench Parameters	:	9 m Height & 10 m Width
Bench Slope	:	70° to 80° (Pit Slope 45-50°)
Ultimate Pit Limit-Conceptual	:	47 to 118.5 m BGL
Ground Water-table	:	60-65 m BGL (Postmonsoon)

Mining will intersect the ground water-table.

Lease Area falls in Survey of India Topo Sheet No. 58 J/13 within the Coordinates 10°57'19.37"-10°59'40.36" North Latitudes & 78°55'29.67"-78°57'08.33" East Longitude. Karaivetti Bird Sanctuary, Notified Eco Sensitive Area (ESA) vide S.O. 1909(E) dated 31.05.2019, is located at a distance of **8.6 km** in east direction from KLK Pit No. 2. The shortest Eco Sensitive Zone (ESZ) of Karaivetti Bird Sanctuary is **7.6 km** in **ENE** direction from KLK Pit No. 1. As the ESZ is notified, **no NOC** from National Board for Wildlife (NBWL) is required for the Project.

Other than Karaivetti Bird Sanctuary, there are no other Eco Sensitive Areas like National Parks, Wildlife Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar Sites, Tiger/Elephant Reserves, etc. (existing as well as proposed) within 10 km from the Lease. Thachankurichi Reserved Forests (RF) is at a distance of 9.0 km in west from KVK Pit No. 4 (15 km from RF's western boundary).

The capital cost of the Project is **Rs.10.00 Crores**. A budget of Rs.50.00 Lakhs has been earmarked as EMP Capital Budget and Rs.25.32 Lakhs per Annum as Operating Cost towards EMP measures, Green Belt development & maintenance, Environmental Monitoring, etc.

Proposed Production Enhancement of Kallakudi & Kovandakurichi ML-I in an extent of <250 Ha falls under Sl. No. 1(a)-**Category B1** of EIA Notification 2006 (as amended) and requires prior EC from State Level EIA Authority-Tamil Nadu (SEIAA-TN). Accordingly, DCBL has applied Online to SEIAA-TN vide Proposal No. **SIA/TN/MIN/414894/2023 on 17.01.2023** and submitted on 19.01.2023. The Proposal was deliberated in the State Level Expert Appraisal Committee-Tamil Nadu (SEAC-TN) in its 361<sup>st</sup> Meeting held on 10.03.2023 and in 607<sup>th</sup> SEIAA-TN Meeting held on 03.04.2023. Terms of Reference (TOR) has been awarded vide **Letter SEIAA-TN/F.No.9739/SEAC/ToR-1420/2023 dated 03.04.2023 with Public Hearing** for preparing Environmental Impact Assessment (EIA) Report.

The EIA Report has been **prepared in compliance with awarded TORs** and submitted as per generic structure proposed in Appendix-III of EIA Notification 2006. The Summary EIA Reports (both in English and Tamil) along with Draft EIA Report are submitted for Public Consultation & Public Hearing.

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 vide Certificate NABET/EIA/1922/RA-0155 with validity extended till **20.07.2023** vide Letter QCI/NABET/ENV/ACO/23/2646 dated 21.04.2023 (Sl. No. 3 of QCI/NABET List dated 08.05.2023) which will also be extended further by NABET. 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 03.04.2022 with validity till 02.04.2024. 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.

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## 1.2 Project Proponent

**M/s. Dalmia Cement (Bharat) Limited** are operating Cement Plants at Dalmiapuram & Ariyalur in Tamil Nadu, Kadapa in Andhra Pradesh, Belgaum in Karnataka and Cement Units across Northeast & Eastern Regions. DCBL's Cement manufacturing capacity is now about 35.9 MTPA.

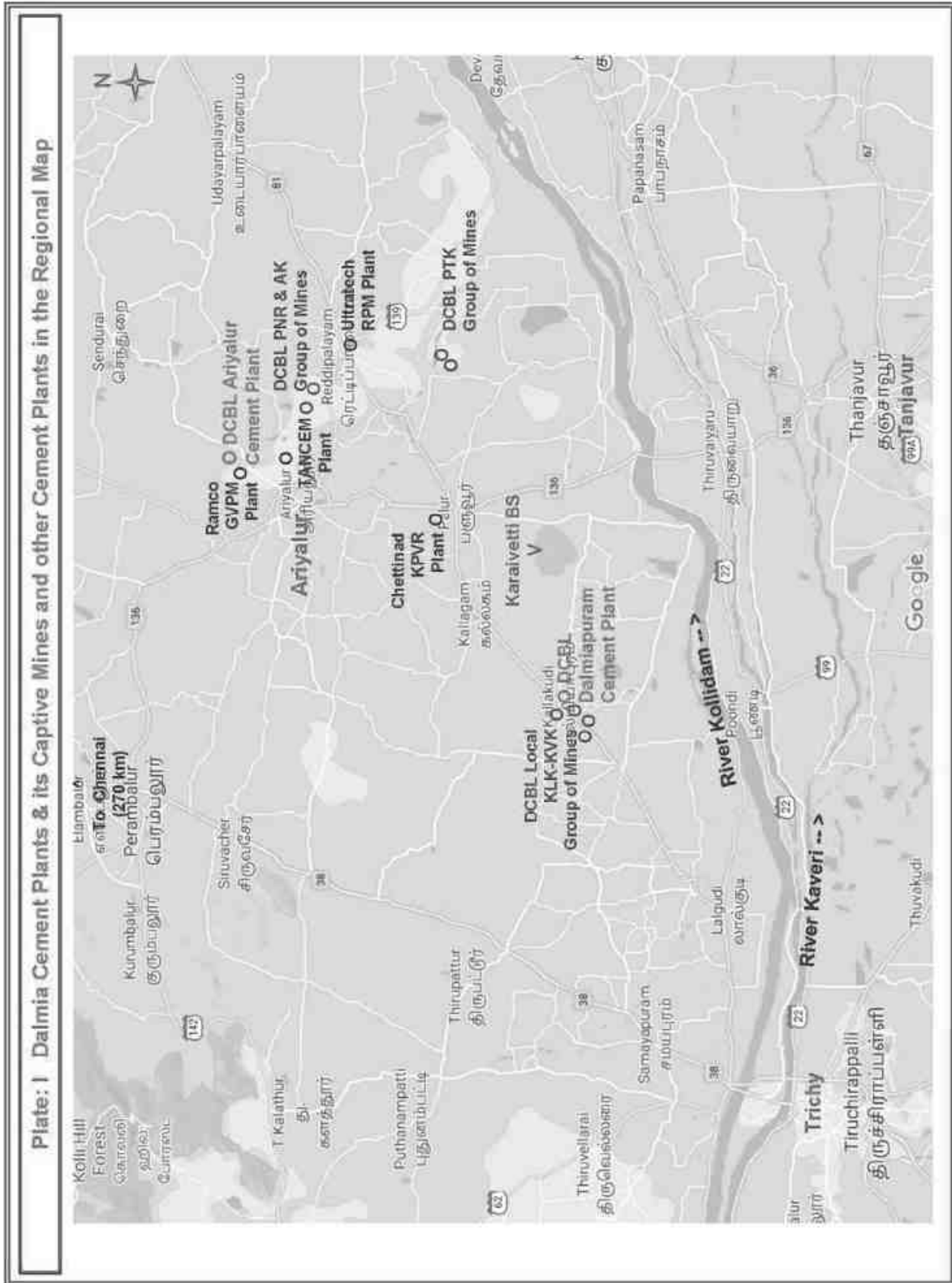
DCBL had established **Dalmiapuram Cement Plant** in the **Year 1939** (Pre-Independence period). With recent Modernization & Expansion on NIPL Mode, Dalmiapuram Plant (with Lines I & II) is now being operated for 3.23 MTPA Clinker and 5.00 MTPA Cement. DCBL had also established the green field Cement Plant of 3.0 MTPA cement capacity at Govindapuram near Ariyalur during 2009-10 and is at a distance of 35 km from Dalmiapuram. With recent Modernization & Expansion, Govindapuram Cement Plant Clinker production will be 2.50 MTPA and Cement production will be 4.00 MTPA (**Table 1.1**). Cement dispatch from these two Cement Plants is fulfilling about 55-60% of the local demand of Tamil Nadu and balance 40-45% is marketed in others States of India.

**Table : 1.1 DCBL Cement Plants in Tamil Nadu & EC Details**

DCBL Plant	Cement Production Capacity, MTPA	Latest EC Reference	On Recent Modernization and Expansion, MTPA	
			Clinker	Cement
Dalmiapuram (with Line-II)	4.02	MoEF F. No. J-11011/68/2004-IA II (I) dated 27.04.2005	3.23	5.00
Govindapuram, Ariyalur	3.00	MoEF F. No. J-11011/751/2007-IA II (I) dated 19.06.2008	2.50	4.00

The limestone requirement of both Cement Plants is being met from Captive Limestone Mines in Ariyalur and Trichy Districts viz. Kallakudi-Kovandakurichi (KLK-KVK) Mines, Periyathirukonam (PTK) Mines and amalgamated Periyagalur, Aminabad & Khairulabad (PNR Group) Mines (Regional Map as **Plate I**) (**Table 1.2**). KLK-KVK Mines are cluster of mines located near the Dalmiapuram Cement Plant (within 2-5 km) and also called **Local Mines**. PTK & PNR Group Mines are located in Ariyalur District at 35 km and 40 km respectively.

Dalmiapuram Cement Plant is located in Palanganatham Village, Ariyalur Taluk and District. Coal based Captive Power Plants (CPP) of 1x27 MW (2005-06) and 1x23 MW (Year 2008) within the Complex to cater the Cement Plant. Solar Power Plant of 2x5 MW capacity is proposed near the Cement Plant. DCBL Township is located in Kallakudi Village with 640 Quarters near the Cement Plant. Also, there is a Hospital, Co-operative Society, Dairy Farm, Dalmia HSS (1,637 Students), Dalmia Vidya Mandir School (836 Students), ITI (150 Students), etc. at Dalmiapuram.



**Table : 1.2 DCBL Captive Limestone Mines**

<b>Mine Group</b>	<b>Extent, Ha</b>	<b>Consented Production Capacity, MTPA</b>	<b>Percentage of Supply</b>
Kallakudi & Kovandakurichi – Local Mines Group (5 Leases)	191.265	2.95	45%
Periyagalur, Aminabad & Khairulabad Mines (PNR Group) (3 Leases)	167.605	1.90	30%
Periyathirukonam Mines (PTK Group; 2 Leases)	106.070	2.20	25%
<b>Total</b>	<b>464.940</b>	<b>7.05</b>	<b>100%</b>

Presently, there are 242 Executives, 270 Staff & Workmen and 1,827 Contract Employees working in Cement Plant, Power Plants and Local Mines. The Plants also generate about 500 Indirect Employments. The communication address is as follows :

**Sri. K.Vinayagamurthi,**  
**Unit Head,**  
Dalmia Cement Bharat Limited,  
Dalmiapuram,  
Lalgudi Taluk,  
Tiruchirapalli District,  
Tamil Nadu-621 651.  
Telephone Nos. : 04329-235123; Fax : 04329-235111  
e-mail : k.vinayagamurthi@dalmiacement.com

DCBL has well laid Environmental Policy approved by its Board of Directors. Any **non-compliance/violations of environmental norms and the corrective actions taken will be reported** by the Unit Head to CEO, Managing Director and the Board of Directors of DCBL. Periodic Internal Audits is being done to identify the non-compliances as part of Integrated Management System (IMS). Auditors findings are classified as Non-Conformance (NC) or Compliance & Findings. Auditee implements the corrective actions & preventive action against the Non-Conformities and follows up with the same Auditor to close the NCs. Non-conformities observed (if any) will be addressed by 'Senior General Manager- Environment, IE & PH' in consultation with Department Head who in turn reports the same to the Plant Head for necessary direction and action.

DCBL has obtained **ISO:9001, ISO:14001, ISO:45000 and ISO:50001 Certifications** for its products, and always stood for the highest quality cements for over seven decades. Recognizing DCBL as Centre of Excellence for transfer of technology, **World Bank** and Danish International Development Agency (DANIDA) Team sponsored a **Regional Training Centre** at Dalmiapuram to cater the needs of South Indian Cement Industries since 1991.

DCBL has also bagged various National Awards as detailed below:

- ❖ Best Improvement in Electrical Energy Performance-**National Award for Energy Efficiency** in Indian Cement Industry by National Council for Cement and Building Materials - **1999 & 2002**.
- ❖ First Place in Energy Conservation in the Cement Sector-**National Energy Conservation Award** by Bureau of Energy Efficiency, Ministry of Power, New Delhi in **2001 & 2002**.
- ❖ **Best Improvement in Thermal Energy Performance (2002)** and National Award for **Best Electrical Energy Performance in Indian Cement Industry (2003)** by National Council for Cement and Building Materials.
- ❖ Chosen by Confederation of Indian Industry (CII) as a **Model Plant for Energy Efficiency** in Year **2003**.
- ❖ **Leadership & Excellence Award in Safety, Health & Environment**-Awarded by CII in the Years **2003 & 2004** - Commendation in SHE Performance.
- ❖ A National Award for **Second Best Environmental Excellence in Plant Operation** in Indian Cement Industries (**2003-04**) by NCCBM.
- ❖ DCBL Human Resource team was recognized by Hewitt as **9<sup>th</sup> Best Employer** in the manufacturing Sector-2009.
- ❖ Second place in the Manufacturing Today '**MT Awards for Excellence in Human Resources-2012**'-Large Enterprises.
- ❖ CII-ITC **Sustainability Award 2012** - for contributions to sustainability and conservation of environment.
- ❖ **ITC Sustain Award** from CII in 2014.
- ❖ **ETTS Award** from CII in 2015.
- ❖ **5-Star Award for the Mine Operations** at Dalmiapuram.
- ❖ **Green Pro Award** from CII in 2016.
- ❖ **Energy Excellence Award** from CII in 2016.
- ❖ **5S Certification** - QCFL & ABK - AoTS.
- ❖ **Green Award by Tamil Nadu State Government** for the Year 2016.
- ❖ Apex India Energy Efficiency Award 2017.
- ❖ Apex India Environmental Excellence Awards 2017.
- ❖ CII Southern Region 5S Excellence Awards 2017.
- ❖ "National Energy Leader" Award & Excellent Energy Efficient Unit Award" by CII -2020.

### 1.3 Kallakudi-Kovandakurichi (KLK-KVK) Local Mines

Kallakudi-Kovandakurichi (KLK-KVK) Mines are granted under 5 Leases in 4 Pits (earlier 5 Pits which are renumbered as 4 now) viz. Kallakudi Pit No. 1, Kallakudi Pit No. 2, Kovandakurichi Pit No. 3 (East & West Blocks) and Kovandakurichi Pit No. 4. Kallakudi Mines are in operation **since 1939** and Kovandakurichi Mine Pits are in operation since **1952**. These Leases cover a **total extent of 191.265 Ha** i.e. 111.985 Ha in Kallakudi (Pits 1 & 2) and 79.280 Ha in Kovandakurichi & Venkatachalapuram (Pits 3 & 4). Kallakudi and Kovandakurichi Pits are distant apart by 4 km and



separated by a **Granitic Gneiss band**. Kallakudi Pit No. 1, Kallakudi Pit No. 2, are separated by the National Highway (NH)-81. The Lease details are furnished in **Table 1.3**.

**Table : 1.3 KLK-KVK Local Mine Leases**

Current GO No. & Date (Earlier GO)	Village	Extent, Ha	Pit No.1	Pit No.2	Pit No.3 (East Block)	Pit No.3 (West Block)	Pit No.4
76 dated 26.07.2018 (GO No. 1)	Kallakudi, Kovandakurichi & Venkatachalapuram	166.005	6.530	91.425	33.230	27.795	7.025
71 dated 20.7.2018 (GO No. 1158)	Kallakudi & Kovandakurichi	13.295	-	2.065	-	11.230	-
143 dated 19.11.2018 (GO No. 258)	Kallakudi	10.545	10.545	-	-	-	-
262 dated 15.11.1995	Kallakudi	1.135	1.135	-	-	-	-
263 dated 15.11.1996	Kallakudi	0.285	0.285	-	-	-	-
<b>Total</b>		<b>191.265</b>	<b>18.495</b>	<b>93.490</b>	<b>33.230</b>	<b>39.025</b>	<b>7.025</b>

#### 1.4 Kallakudi & Kovandakurichi Limestone Mines (ML-I) under GO No. 76

Kallakudi & Kovandakurichi Limestone **Mining Lease-I (KLK-KVK ML-I)** of Local Mines is having an extent of **166.005 Ha** falling in Survey Nos. 39/8, 40,41/1, 47/1,4 7/3, 47/11, 49, 50, 51, 52, etc. of Kallakudi Village, Survey Nos. 54/1, 54/2, 55, 56, 57, 60, 75,81/1B, etc. of Kovandakurichi Village and Survey No. 32 of Venkatachalapuram Village, Lalgudi Taluk, Tiruchirapalli District of Tamil Nadu (**Table 1.4**). **VAO Certificates are appended**. Limestone & Marl are the minerals that being mined out from the Lease. ML-I is Captive Mine to both Dalmiapuram & Ariyalur Cement Plants of DCBL. ML-I Lease is accessible from Trichy-Chidambaram National Highway (NH)-81 at Kallakudi and is 38 km from Trichy. The Lease falls in all 4 Pits viz. Kallakudi Pit Nos. 1 & 2, Kovandakurichi Pit No. 3 (East & West Blocks) and Kovandakurichi Pit No. 4. Land details, Village-wise, and Survey Numbers of the Lease Area are given in **Table 1.4**.

Dalmia owned Patta Lands	:	93.955 Ha
Govt. Poramboke (Waste) Lands	:	72.050 Ha
		-----
Total	:	166.005 Ha
		-----

ML-I Environs shown in **Plate II** and **its Google Earth Imagery** as **Plate III**, Lease Area in FMB as **Plate IV**, **Photographs** of the Mine Pits as **Plate V** and **Green Belt developed** as **Plate VI**.

**Table : 1.4 Land Details of KLK-KVK ML-I**

Revenue Village	Land	Survey Nos.	Extent, Ha	Total, Ha
Kallakudi	Dalmia Patta Land	39/8, 47/1, 47/3, 47/4, 49, 51, 53/1, 55/1 (P), 112/1, 112/11B, 112/14A, 112/15, 114/1, 114/6, 114//7, 114/11, 114/12, 114/13, 114/14, 114/15, 114/17A, 114/17B, 114/18, 115/1, 115/3, 115/4, 115/6, 115/7, 115/9, 115/10, 117/1, 117/2, 117/3, 117/5, 118/1, 118/3A, 118/3C, 118/5, 118/10, 119/1, 119/19B, 120, 121/1, 121/7A, 121/18, 121/19, 135/1, 135/2, 136/1, 136/3, 136/7, 136/11, 136/12, 136/13, 136/14, 137/2, 137/3, 137/6, 137/7, 139/3, 139/4, 140/1, 140/2, 140/3, 140/6B, 254/4, 254/7, 254/8, 254/9, 254/10, 254/11, 254/12, 254/13, 258/1, 260/3, 260/7, 260/9, 260/13, 260/16,	49.915	97.955
	Govt. Poramboke	40, 41/1, 47/11, 50, 52, 55/15, 101, 102/20, 104/1A, 104/15, 104/24, 110/2, 110/3, 110/4, 110/15, 111/1, 111/2, 112/8, 112/12, 113/1, 113/3, 114/19, 116/1, 116/2, 116/3, 117/4, 117/6, 117/7, 117/8, 122, 136/10, 137/1, 138/1, 138/2, 139/1, 139/2, 139/5, 139/6, 139/7, 140/4, 252, 259/6, 260/18, 268/1(P), 403	48.040	
Kovandakurichi	Dalmia Patta Land	54/1, 54/2, 55, 57, 58(P), 59/1B(P), 60, 61/8, 72/1, 72/3(P), 73/1, 73/3, 73/5, 74/1, 77/4(P), 78/5(P), 78/7(P), 78/8A, 79/1A(P), 79/1B, 79/2, 79/6, 80/1, 81/4, 82, 83, 85/2, 86/1, 87, 88/1, 89/1, 93/1D, 94/7(P), 95/8(P), 147/1	44.040	66.820
	Govt. Poramboke	56, 75, 81/1B, 81/3, 92(P), 140A/1	22.780	
Venkatachalapuram	Dalmia Patta Land	-	-	1.230
	Govt. Poramboke	32	1.230*	
<b>Grand Total</b>			<b>166.005</b>	<b>166.005</b>


\* - The non-mining area of 1.23 Ha in Venkatachalapuram Village is now under the purview of State Government and the Lease grant has to be amended/updated accordingly.

### சான்று

திருச்சி மாவட்டம், இலால்குடி வட்டம், கல்லக்குடி கிராம நிர்வாக அலுவலர் அளிக்கும் சான்று, திருவாளர்கள் டால்மியா சிமெண்ட் (பாரத்) லிமிடெட் நிறுவனம் திருச்சிராப்பள்ளி மாவட்டம், இலால்குடி வட்டம் கல்லக்குடி கிராம சர்வே எண்கள்:

39/8, 40, 41/1, 47/1, 47/3, 47/4, 47/11, 49, 50, 51, 52, 53/1, 55/1 (P), 55/15, 101, 102/20, 104/1A, 104/15, 104/24, 110/2, 110/3, 110/4, 110/15, 111/1, 111/2, 112/1, 112/8, 112/118, 112/12, 112/14A, 112/15, 113/1, 113/3, 114/1, 114/6, 114/7, 114/11, 114/12, 114/13, 114/14, 114/15, 114/17A, 114/17B, 114/18, 114/19, 115/1, 115/3, 115/4, 115/6, 115/7, 115/9, 115/10, 116/1, 116/2, 116/3, 117/1, 117/2, 117/3, 117/4, 117/5, 117/6, 117/7, 117/8, 118/1, 118/3A, 118/3C, 118/5, 118/10, 119/1, 119/19B, 120, 121/1, 121/7A, 121/18, 121/19, 122, 135/1, 135/2, 136/1, 136/3, 136/7, 136/10, 136/11, 136/12, 136/13, 136/14, 137/1, 137/2, 137/3, 137/6, 137/7, 138/1, 138/2, 139/1, 139/2, 139/3, 139/4, 139/5, 139/6, 139/7, 140/1, 140/2, 140/3, 140/4, 140/68, 257, 254/4, 254/7, 254/8, 254/9, 254/10, 254/11, 254/12, 254/13, 258/1, 259/6, 260/3, 260/7, 260/9, 260/13, 260/16, 260/18, 268/1(P), 403 ஆகிய மட்டா மற்றும் அரசு நிலங்களில் உள்ள மொத்த விஸ்தீரணம் 97.95.5 ஹெக்டேர் பரப்பளவில் 1939 ஆம் ஆண்டிலிருந்து கரங்க பணி நடைபெறுகிறது. மேலும் குவாரி குத்தகை செயல்பாடுகளுக்கான நீடிப்பு மற்றும் பரிந்துரைக்கப்பட்ட ஆணை தொழில் துறை அறிவிப்பு கடித எண். GO.No.(Ms)No.76 Industries (MMA.1) Department. Dt. 26.07.2018. மூலம் ஒப்புதல் பெறப்பட்டுள்ளது.

மேற்கண்ட நிலங்கள் டால்மியா சிமெண்ட் (பாரத்) கம்பெனி நிறுவனத்திற்கு கரங்க குத்தகைக்கு அனுமதிக்கப்பட்டுள்ளது. அவர்களது அனுபவத்தில் தற்போதும் கரங்க பணி செய்து வெட்டுப் பள்ளமாக உள்ளது. மேற்கண்ட நிலங்களுக்கு 300 மீட்டர் சுற்றவீற்குள், ஆரங்ககாதார நிலையம், குடியிருப்பு பகுதிகளும், மேல்நிலை தண்ணீர் தொட்டிகள், கிறிஸ்தவ தேவாலயங்கள் உள்ளது. கல்வி நிலையங்கள், பெட்ரோல் பங்கு, கல்லறை, சமுதாய கூடம், வங்கிகள், இந்து சமய கோவில்கள், போகத்து நிலையம் மற்றும் தேசிய நெடுஞ்சாலைமும் உள்ளது என்பதைத் தெரிவித்துக் கொள்கிறேன்.

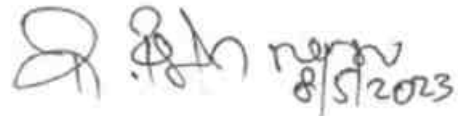
  
 15/05/2023  
 VILLAGE ADMINISTRATIVE OFFICER  
 21, KALLAKKUDI  
 LALGUDI-TK, TRICHY-DT.

## சான்று

திருச்சி மாவட்டம், இலால்குடி வட்டம், கோவாண்டாகுறிச்சி கிராம நிர்வாக அலுவலர் அளிக்கும் சான்று, திருவாளர்கள் டால்மியா சிமெண்ட் (பாரத்) லிமிடெட் நிறுவனம் திருச்சிராப்பள்ளி மாவட்டம், இலால்குடி வட்டம் கோவாண்டாகுறிச்சி கிராம சர்வே எண்கள்:

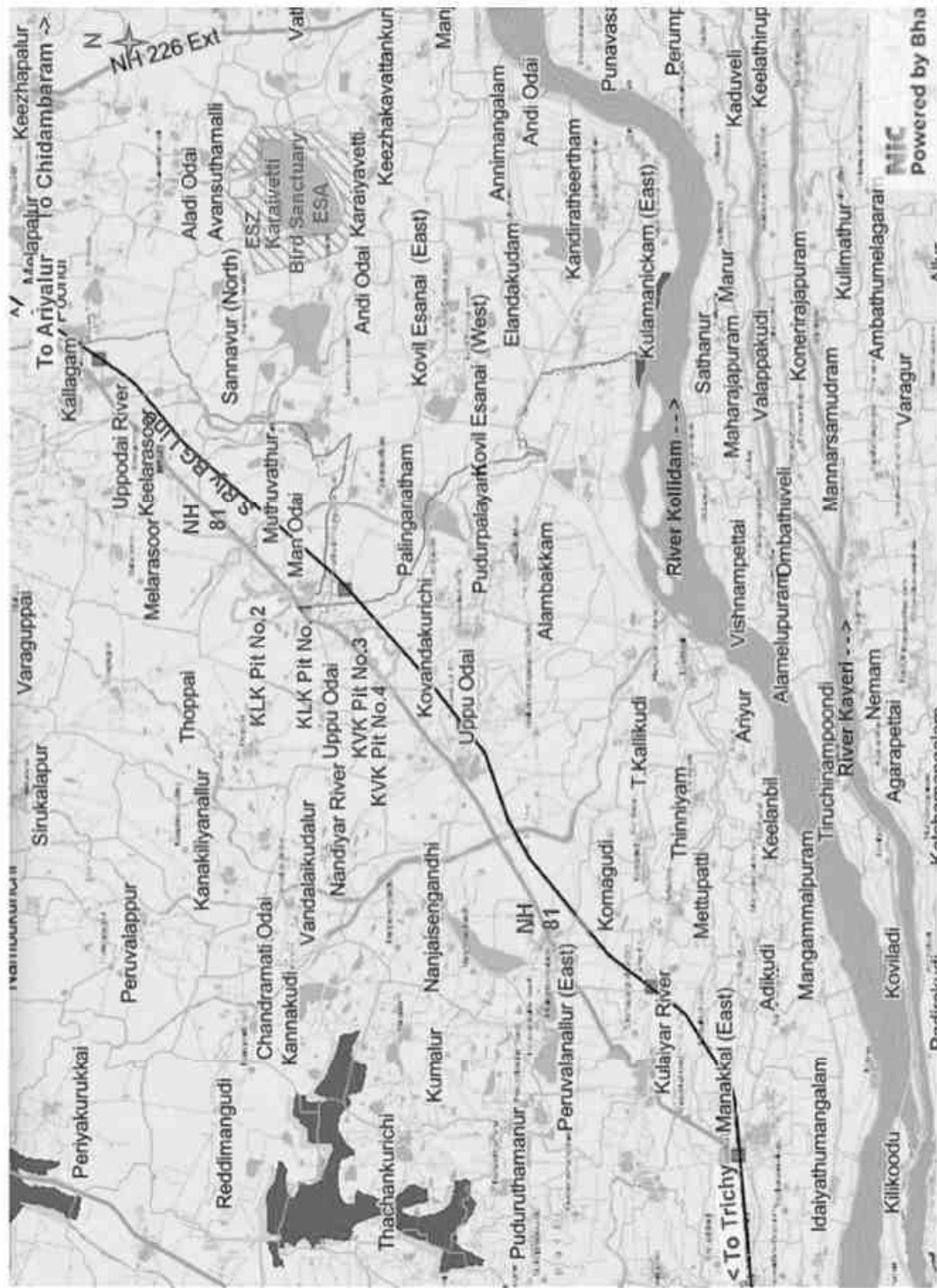
54/1, 54/2, 55, 56, 57, 58(P), 59/1B(P), 60, 61/8, 72/1, 72/3(P), 73/1, 73/3, 73/5, 74/1, 75, 77/4(P), 78/5(P), 78/7(P), 78/8A, 79/1A(P), 79/1B, 79/2, 79/6, 80/1, 81/1B, 81/3, 81/4, 82, 83, 85/2, 86/1, 87, 88/1, 89/1, 92(P), 93/1D, 94/7(P), 95/8(P), 140A/1, 147/1 ஆகிய பட்டா மற்றும் அரசு நிலங்களில் உள்ள மொத்த விஸ்தீரணம் 66.82.0 ஹெக்டேர் பரப்பளவில் 1939 ஆம் ஆண்டிலிருந்து சுரங்க பணி நடைபெறுகிறது. மேலும் குவாரி குத்தகை செயல்பாடுகளுக்கான நீடிப்பு மற்றும் பரிந்துரைக்கப்பட்ட ஆணை தொழில் துறை அறிவிப்பு கடித எண் GO.No.(Ms)No.76 Industries (MMA.1) Department. Dt. 26.07.2018. மூலம் ஒப்புதல் பெறப்பட்டுள்ளது.

மேற்கண்ட நிலங்கள் டால்மியா சிமெண்ட் (பாரத்) கம்பெனி நிறுவனத்திற்கு சுரங்க குத்தகைக்கு அனுமதிக்கப்பட்டுள்ளது. அவர்களது அனுபவத்தில தற்சமயம் சுரங்க பணி செய்து வெட்டுப் பள்ளமாக உள்ளது. மேற்கண்ட நிலங்களுக்கு 300 மீட்டர் சுற்றளவிற்குள், புகை வண்டி தடம், கிராம சுகாதார நிலையம், குடியிருப்பு பகுதிகள், பேருந்து நிறுத்தம், கிறிஸ்தவ தேவாலயங்கள், தொழில்பயிற்சி கல்வி நிலையம் கல்லறை, கல்வி நிலையம், மேல்நிலை நீர்தேக்க தண்ணீர் தொட்டி, தேசிய நெடுஞ்சாலையும் உள்ளது என்பதைத் தெரிவித்துக் கொள்கிறேன்.

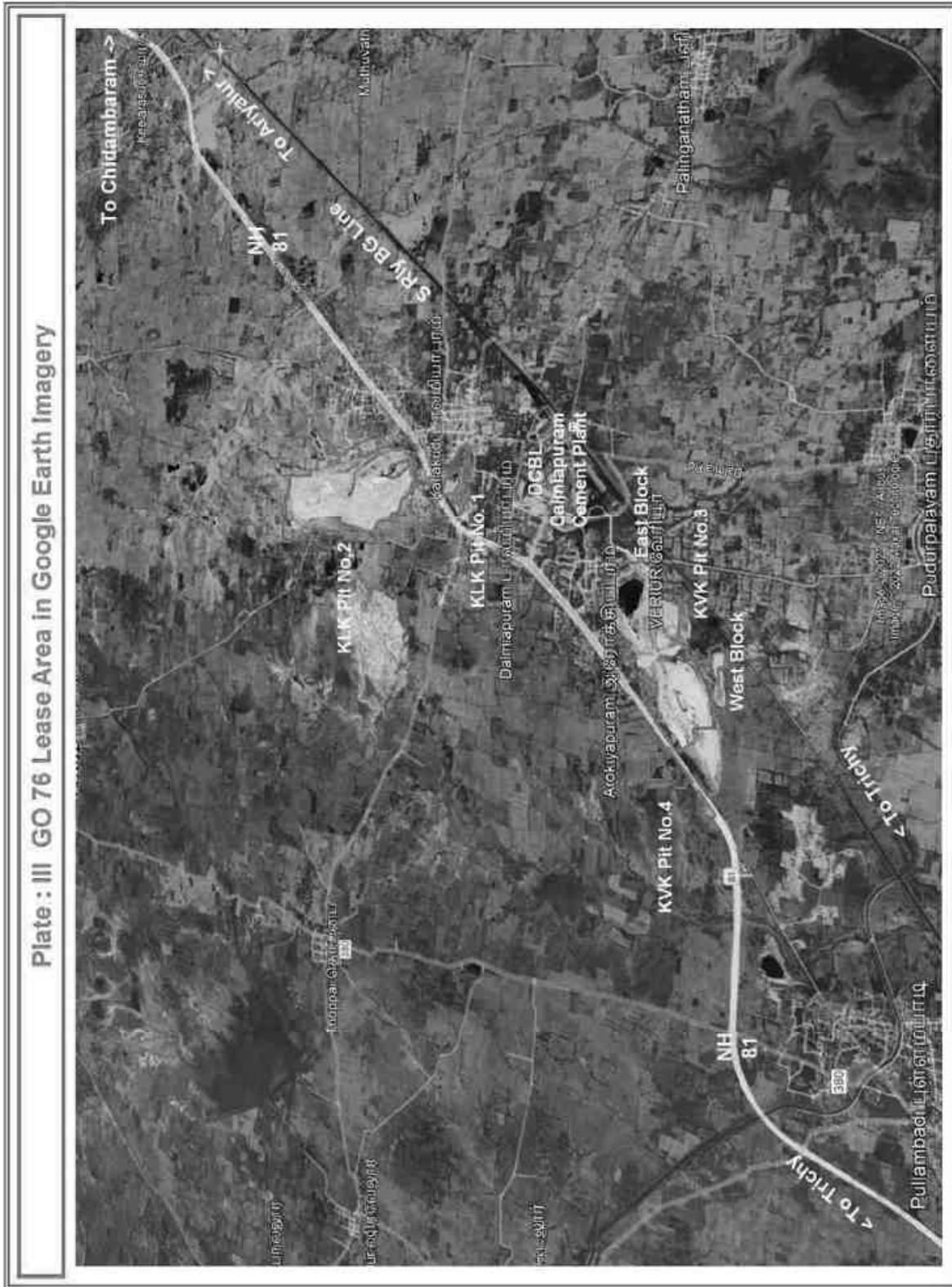
 8/5/2023

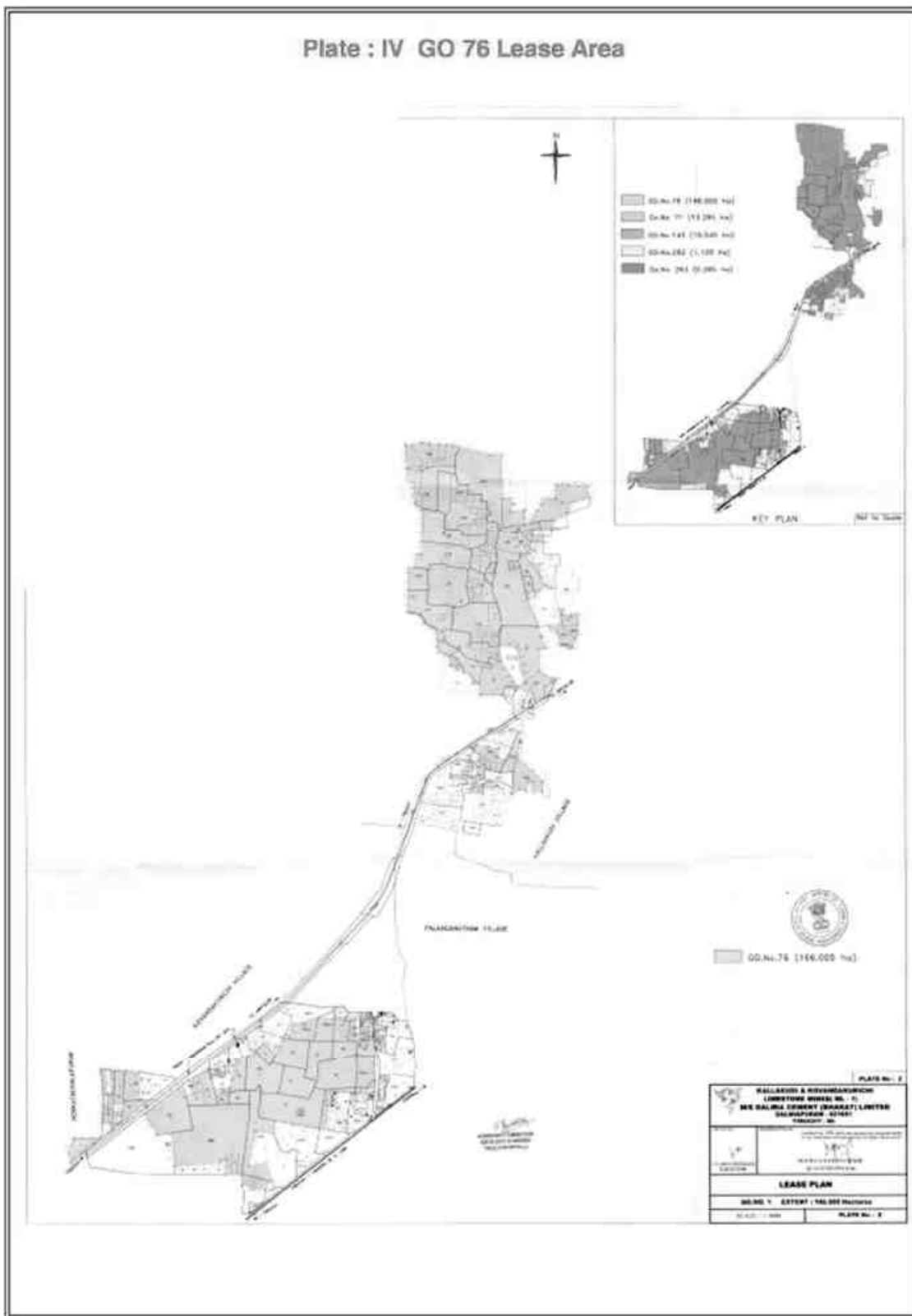
VILLAGE ADMINISTRATIVE OFFICE  
23, KOVANDAKKURICHI  
KALLAKUDI TK, THIRUCHI DL

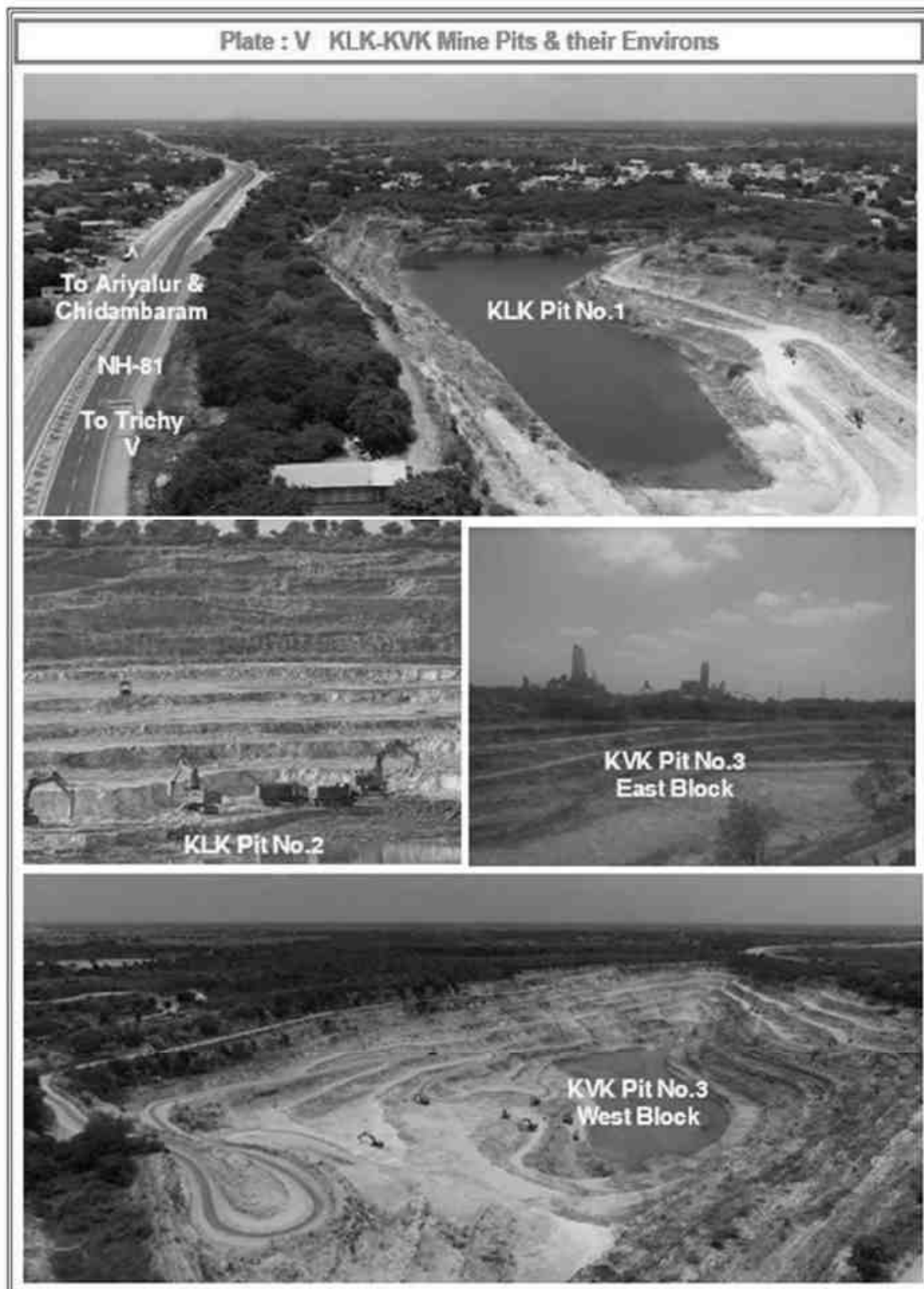
Plate : II KLK-KVK ML-I – Regional Setting



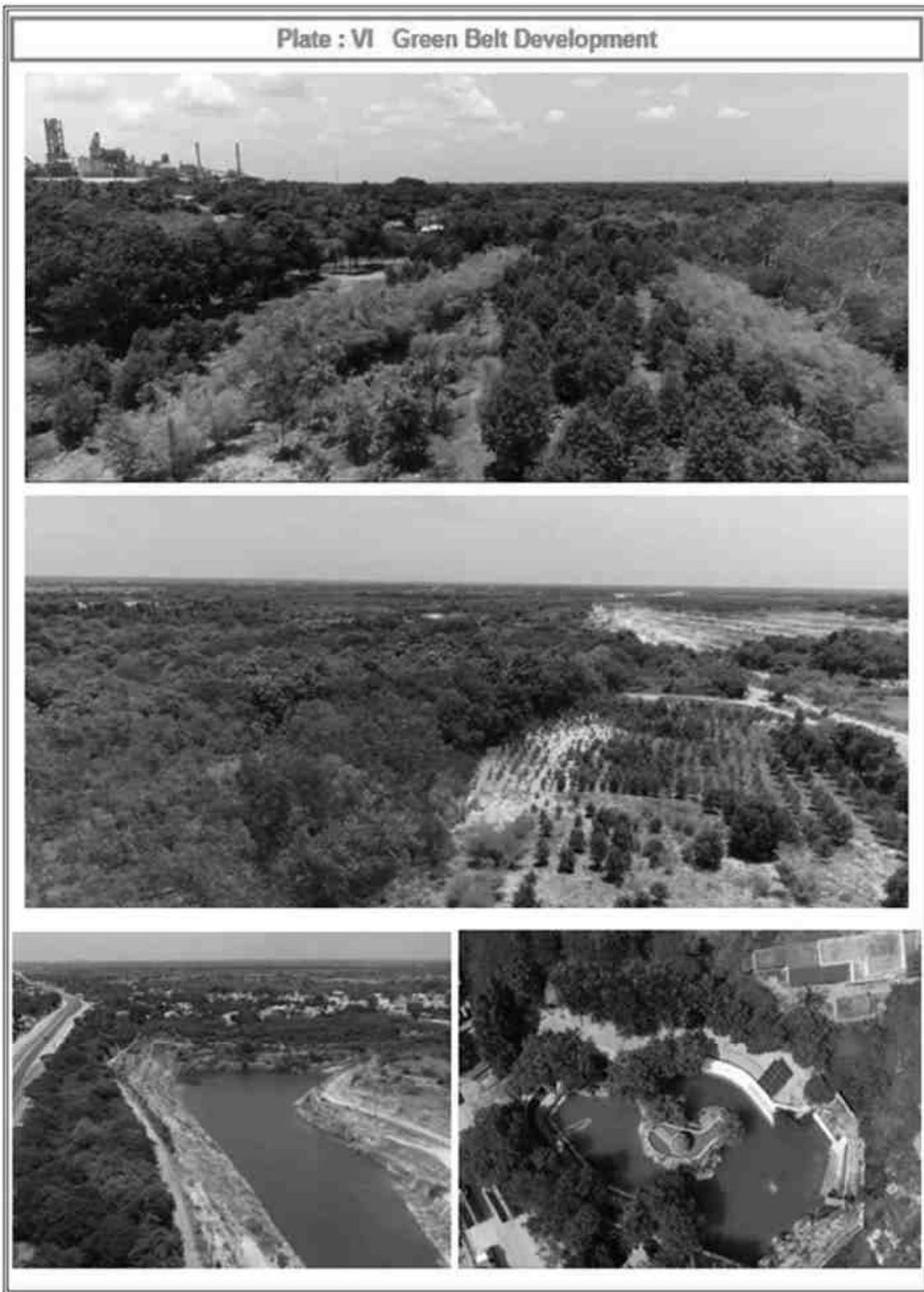
NIC  
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Pit No.1 exists on the southern side of NH -81 and Pit No.2 exists at the northern side of NH-81 at Kallakudi Village. Pit No.3 (East Block) exists near Vadugarpet hamlet of Kovandakurichi village. Pit No.3 (West Block) exists on the southern side of NH-81 and Pit No.4 exists at the northern side of NH-81 at Kovandakurichi Village. As stated earlier, Kallakudi Mine Pits are in operation since 1939 and Kovandakurichi Mine Pits are in operation since 1952. **All the Pits are being worked by Non-Conventional Method of Mining** using Rock Breakers, as the areas are in close proximity to habitation, worship places, etc. **An Affidavit/Undertaking has been given by DCBL for 'No Blasting Operations in GO No. 76'** is appended.

## 1.5 Statutory Approvals

### 1.5.1 Mining Lease Grant

There were 6 Nos. Leases earlier and were amalgamated as a single Lease through GO (3D) No. 1 Industries MMA.2 Department dated 08.01.2002 for an Extent of 166.005 Ha (Table 1.5). First Renewal of amalgamated leases was granted for 20 years vide GO (Ms) No. 189 on 11.12.2014. This Lease has been extended upto **31.03.2030 vide GO No. 76 dated 26.07.2018** as per MMDR Amendment Act, 2015 (**Doc-1**). Supplementary **Lease Deed** is executed on 30.11.2019 and Registered as Document No. 2497 on 05.12.2019 (**Doc-2**). Thus, **DCBL is the rightful Lessee**. Inclusion of **Marl** (Minor Mineral) has been permitted vide **GO (3D) No. 8 dated 12.02.2008**.

**Table : 1.5 Details of Mining Lease Grants**

Sl. No.	ML Grant Reference	Date	Extent, Ha	Validity		Lease Executed on
				Years	From-To	
1	GO (2D) No. 364	14.11.1996	2.18	10	05.02.1998-04.02.2008	17.01.2000
2	GO (2D) No. 366	19.11.1996	28.9	10	23.02.1998-22.02.2008	29.08.1997
3	GO (3D) No. 44	11.03.1997	39.8	20	19.06.1986-18.06.2006	11.12.1998
4	GO (3D) No. 109	11.07.1997	25.9	20	19.06.1986-18.06.2006	28.10.1998
5	GO (3D) No. 195	11.11.1997	68.9	20	01.09.1985-31.08.2005	10.07.1999
6	GO (3D) No 83	23.06.1998	7.26	20	01.09.1984-31.08.2004	10.07.1999
Leases mentioned above in Sl. Nos. 1 to 6 were amalgamated as a single Lease through GO (3D) No. 1 Industries MMA.2 Department dated 08.01.2002						
1	GO (3D) No. 1	08.01.2002	166.005	-	31.08.2004	-
2	GO (Ms) No. 189 (1 <sup>st</sup> Renewal of amalgamated lease)	11.12.2014	166.005	20	01.09.2004 to 31.03.2024	Sup. Lease Deed along with GO No. 76 on 05.12.2019
3	GO No. 76	26.07.2018	166.005	-	01.09.2004 to 31.03.2030	30.11.2019 Regd. on 05.12.2019



*cement! sugar! refractories! power!*

15.05.2023

**Affidavit**

The Member Secretary,  
State Level Environment Impact Assessment Authority - Tamilnadu  
3<sup>rd</sup> Floor, Panagal Maligai, No.1, Jeenai road,  
Saidapet,  
Chennai – 600015.

Dear Sir,

**Subject: Submission of Affidavit for "No Blasting Operation" in our mining lease of (GO. No. 76 of Kallakudi, Kovandakurichi and Venkatachalapuram) – dated 26.07.2018**  
**Reference- Lr No. SEIAA-TN/F.No.9739/SFAC/ToR-1420/2023 Dated: 03.04.2023**

With reference to the above subject, we invite your kind attention that, we have applied for enhancement of production in the above mines from 2.0 to 6.97 Million Tons per annum to SEIAA. Accordingly, we have been granted Terms of Reference vide - Lr No. SEIAA-TN/F.No.9739/SEAC/ToR-1420/2023 dated: 03.04.2023 for the Proposal.

In this connection, in order to comply with the Terms of Reference condition we hereby affirm solemnly that, since 2005 onwards, we have adopted Non-Conventional method of Mining and stopped blasting operation in our mining lease. We are utilizing rock breaker and surface miner for the production of Limestone.

Hence, there is no blasting operation in our mines, we hereby affirm that, in future also, we shall not carry out blasting operation in the above G.O.

This strategic decision has been taken considering long-term safety and sustainability of mining operations.

Thanking you.

Authorized signatory  
K. Vinayagamurthi  
Plant Head & Agent (Mines)  
M/s. Dalmia Cement Bharat Limited  
Dalmapuram, Lalgudi taluk, Trichy District

### 1.5.2 Mining Plan Approvals

DCBL has obtained the Approvals for Mining Plans/Schemes from Indian Bureau of Mines (IBM) as detailed in **Table 1.6**. Modification in Modified Mining Plan along with Progressive Mine Closure (PMC) Plan for balance Period 2022-23 & 2023-24 for 6.97 MTPA has been approved by the Regional Controller of Mines, IBM, Chennai vide TN/TCR/LST/MMP-2088.MDS dated 19.08.2022 (**Doc-3**).

**Table : 1.6 Mining Plan/Scheme Approvals**

Sl. No.	Mining Plan/Scheme	Plan Period	Approval vide IBM Letter Reference	IBM Letter Date
1	Mining Plan	01.04.2003 -31.03.2009	TN/TCR/MP/LST/1461-SZ	04.03.2003
2	Modification of Mining Plan	01.04.2003 -31.03.2009	TN/TCR/MP/LST/1461-SZ	06.02.2004
3	Modification of Mining Plan	01.04.2007 -31.03.2009	TN/TCR/MP/LST/1461-SZ	30.05.2007
4	1 <sup>st</sup> Scheme of Mining	01.04.2009 - 31.03.2014	TN/TCR/LST/ MS-495-SZ	01.04.2009
5	2 <sup>nd</sup> Scheme of Mining	01.04.2014- 31.03.2019	TN/TCR/LST/MS-1028.MDS	08.04.2014
6	Review of Mining Plan	01.04.2019- 31.03.2024	TN/TCR/LST/ROMP. 1539.MDS	18.12.2018
7	Modification of Mining Plan	01.04.2019- 31.03.2024	TN/TCR/LST/MMP-2057. MDS	29.05.2019
8	Modification in Modified Mining Plan-6.97 MTPA	01.04.2019- 31.03.2024 (Balance Period 2022-23 & 2023-24)	TN/TCR/LST/MMP-2088. MDS	19.08.2022

### 1.5.3 Environmental Clearance

Initial Environmental Clearance (EC) for ML-I was obtained in the Year 2005 for the Production Enhancement from 0.5 MTPA to 1.0 MTPA vide MoEF Letter J.11015/339/2005-IA.II(M) dated 24.10.2005. EC for the Production Enhancement from 1.0 MTPA to 2.0 MTPA of ML-I has been obtained for **30 years** vide MoEF&CC Letter J-11015/912/2007-1 A.II (M) dated **27.05.2008** (valid till 2038) (**Doc-4**).

### 1.5.4 Certified EC Compliance Report

DCBL is submitting periodical Six-monthly EC Compliance Reports to MoEF&CC Regional Office, Chennai. The Certified EC Compliance Status Report for ML-I has been issued by IRO, MoEF&CC, Chennai vide Letter EP 12.1/724/TN/966 dated 09.09.2022 (**Doc-5**). One **EC Condition Non-Compliance** has been highlighted in the Compliance Report '**for operating two pits simultaneously in the ML**'. As the awarded EC for Expansion of 2.0 MTPA is covering all Pits and

to be worked simultaneously for achieving the EC/consented production quantity of 2.0 MTPA, DCBL has clarified its submission for the observed Non-Compliance (**Doc-6**).

### 1.5.5 Consents to Operate

Consents to Operate Orders (CTOs) are being granted by Tamil Nadu Pollution Control Board (TNPCB) which are also periodically renewed. Existing CTOs are 1908121917156 (Water Act) and 1908221917156 (Air Act) dated 13.09.2019 for 2.00 MTPA Limestone are **valid upto 31.03.2024 (Doc-7)**.

### 1.6 Development Quantity

**Top Soil** : The entire lease area is **already opened**. The entire **Top Soil quantity of 3,42,272 Tons** generated was fully utilised for Green Belt development in the Leases.

**Over Burden** : There are 7 Existing Dumps in ML-I with 9,82,324 Tons OB.

### 1.7 Production Quantity of the Mine

Amalgamation of 6 Leases into a single Lease through GO (3D) No. 1 (ML-I) was done on 08.01.2002. Thus, the production from 1993-94 was cumulative one till 2002. EC for ML-I for production enhancement from 0.5 MTPA to 1.0 MTPA was obtained in the Year 2005 and EC for production enhancement from 1.0 MTPA to 2.0 MTPA for ML-I was obtained on 27.05.2008. The Production details since last EC are given in **Table 1.7**.

**There is no other minerals/resources** like sand in the Lease area within the approved depth of mining and below depth of mining is certified by AD (Geo & Mining), Trichy Letter Rc. No. 647/2023/Mines dated 04.05.2023 along with **authenticated Production** from this Lease (appended). The maximum Production achieved was **19,96,045 Tonnes** during 2022-23. All yearly productions from 2008-09 to 2021-22 were within the Consented Quantity. There is **no illegal mining in the Lease Area**.

**'Common Cause' Judgement Compliance** : Hon'ble Supreme Court judgment dated 02.08.2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of 'Common Cause versus Union of India & Ors.' is **not applicable** to this Lease.

### 1.8 Dispatched Quantity

Limestone & Marl (ROM) Dispatch details along with Royalty payment by DCBL are given in **Table 1.8. Royalty amount of Rs.183.69 Crores was paid** by DCBL for the production from ML-I during 2008-09 to 2022-23.

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<p>From Thiru. A.Balamurugan, M.Sc, M.B.A., Assistant Director, Geology and Mining, Tiruchirappalli.</p>	<p>To Tvl. Dalmia Cement (Bharat) Limited, Dalmiapuram – 621 651 Lalgudi Taluk, Tiruchirappalli District.</p>
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**Rc. No. 647/2023/ Mines, dated 04.05.2023.**

Sir,

Sub: Mines and Mineral- Limestone and Marl - Tiruchirappalli District -Lalgudi Taluk - Kallakudi Village - SEIAA - Application for grant of Environmental Clearance for the expansion of Kallakudi & Kovandakurichi Limestone Mines (ML-I) under GO No. 76 - over a total extent of 166.005 Hectares of patta and Govt. lands for enhancement of production from 2.00 MTPA to 6.97 MTPA (ROM) at SF Nos. 39/8, 40,41/1, 47/1,etc. of Kallakudi Village, SF Nos. 54/1, 54/2, etc. of Kovandakurichi Village and SF No. 32 of Venkatachalapuram Village, Lalgudi Taluk, Trichy District - ToR issued by the SEAC - report called for- furnished - regarding.

- Ref:
1. G.O.Ms.NO.76 Ind Dept. dated 26.7.2018 for the period from 1.9.2004 to 31.3.2030
  2. DCBL application for grant of Environmental Clearance vide DCBL/DPM/Mines/ GO 76/ 01-2023 dt 9<sup>th</sup> Jan 2023.
  3. Modification to Mining Plan approved by the RCOM for 6.97 MTPA in TN/TCR/LST/MMP2088.MDS dated 19.8.2022.
  4. ToR issued by the SEIAA in Lr. No. SEIAA-TN/F.No.9739/SEAC/ToR-1420/2023 dated 3.4.2023.
  5. Tvl. Dalmia Cement (Bharat) Limited, Dalmiapuram letter No. DCBL/DPM/Mines/ GO 76/ 01-2023 dated 26.4.2023.

kind attention is reference to the above cited.

In the reference 1<sup>st</sup> cited, the Government has granted 1<sup>st</sup> renewal of mining lease to Tvl. Dalmia Cement (Bharat) Limited over 166.005 Hectares of patta and Govt. lands in Kallakudi, Kovandakurichi and Venkatachalapuram villages for a period from 1.9.2004 to 31.3.2030 for the mineral Limestone and Marl. The lessee company is operating the said mining lease in compliance of Mining Plan and other statutory regulations.

In the reference 2<sup>nd</sup> cited, the lessee has applied for grant of Environmental Clearance for enhancing the production from 2.0 MTPA to 6.97 MTPA in the above said Mining Lease to meet their enhanced

production requirements of their cement plants at Ariyalur and Dalmiapuram.

In the reference 3<sup>rd</sup> cited, the lessee company has obtained approval of the Indian Bureau of Mines to produce totally 8.97 million tonnes from the above said mining lease for the years 2022-23 (2.0 Million Tonnes) and 2023-24 (6.97 Million Tonnes) respectively. Similarly, the lessee company proposed to remove a total quantity of 0.5297 Million Tonnes of over burden; 1.248 Million Tonnes of sub-grade ore and 1.561 Million Tonnes of Gneiss respectively.

The SEAC has granted ToR in the reference 4<sup>th</sup> cited to the lessee company for compliance of the details called for in which the lessee was instructed to obtain a report from this office in Para 15.7 of the ToR and in compliance of additional particulars called for to the executive summary in para No.9 in Page 22 of ToR.

In compliance of the ToR, the point wise details are furnished with respect to the Mining Lease granted to the lessee company as stated above.

<b><u>Details called for as per Para 15.7 of ToR.</u></b>	<b><u>Particulars furnished</u></b>																																																
a) The period of operation and stoppage of the earlier mines with last work permit issued by the AD (Mines)	Not applicable as this mine is in continuous operation.																																																
b) Quantity of minerals mined out	Year-wise quantity mined out by the lessee company from 2012-13. <table border="1"> <thead> <tr> <th>Year</th> <th>Mining Plan Approved Quantity</th> <th>EC approved Quantity</th> <th>Despatch as per Audit Statement</th> </tr> </thead> <tbody> <tr> <td>2012-13</td> <td>1995235</td> <td>2000000</td> <td>1992752</td> </tr> <tr> <td>2013-14</td> <td>2004640</td> <td>2000000</td> <td>1911269</td> </tr> <tr> <td>2014-15</td> <td>1951929</td> <td>2000000</td> <td>1677255</td> </tr> <tr> <td>2015-16</td> <td>1996187</td> <td>2000000</td> <td>1799273</td> </tr> <tr> <td>2016-17</td> <td>1984382</td> <td>2000000</td> <td>1983535</td> </tr> <tr> <td>2017-18</td> <td>1990590</td> <td>2000000</td> <td>1989986</td> </tr> <tr> <td>2018-19</td> <td>1998738</td> <td>2000000</td> <td>1636596</td> </tr> <tr> <td>2019-20</td> <td>1999995</td> <td>2000000</td> <td>1561683</td> </tr> <tr> <td>2020-21</td> <td>3510711</td> <td>2000000</td> <td>1698837</td> </tr> <tr> <td>2021-22</td> <td>4534748</td> <td>2000000</td> <td>1795095</td> </tr> <tr> <td>2022-23</td> <td>1997746</td> <td>2000000</td> <td>1996045</td> </tr> </tbody> </table>	Year	Mining Plan Approved Quantity	EC approved Quantity	Despatch as per Audit Statement	2012-13	1995235	2000000	1992752	2013-14	2004640	2000000	1911269	2014-15	1951929	2000000	1677255	2015-16	1996187	2000000	1799273	2016-17	1984382	2000000	1983535	2017-18	1990590	2000000	1989986	2018-19	1998738	2000000	1636596	2019-20	1999995	2000000	1561683	2020-21	3510711	2000000	1698837	2021-22	4534748	2000000	1795095	2022-23	1997746	2000000	1996045
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c) Highest Production achieved in any one year	1996045 Tonnes in the year 2022-23.
d) Details of approved depth of mining	As per the Modified Mining Plan approval No.TN/TCR/LST/MMP-2088.MDS, Dt: 19.08.2022 the proposed depth of mining is 77 meters for the plan period and propose to mine up to a maximum depth of 118.5 Meters ultimately (conceptual stage).
e) Actual Depth of mining achieved earlier.	The lessee company has gone up to maximum of 64 meters depth during 2022-23.
f) Name of the person already mined in that leased area	Tvl. Dalmia Cement (Bharat) Limited
g) If EC and CTO already obtained, the copy of the same shall be furnished	Enclosed.
h) Whether mining was carried out as per the approved Mining Plan with stipulated benches.	Yes.
<b><u>Details called for as per Para 9 in Page 22 of ToR.</u></b>	<b><u>Particulars furnished</u></b>
To obtain letter / certificate of AD(Mines) to the effect that there is no other minerals / resources like sand in the quarrying area with the approved depth of mining or below depth of mining.	Being the sedimentary rock Limestone and Marl formation of upper cretaceous age, the general geology of this area in question does not consist of sand or other minerals / resources within the approved depth and forming shale and granitic gneiss below the approved depth.

Encl: As above.

*[Signature]*  
4/5/23  
Assistant Director  
Geology and Mining  
Tiruchirappalli.

To  
Tvl. Dalmia Cement (Bharat) Limited,  
Dalmiapuram.

*[Signature]*  
4/5/23



**Table : 1.7 Mine Production Data**

Year	Top Soil, Tons	OB, Tons	Production, Tonnes				Dispatched ROM, Tonnes
			Planned	Actual			
				Limestone	Marl	ROM	
<b>Opening Stock</b>	-	-	-	883	9,06,128	9,07,011	-
2008-09	Nil	Nil	20,56,725	8,33,700	1,59,000	9,92,700	16,58,655
2009-10	Nil	Nil	20,05,421	8,89,400	8,19,400	17,08,800	16,28,005
2010-11	Nil	Nil	20,11,781	14,76,200	2,02,400	16,78,600	17,83,779
2011-12	Nil	Nil	19,94,630	18,71,100	83,700	19,54,800	19,54,422
2012-13	Nil	Nil	19,95,235	19,89,200	0	19,89,200	19,92,752
2013-14	Nil	Nil	20,04,640	19,09,700	0	19,09,700	19,11,269
2014-15	Nil	Nil	19,51,929	16,79,700	0	16,79,700	16,77,255
2015-16	Nil	Nil	19,96,187	18,00,400	0	18,00,400	17,99,273
2016-17	Nil	Nil	19,84,382	19,75,100	0	19,75,100	19,83,535
2017-18	Nil	Nil	19,90,590	19,88,800	0	19,88,800	19,89,986
2018-19	Nil	Nil	19,98,738	16,37,800	0	16,37,800	16,36,596
2019-20	Nil	Nil	19,99,995	15,65,200	0	15,65,200	15,61,683
2020-21	1,19,259	4,44,625	35,10,711	17,01,700	0	17,01,700	16,98,837
2021-22	2,23,013	5,37,699	45,34,748	17,98,700	0	17,98,700	17,95,095
2022-23	0	0	19,97,746	19,96,045	0	<b>19,96,045</b>	19,96,045
<b>Total</b>	<b>3,42,272</b>	<b>9,82,324</b>	<b>3,20,35,712</b>	<b>2,51,13,628</b>	<b>21,70,628</b>	<b>2,72,84,256</b>	<b>2,70,67,187</b>
<b>Closing Stock</b>	-	-	-	16,648	2,00,421	<b>2,17,069</b>	-

**Table :1.8 Mine Production Data**

Year	Dispatched Quantity, Tonnes			Audit Report/Proceedings Date		Royalty Paid, Rs.
	Limestone	Marl	ROM	Limestone	Marl	
2008-09	8,31,798	8,26,857	16,58,655	01.06.2009	01.06.2009	4,24,91,275
2009-10	8,58,217	7,69,788	16,28,005	08.07.2010	08.07.2010	5,51,06,845
2010-11	14,93,975	2,89,804	17,83,779	28.07.2011	28.07.2011	9,58,94,023
2011-12	18,70,664	83,758	19,54,422	06.11.2012	06.11.2012	11,83,64,431
2012-13	19,92,752	0	19,92,752	26.06.2013	-	12,55,43,376
2013-14	19,11,269	0	19,11,269	28.05.2014	-	12,04,09,947
2014-15	16,77,255	0	16,77,255	01.07.2015	-	12,22,62,210
2015-16	17,99,273	0	17,99,273	02.08.2016	-	14,39,41,840
2016-17	19,83,535	0	19,83,535	21.09.2017	-	15,86,82,800
2017-18	19,89,986	0	19,89,986	09.07.2018	-	15,91,98,880
2018-19	16,36,596	0	16,36,596	22.07.2018	-	13,09,27,680
2019-20	15,61,683	0	15,61,683	17.07.2020	-	12,49,34,640
2020-21	16,98,837	0	16,98,837	01.09.2021	-	13,59,06,960
2021-22	17,95,095	0	17,95,095	07.09.2022	-	14,36,07,600
2022-23	19,96,045	0	19,96,045	04.05.2023	-	15,96,83,600
<b>Total</b>	<b>25,096,980</b>	<b>1,970,207</b>	<b>27,066,187</b>	-	-	<b>183,69,56,107</b>

## 1.9 Existing Pits Dimension

In the total Lease Area of 166.005 Ha, **Mineralised Area is 124.98 Ha** & Non-Mineralised Area is 41.025 Ha. The existing Pits Configuration are given in **Table 1.9**.

**Table : 1.9 Existing Pits Dimension**

Pit ID	Length, m	Width, m	Depth (BGL), m	Top RL, m	Bottom RL, m
KLK Pit No. 1	238	236	32.7	88-84	55.06
KLK Pit No. 2	1389	420	45.0	97-83	49.40
KVK Pit No. 3 (East Block)	722	265	42.5	83-79.5	36.48
KVK Pit No. 3 (West Block)	606	335	64.0	80-72	13.12
KVK Pit No. 4	90	82	1.0	79-76	75.72

## 1.10 Need for Production Enhancement of ML-I

Expanded Cement Plants at Dalmiapuram & Ariyalur require about 9.0-10.0 MTPA Cement Grade Limestone. The production capacity of existing Captive Working Mines is about 7.05 MTPA and are in Conceptual Stage and will be completely exhausted in another 2-3 years period. Proved Mineable Reserves (111 Category) of KLK-KVK ML-I is **64,485,659 Tonnes** as on 01.04.2022. ML-I alone is having the Reserves to support the Cement Plants comfortably for another 10 years. Thus, the production level of ML-I Limestone Mine has to be enhanced. Accordingly, DCBL now proposes to **increase the production capacity of KLK-KVK ML-I from existing 2.0 MTPA to 6.97 MTPA ROM.**

## 1.11 The Proposal

The proposal is for Production Enhancement of KLK-KVK ML-I Mine from **2.0 MTPA to 6.97 MTPA ROM within the existing Lease Area**. Mining will be continued to be carried out by **Open Cast Mechanized Non-conventional Method using Rock Breakers and Surface Miners**. No Drilling and Blasting will be carried out. The **Ultimate Pit Depth** at Conceptual Stage will be **118.5 m BGL in KLK Pit No. 2**, 117 m BGL in KVK Pit No. 3 (East Block), 108 m BGL in KVK Pit No. 3 (West Block), 58.8 m BGL in KLK Pit No. 1 and 47.0 m BGL in KVK Pit No. 4.

### Mine Profile :

Minerals	:	Limestone & Marl as ROM
Mineable Reserves	:	Proved (111) 64,485,659 Tonnes (as on 01.04.2022) Limestone – 35,089,690 Tonnes Marl – 29,395,969 Tonnes
Feasible (221) Reserves	:	62,057,019 Tonnes ROM
Proposed Production	:	6.97 MTPA ROM @ 21100 Tons per day (TPD)

DCBL EC for Expn. of Kallakudi-Kovandakurichi Limestone Mine GO No. 76 (Extent 166.005 Ha), Trichy Dist.

No. of working days	:	330 (3 shifts)
Life of the Mine	:	9 years
<b>Ore:OB Ratio-Scheme Period</b>	:	<b>1:0.27</b>
Bench Height	:	9 m
Bench Width	:	10 m
Bench Slope	:	70° to 80° (Pit Slope 45-50°)
<b>Ultimate Pit Limit-Conceptual</b>	:	<b>47 to 118.5 m BGL</b>
Ground Water-table	:	60-65 m BGL (Postmonsoon)

**Mining will intersect the ground water-table.**

There is **no Rehabilitation & Resettlement (R&R) issue** due to the Proposal of Expansion of exiting Mine. Also, there is **no litigation/pending case** against the proposal.

### 1.12 Environmental Setting

ML-I Lease Area is located in the Survey of India **Topo Sheet No. 58 J/13** within the Coordinates **10°57'19.37"-10°59'40.36" North Latitudes & 78°55'29.67"-78°57'08.33" East Longitude** as detailed below :

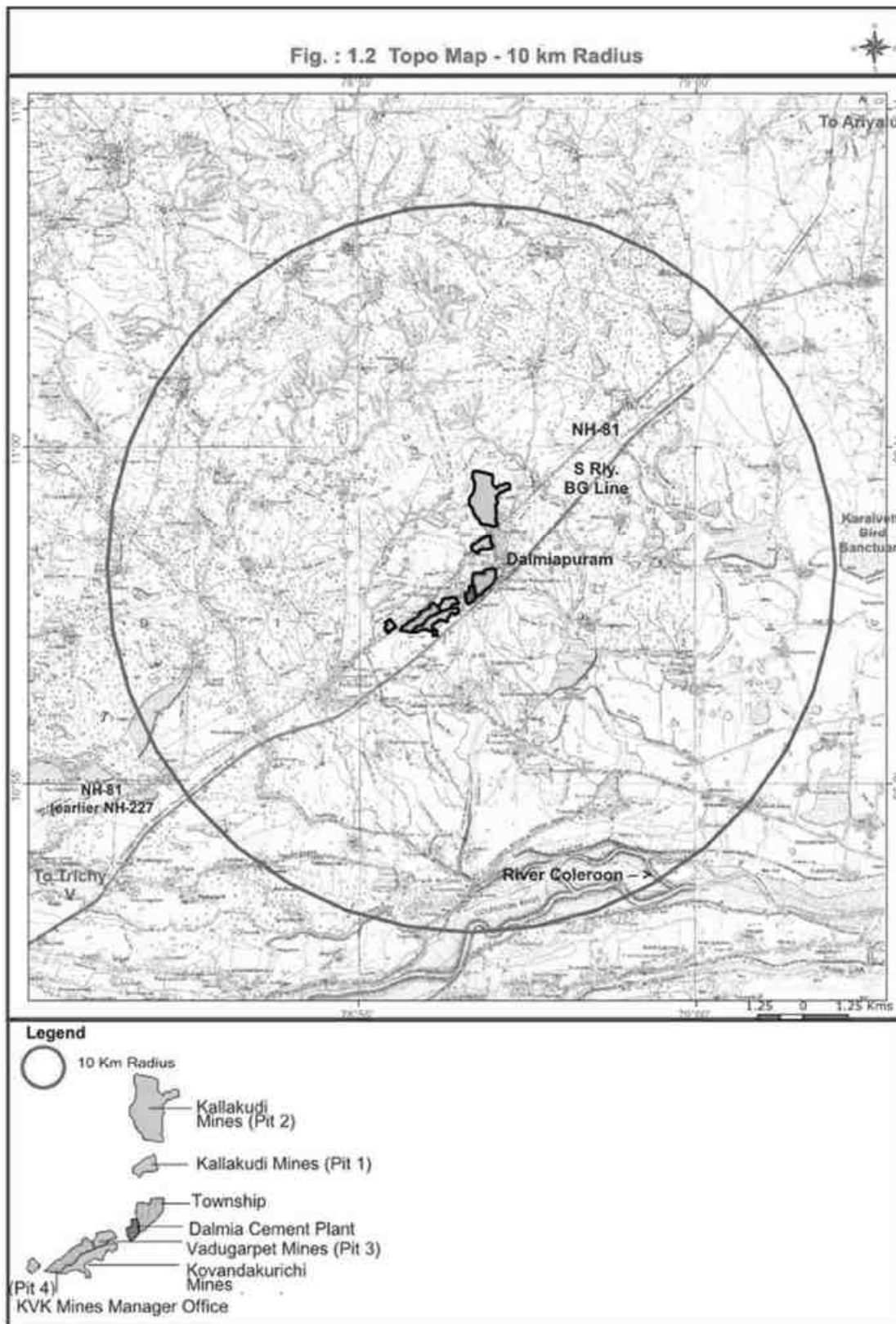
Lease Area in Kallakudi Pit Nos. 1 & 2 : **10°58'32.81" - 10°59'40.36" North Latitudes & 78°56'32.58" - 78°57'08.33" East Longitudes.**

Lease Area in Kovandakurichi Pit Nos. 3 & 4 : **10°57'19.37" - 10°57'53.73" North Latitudes & 78°55'29.67" - 78°56'27.84" East Longitudes.**

Boundary Coordinates (Pillars) of the Lease Area are appended.

For Cumulative Impact Assessment of existing Plants & Mines, Study Area Map from centre near the Plant is considered (Fig. 1.2). **Karaivetti Bird Sanctuary, Notified Eco Sensitive Area (ESA) vide S.O. 1909(E) dated 31.05.2019**, is located at a distance of **8.6 km** in east direction from the Lease in from KLK Pit No. 2. The shortest Eco Sensitive Zone (ESZ) of Karaivetti Bird Sanctuary is 7.6 km in ENE direction from KLK Pit. As the ESZ is notified, **no NOC** from National Board for Wildlife (NBWL) is required for the Project. There is **no Reserved Forest (RF) exists within 1 km** of Lease Area. **DFO, Trichy Letter No, 3565/2023 dated 15.05.2023** in this regard is appended. **Thachankurichi Reserved Forests (RF)** is at a distance of 9.0 km in west from KVK Pit No. 4.

Other than Karaivetti Bird Sanctuary, there are **no other Eco Sensitive Areas** like National Parks, Wildlife Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar Sites, Tiger/Elephant Reserves, etc. (existing as well as proposed) within 10 km from the Lease.



ந.க.எண்: 3565/2023/வ நான்: 15.05.2023

மாவட்ட வன அலுவலகம்  
திருச்சிராப்பள்ளி கோட்டம்,  
நீதிமன்ற வளாகம், திருச்சிராப்பள்ளி, I.  
தொ.பெ.எண் : 0431-2414265

பொருள் : வனம் - திருச்சிராப்பள்ளி வனச்சரகம், சுரங்க குத்தகை பூட்டித்தல் - கல்லக்குடி, கோவண்டகுறிச்சி, வெங்கடாசலூர் கிராமம் கல்லக்குடி கிராம புல எண்.39/8,40,41/1 கோவண்டகுறிச்சி கிராம புல எண். 54/1, 54/2 மற்றும் 55 வெங்கடாசலூர் கிராம புல எண். 32 சுரங்கக் குத்தகை மேற்கொள்ளுதல் அநுகாமைப்பிள்ளை காப்புக் காட்டிலிருந்து காப்புக்காடுகள், தேசிய பூங்காக்கள் மற்றும் சரணாலயங்கள் வான்வழி (Aerial Distance) தூரம் கோருதல் - தொடர்பாக

- பரிந்துரை : 1. அரசாணை எண். G.O. Ms.No. 76 தொழில்நுறை (MMA1) துறை நான் : 26.07.2018
2. Deputy General Manager, (Corp., Affairs) Dalmia Cement (Bharath) Ltd., Letter No. SEIAA-TN/F.No.939/SEAC/ToR-1420/2023 Dated 03.04.2023
2. வனச்சரக அலுவலர், திருச்சிராப்பள்ளி வனச்சரகம் கடித எண் 34/2023 நான் : 11.05.2023

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மேற்காணும் பொருள் தொடர்பாக, பரிந்துரை 1-ல்காணும் அரசாணை மற்றும் பரிந்துரை 2-ல் காணும் Dalmia Cement (Bharath) Ltd., டால்மியாபுரம், திருச்சிராப்பள்ளி அவர்களது கடிதத்தின்படி சுரங்கக்குத்தகை பூட்டிக்கும் பொருட்டு கல்லக்குடி, கோவண்டகுறிச்சி, வெங்கடாசலூர் கிராமம் கல்லக்குடி கிராம புல எண்.39/8,40,41/1 கோவண்டகுறிச்சி கிராம புல எண். 54/1, 54/2 மற்றும் 55 வெங்கடாசலூர் கிராம புல எண். 32ல் மேற்கொள்ளும் பொருட்டு பரிந்துரை-3ல் காணும் வனச்சரக அலுவலர், திருச்சிராப்பள்ளி கடிதத்தின்படி பணி மேற்கொள்ளும் கிராமம் மற்றும் அநுகாமைப்பிள்ளை காப்புக்காடுகள், தேசிய பூங்காக்கள் மற்றும் சரணாலயங்கள் வான்வழி (Aerial Distance) தூரம் கீழ்க்கண்ட வரறு தேர்வீக்கப்படுகிறது.

வரிசை எண்.	கிராமம் மற்றும் புல எண்.	GPS குறிப்பீடுகள்	காப்புக்காடு, வன உயிர் சரணாலயம், மற்றும் தேசியப்பூங்கா, வான்வழி தூரம்
1	கல்லக்குடி கிராமம் புல எண். 39/8,40,41/1	N : 10.981563 E : 78.948785	தச்சங்குறிச்சி காப்புக்காட்டின் மேற்குப்பகுதியிலிருந்து 17 கி.மீ தொலைவு மற்றும் கிழக்குப்பகுதியில் கரைமேட்டி புவனவகை சரணாலயத்திற்கு 7.6 கி.மீ.ட்ட தொலைவில் அமைந்துள்ளது
2	கோவண்டகுறிச்சி கிராமம் புல எண். 54/1, 54/2 மற்றும் 55	N : 10.96042 E : 78.934825	தச்சங்குறிச்சி காப்புக்காட்டின் மேற்குப்பகுதியிலிருந்து 15 கி.மீ தொலைவு மற்றும் கிழக்குப்பகுதியில் கரைமேட்டி புவனவகை சரணாலயத்திற்கு 9.6 கி.மீ.ட்ட தொலைவில் அமைந்துள்ளது
3	வெங்கடாசலூர் கிராம புல எண். 32	N : 10.977848 E : 78.94568	தச்சங்குறிச்சி காப்புக்காட்டின் மேற்குப்பகுதியிலிருந்து 16 கி.மீ தொலைவு மற்றும் கிழக்குப்பகுதியில் கரைமேட்டி புவனவகை சரணாலயத்திற்கு 8.60 கி.மீ.ட்ட தொலைவில் அமைந்துள்ளது

மேற்கண்டவாறு சுரங்கக்குத்தகை பூட்டிக்கொட அளவையிடவுள்ள கிராமங்களின் வான்வழி தூரம் மற்றும் காப்புக்காடுகள் ஏதும் இல்லை என்பதடன் சுரங்கப்பணி மேற்கொள்ளும் அநுகாமைப்பில் வேம்பு, பூங்கா, நாவல் போன்ற உயர்ந்த செடிகள் (Taller Seedlings) உற்பத்தி செய்யு பராமரிக்க பரிந்துரைக்கப்படுகிறது.

மாவட்ட வன அலுவலர்  
திருச்சிராப்பள்ளி.

பெற்றம்

Deputy General Manager, (Corp., Affairs),  
Dalmia Cement (Bharath) Ltd., Dalmiapuram, Tiruchirappalli

நகல் : வனச்சரக அலுவலர், திருச்சிராப்பள்ளி வனச்சரகம், நகலனுக்காக.

**ML-I in KLK Mine**

<b>Pillar No.</b>	<b>N-Latitude</b>	<b>E-Longitude</b>	<b>Pillar No.</b>	<b>N-Latitude</b>	<b>E-Longitude</b>
KLK-1	10° 58' 50.37"	78° 56' 56.74"	KLK-31	10° 59' 09.36"	78° 56' 32.58"
KLK-2	10° 58' 51.39"	78° 56' 56.37"	KLK-32	10° 59' 10.98"	78° 56' 32.66"
KLK-3	10° 58' 52.26"	78° 56' 54.68"	KLK-33	10° 59' 12.25"	78° 56' 32.73"
KLK-4	10° 58' 53.00"	78° 56' 53.35"	KLK-34	10° 59' 13.87"	78° 56' 32.80"
KLK-4A	10° 58' 53.84"	78° 56' 54.58"	KLK-35	10° 59' 15.60"	78° 56' 32.99"
KLK-4A1	10° 58' 55.47"	78° 56' 54.27"	KLK-36	10° 59' 16.48"	78° 56' 33.13"
KLK-4A2	10° 58' 57.06"	78° 56' 53.95"	KLK-37	10° 59' 16.22"	78° 56' 34.41"
KLK-4A3	10° 58' 58.67"	78° 56' 53.62"	KLK-38	10° 59' 17.82"	78° 56' 34.52"
KLK-4A4	10° 59' 00.31"	78° 56' 53.30"	KLK-39	10° 59' 18.88"	78° 56' 34.60"
KLK-4B	10° 59' 00.60"	78° 56' 53.22"	KLK-40	10° 59' 18.73"	78° 56' 35.56"
KLK-4B1	10° 59' 00.78"	78° 56' 51.57"	KLK-41	10° 59' 20.36"	78° 56' 35.62"
KLK-4C	10° 59' 00.99"	78° 56' 49.92"	KLK-42	10° 59' 21.21"	78° 56' 35.67"
KLK-4C1	10° 58' 59.37"	78° 56' 50.13"	KLK-43	10° 59' 22.82"	78° 56' 35.81"
KLK-4D	10° 58' 58.13"	78° 56' 50.27"	KLK-44	10° 59' 24.46"	78° 56' 35.89"
KLK-4D1	10° 58' 56.74"	78° 56' 51.10"	KLK-45	10° 59' 26.07"	78° 56' 35.98"
KLK-4D2	10° 58' 55.31"	78° 56' 51.93"	KLK-46	10° 59' 27.70"	78° 56' 36.01"
KLK-4D3	10° 58' 53.92"	78° 56' 52.77"	KLK-47	10° 59' 28.83"	78° 56' 34.64"
KLK-5	10° 58' 52.53"	78° 56' 52.88"	KLK-48	10° 59' 30.45"	78° 56' 34.60"
KLK-6	10° 58' 52.97"	78° 56' 50.97"	KLK-49	10° 59' 31.42"	78° 56' 34.54"
KLK-7	10° 58' 52.07"	78° 56' 50.40"	KLK-50	10° 59' 33.10"	78° 56' 34.46"
KLK-8	10° 58' 51.40"	78° 56' 50.81"	KLK-51	10° 59' 33.18"	78° 56' 33.42"
KLK-9	10° 58' 51.75"	78° 56' 50.15"	KLK-52	10° 59' 34.81"	78° 56' 33.35"
KLK-10	10° 58' 51.81"	78° 56' 48.50"	KLK-53	10° 59' 35.62"	78° 56' 33.33"
KLK-11	10° 58' 51.93"	78° 56' 46.85"	KLK-54	10° 59' 35.74"	78° 56' 34.95"
KLK-12	10° 58' 51.98"	78° 56' 45.88"	KLK-55	10° 59' 35.77"	78° 56' 35.95"
KLK-13	10° 58' 52.21"	78° 56' 46.24"	KLK-56	10° 59' 36.41"	78° 56' 35.82"
KLK-14	10° 58' 54.07"	78° 56' 45.97"	KLK-57	10° 59' 36.12"	78° 56' 34.91"
KLK-15	10° 58' 54.14"	78° 56' 44.78"	KLK-58	10° 59' 37.23"	78° 56' 33.28"
KLK-16	10° 58' 55.64"	78° 56' 44.42"	KLK-59	10° 59' 38.87"	78° 56' 33.21"
KLK-17	10° 58' 56.27"	78° 56' 43.01"	KLK-60	10° 59' 39.99"	78° 56' 33.18"
KLK-18	10° 58' 56.90"	78° 56' 41.63"	KLK-61	10° 59' 40.19"	78° 56' 34.85"
KLK-19	10° 58' 57.51"	78° 56' 40.40"	KLK-62	10° 59' 40.36"	78° 56' 36.36"
KLK-20	10° 58' 59.38"	78° 56' 40.43"	KLK-63	10° 59' 40.13"	78° 56' 37.95"
KLK-21	10° 58' 59.69"	78° 56' 39.55"	KLK-64	10° 59' 40.06"	78° 56' 39.66"
KLK-22	10° 59' 00.20"	78° 56' 38.52"	KLK-65	10° 59' 39.93"	78° 56' 41.20"
KLK-23	10° 59' 01.38"	78° 56' 38.16"	KLK-66	10° 59' 39.81"	78° 56' 42.26"
KLK-24	10° 59' 03.03"	78° 56' 38.19"	KLK-67	10° 59' 39.37"	78° 56' 43.76"
KLK-25	10° 59' 04.10"	78° 56' 38.21"	KLK-68	10° 59' 38.94"	78° 56' 45.34"
KLK-26	10° 59' 05.04"	78° 56' 36.85"	KLK-69	10° 59' 38.52"	78° 56' 46.93"
KLK-27	10° 59' 05.80"	78° 56' 35.63"	KLK-70	10° 59' 38.11"	78° 56' 48.52"
KLK-28	10° 59' 07.36"	78° 56' 34.85"	KLK-71	10° 59' 37.75"	78° 56' 49.68"
KLK-29	10° 59' 07.75"	78° 56' 33.24"	KLK-72	10° 59' 37.70"	78° 56' 51.34"
KLK-30	10° 59' 07.86"	78° 56' 32.63"	KLK-73	10° 59' 37.70"	78° 56' 51.87"
KLK-74	10° 59' 36.07"	78° 56' 51.63"	KLK-117	10° 59' 21.67"	78° 56' 59.27"

Pillar No.	N-Latitude	E-Longitude	Pillar No.	N-Latitude	E-Longitude
KLK-75	10° 59' 34.53"	78° 56' 51.41"	KLK-118	10° 59' 20.43"	78° 56' 59.12"
KLK-76	10° 59' 32.90"	78° 56' 51.44"	KLK-119	10° 59' 20.59"	78° 56' 57.48"
KLK-77	10° 59' 31.80"	78° 56' 51.55"	KLK-120	10° 59' 20.63"	78° 56' 56.90"
KLK-78	10° 59' 30.14"	78° 56' 51.52"	KLK-121	10° 59' 19.36"	78° 56' 56.67"
KLK-79	10° 59' 29.37"	78° 56' 51.49"	KLK-122	10° 59' 18.38"	78° 56' 56.64"
KLK-80	10° 59' 29.39"	78° 56' 53.18"	KLK-123	10° 59' 18.36"	78° 56' 55.55"
KLK-81	10° 59' 27.73"	78° 56' 52.97"	KLK-124	10° 59' 19.98"	78° 56' 55.32"
KLK-82	10° 59' 26.76"	78° 56' 52.92"	KLK-125	10° 59' 21.60"	78° 56' 55.07"
KLK-83	10° 59' 26.75"	78° 56' 54.58"	KLK-126	10° 59' 22.61"	78° 56' 54.91"
KLK-84	10° 59' 26.74"	78° 56' 55.79"	KLK-127	10° 59' 22.48"	78° 56' 54.37"
KLK-85	10° 59' 25.12"	78° 56' 55.67"	KLK-128	10° 59' 21.52"	78° 56' 54.50"
KLK-86	10° 59' 24.14"	78° 56' 55.62"	KLK-129	10° 59' 19.96"	78° 56' 54.74"
KLK-87	10° 59' 24.54"	78° 56' 56.65"	KLK-130	10° 59' 18.36"	78° 56' 54.97"
KLK-88	10° 59' 25.97"	78° 56' 57.51"	KLK-131	10° 59' 17.01"	78° 56' 56.47"
KLK-89	10° 59' 26.96"	78° 56' 58.15"	KLK-132	10° 59' 16.38"	78° 56' 56.90"
KLK-90	10° 59' 28.15"	78° 56' 59.15"	KLK-133	10° 59' 16.25"	78° 56' 58.18"
KLK-91	10° 59' 29.17"	78° 56' 59.23"	KLK-134	10° 59' 14.67"	78° 56' 58.37"
KLK-92	10° 59' 29.11"	78° 57' 00.89"	KLK-135	10° 59' 14.10"	78° 56' 58.41"
KLK-93	10° 59' 29.08"	78° 57' 01.84"	KLK-136	10° 59' 12.38"	78° 56' 59.26"
KLK-94	10° 59' 30.70"	78° 57' 01.99"	KLK-137	10° 59' 11.33"	78° 56' 58.03"
KLK-95	10° 59' 31.62"	78° 57' 02.07"	KLK-138	10° 59' 10.18"	78° 56' 57.07"
KLK-96	10° 59' 31.60"	78° 57' 03.70"	KLK-139	10° 59' 11.22"	78° 56' 56.92"
KLK-97	10° 59' 31.59"	78° 57' 04.34"	KLK-140	10° 59' 10.86"	78° 56' 56.07"
KLK-98	10° 59' 31.44"	78° 57' 05.97"	KLK-141	10° 59' 09.84"	78° 56' 56.23"
KLK-99	10° 59' 31.28"	78° 57' 07.61"	KLK-142	10° 59' 09.65"	78° 56' 55.83"
KLK-100	10° 59' 31.24"	78° 57' 08.03"	KLK-143	10° 59' 08.14"	78° 56' 56.40"
KLK-101	10° 59' 29.63"	78° 57' 08.26"	KLK-144	10° 59' 06.64"	78° 56' 56.98"
KLK-102	10° 59' 29.13"	78° 57' 08.33"	KLK-145	10° 59' 05.08"	78° 56' 57.56"
KLK-103	10° 59' 28.79"	78° 57' 06.73"	KLK-146	10° 59' 04.52"	78° 56' 57.77"
KLK-104	10° 59' 28.43"	78° 57' 05.13"	KLK-147	10° 59' 02.99"	78° 56' 58.13"
KLK-105	10° 59' 28.31"	78° 57' 04.56"	KLK-148	10° 59' 02.51"	78° 56' 58.23"
KLK-106	10° 59' 26.78"	78° 57' 04.02"	KLK-149	10° 59' 00.99"	78° 56' 58.81"
KLK-107	10° 59' 26.35"	78° 57' 03.88"	KLK-150	10° 59' 00.23"	78° 56' 59.11"
KLK-108	10° 59' 25.66"	78° 57' 02.47"	KLK-151	10° 59' 00.21"	78° 56' 57.79"
KLK-109	10° 59' 24.97"	78° 57' 01.09"	KLK-152	10° 58' 58.56"	78° 56' 57.64"
KLK-110	10° 59' 23.24"	78° 57' 01.14"	KLK-153	10° 58' 56.95"	78° 56' 57.58"
KLK-111	10° 59' 23.18"	78° 57' 00.76"	KLK-154	10° 58' 55.89"	78° 56' 57.54"
KLK-112	10° 59' 23.22"	78° 56' 59.12"	KLK-155	10° 58' 54.35"	78° 57' 00.02"
KLK-113	10° 59' 23.24"	78° 56' 58.68"	KLK-156	10° 58' 54.27"	78° 57' 00.88"
KLK-114	10° 59' 23.25"	78° 56' 57.32"	KLK-157	10° 58' 52.65"	78° 57' 00.02"
KLK-115	10° 59' 21.80"	78° 56' 57.12"	KLK-158	10° 58' 53.77"	78° 57' 00.19"
KLK-116	10° 59' 21.71"	78° 56' 58.89"	KLK-159	10° 58' 52.05"	78° 56' 58.36"

Pillar No.	N-Latitude	E-Longitude	Pillar No.	N-Latitude	E-Longitude
KLK-160	10° 58' 51.07"	78° 56' 58.47"	KLK-219	10° 58' 33.10"	78° 56' 46.20"
KLK-161	10° 59' 00.84"	78° 57' 01.74"	KLK-220	10° 58' 32.87"	78° 56' 44.56"
KLK-162	10° 59' 02.54"	78° 57' 01.49"	KLK-221	10° 58' 32.81"	78° 56' 43.53"
KLK-163	10° 59' 03.26"	78° 57' 01.24"	KLK-273	10° 58' 41.29"	78° 56' 44.59"
KLK-164	10° 59' 04.15"	78° 56' 59.94"	KLK-274	10° 58' 42.38"	78° 56' 45.12"
KLK-165	10° 59' 04.63"	78° 56' 59.03"	KLK-290	10° 58' 44.56"	78° 56' 53.09"
KLK-166	10° 59' 04.73"	78° 57' 00.81"	KLK-291	10° 58' 41.50"	78° 56' 51.89"
KLK-167	10° 59' 04.57"	78° 57' 02.16"	KLK-292	10° 58' 39.32"	78° 56' 50.81"
KLK-168	10° 59' 06.21"	78° 57' 01.94"	KLK-293	10° 58' 39.81"	78° 56' 49.04"
KLK-169	10° 59' 07.66"	78° 57' 01.65"	KLK-294	10° 58' 41.41"	78° 56' 49.54"
KLK-170	10° 59' 07.59"	78° 57' 02.67"	KLK-295	10° 58' 41.73"	78° 56' 47.15"
KLK-171	10° 59' 06.45"	78° 57' 02.48"	KLK-296	10° 58' 41.84"	78° 56' 47.27"
KLK-172	10° 59' 06.32"	78° 57' 04.04"	KLK-297	10° 58' 40.66"	78° 56' 44.28"
KLK-173	10° 59' 06.54"	78° 57' 04.09"	KLK-298	10° 58' 40.39"	78° 56' 45.46"
KLK-174	10° 59' 06.52"	78° 57' 05.39"	KLK-299	10° 58' 38.98"	78° 56' 45.09"
KLK-175	10° 59' 04.72"	78° 57' 05.31"	KLK-301	10° 58' 39.03"	78° 56' 43.24"
KLK-176	10° 59' 02.59"	78° 57' 05.19"	KLK-302	10° 58' 38.80"	78° 56' 44.36"
KLK-177	10° 59' 01.97"	78° 57' 04.74"	KLK-303	10° 58' 38.03"	78° 56' 45.70"
KLK-178	10° 59' 01.15"	78° 57' 04.42"	KLK-304	10° 58' 36.91"	78° 56' 52.16"
KLK-179	10° 59' 00.23"	78° 57' 04.10"	KLK-305	10° 58' 36.69"	78° 56' 49.60"
KLK-180	10° 59' 00.35"	78° 57' 03.66"	KLK-306	10° 58' 36.69"	78° 56' 49.60"
KLK-181	10° 59' 00.74"	78° 57' 02.13"	KLK-308	10° 58' 36.71"	78° 56' 46.25"
KLK-184	10° 58' 44.41"	78° 56' 53.56"	KLK-309	10° 58' 35.77"	78° 56' 46.53"
KLK-185	10° 58' 42.75"	78° 56' 53.40"	KLK-310	10° 58' 34.86"	78° 56' 44.44"
KLK-186	10° 58' 41.10"	78° 56' 53.21"	KLK-311	10° 58' 34.50"	78° 56' 45.25"
KLK-187	10° 58' 40.16"	78° 56' 53.08"	KLK-311 A	10° 58' 34.50"	78° 56' 45.25"
KLK-188	10° 58' 39.28"	78° 56' 53.22"	KLK-311 B	10° 58' 34.50"	78° 56' 45.25"
KLK-189	10° 58' 38.13"	78° 56' 54.17"	KLK-312	10° 58' 34.70"	78° 56' 46.14"
KLK-190	10° 58' 36.99"	78° 56' 55.88"	KLK-313	10° 58' 35.43"	78° 56' 47.11"
KLK-191	10° 58' 35.82"	78° 56' 56.97"	KLK-314	10° 58' 36.53"	78° 56' 45.61"
KLK-192	10° 58' 35.05"	78° 56' 57.66"	KLK-315	10° 58' 36.40"	78° 56' 45.15"
KLK-193	10° 58' 33.15"	78° 56' 57.56"	KLK-316	10° 58' 37.70"	78° 56' 45.17"
KLK-194	10° 58' 33.14"	78° 56' 55.86"	KLK-317	10° 58' 37.93"	78° 56' 44.37"
KLK-195	10° 58' 35.00"	78° 56' 55.66"	KLK-318	10° 58' 37.56"	78° 56' 44.25"
KLK-196	10° 58' 35.06"	78° 56' 55.00"	KLK-319	10° 58' 37.90"	78° 56' 42.66"
KLK-197	10° 58' 33.33"	78° 56' 54.41"	KLK-320	10° 58' 37.26"	78° 56' 43.46"
KLK-198	10° 58' 33.61"	78° 56' 53.27"	KLK-321	10° 58' 37.42"	78° 56' 42.58"
KLK-199	10° 58' 32.82"	78° 56' 51.84"	KLK-322	10° 58' 36.93"	78° 56' 42.35"
KLK-200	10° 58' 32.93"	78° 56' 51.64"	KLK-323	10° 58' 36.81"	78° 56' 43.40"
KLK-201	10° 58' 34.10"	78° 56' 51.83"	KLK-324	10° 58' 36.26"	78° 56' 44.59"
KLK-211	10° 58' 35.33"	78° 56' 48.00"	KLK-325	10° 58' 36.29"	78° 56' 43.70"
KLK-212	10° 58' 33.85"	78° 56' 47.84"	KLK-326	10° 58' 35.67"	78° 56' 43.67"
KLK-218	10° 58' 33.95"	78° 56' 46.16"	KLK-327	10° 58' 35.68"	78° 56' 44.53"



Pillar No.	N-Latitude	E-Longitude	Pillar No.	N-Latitude	E-Longitude
KLK-328	10° 58' 34.76"	78° 56' 43.22"	KLK-332	10° 58' 35.50"	78° 56' 42.42"
KLK-329	10° 58' 36.25"	78° 56' 43.31"	KLK-333	10° 58' 36.41"	78° 56' 42.58"
KLK-330	10° 58' 36.28"	78° 56' 42.91"	KLK-334	10° 58' 36.74"	78° 56' 40.14"
KLK-331	10° 58' 34.75"	78° 56' 42.76"	KLK-335	10° 58' 36.02"	78° 56' 40.06"

**ML-I in KVK Mine**

Pillar No.	N-Latitude	E-Longitude	Pillar No.	N-Latitude	E-Longitude
KVK-1	10° 57' 41.17"	78° 56' 27.96"	KVK-44	10° 57' 21.95"	78° 56' 01.96"
KVK-2	10° 57' 41.18"	78° 56' 27.62"	KVK-45	10° 57' 21.83"	78° 56' 00.56"
KVK-3	10° 57' 40.33"	78° 56' 26.94"	KVK-46	10° 57' 23.30"	78° 56' 00.33"
KVK-4	10° 57' 39.75"	78° 56' 26.82"	KVK-47	10° 57' 24.58"	78° 56' 00.12"
KVK-5	10° 57' 38.69"	78° 56' 26.70"	KVK-48	10° 57' 24.35"	78° 55' 59.19"
KVK-6	10° 57' 38.69"	78° 56' 25.06"	KVK-49	10° 57' 23.93"	78° 55' 59.06"
KVK-7	10° 57' 38.68"	78° 56' 24.54"	KVK-50	10° 57' 23.71"	78° 55' 57.41"
KVK-8	10° 57' 37.08"	78° 56' 24.59"	KVK-51	10° 57' 23.51"	78° 55' 55.77"
KVK-9	10° 57' 37.17"	78° 56' 23.25"	KVK-52	10° 57' 23.31"	78° 55' 54.14"
KVK-10	10° 57' 38.60"	78° 56' 23.34"	KVK-53	10° 57' 23.09"	78° 55' 52.51"
KVK-11	10° 57' 38.84"	78° 56' 22.15"	KVK-54	10° 57' 22.86"	78° 55' 50.88"
KVK-12	10° 57' 38.71"	78° 56' 20.43"	KVK-55	10° 57' 22.78"	78° 55' 50.25"
KVK-13	10° 57' 38.67"	78° 56' 19.93"	KVK-76	10° 57' 32.37"	78° 55' 43.87"
KVK-14	10° 57' 37.21"	78° 56' 19.82"	KVK-76 A	10° 57' 28.92"	78° 55' 49.44"
KVK-15	10° 57' 35.98"	78° 56' 19.73"	KVK-76 A1	10° 57' 28.66"	78° 55' 47.83"
KVK-16	10° 57' 36.03"	78° 56' 19.20"	KVK-76 B	10° 57' 28.46"	78° 55' 46.60"
KVK-17	10° 57' 34.40"	78° 56' 19.00"	KVK-76 C1	10° 57' 31.06"	78° 55' 44.79"
KVK-18	10° 57' 32.71"	78° 56' 18.77"	KVK-76 C2	10° 57' 30.10"	78° 55' 45.47"
KVK-19	10° 57' 31.44"	78° 56' 18.62"	KVK-76 C3	10° 57' 25.72"	78° 55' 49.87"
KVK-20	10° 57' 31.61"	78° 56' 16.98"	KVK-76 C4	10° 57' 24.26"	78° 55' 50.06"
KVK-21	10° 57' 31.77"	78° 56' 15.35"	KVK-77	10° 57' 33.48"	78° 55' 45.14"
KVK-22	10° 57' 31.94"	78° 56' 13.65"	KVK-78	10° 57' 34.54"	78° 55' 46.35"
KVK-23	10° 57' 32.05"	78° 56' 12.54"	KVK-79	10° 57' 35.65"	78° 55' 47.70"
KVK-24	10° 57' 32.23"	78° 56' 10.78"	KVK-80	10° 57' 36.67"	78° 55' 48.82"
KVK-25	10° 57' 32.39"	78° 56' 09.12"	KVK-81	10° 57' 37.74"	78° 55' 50.06"
KVK-26	10° 57' 30.79"	78° 56' 08.93"	KVK-82	10° 57' 38.44"	78° 55' 50.90"
KVK-27	10° 57' 30.03"	78° 56' 08.83"	KVK-83	10° 57' 36.69"	78° 55' 51.45"
KVK-28	10° 57' 30.16"	78° 56' 07.28"	KVK-84	10° 57' 37.25"	78° 55' 52.73"
KVK-29	10° 57' 30.30"	78° 56' 05.55"	KVK-85	10° 57' 39.18"	78° 55' 51.90"
KVK-30	10° 57' 28.45"	78° 56' 05.25"	KVK-86	10° 57' 39.86"	78° 55' 52.99"
KVK-31	10° 57' 26.82"	78° 56' 04.99"	KVK-87	10° 57' 40.72"	78° 55' 54.38"
KVK-32	10° 57' 25.21"	78° 56' 04.74"	KVK-88	10° 57' 41.58"	78° 55' 55.78"
KVK-33	10° 57' 23.60"	78° 56' 04.48"	KVK-89	10° 57' 41.51"	78° 55' 55.79"
KVK-34	10° 57' 23.96"	78° 56' 06.13"	KVK-89 A	10° 57' 41.91"	78° 55' 57.42"
KVK-35	10° 57' 24.33"	78° 56' 07.87"	KVK-90	10° 57' 42.00"	78° 55' 57.80"
KVK-36	10° 57' 22.83"	78° 56' 08.53"	KVK-91	10° 57' 40.82"	78° 55' 57.98"

Pillar No.	N-Latitude	E-Longitude	Pillar No.	N-Latitude	E-Longitude
KVK-37	10° 57' 20.95"	78° 56' 09.35"	KVK-92	10° 57' 41.00"	78° 55' 58.78"
KVK-38	10° 57' 21.22"	78° 56' 08.52"	KVK-93	10° 57' 42.24"	78° 55' 58.69"
KVK-39	10° 57' 19.37"	78° 56' 08.09"	KVK-94	10° 57' 42.49"	78° 55' 59.53"
KVK-40	10° 57' 19.64"	78° 56' 06.51"	KVK-95	10° 57' 41.18"	78° 55' 59.60"
KVK-41	10° 57' 19.91"	78° 56' 04.91"	KVK-96	10° 57' 40.39"	78° 55' 58.83"
KVK-42	10° 57' 20.15"	78° 56' 03.55"	KVK-96 A	10° 57' 40.14"	78° 55' 57.78"
KVK-43	10° 57' 22.10"	78° 56' 03.54"	KVK-97	10° 57' 39.76"	78° 55' 56.20"
KVK-98	10° 57' 37.97"	78° 55' 56.85"	KVK-139	10° 57' 53.73"	78° 56' 26.06"
KVK-99	10° 57' 38.07"	78° 55' 58.50"	KVK-140	10° 57' 53.23"	78° 56' 26.01"
KVK-100	10° 57' 38.17"	78° 56' 00.13"	KVK-141	10° 57' 53.19"	78° 56' 25.52"
KVK-101	10° 57' 39.88"	78° 56' 00.40"	KVK-142	10° 57' 51.61"	78° 56' 25.60"
KVK-102	10° 57' 41.50"	78° 56' 00.65"	KVK-143	10° 57' 50.47"	78° 56' 25.66"
KVK-103	10° 57' 43.00"	78° 56' 00.89"	KVK-144	10° 57' 50.40"	78° 56' 25.79"
KVK-104	10° 57' 43.55"	78° 56' 00.98"	KVK-145	10° 57' 49.25"	78° 56' 25.98"
KVK-105	10° 57' 44.17"	78° 56' 02.17"	KVK-146	10° 57' 49.27"	78° 56' 26.22"
KVK-106	10° 57' 44.53"	78° 56' 02.86"	KVK-147	10° 57' 49.64"	78° 56' 26.14"
KVK-107	10° 57' 45.61"	78° 56' 04.54"	KVK-148	10° 57' 49.77"	78° 56' 27.05"
KVK-108	10° 57' 45.72"	78° 56' 04.39"	KVK-149	10° 57' 47.94"	78° 56' 27.43"
KVK-108A	10° 57' 46.85"	78° 56' 05.56"	KVK-150	10° 57' 45.98"	78° 56' 27.61"
KVK-109	10° 57' 47.37"	78° 56' 06.09"	KVK-151	10° 57' 44.48"	78° 56' 27.72"
KVK-110	10° 57' 46.22"	78° 56' 07.27"	KVK-152	10° 57' 42.78"	78° 56' 27.84"
KVK-111	10° 57' 45.12"	78° 56' 08.39"	KVK-153	10° 57' 34.95"	78° 55' 44.92"
KVK-112	10° 57' 46.62"	78° 56' 08.97"	KVK-154	10° 57' 34.77"	78° 55' 42.91"
KVK-113	10° 57' 48.16"	78° 56' 09.54"	KVK-155	10° 57' 36.38"	78° 55' 42.73"
KVK-114	10° 57' 48.56"	78° 56' 09.69"	KVK-156	10° 57' 38.00"	78° 55' 42.54"
KVK-115	10° 57' 48.49"	78° 56' 10.85"	KVK-157	10° 57' 39.62"	78° 55' 42.35"
KVK-116	10° 57' 50.06"	78° 56' 11.18"	KVK-158	10° 57' 40.11"	78° 55' 42.28"
KVK-117	10° 57' 51.25"	78° 56' 11.43"	KVK-159	10° 57' 40.11"	78° 55' 39.68"
KVK-118	10° 57' 51.71"	78° 56' 12.95"	KVK-160	10° 57' 40.09"	78° 55' 38.15"
KVK-119	10° 57' 52.16"	78° 56' 14.48"	KVK-161	10° 57' 40.09"	78° 55' 37.71"
KVK-120	10° 57' 52.63"	78° 56' 16.04"	KVK-162	10° 57' 40.12"	78° 55' 36.81"
KVK-121	10° 57' 52.74"	78° 56' 17.72"	KVK-163	10° 57' 38.52"	78° 55' 36.89"
KVK-122	10° 57' 52.83"	78° 56' 19.44"	KVK-164	10° 57' 36.89"	78° 55' 37.00"
KVK-123	10° 57' 52.88"	78° 56' 21.08"	KVK-165	10° 57' 35.62"	78° 55' 37.06"
KVK-124	10° 57' 52.90"	78° 56' 21.58"	KVK-166	10° 57' 35.42"	78° 55' 36.36"
KVK-125	10° 57' 52.66"	78° 56' 21.58"	KVK-167	10° 57' 35.40"	78° 55' 36.20"
KVK-126	10° 57' 52.60"	78° 56' 22.34"	KVK-168	10° 57' 36.86"	78° 55' 36.04"
KVK-127	10° 57' 52.60"	78° 56' 22.84"	KVK-169	10° 57' 38.50"	78° 55' 35.87"
KVK-128	10° 57' 52.62"	78° 56' 23.25"	KVK-170	10° 57' 40.13"	78° 55' 35.69"
KVK-129	10° 57' 51.08"	78° 56' 23.59"	KVK-171	10° 57' 40.15"	78° 55' 35.00"
KVK-130	10° 57' 50.65"	78° 56' 23.68"	KVK-172	10° 57' 38.03"	78° 55' 35.06"
KVK-131	10° 57' 50.55"	78° 56' 24.64"	KVK-173	10° 57' 36.70"	78° 55' 35.27"
KVK-131A	10° 57' 50.66"	78° 56' 24.99"	KVK-174	10° 57' 35.13"	78° 55' 35.53"
KVK-132	10° 57' 50.76"	78° 56' 25.30"	KVK-175	10° 57' 33.37"	78° 55' 36.42"

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Pillar No.	N-Latitude	E-Longitude	Pillar No.	N-Latitude	E-Longitude
KVK-133	10° 57' 49.22"	78° 56' 25.50"	KVK-175A	10° 57' 35.02"	78° 55' 36.38"
KVK-134	10° 57' 49.17"	78° 56' 25.22"	KVK-176	10° 57' 33.28"	78° 55' 35.66"
KVK-135	10° 57' 51.81"	78° 56' 25.01"	KVK-177	10° 57' 31.36"	78° 55' 35.81"
KVK-136	10° 57' 53.20"	78° 56' 24.90"	KVK-178	10° 57' 30.20"	78° 55' 35.77"
KVK-137	10° 57' 53.18"	78° 56' 25.42"	KVK-179	10° 57' 30.20"	78° 55' 37.27"
KVK-138	10° 57' 53.67"	78° 56' 25.47"	KVK-180	10° 57' 28.37"	78° 55' 37.29"

Pillar No.	N-Latitude	E-Longitude	Pillar No.	N-Latitude	E-Longitude
KVK-181	10° 57' 28.83"	78° 55' 37.87"	<b>Venkatachalapuram Village</b>		
KVK-182	10° 57' 30.11"	78° 55' 39.31"	KVK-196	10° 57' 27.11"	78° 55' 33.83"
KVK-183	10° 57' 31.18"	78° 55' 40.55"	KVK-197	10° 57' 27.04"	78° 55' 32.16"
KVK-184	10° 57' 32.25"	78° 55' 41.79"	KVK-198	10° 57' 26.99"	78° 55' 30.51"
KVK-185	10° 57' 33.32"	78° 55' 43.03"	KVK-199	10° 57' 25.47"	78° 55' 30.04"
KVK-186	10° 57' 34.39"	78° 55' 44.27"	KVK-200	10° 57' 24.28"	78° 55' 29.67"
KVK-187	10° 57' 34.03"	78° 55' 39.68"	KVK-201	10° 57' 22.40"	78° 55' 30.23"
KVK-188	10° 57' 33.64"	78° 55' 37.84"	KVK-202	10° 57' 23.47"	78° 55' 31.47"
KVK-189	10° 57' 32.39"	78° 55' 37.88"	KVK-203	10° 57' 24.54"	78° 55' 32.71"
KVK-190	10° 57' 32.64"	78° 55' 39.56"	KVK-204	10° 57' 25.62"	78° 55' 33.95"
KVK-191	10° 57' 31.32"	78° 55' 37.89"	KVK-205	10° 57' 26.69"	78° 55' 35.19"
KVK-192	10° 57' 31.55"	78° 55' 39.45"		-	
KVK-193	10° 57' 30.74"	78° 55' 39.38"			
KVK-194	10° 57' 30.18"	78° 55' 37.93"			
KVK-195	10° 57' 27.18"	78° 55' 35.75"			

The general elevation of the study area ranges from 40 m to 120 m above MSL (aMSL). The Seasonal **River Kollidam (River Coleroon)** is the major river course flowing west to east at southern side (7.1-9.0 km distance). **River Kaveri (River Cauvery)** flows at 11.5-13.9 km in south direction.

The seasonal nallahs which drain the area are : Uppar Odai/Andi Odai, Man Odai and Nandiyar Nallah. Pullambadi Canal runs in the southern side of the Mines. All the rivers & nallas are **seasonal** and there is no perennial river in this area. Apart from these nallahs, **Pullambadi Canal** runs in the southern side of the mines.

ML Area is accessible from Trichy-Chidambaram NH-81 (earlier NH-227) which passes adjacent to the Lease. Dalmiapuram Plant is located at 400 m (aerial) in northeast from KLK Pit No. 3 & 500 m (in south) from KLK Pit No. 1. DCBL Ariyalur Cement Plant is at a distance of 32 km in the northeast. KLK Pits & KVK Pits are located in-between 0.2-3.0 km distance between them. Dalmia Refractories Ltd. is located adjacent to Dalmia Plant in the north. Dhandapani Cement's Venkatachalapuram & Pullambadi Mines are located at 0.8 and 1.2 km in southwest.

The major settlements with in the study area are Kallakudi (Population-11,604; 2011 Census)-adjacent to KLK Pit Nos. 1 & 2 - and Pullambadi (Population-10,241) Town Panchayats. Taluk Headquarters Lalgudi is at 17.3 km in southwest. District Headquarters Trichy is at 26.0 km in southwest.

Southern Railway BG Line connecting Chennai Egmore-Trichy-Kanniyakumari runs at a distance of 0.05-1.1 km from the mines and Kallakudi Palanganatham is the nearest railway station. Ariyalur Railway Station is at 21.5 km in northwest. Trichy is the nearest Airport (33 km in southwest). Karaikkal Port is 99 km in east-southeast & Bay of Bengal is at 100 km in east.

Environmental Plans of ML-I in KLK Pit Nos. 1 & 2 and KVK Pit Nos. 3 & 4 are given in **Figs. 1.3-1.4**.

### **1.13 Employment Potential**

Project will employ about 296 persons directly and indirectly.

### **1.14 Project Cost**

The capital cost of the Project is **Rs.10.00 Crores**. A budget of Rs.50.00 Lakhs has been earmarked as EMP Capital Budget and Rs.25.32 Lakhs per Annum as Operating Cost towards EMP measures, Green Belt development & maintenance, Environmental Monitoring, etc. Also, an amount of Rs.3.00 Lakhs per Annum has been earmarked for Occupational Health Measures.

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Fig. : 1.3 Environmental Plan of ML-I in KLK Pit Nos. 1 & 2

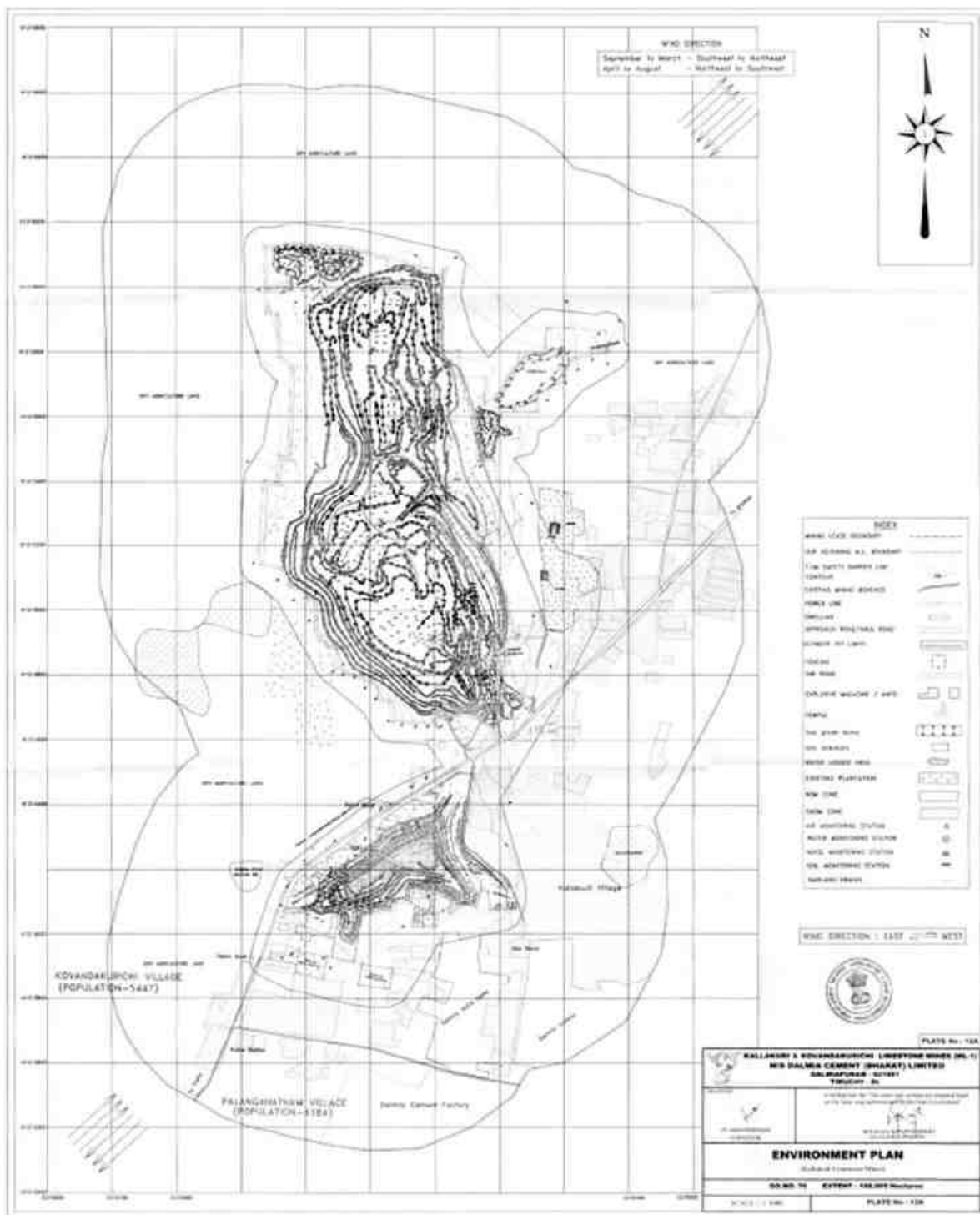
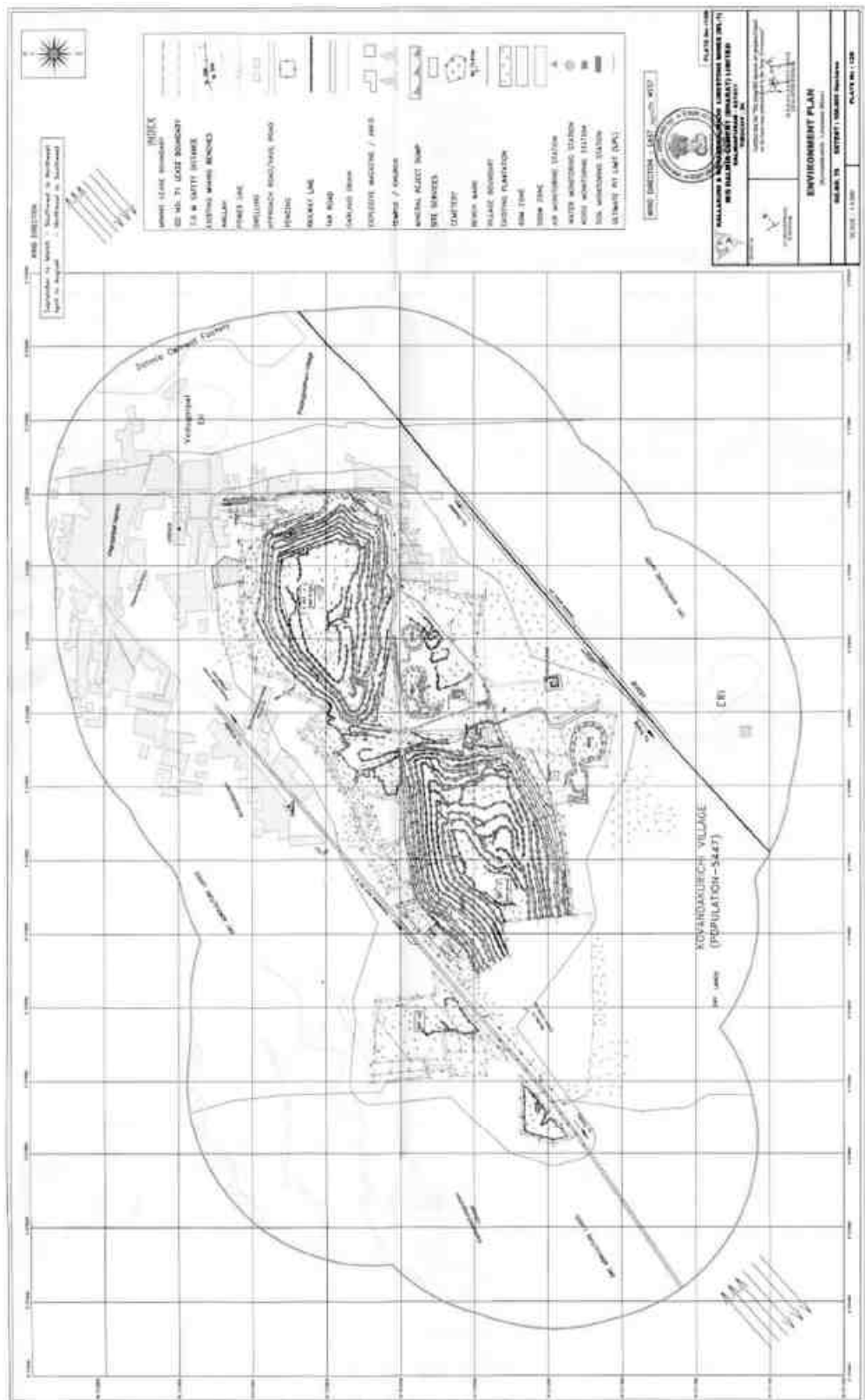


Fig. : 1.4 Environmental Plan of ML-I in KVK Pit Nos. 3 & 4



### 1.15 Proposal Benefits

**Environmental Benefits :** The proposal ensures the continuous limestone supply to Cement Plants. Effective utilization of the Minerals for Cement manufacturing is a Conservation Measure.

**Social Benefits :** Project will employ about 296 persons directly and indirectly. The direct & indirect employment, CSR/CER activities, etc., will have a positive impact on the Socioeconomic Structure of the area. **About 2% of the Project Cost – Rs.20.00 Lakhs** has been earmarked for Corporate Environmental Responsibility (CER) Budget and to address Public Hearing Issues.

**Financial Benefits :** The Proposal will contribute about **Rs.515.00 Crores as Royalty** to State Government (on prevailing rate/Tonne). As per MMDR Act 2015, 30% of Royalty Amount (about **Rs.154.50 Crores**) will be earmarked for **District Mineral Foundation (DMF)** and the amount will be spent for benefit of Kallakudi & Kovandakurichi Villages by the District Administration.

### 1.16 EIA Study

Proposed Production Enhancement of Kallakudi & Kovandakurichi ML-I in an extent of <250 Ha falls under Sl. No. 1(a)-**Category B1** of EIA Notification 2006 (as amended) and requires prior EC from State Level EIA Authority-Tamil Nadu (SEIAA-TN). Accordingly, DCBL has applied Online to SEIAA-TN vide Proposal No. **SIA/TN/MIN/414894/2023 on 17.01.2023** and submitted on 19.01.2023. The Proposal was deliberated in the State Level Expert Appraisal Committee-Tamil Nadu (SEAC-TN) in its 361<sup>st</sup> Meeting held on 10.03.2023 and in 607<sup>th</sup> SEIAA-TN Meeting held on 03.04.2023. Terms of Reference (TOR) has been awarded vide **Letter SEIAA-TN/F.No.9739/SEAC/ToR-1420/2023 dated 03.04.2023 with Public Hearing** for preparing Environmental Impact Assessment (EIA) Report.

Baseline Data (BLD) collected during Winter 2022-23 Season i.e. **December 2022-February 2023** has been utilised for the EIA Study in compliance with MoEF&CC Office Memorandum No. J-11013/41/2006-IA-II(I)(Part) dated 29.08.2017. EIA Report has been **prepared in compliance with awarded TORs** and submitted as per generic structure proposed in Appendix-III of EIA Notification 2006. The Summary EIA Reports (both in English and Tamil) along with Draft EIA Report are submitted for Public Consultation & Public Hearing.

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 vide Certificate NABET/EIA/1922/RA-0155 with validity extended till **20.07.2023** vide Letter QCI/NABET/ENV/ACO/23/2646 dated 21.04.2023 (Sl. No. 3 of QCI/NABET List dated 08.05.2023) which will also be extended further by NABET. ABC Techno Labs India Private Limited Laboratory is accredited by the National Accreditation Board for Testing and Calibration

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Laboratories (**NABL**) vide Certificate No. TC-5770 dated 03.04.2022 with validity till 02.04.2024. 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.

The **EIA Report has been prepared and submitted as per awarded TORs** and submitted as per generic structure proposed in Appendix-III of EIA Notification 2006 with the following Chapters :

- Chapter-1 : Introduction with Need for the Project & Environmental Setting of the Project.
- Chapter-2 : Project Profile - an outline of the Project and allied activities.
- Chapter-3 : Description of Environment (Baseline Status).
- Chapter-4 : Anticipated Impacts along with Prediction of Impacts and Mitigation Measures.
- Chapter-5 : Analysis of Alternatives (Technology & Site).
- Chapter-6 : Environmental Quality Monitoring Programme.
- Chapter-7 : Additional Studies like Risk Assessment, DMP, Hydrogeological Study, etc.
- Chapter-8 : Project Benefits.
- Chapter-9 : Cost-Benefit Analysis, if any.
- Chapter-10 : Environmental Management Plan
- Chapter-11 : Summary EIA.
- Chapter-12 : Disclosure of Consultants engaged.

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## 2.0 Project Profile

### 2.1 Type of the Project

Proposed Production Enhancement of Kallakudi & Kovandakurichi ML-I in an extent of <250 Ha falls under Sl. No. 1(a)-**Category B1** of EIA Notification 2006 (as amended) and requires prior EC from State Level EIA Authority-Tamil Nadu (SEIAA-TN). Accordingly, DCBL has applied Online to SEIAA-TN vide Proposal No. **SIA/TN/MIN/414894/2023** on **17.01.2023** and submitted on 19.01.2023 along with Approved Mining Plan (MMP) to the Authority to determine TORs.

### 2.2 Technology & Magnitude of Operation

The Limestone Mining will be over an extent of **166.005 Ha** by fully **Mechanized Opencast Non-conventional method of Mining by deploying Rock Breakers & Surface Miners** for a production enhancement from existing 2.00 MTPA to **6.97 MTPA ROM (Limestone & Marl)**. Approved Modification in Modified Mining Plan (MMP) is for balance Period of 2023-24. However, the same **Production Capacity of 6.97 MTPA ROM will be retained** for subsequent Plan/Scheme Periods also (**Table 2.1**). With the proposed Production of 6.97 MTPA ROM, **Life of the Mine will be 9 years**.

**Table : 2.1 Production Plan Period & Subsequent Periods**

Year	Period	Top Soil, Tons	OB, Tons	Sub Grades, Tonnes	Gneiss, Tons	ROM (LS & Marl), Tonnes
	<b>Plan Period:</b>					
1	2022-23	57,262	0	0	0	19,97,746
2	2023-24	0	4,72,529	12,48,441	15,61,861	69,69,998
	<b>Till Conceptual:</b>					
3	2024-25	0	2,44,609	12,30,000	11,57,251	69,70,000
4	2025-26	0	2,85,377	12,30,000	10,80,102	69,70,000
5	2026-27	0	2,85,377	12,30,000	10,80,102	69,70,000
6	2027-28	0	0	12,30,000	5,40,049	69,70,000
7	2028-29	0	0	12,30,000	0	69,70,000
8	2029-30	0	0	11,01,559	0	69,70,000
9	2030-31	0	0	0	0	51,97,915
	<b>Total</b>	<b>57,262</b>	<b>12,87,892</b>	<b>85,00,000</b>	<b>54,19,365</b>	<b>5,59,85,659</b>

Proved Mineable Reserves as on 01.04.2022	:	64,485,659 Tonnes
Proposed ROM Production till Conceptual Stage	:	55,985,659 Tonnes
<b>Sub Grade Materials for future Utilisation</b>	:	<b>8,500,000 Tonnes</b>
Maximum ROM Production proposed	:	6.97 MTPA
Ore:OB Ratio (till Conceptual Stage)	:	1:0.27
Life of the Mining Lease	:	9 Years

Top Soil of 57,262 Tons will be fully utilized for Green Belt development. OB of 12,87,892 Tons and Sub Grade materials of 85,00,000 Tonnes will be temporarily dumped in earmarked Reject Dumps.

**Granite Gneiss** of 54,19,365 Tons will be generated which **will be sold** after obtaining the required permissions and approvals.

## **2.3 Project Description**

### **2.3.1 Geology**

**Regional Geology :** The rocks in these region form part of the marine sedimentary formation of cretaceous age referred to Uttathur stage. The Uttathur formation is the oldest stage among the cretaceous formation. The Uttathur formation is widely spread all along the Southwest boundary over 9 to 10 kms. The general strike of the occurrence is North-South and width is ranging about 200 to 300 mtrs. The observed thickness of deposit is about 80 mtrs. Granite and granite gneisses form the basement which one of Archean age. The order of superposition of the rocks is clearly observed by the presence of overlying conglomerate horizons above which deposition of cretaceous age took place.

The Limestone in Kallakudi and Kovandakurichi area is of sedimentary origin. The deposit is of bedded type with layers of Marl and Clastic Limestone. Hard Massive coral pink Limestone referable to Uttathur stage of upper cretaceous formation and of marine transgressional series is also available in this area. From the field relationship it is observed that the sedimentary process involved could be tectonics upheaval resulted in faulting which is clearly manifested in Kovandakurichi and Kallakudi quarries as two sets of almost E-W and NNE-SSW trending normal fault system. The above deposit dips at an angle of 5° to 10° towards west with N-S strike direction at Kallakudi area. Similarly in Kovandakurichi area, the deposit dips at an angle of 5° to 10° towards NNW with NNE-SSW strike direction.

**Local Geology :** The limestone deposit in Kallakudi and Kovandakurichi area is of sedimentary origin and referable to Uttathur stage of upper cretaceous formation and are of marine transgressional series. From the field relationship it is observed that the sedimentary process involved could be tectonics upheaval resulted in faulting which is clearly manifested in Kovandakurichi and Kallakudi quarries as two sets of almost E-W and NNE-SSW trending normal fault system.

The above deposit dips at an angle of 5° to 10° towards west with N-S strike direction at Kallakudi area. Similarly in Kovandakurichi area, the deposit dips at an angle of 5° to 10° towards NNW with NNE-SSW strike direction.

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Geological succession in the Kallakudi & Kovandakurichi limestone deposit:

Geological Age	Litho log / Rock Type
Recent	Alluvium, soil and morrum
Tertiary	Ferrugenous sandstone
Upper Cretaceous	Marl and Marly limestone Clastic bedded limestone and Marl
Lower Cretaceous	Massive pink coral limestone Grey shale
Upper Gondwana	Conglomerate and sandstone
Archean	Ambhibole gneiss

Approved **Surface & Geological Plans** of KLK & KVK Pits are given as **Figs. 2.1-2.2**. **Geological Sections** are given as **Figs. 2.3-2.4**.

### 2.3.2 Reserves

DCBL had drilled 37 Coreholes to 3107 m during 2015-19 over the Lease Area of 166.005 Ha. Also, during 2021-22, 11 Coreholes were drilled for 300 m to assess the Reserves & Resources in the Lease Area. The mineral reserves and resources related to G1, F1, E1 Axis of United Nations Framework Classification (UNFC) System are assessed by cross sections method. The core drilling has been carried out in a grid interval of 200 x 200 meters, the mineral falling between two boreholes spaced less than 200 m has been considered as G1 category and the mineral falling between two boreholes spaced more than 200 m has been considered as G2 category and accordingly the reserve and resource has been estimated. Thus, in accordance with the UNFC classification, the limestone reserves of this Kallakudi & Kovandakurichi Limestone Mine (ML 1) can be classified as “111” and “221”.

For the purpose of estimation of reserves and resources, the bulk density of in-situ limestone has been considered as 2.2 (one cubic meter of limestone by volume is equivalent to 2.2 Tonnes of limestone by weight). **Mineable Reserves** (111 Category) as on 01.04.2022 is Limestone-35,089,690 Tonnes and Marl-29,395,969 Tonnes, thus, total **64,485,659 Tonnes ROM** (Table 2.2).

**Table : 2.2 Mineral Reserves and Resources as on 01.04.2022**

Sl. No.	Description & UNFC Category	Limestone, Tonnes	Marl, Tonnes	Total ROM, Tonnes
1	Proved Mineral Reserves (111)	35,089,690	29,395,969	<b>64,485,659</b>
2	Prefeasibility Mineral Resource (221)	31,465,766	30,591,253	<b>62,057,019</b>
<b>Total Reserves &amp; Resources</b>		<b>66,555,456</b>	<b>59,987,222</b>	<b>126,542,678</b>

The total Resources available is 126,542,678 Tonnes.

Fig. : 2.1 Surface & Geological Plan of ML-I in KLK Pit Nos. 1 & 2

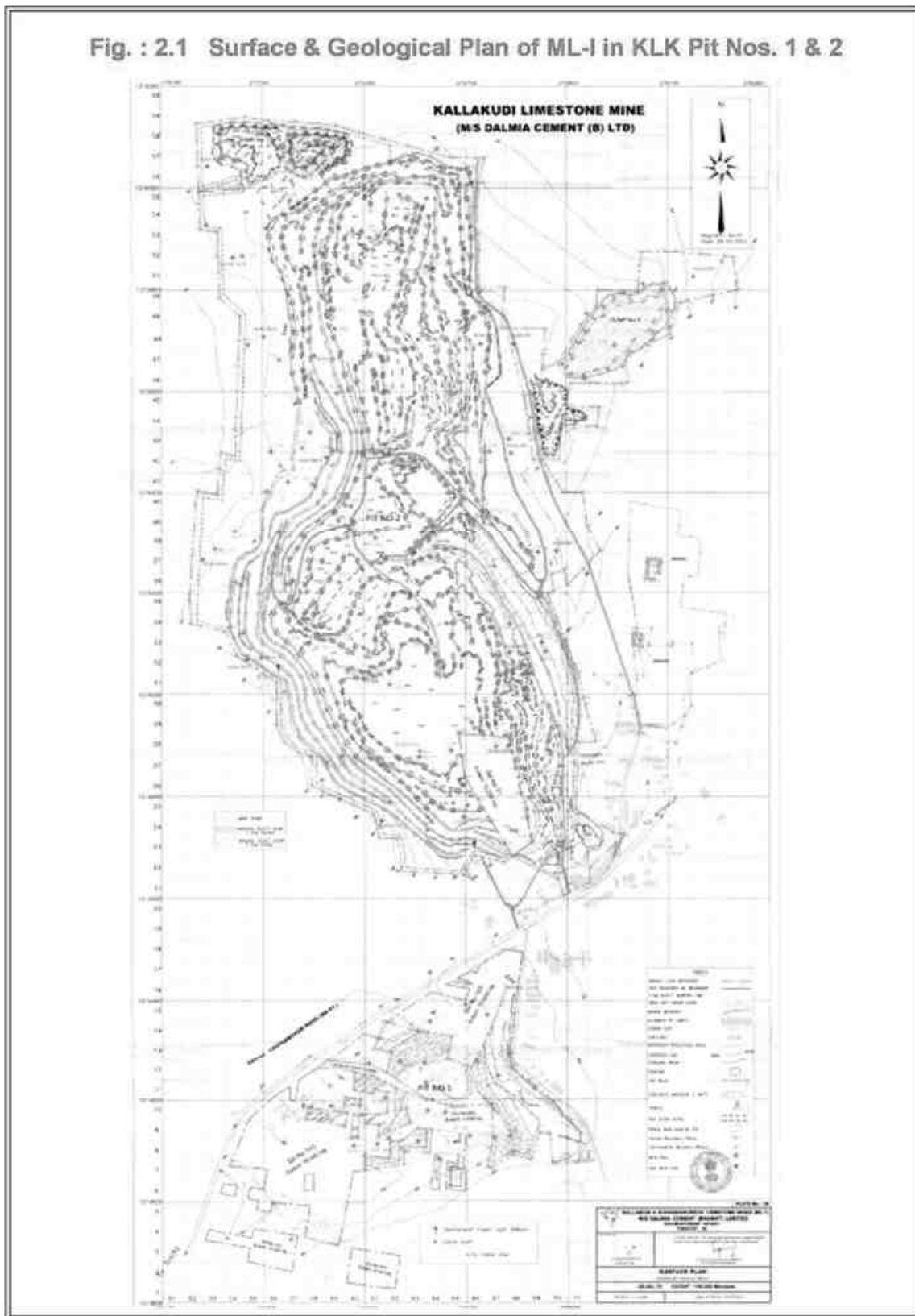


Fig. : 2.2 Surface & Geological Plan of ML-I in KVK Pit Nos. 3 & 4

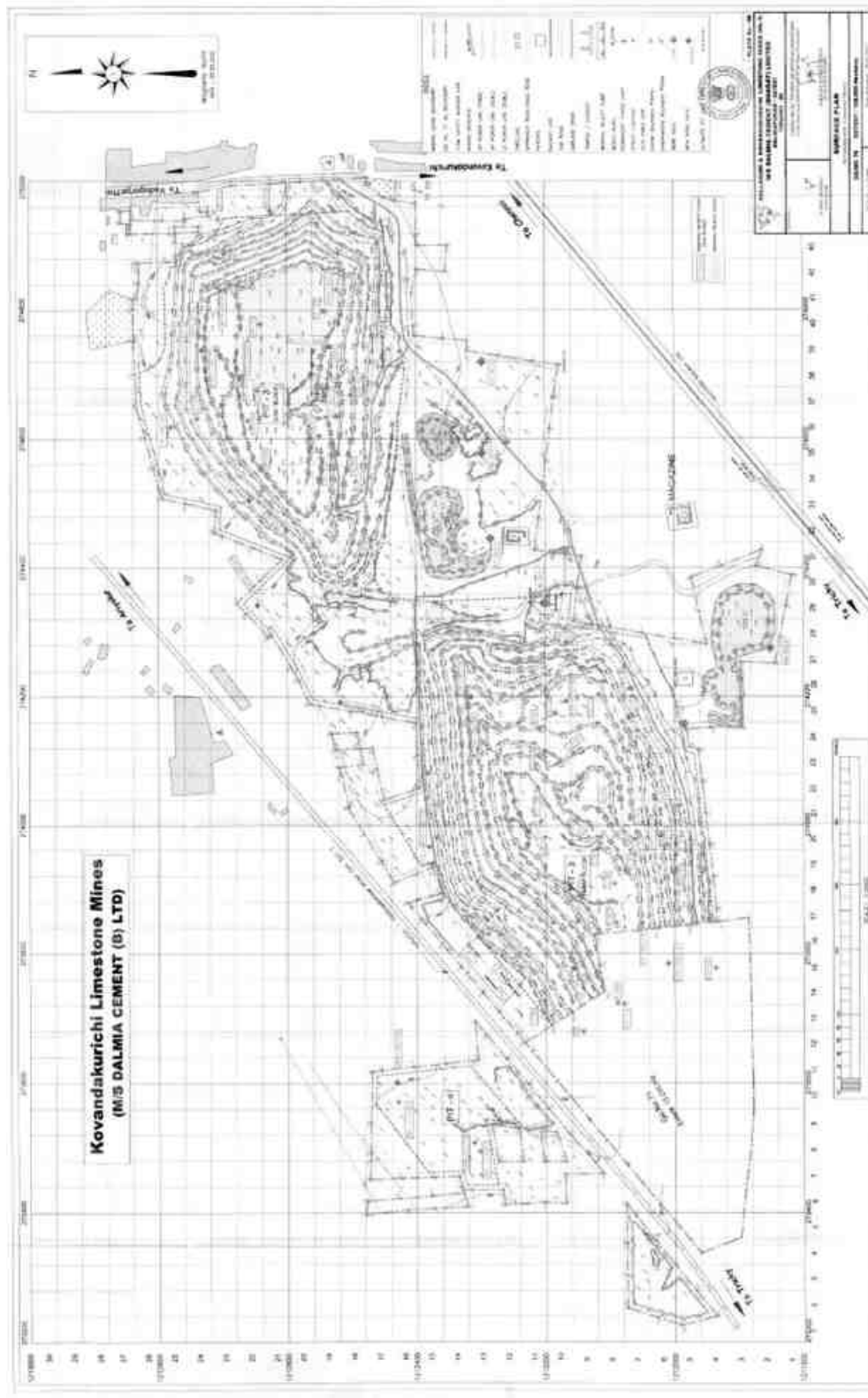


Fig. : 2.3 Geological Section of KLK Pit Nos. 1 & 2

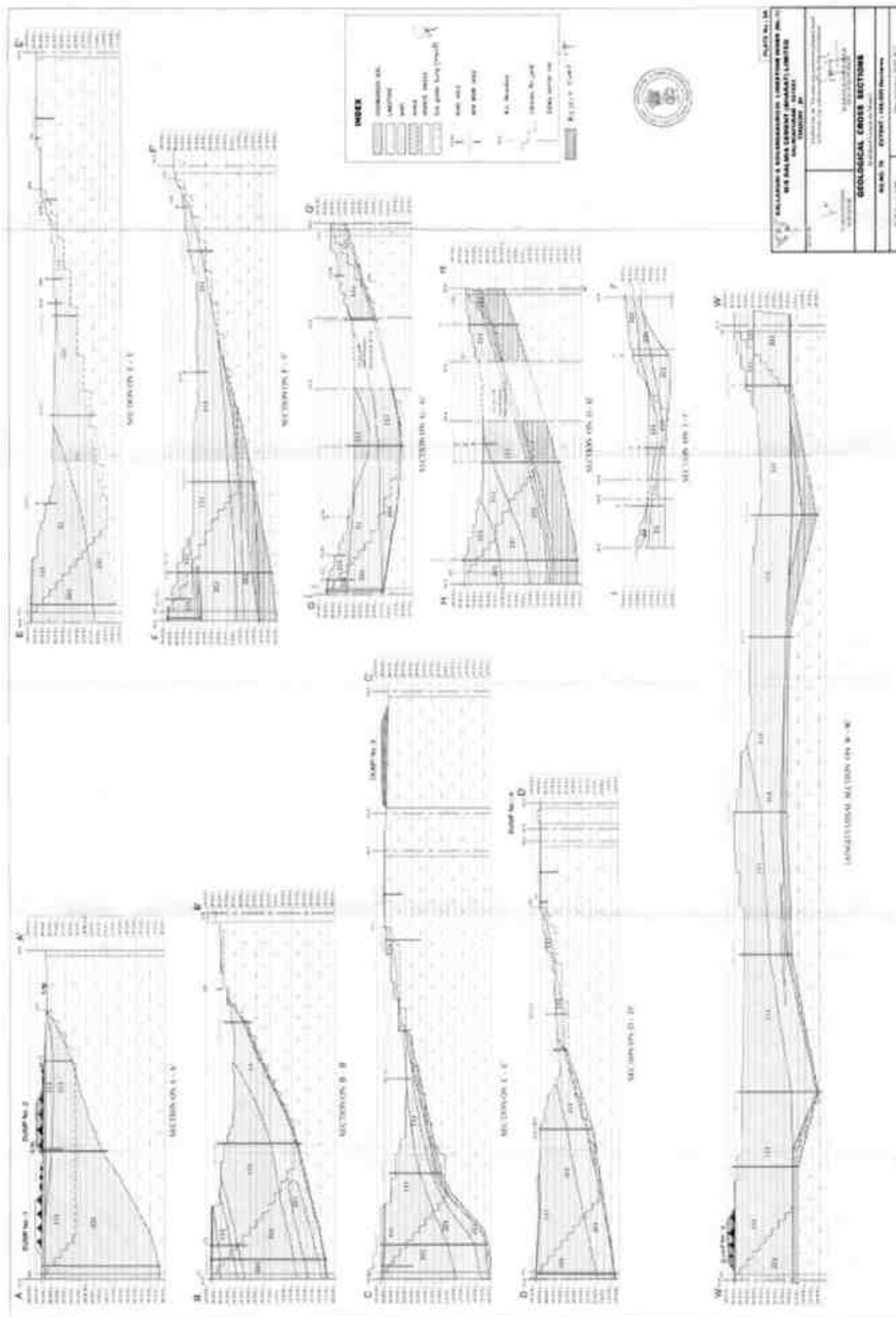
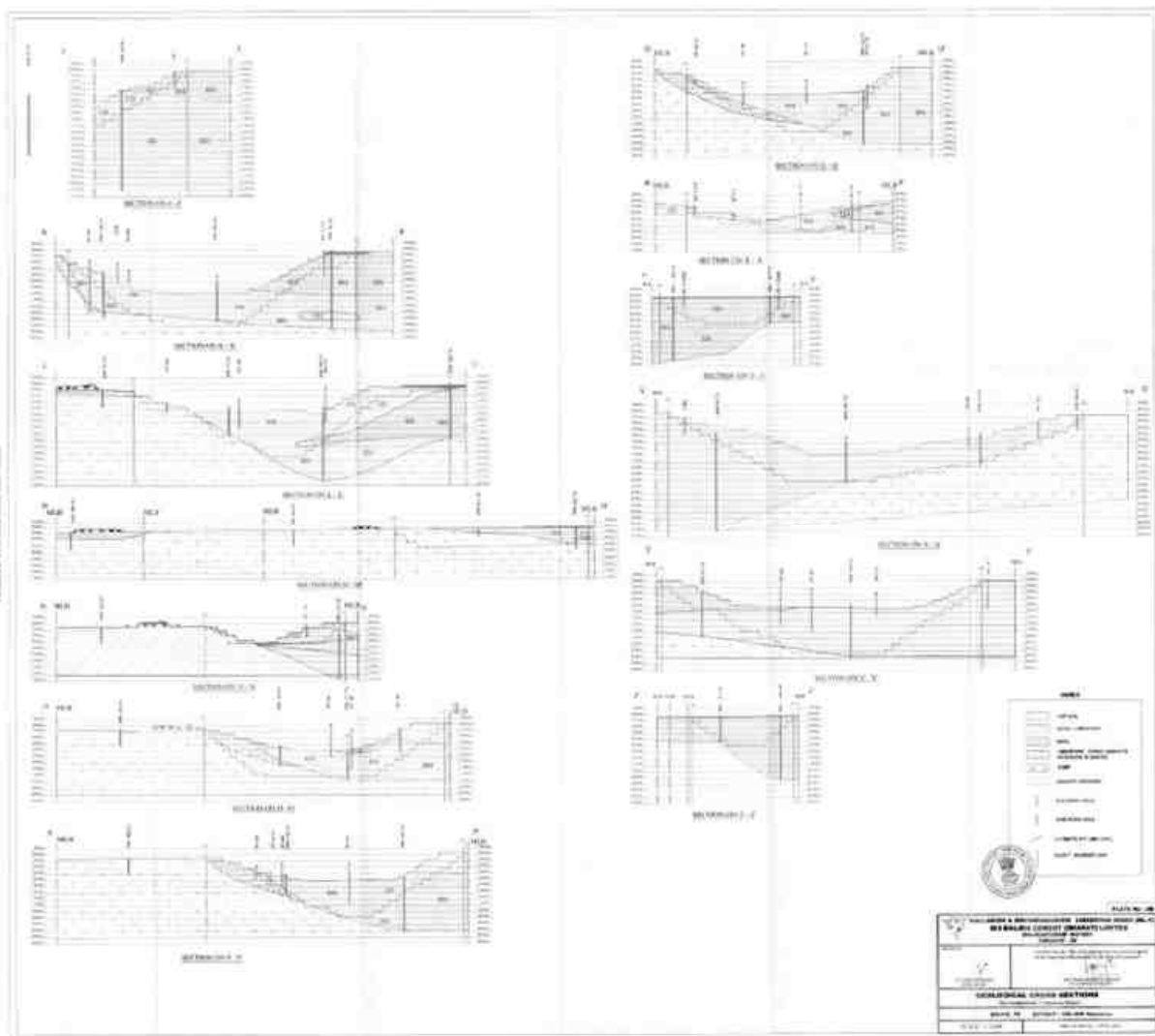


Fig. : 2.4 Geological Section of KVK Pit Nos. 3 & 4



### 2.3.3 Ore Quality

Samples were collected and analysed in NABL approved Lab for chemical properties of Limestone & Marl. The chemical characteristics are given in **Table 2.3**.

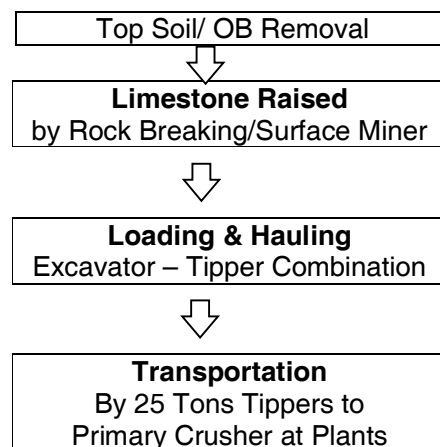
**Table : 2.3 Chemical Characteristics of Minerals**

Chemical Constituent	Composition Range, %	
	Limestone	Marl
Silica (SiO <sub>2</sub> )	1.98-18.96	22-30
Alumina as (Al <sub>2</sub> O <sub>3</sub> )	0.98-7.57	5-7
Iron (Fe <sub>2</sub> O <sub>3</sub> )	1.06-11.05	4-10
Calcium Oxides (CaO)	35-54	24-32
Magnesium Oxides (MgO)	0.35-0.83	1.2-5

### 2.4 Mining Method

**Opencast Non-conventional method of Mining** by deploying **Mega Rock Breakers & Surface Miners** will be adopted which eliminates **Drilling and Blasting**. Broken material will be loaded by Hydraulic Excavators of 2.2 m<sup>3</sup> bucket capacity and transported by 25 Tons Taurus Tippers to Crusher Hoppers located in the Cement Plants at Dalmiapuram and Govindapuram (2-5 km & 32 km respectively from the Lease). **No Beneficiation/Screening** is required.

#### Flow Chart



Generally, the bench height is maintained at 9.0 m. Each advancing bench shall have 10 m width from subsequent bench for smooth and safe movement of mining equipment. The mining benches have been so designed that ultimate Pit Slope will be 45-50° and Bench slope will be 70-80°. The haul roads are being maintained with a gradient not less than 1:16. Ramp and access road shall not have gradients less than 1:10.



## 2.5 Yearwise Productions

During this balance years of MOM Period, yearwise Development & Production are given in Tables 2.4-2.5. Yearwise Development & Production Plans (2023-24) are given as Figs. 2.5-2.6.

**Table : 2.4 Yearwise Development & Production – MOM Period**

Pit ID	RLs, m	Top Soil, Tons	Over Burden/ Subgrade /Gneiss, Tons	Production during 2022-23, Tonnes			Production during 2023-24, Tonnes		
				Lime-stone	Marl	Total ROM	Lime-stone	Marl	Total ROM
KLK Pit No. 1	-	-	-	-	-	-	-	-	-
	55.0-50.0	-	-	-	-	-	50034	-	50034
KLK Pit No. 2	94.5-48.5	57262	-	980224	317561	1297785	-	-	-
	86.0-45.0	-	0 684694 <b>1376140</b>	-	-	-	2765994	1485510	4251504
KVK Pit No. 3 (East Block)	47.5-42.0	-	-	15681	-	15681	-	-	-
	78.0-48.5	-	472529 563747 <b>185721</b>	-	-	-	-	20740	20740
KVK Pit No. 3 (West Block)	55.0-13.0	-	-	632085	52195	684280	-	-	-
	57.0-0	-	-	-	-	-	2304858	313442	2618300
KVK Pit No. 4	-	-	-	-	-	-	-	-	-
	77.0-68.0	-	-	-	-	-	-	29420	29420
<b>Total</b>	<b>94.5 - 0</b>	<b>57262</b>	<b>3282831</b>	<b>1627990</b>	<b>369756</b>	<b>1997746</b>	<b>5120886</b>	<b>1849112</b>	<b>6969998</b>
<b>Ore:OB Ratio</b>	-	-	-	-	-	<b>1:0.03</b>	-	-	<b>1:0.47</b>

**Table : 2.5 Pit-wise Development & Production – MOM Period**

Pit ID	Top Soil, Tons	OB/SubGrade, Tons	Gneiss, Tons	Limestone & Marl (ROM), Tonnes	Rejects, Tonnes	Ore:OB Ratio
KLK Pit No. 1	0	0		50,034	0	-
KLK Pit No. 2	57,262	0 6,84,694	13,76,140	55,49,291	0	-
KVK Pit No. 3 (East Block)	0	4,72,529 5,63,747	1,85,721	36,422	0	-
KVK Pit No. 3 (West Block)	0	0		33,02,583	0	-
KVK Pit No. 4	0	0		29,420	0	-
<b>Total</b>	<b>57,262</b>	<b>17,20,970</b>	<b>15,61,861</b>	<b>89,67,750</b>	<b>0</b>	<b>0.17</b>

Fig. : 2.5 2023-24 Year Plan - KLK Pit Nos. 1 & 2

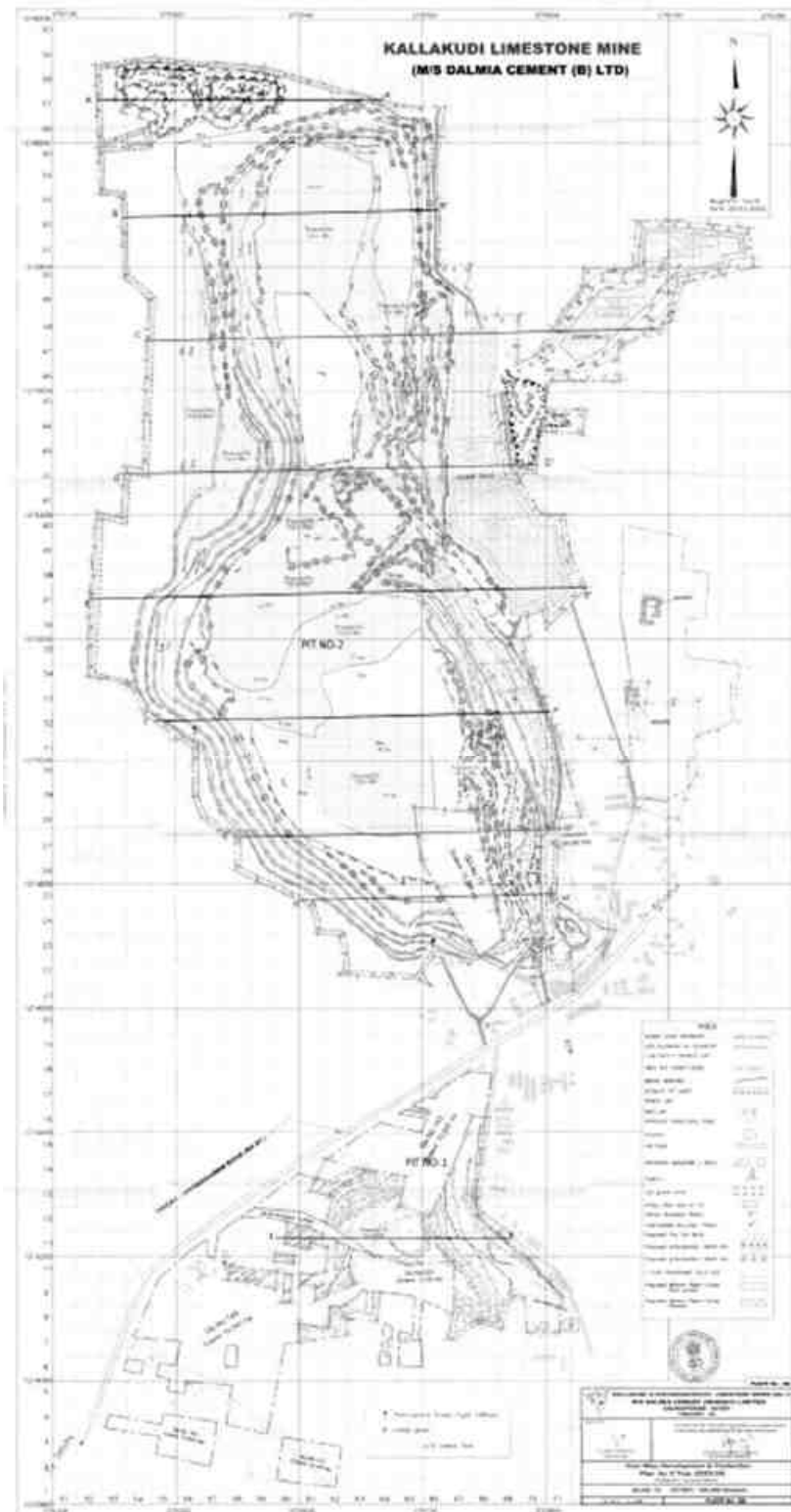
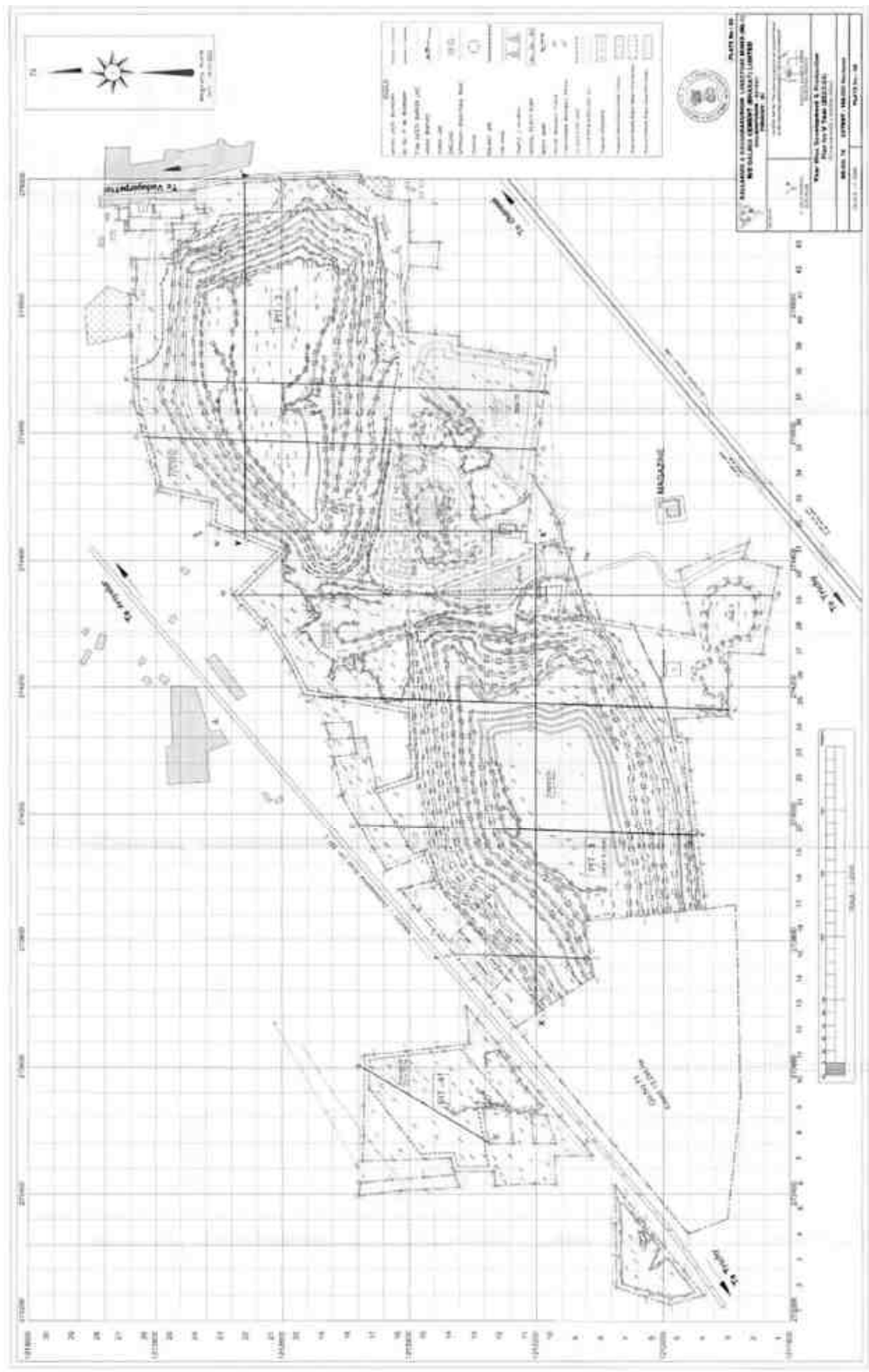


Fig. : 2.6 2023-24 Year Plan - KVK Pit Nos. 3 & 4



**Year 2023-24 :-**

**Pit No. 1 :** About 50,034 Tonnes of Limestone will be mined out and transported from Pit No 1. It will be mined from VII Bench from 55.0 m RL to 50.0 m RL.

**Pit No. 2 :** About 14,85,510 Tonnes of Marl and 27,65,994 Tonnes of Limestone, totally 42,51,504 Tonnes of ROM will be mined out and transported from Pit No. 2. It will be mined from Benches I, II, III, IV, V, VI & VII from 86.0 m RL to 45.0 m RL.

About 6,84,694 Tonnes of Subgrade mineral will be mined from Pit No. 2 from Benches I, II, III, IV, V, VI from 93.0 m RL to 45.0 m RL. About 13,76,140 Tons of Gniess will be mined from Pit No. 2 from Benches I, II, III, IV, V & VI from 86.0 m RL to 50.0 m RL.

**Pit No. 3 :** About 20,740 Tonnes of Marl will be mined out and transported from Pit No. 3 (East Block). It will be mined from IV Bench from 62.0 m RL to 53.0 m RL.

About 4,72,529 Tons of overburden will be generated from Pit No. 3 (East Block) from Benches I & II from 78.0 m RL to 65.5 m RL. About 5,63,747 Tonnes of Subgrade mineral will be mined from Pit No. 3 (East Block) from I Bench from 77.0 m RL to 69.0 m RL. About 1,85,721 Tons of Gniess will be mined from Pit No. 3 (East Block) from Benches I, II, IV, V & VI from 75.0 m RL to 48.5 m RL.

About 3,13,442 Tonnes of Marl and 23,04,858 Tonnes of Limestone, totally 26,18,300 Tonnes of ROM will be mined out and transported from Pit No. 3 (West Block). It will be mined from Benches III, IV, V, VI, VII, VIII, IX, X & XI from 57.0 m RL to 0 m RL.

**Pit No. 4 :** About 29,420 Tonnes of Marl will be mined out and transported from Pit No. 4. It will be mined from I Bench from 77.0 m RL to 68.0 m RL.

**Production Summary :-**

OB generation & Dumping	:	4,72,529 Tons
Gniess generation & for Sale	:	15,61,861 Tons
Sub Grade Materials for temporary Dumping	:	12,48,441 Tonnes
Limestone & Marl as ROM production	:	69,69,998 Tonnes
		<b>(6.97 MTPA)</b>

During MOM Plan Balance Period, the maximum Production will be **6.97 MTPA ROM which will be continued till Conceptual Stage** (upto 9<sup>th</sup> Year of ML Life).

## 2.6 List of Machineries

The machineries to be deployed for the Mine are given in **Table 2.6**. To facilitate the maintenance of all equipments, there is a central workshop available at Factory for electrical, mechanical and instrumentation repairs.

**Table : 2.6 Mine Machineries**

Sl. No.	Name of the Machine	Make	Model/Capacity	Nos.
1	Base machine for Breaker - Limestone	Kobelco	SK 520	35
2	Base machine for Breaker - Rejects	Kobelco	SK 520	12
3	Surface Miner	Vermeer/L&T	TL 1255/ KSM 304	2
4	Loading Excavator – Limestone (2.2 m <sup>3</sup> bucket capacity)	Kobelco	SK 380	7
5	Loading Excavator - Rejects	Kobelco	SK 380	4
6	Chain Dozer	8D 65	165 HP	5
7	Dumpers (30 Tons) for Limestone	Tata Benz / Ashok Leyland	-	91
8	Dumpers (25/27 Tons) for Rejects	Tata Benz / Ashok Leyland	-	14
9	Lorry (Water Sprinkler)	Leyland	10 KL Capacity	2

## 2.7 Competent Mining Personnel

The Mine will be operated with the required **Statutory Officials and Competent Persons** mandatorily appointed as per the provisions of Mines Act 1952 and Metalliferous Mines Regulations 1961 (**Table 2.7**). Project will employ about **296 persons** directly and indirectly.

**Table : 2.7 Mining Personnel**

Sl. No	Post	Qualification / Experience	Number of Persons		Total
			General	In Shifts	
	<b>Managerial :-</b>				
1	Mines Manager	I Class Manager's Certificate of Competency.	1	-	1
2	Geologist	Master Degree in Geology	1	-	1
3	2 <sup>nd</sup> Class Manager	II class Manager Certificate Holder	1	3	4
4	Electrical Engineer	BE	1	-	1
5	Mechanical Engineer	BE (Mech)/ Diploma in Mech. Engg.	1	-	1

DCBL EC for Expn. of Kallakudi-Kovandakurichi Limestone Mine GO No. 76 (Extent 166.005 Ha), Trichy Dist.

Sl. No	Post	Qualification / Experience	Number of Persons		Total
			General	In Shifts	
	<b>Supervisory :-</b>				
6	Foreman	Foreman's Certificate of Competency	-	3	3
7	Mine-mates	-	-	3	3
	<b>Skilled Workers/ Operators :-</b>				
8	Operators	-	10	150	160
9	Pump Operators	-	-	6	6
10	Dozer/ Grader Operators	-	3	15	18
11	Technicians	-	12	45	57
	<b>Semi-skilled Workers :-</b>				
12	Workers	-	2	18	20
	<b>Un-skilled Workers :-</b>				
13	Unskilled Workers	-	5	10	15
	<b>Others :-</b>				
14	Tractor Drivers	-	1	2	3
15	Water Tanker Drivers	-	-	3	3
<b>Total</b>			<b>38</b>	<b>258</b>	<b>296</b>

## 2.8 Solid Wastes

There are 7 Existing Dumps (of 9 m maximum height) in ML-I with 1,39,792 cu. m of Marl and 5,25,589 cu. m of Mineral Rejects, total **6,65,381 cu. m** (Table 2.8).

**Table : 2.8 Existing Dump Details**

Sl. No.	Dump ID	Dump Material	Height, m	Quantity, cu. m	Location of the Dump
1	Dump-1	Marl	6	90,435	North of Pit No. 2
2	Dump-2	Mineral Rejects	9	84,075	North of Pit No. 2
3	Dump-3	Mineral Rejects	8	2,47,834	NE of Pit No. 2
4	Dump-4	Marl	5	49,357	NE of Pit No. 2
5	Dump-6	Mineral Rejects	5	66,400	South of Pit No. 3 (EB)
6	Dump-7	Mineral Rejects	4	4,080	South of Pit No. 3 (WB)
7	Dump-8	Mineral Rejects	7	1,23,200	South of Pit No. 3 (EB)
<b>Total</b>				<b>6,65,381</b>	-

During the Plan Period, **32,82,831 cu. m of Mineral Rejects** will be dumped temporarily over an extent of **11.461 Ha** in Existing as well as Proposed Dumps (Table 2.9) with a maximum height of **16.5 m**. As such **no back filling and reclamation** is envisaged.

**Table : 2.9 Proposed Dump Details**

Sl. No.	Dump ID	Material	Area, sq.m	Height, m	Quantity, cu. m	Location
1	Dump-3	Mineral Rejects	18,848	16.5	6,84,694	NE of Pit No. 2
2	Dump-5	Mineral Rejects	43,610	14.3	13,76,140	East of Pit No. 2
3	Dump-6	Mineral Rejects	23,295	11.0	5,63,747	South of Pit No. 3 (EB)
4	Dump-9	Mineral Rejects	6,030	14.0	1,85,721	South of Pit No. 3 (EB)
5	Dump-10	Mineral Rejects	22,827	11.5	4,72,529	South of Pit No. 3 (EB)
<b>Total</b>			<b>1,14,610</b>	<b>-</b>	<b>32,82,831</b>	

Post Plan Period and till Conceptual Stage, another 8,15,363 cu. m of OB and 72,51,559 cu. m of Mineral Rejects (total 80,66,922 Tonnes) will be generated and dumped temporarily in the Dumps. In total, **85,00,000 Tonnes of Mineral Rejects** will be temporarily kept in Dumps for future utilisation.

## 2.9 PMC Plans & Land Use Pattern

The Progressive Mine Closure Plans are given as **Figs. 2.7-2.8**. The Conceptual Plans are given as **Figs. 2.9-2.10**.

The excavated area shall be 123.230 Ha at the end of mining operation. The mined out pit area will be partly backfilled to an extent of 14.50 Ha and remaining area of 108.730 Ha will be converted into artificial pond/reservoir to harvest rain water (**Table 2.10**). About 26.00 Ha will be under Green Belt and another 14.50 Ha will be backfilled & afforested. Total Green Belt Coverage will be **40.50 Ha (24.40%)**. Pits dimension at Conceptual Stage are given in **Table 2.11**. The Ultimate Pit Depth at Conceptual Stage will be 118.5 m BGL in KVK Pit No. 2, 117 m BGL in KVK Pit No. 3 (East Block), 108 m BGL in KVK Pit No. 3 (West Block), 58.8 m BGL in KVK Pit No. 1 and 47.0 m BGL in KVK Pit No. 4.

**Table : 2.10 Land Use Pattern**

Activities	Existing Land Use, Ha	At the End of Plan Period, Ha	At Conceptual Stage, Ha
Mined out Pit Area	102.239	107.509	123.230 Backfilled : 14.500 Reservoir : 108.730
Storage for Top Soil	0	0	0
OB/Reject Dumps	6.760	18.660	15.040
Utility Services	1.074	1.074	1.074
Roads	0.550	0.550	0.550
Green Belt Area	22.500	26.000	26.000
Others : Undisturbed/Virgin	32.882	12.212	0.111
<b>Total</b>	<b>166.005</b>	<b>166.005</b>	<b>166.005</b>

Fig. : 2.7 Progressive Mine Closure Plan - KLK Pit Nos. 1 & 2

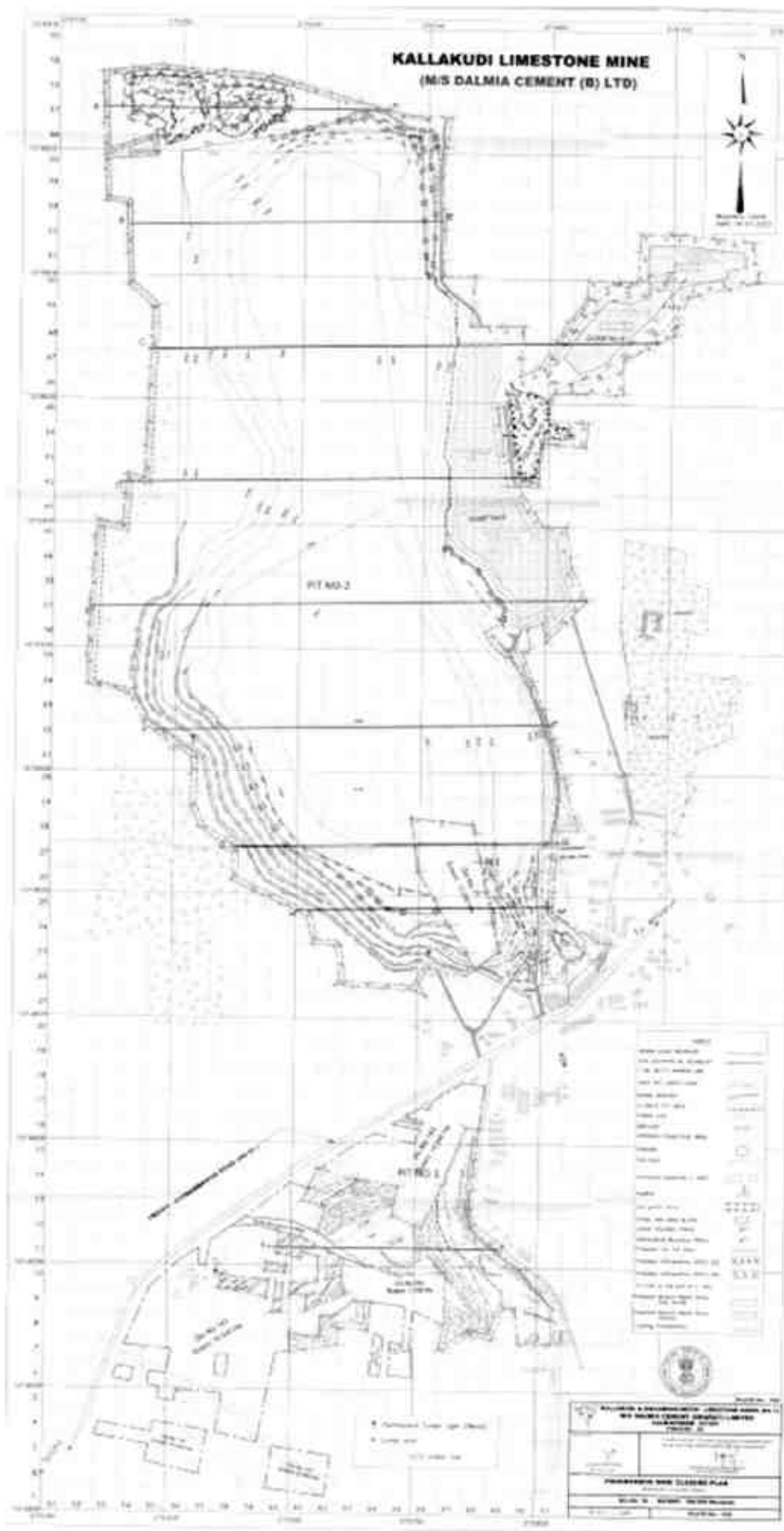




Fig. : 2.8 Progressive Mine Closure Plan - KVK Pit Nos. 3 & 4

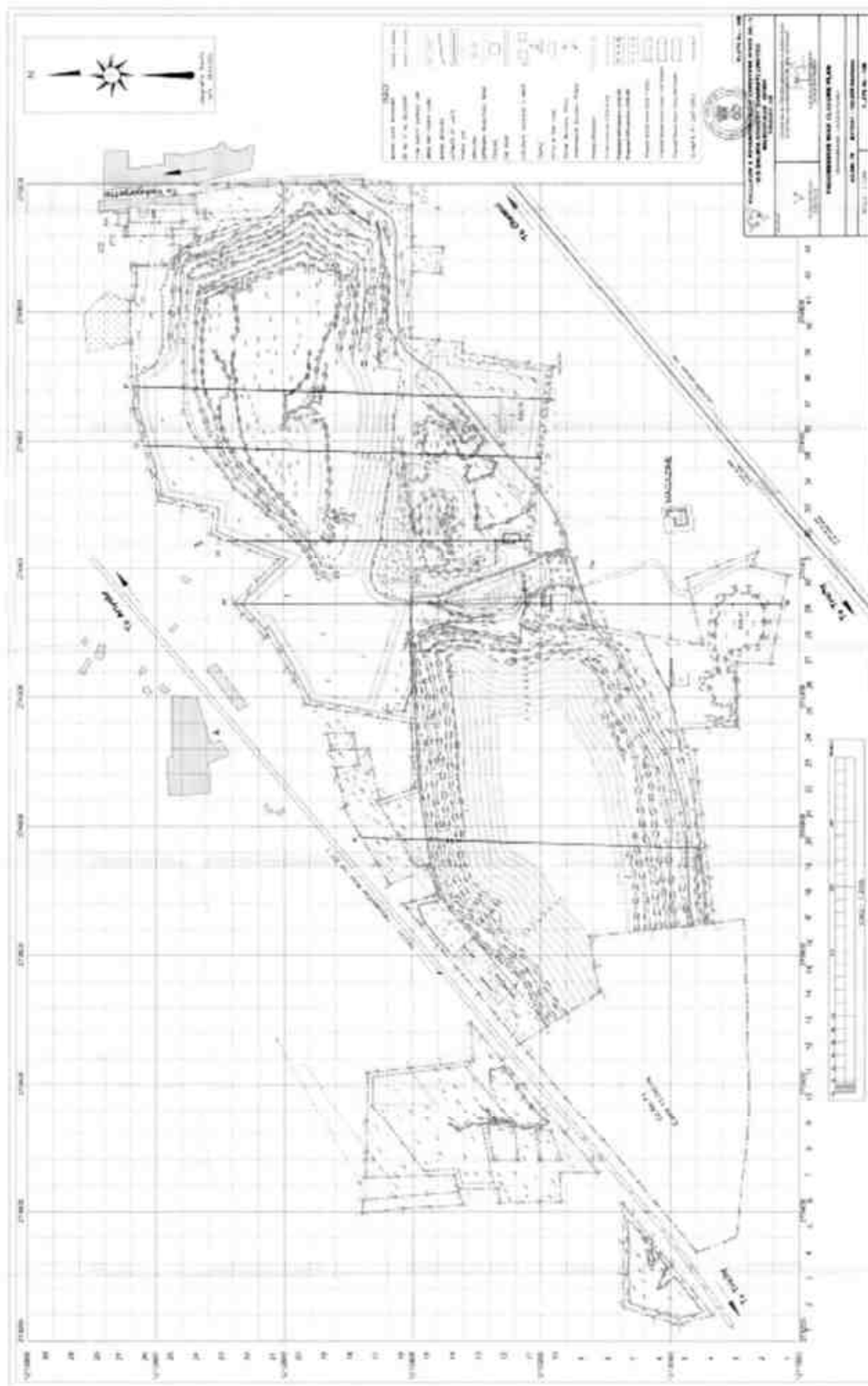


Fig. : 2.9 Conceptual Plan - KLK Pit Nos. 1 & 2

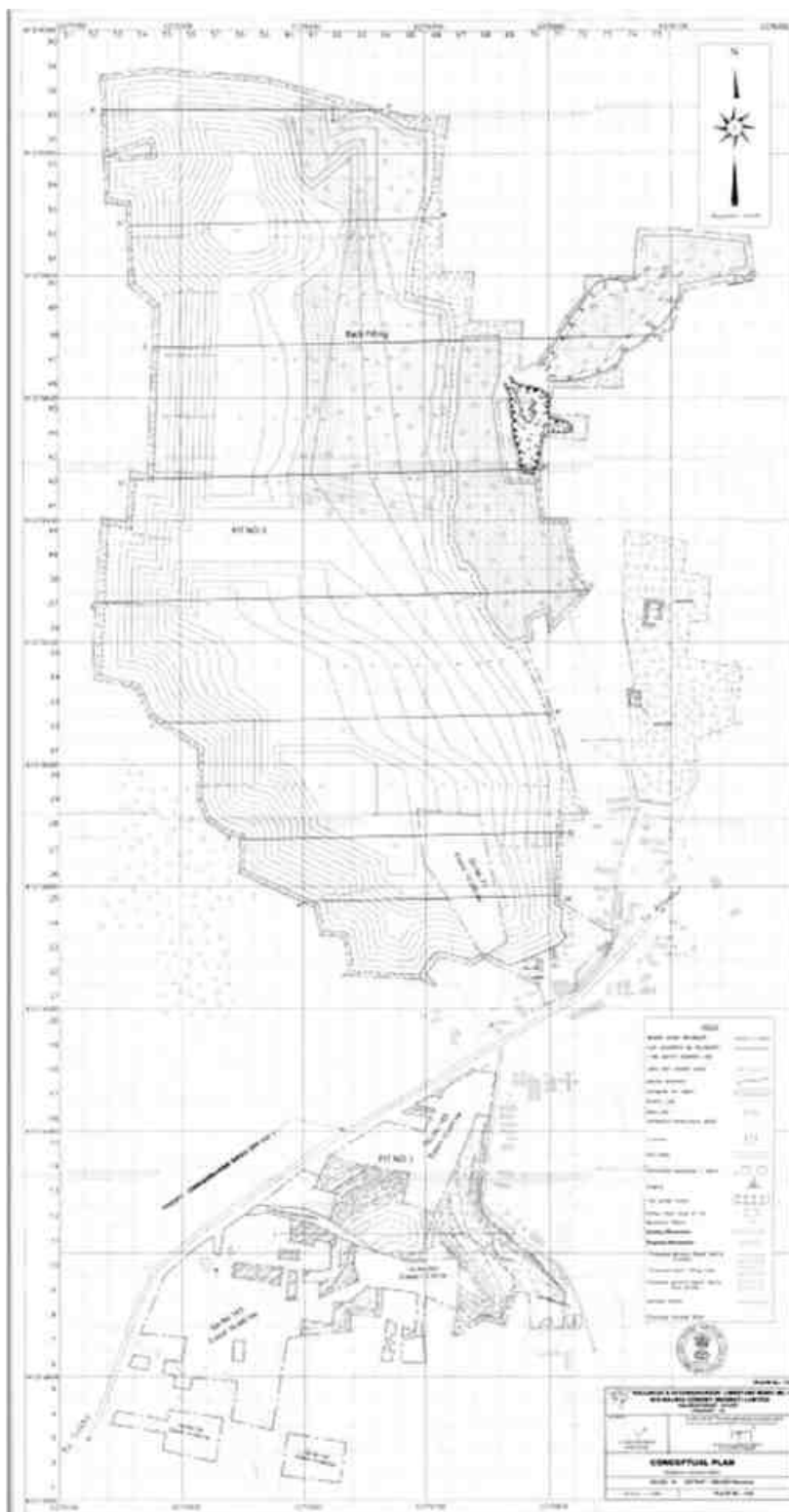
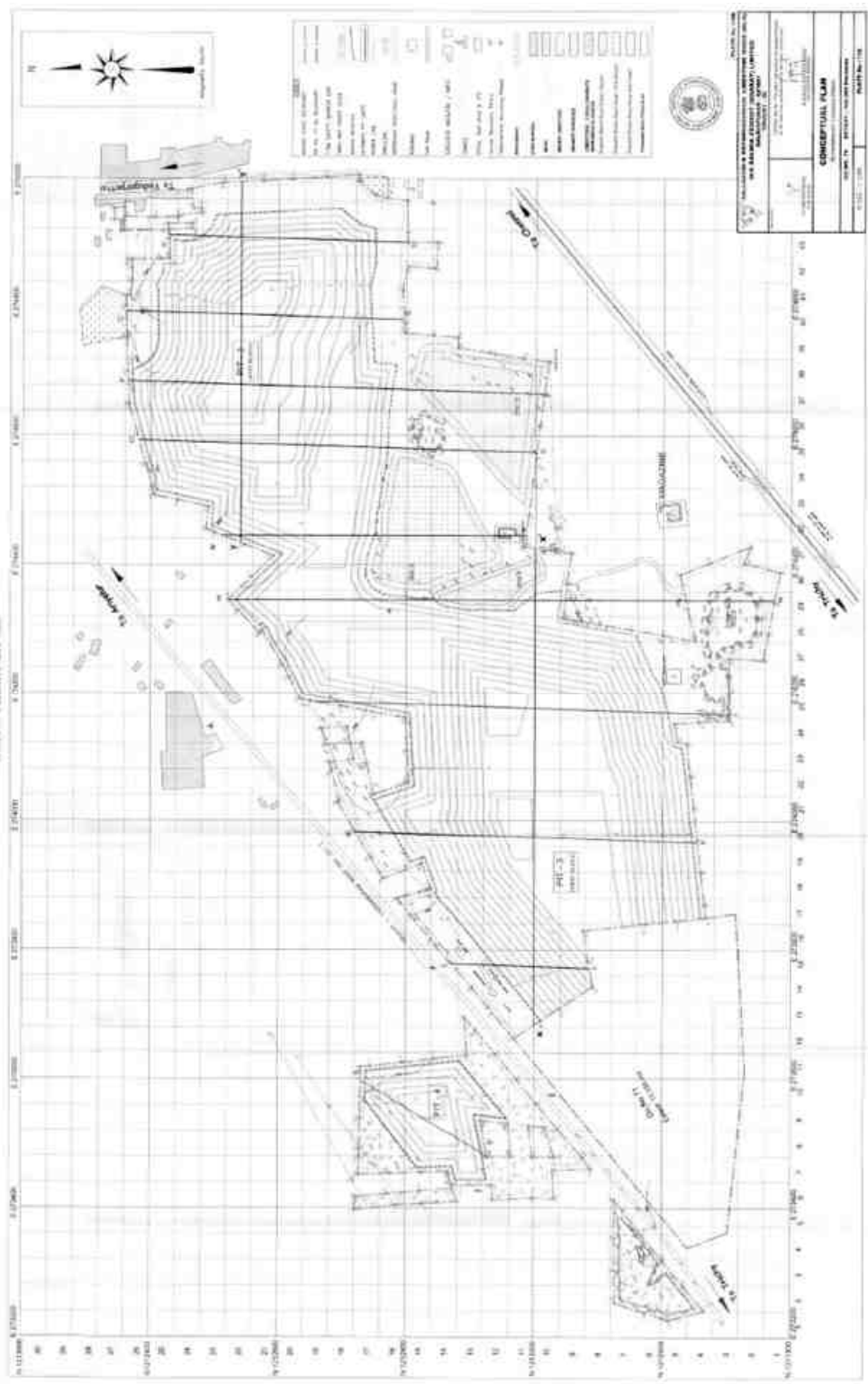


Fig. : 2.10 Conceptual Plan - KVK Pit Nos. 3 & 4



**Table : 2.11 Pits Dimension – Conceptual Stage**

Pit No.	At Start Plan Period			Conceptual Stage		
	Length, m	Width, m	Depth (BGL), m	Length, m	Width, m	Depth (BGL), m
KLK Pit No. 1	238	236	32.7	238	236	58.8
KLK Pit No. 2	1389	420	45.0	1505	470	118.5
KVK Pit No. 3 (East Block)	722	265	42.5	708	630	117.0
KVK Pit No. 3 (West Block)	606	335	64.0			108.0
KVK Pit No. 4	90	82	1.5	184	137	47.0

## 2.10 Financial Closure Plan

An amount of Rs.6.39 Crores has to be paid towards Financial Closure Plan for ML-I. A total of **Rs.6.80 Crores** has already been submitted vide Bank Guarantees (i) BG No. 1731318BG0001159 dated 10.12.2018 for Rs.3.319 Crores with validity upto 31.03.2024, (ii) BG No. LOBG201011901903 dated 14.05.2019 for Rs.0.761 Crores with validity upto 31.03.2024 and (iii) BG No. 003GT02220140013 dated 24.01.2022 for Rs.2.72 Crores with validity upto 31.03.2024.

## 2.11 Facilities in the Lease

All the services viz. Mines Office, First Aid Room, Rest Shelters, potable water and other necessary amenities are provided at the Mines. **Common workshop** facility is there for KLK-KVK Mines. **Occupational Health Centre** is established at the Factory. A well established Township exists near the Factory and **no Township is proposed for the Mine**. Central Store is located at centralized location at the Factory to facilitate storage and issue of materials along with lifting, loading and unloading facilities. A licensed fuel storage tanks is established at the Factory and the daily requirement of HSD and other lubricants is met by a licensed mobile bowser.

## 2.12 Power & Fuel Demands

The mine requires 300 KVA domestic supply from the TNEB Grid for lighting and Mine use. No standby DG set is there. HSD @ 12,000 lits./day is required for the mining equipments and transportation.

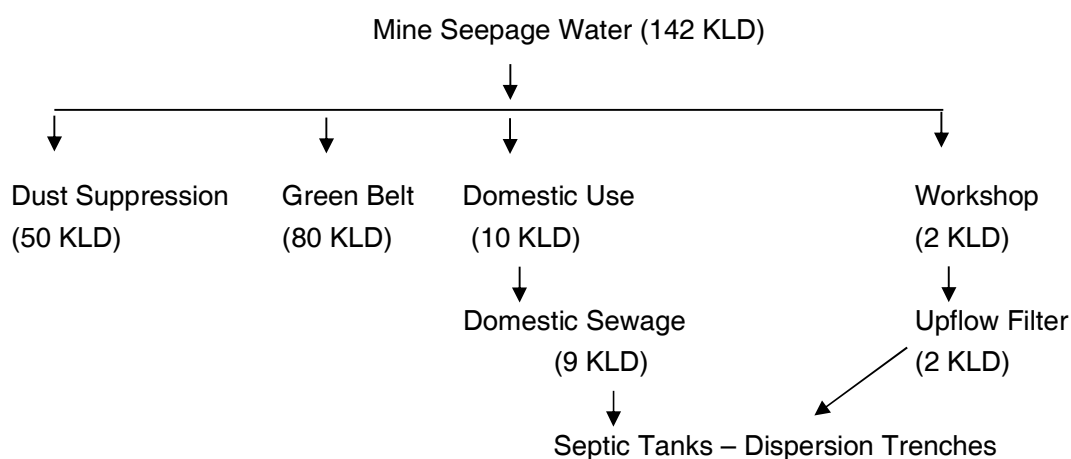
## 2.13 Water Demand & Water Balance

ML-I will require about 142 KLD water which will be met from seepage water accumulated in the Mine Pits.

Domestic Consumption	:	10 KLD
Workshop	:	2 KLD
Dust Control Measures	:	50 KLD (including Tipper Washing)
Green Belt use	:	80 KLD (well grown trees)
		-----
Total	:	142 KLD
		-----

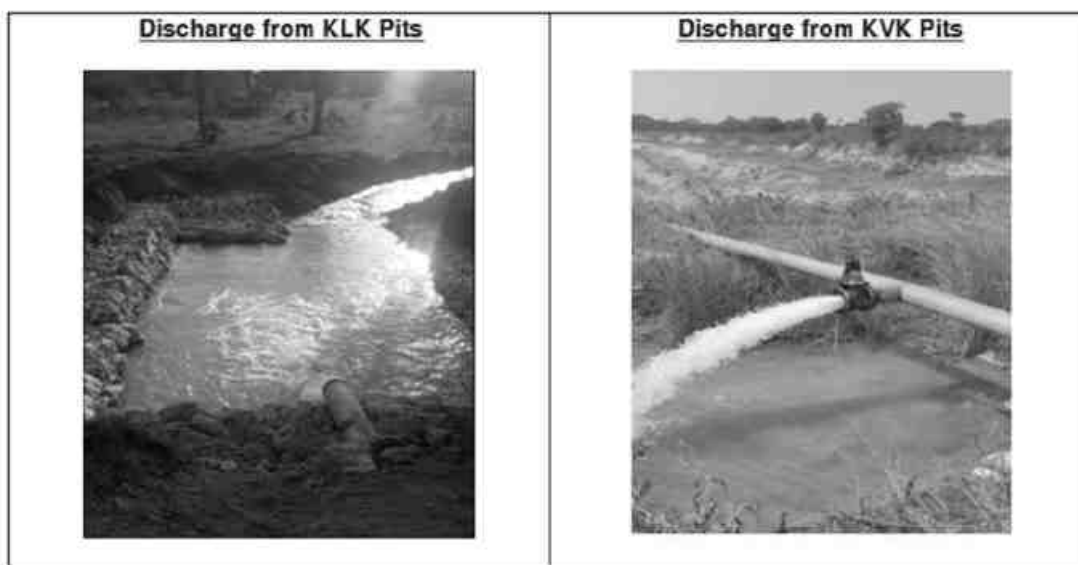
Domestic Sewage generation from the Mines will be only **9 KLD** which will be treated in **individual Septic Tanks** followed by dispersion trenches at Kallakudi as well as Kovandakurichi Mine Offices. Workshop effluent of 2.0 KLD will be treated in a Upflow Filter for Oil & Grease removal and the treated water will be connected to the Septic Tank for further dispersion. Water Balance is given as **Fig. 2.11**.

**Fig. : 2.11 Water Balance**



## 2.14 Mine Pit Water for Gainful Utilisation

Annual normal rainfall of the Region is **883 mm**. The Region receives 50% of total rainfall during Northeast Monsoon periods (October-November months) with 20-25 rainy days. Remaining 50% of rainfall occurs during Southwest Monsoon and Transitional Periods with 30-40 rainy days. Mine Pits dewatering quantity, cumulatively from all 4 Pits : Minimum was about 1,285 KLD, Maximum was about 7,705 KLD and Average quantity was 4,134 KLD during Apr.-Dec. 2022 Period (**Table 2.12**). The dewatered quantity, after own consumption, **is pumped to Kallakudi Irrigation Tank** for agricultural activities in eastern side (about **33 acres**). Mostly dry crops (single season) are being raised on rotation basis. Kallakudi Tank supply will supplement **10% of the water requirement** for agriculture activities in this area. Thus, Mine Pits water is gainfully utilized.



**Table : 2.12 Mine Pit Dewatering Data from all 4 Pits –  
Summary of monthly data during Apr.-Dec. 2022**

Month-2022	Mine Pit Dewatering to Kallakudi Tank from all 4 Pits, KLD (Monthly Avg.)		
	Min.	Max.	Avg.
Apr.	1,998	4,820	3,154
May	1,285	7,405	4,291
Jun.	1,635	6,430	3,943
Jul.	1,440	7,705	3,881
Aug.	1,980	6,290	4,103
Sep.	2,115	7,145	4,088
Oct.	1,980	6,280	4,386
Nov.	1,925	5,860	4,547
Dec.	3,685	5,725	4,814
<b>During the Period</b>	<b>1,285</b>	<b>7,705</b>	<b>4,134</b>

## 2.15 Green Belt

About 26.00 Ha will be under Green Belt (**29,500 Trees @ 1,135 Tree/Ha with 85% Survival Rate**) and another 14.50 Ha will be backfilled and Afforested. Thus, total Green Belt Coverage will be **40.50 Ha (24.40%)** pertaining to ML-I.

Proposed :- Pits 2 & 3 boundaries : 2.50 Ha @ 2500 Trees  
2023-24 : 1.00 Ha @ 1500 Trees  
(85%/ Survival).

DCBL has developed an effective Green Belt and Lawns in the Cement Plant and Mines which will have significant long term positive impact on the environment. Green Belt has been developed inside & outside the Plant in a total extent of 45.720 Ha with about 50,404 Trees @ 1,100 Trees/Ha with a Survival Rate in the range 85-95% (**Table 2.13**).

**Table : 2.13 Green Belt Developed - Plant**

Description	No. of Trees Planted		Total No. of Trees	Predominant Species
	Inside Campus	Outside Campus		
Till Mar. 2014	2,051	5,000	7,051	Neem, Ashoka, Pungan, Kulmohar, Casuarina, Mahagani, etc. in consultation with local DFO
2014-15	1,041	3,000	4,041	
2015-16	2,025	6,000	8,025	
2016-17	3,350	6,500	9,850	
2017-18	605	2,000	2,605	
2018-19	832	1,000	1,832	
2019 -20	700	2,500	3,200	
2020 -21	100	6,350	6,450	
2021-22	6,900	450	7,350	
<b>Total</b>	<b>17,604</b>	<b>32,800</b>	<b>50,404</b>	

## 2.16 Occupational Health & Safety

**Occupational health surveillance programme** is being carried out for all employees regularly with Lung Function Test, ECG, Chest X-Ray, Blood Analysis, Urine Analysis, Audiometry, Colour Blindness, etc. The baseline data on the health status of workmen in the Pre-recruitment stage has been established. The same is being reviewed periodically to take action accordingly.

## 2.17 CSR Activities

DCBL CSR Committee exists as per provisions notified by the **Ministry of Corporate Affairs on February 27, 2014**. Based on the CSR Committee and declared CSR Policy of the Company, the CSR activities are carried out. CSR Budget spent in the last 6 years period are given in **Table 2.14**.

**Table : 2.14 CSR Budget Spent**

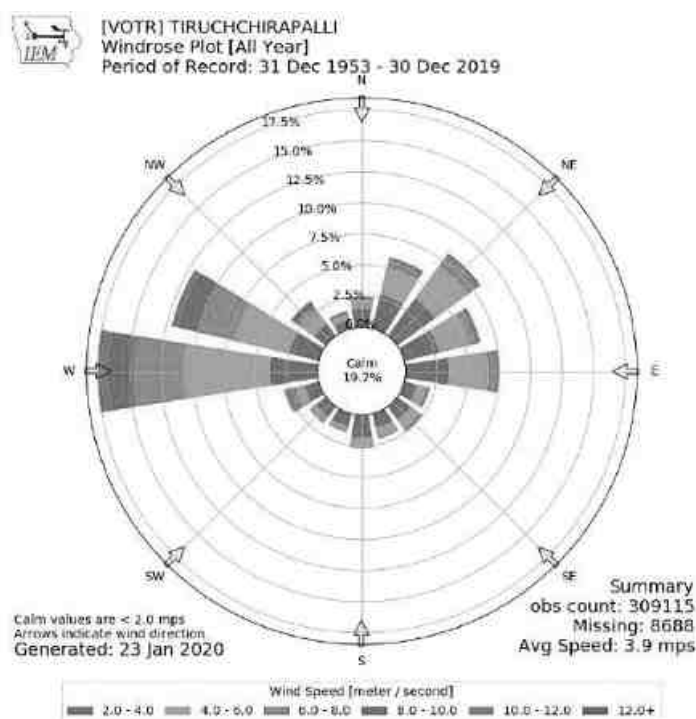
Sl. No.	Program	CSR/CER Amount Spent in Rs.					
		2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
1	Soil & Water Conservation	12,85,125	22,20,756	18,89,957	15,76,188	16,39,750	20,22,000
2	Energy Conservation	4,58,700	75,000	0	15,990	0	3,60,000
3	Livelihood	7,93,975	12,05,500	12,42,000	17,82,545	1,95,220	23,82,000
4	Social Development	10,61,147	15,70,256	1,80,534	13,61,696	21,50,516	48,00,000
5	Execution Cost	3,29,314	3,45,127	3,06,200	3,00,000	3,00,000	3,20,000
<b>Total</b>		<b>39,28,261</b>	<b>54,16,639</b>	<b>36,18,691</b>	<b>50,36,419</b>	<b>42,85,486</b>	<b>98,84,000</b>

\*\*\*

### 3.0 Description of the Environment (Baseline Status)

#### 3.1 Study Area

The study area of **10 km radius (from boundary)** has been considered for assessing the baseline environmental status (Fig. 3.1). The monitoring stations were selected in such a way that the baseline environmental data reflects the **Cumulative Impact of existing Mines and Industries** in the Study area. Annual Wind Rose of Trichy (Period 1953 to 2019-Source IEM Website) is referred while fixing the Monitoring Stations (appended). The nearest IMD Station is Trichy Airport. **Project area does not fall in Critically Polluted Industrial Clusters** listed by COCB. As Bay of Bengal is at 120 km from the Lease, Coastal Regulation Zone (CRZ) applicability is not there.



**Physiography** : ML area is about 88 m above Mean Sea Level (aMSL). The general elevation of the study area ranges from 40 m to 120 m above MSL (aMSL). The elevation contour indicates the area is sloping towards south. The mines are located in relatively elevated area. There is no hillocks noticed in the study area. Physiography of the Study Area is given as Fig. 3.2.

**Drainage Pattern** : There is **no nallah crossing at the Mine Area**. Seasonal River Coleroon is the major river course flowing west to east at southern side (8.5-10 km distance) (Fig. 3.3). The seasonal nallahs which drain the area are Uppar Odai/Andi Odai, Man Odai, Nandiyar Nallah, etc. Pullambadi Canal runs in the southern side of the mines.



Fig. : 3.1 Environmental Quality Monitoring Stations

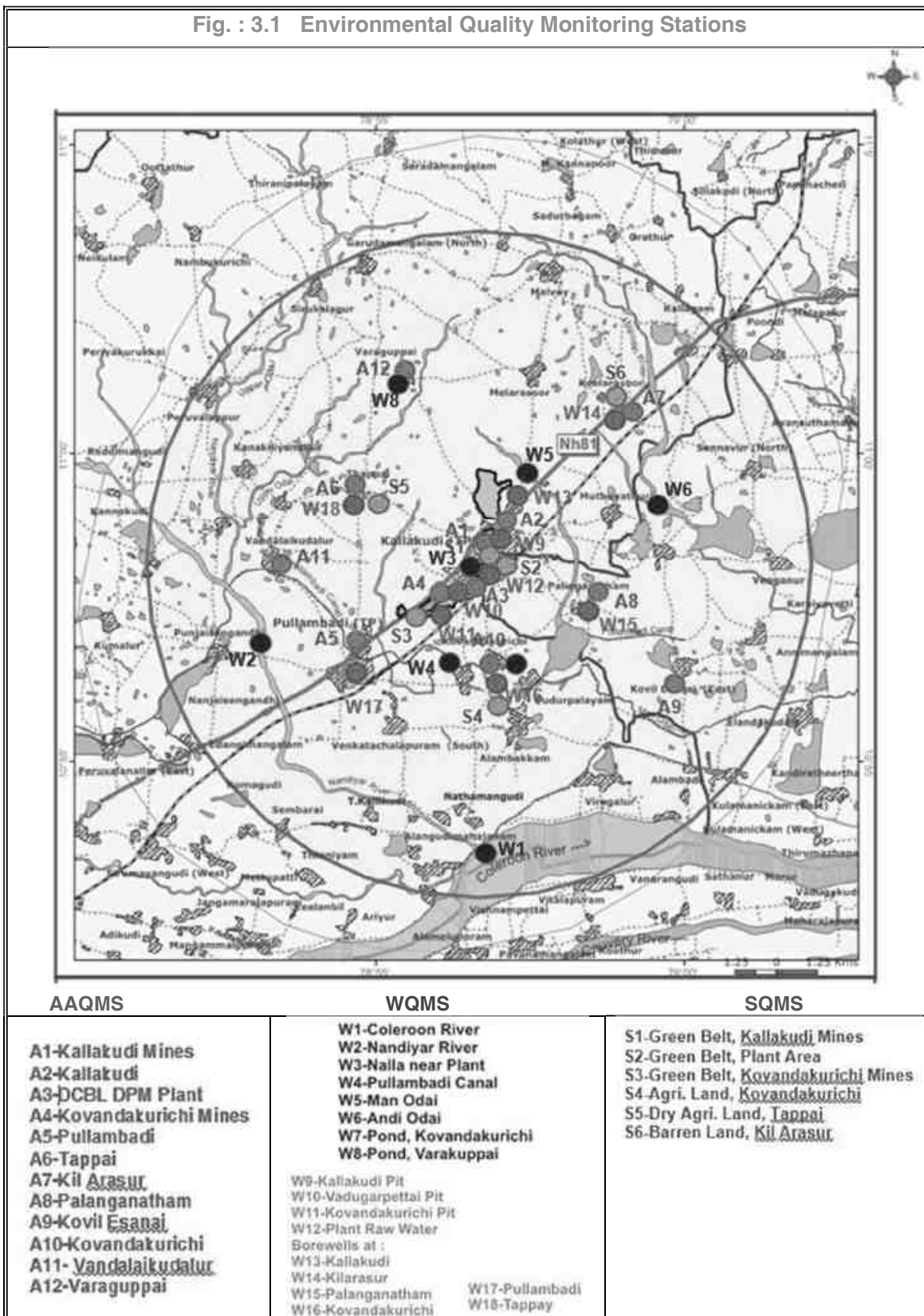


Fig. : 3.2 Physiography

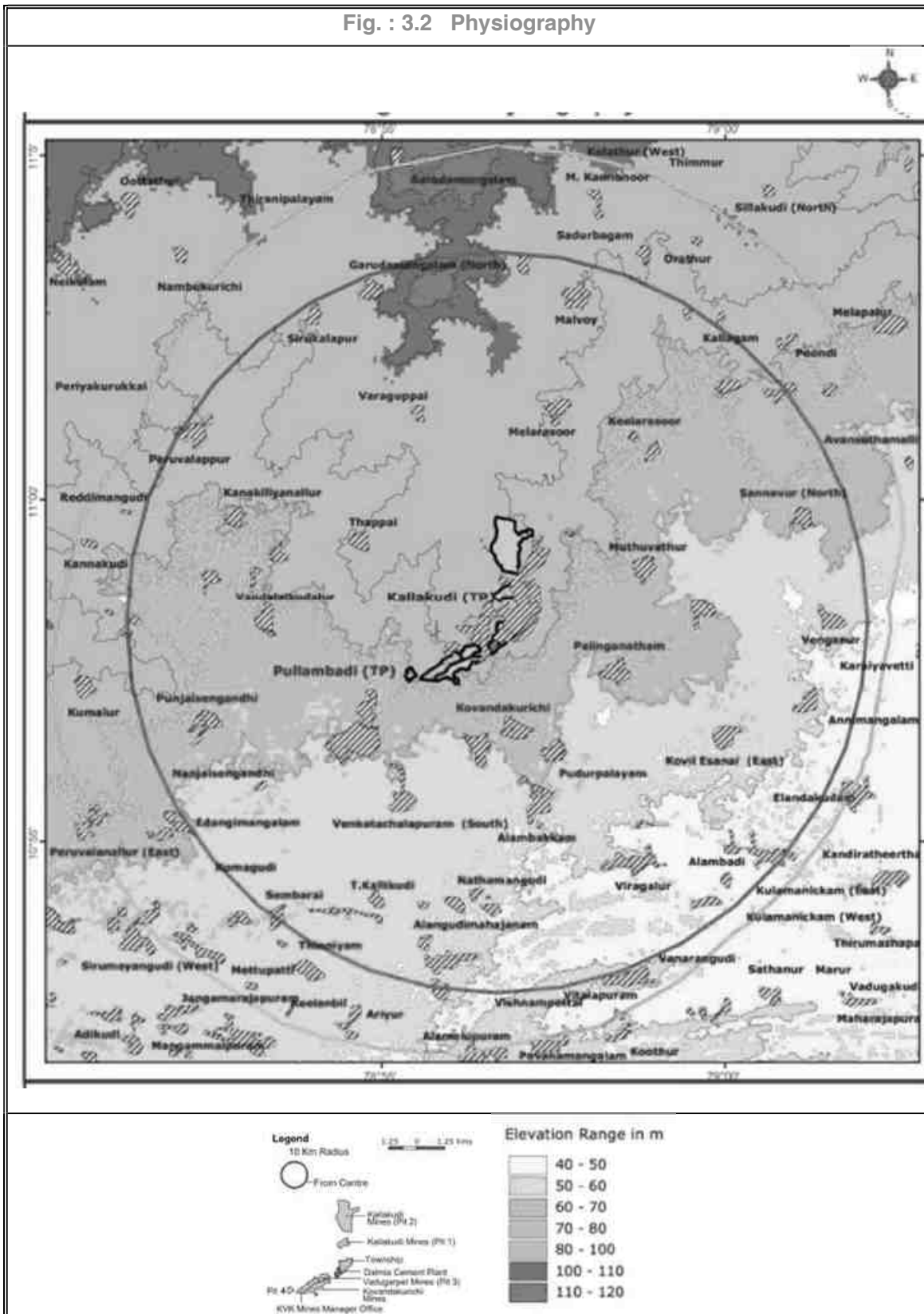
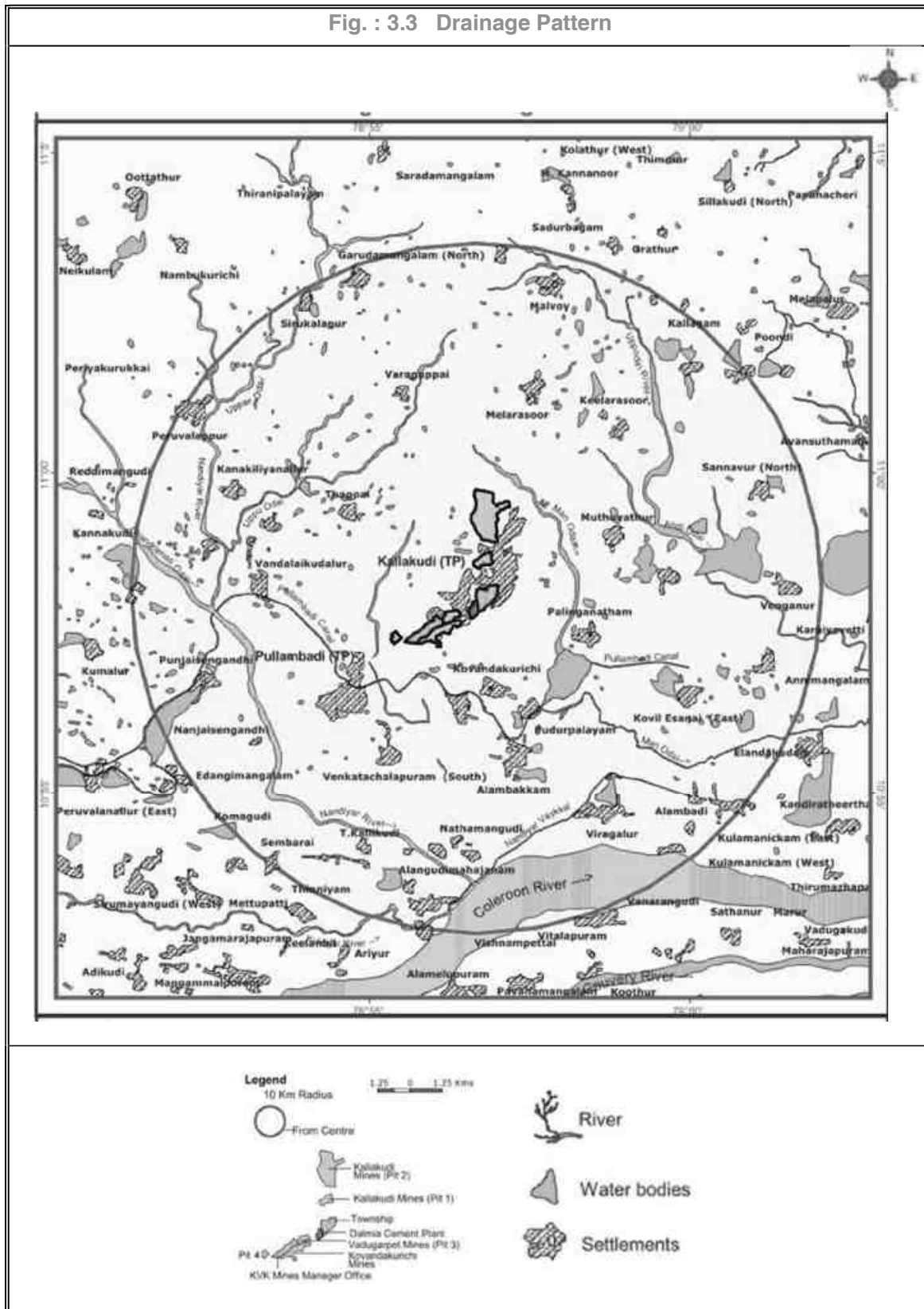


Fig : 3.3 Drainage Pattern



### 3.2 Environmental Components

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 rose), temperature, humidity, cloud cover, atmospheric pressure, rainfall, etc.
- ❖ **Ambient Air Quality Monitoring** at **12 locations** on 24-hourly basis, continuously for 2 days in a week for 4 weeks in a month for a season for the parameters as per Revised NAAQ Norms.
- ❖ 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 of Surface Water (**8 locations**) and Ground Water (**10 Locations**) including existing Plant Raw Water - once in the Season.
- ❖ Soil Quality Monitoring at **6 locations** once in the Season for Textural & Physical Parameters & Nutrients.
- ❖ **Land use pattern** based on recent available Satellite Imagery.
- ❖ Biotic Attributes for : **Flora & Fauna** in Core & Buffer Zones.
- ❖ **Socio-Economic** Profile, based on 2011-Census and Need Based Assessment, once in the study period for: Total Population / Household Size, Gender Composition, S.C / S.T Population, Literacy Levels, Occupational Structure, etc.

### 3.3 Methodology Adopted

**Micrometeorology** : As a part of the study, the micrometeorology and microclimatic parameters were recorded by installing a weather monitoring station (Envirotech WM 200) at the Plant at 9 m height. Data of wind velocity, wind direction, ambient temperature, relative humidity, cloud cover and atmospheric pressure were recorded at hourly intervals along with rainfall during the monitoring period.

**Ambient Air Quality** : The study area represents the Industrial, Residential, Rural and other Areas with respect to Revised National Ambient Air Quality (NAAQ) Norms stipulated by CPCB. Calibrated Fine Particulate Samplers (Envirotech APM 550) & Respirable Dust Samplers (Envirotech APM 460) were used for monitoring of PM<sub>2.5</sub> & PM<sub>10</sub>. Gaseous samples are collected by integrated gas sampling assembly (Envirotech APM 411). A tapping provided in the hopper of the sampler is utilised for sampling of SO<sub>2</sub> and NO<sub>x</sub>, etc. with proper flow controller and a flow of 1.0 l/min.

**PM<sub>2.5</sub> & PM<sub>10</sub>** : APM 550 system is a manual method for sampling fine particles and is based on impactor designs standardized by EPA for Ambient Air Quality Monitoring. Ambient Air enters the APM 550 system through an omni-directional inlet designed to provide a clean aerodynamic cut point for particles greater than 10 microns. Particles in the air stream finer than 10 microns proceed

to a second impactor that has an aerodynamic cut point at 2.5 microns. The air sample and the fine particulates existing from the PM<sub>2.5</sub> impactor is passed through a 47 mm dia filter. Teflon filter membrane that retains the PM. APM 550 system allows removal of the PM<sub>2.5</sub> impactor from the sample stream so that the same system may be optionally used as a PM<sub>10</sub> sampler also.

**SO<sub>2</sub>** : Modified West & Gaeke method (spectrophotometric) was adopted. SO<sub>2</sub> was collected in a scrubbing solution of sodium tetrachloro mercurate (TCM) and was allowed to react with sulphamic acid, formaldehyde and then with pararosaniline hydrochloride. The absorbance of product red-violet dye was measured using UV Visible Spectrophotometer at a wavelength of 560 nm. Concentration of SO<sub>2</sub> was calculated by multiplying the absorbance with calibration factor and dividing by volume of air sampled.

**NO<sub>x</sub>** : Jacob and Hocheiser modified method was adopted. Nitrogen oxides as nitrogen dioxide were collected by bubbling air through sodium hydroxide-sodium arsenite solution to form a stable solution of sodium nitrite. The nitrite ion produced during sampling was determined spectrophotometrically (at 540 nm) by reacting the exposed absorbing reagent with phosphoric acid, sulphanilamide and N (1-naphthyl) ethylamine dihydrochloride. Concentration of NO<sub>x</sub> was calculated as described in SO<sub>2</sub> measurement.

**Ozone** : IS:5182 Part IX (Methods for Measurement of Air Pollution - Oxidants)/ APHA Method 410 was adopted. Micro amounts of ozone and the oxidants liberate iodine when absorbed in a 1% solution of potassium iodine buffered at pH 6.8 ±0.2. The iodine is determined spectrophotometrically by measuring the absorption of tri-iodide ion at 352 nm. Drager Multiwarn Detector was also used for real time value.

**Ammonia** : Indophenols method (APHA Method 401, Air Sampling and Analysis, 3<sup>rd</sup> Edition) was adopted. Ammonia in the atmosphere is collected by bubbling a measured volume of air through a dilute solution of sulphuric acid to form ammonium sulphate. The ammonium sulphate formed in the sample is analysed colorimetrically by reaction with phenol and alkaline sodium hypochlorite to produce indophenols. The reaction is accelerated by the addition of Sodium nitroprusside as catalyst.

**CO** : Envirotech APM 850 Organic Vapour Samplers are used for CO monitoring. Standard MSA tubes are used for monitoring carbon monoxide. A measured volume of air is passed at the flow rate of 100 to 200 ml/min for 1 to 8 hours and the colour change (yellow to green) in indicating gel filled in the detector tubes and is matched with the colour chart provided with detector tubes for finding out CO concentration. Drager Multiwarn Detector was also used for real time value.

**Benzene** : The charcoal tubes are available in different sizes and contain varying amount of activated charcoal. The ambient air was sucked through the tube using a low flow sampler used for collection of BTX sample in a way that results in an enrichment of the relevant substances in the activated charcoal. Desorption of the adsorbed benzene was done using Carbon disulphide (CS<sub>2</sub>). The substances desorbed in CS<sub>2</sub> were analyzed by capillary Gas Chromatography.

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**Benzo (a) Pyrene (BaP)** is one of the most important constituent of PAH compounds and also one of the most potent carcinogens. This can be measured in both particulate phase and vapour phase. In the vapour phase the concentration of B(a)P is significantly less than the particulate phase. Therefore, more care to be taken for the measurement of Benzo(a) Pyrene in the particulate phase. It is based on BIS method IS 5182 (Part XII). This method is designed to collect particulate phase PAHs in ambient air and fugitive emissions and to determine individual PAH compounds using capillary Gas Chromatography equipped with flame ionization detector.

**Nickel and Arsenic** : The Atomic Absorption Spectroscopy (AAS) technique makes use of absorption spectrometry to assess the concentration of an analyte in the sample. The method is based on active sampling using PM10 High Volume Sampler and then sample analysis is done by atomic absorption spectroscopy.

**Particulate Lead** : The exposed glass fibre filter papers were cut into small pieces and to it 100 ml distilled water and 10 ml nitric acid were added and heated on a hot plate for 4-6 hours. The clear solution obtained after digestion was filtered and made upto 25 ml and were analysed on a Analytic Jena Atomic Absorption Spectrophotometer (AAS) employing Lead Hollow Cathode Lamp. Concentration of lead was calculated by taking the result obtained from AAS analysis and dividing it with the volume of air sampled.

The **detectable range** of the Air Pollutants are as follows:

Parameter	Method	Range
Respirable Particulate Matter (less than 10 µm or PM10)	IS 5182: (Part 23) : 2006 RA: 2017	5-1000 µg/m <sup>3</sup>
Particulate matter (less than 2.5 µm or PM2.5)	USEPA Quality Assurance Handbook Vol II Part II - Guidance Documents 2.12 issue year: Nov-1998	10-1000 µg/m <sup>3</sup>
Sulphur Dioxide	IS 5182: (Part 2), 2001 RA: 2017	5-1000 µg/m <sup>3</sup>
Nitrogen Dioxide	IS 5182: (Part 6), 2006 RA: 2017	6-750 µg/m <sup>3</sup>
Carbon Monoxide	IS 5182: (Part 10), 1999 RA: 2014	1-200 mg/m <sup>3</sup>
Ammonia	Indophenol Method (Method of Air sampling and analysis 3 <sup>rd</sup> edition method 401)	5-700 µg/m <sup>3</sup>
Ozone	IS 5182: (Part 9), 1974, RA 2014	10-19000 µg/m <sup>3</sup>
Benzene (C <sub>6</sub> H <sub>6</sub> )	IS 5182 (Part 11), 2006 RA: 2017	1-1000 µg/m <sup>3</sup>
Banzo (α) Pyrene Particulate Phase only	IS 5182: (Part 12): 2004, RA: 2014	1-10,000 ng/ m <sup>3</sup>
Nickel	IS 5182: (Part 22), 2004, RA: 2014 /NAAQS Monitoring & Analysis Guidelines Volume-I	2.0 -50 ng/m <sup>3</sup>
Arsenic		2.0-10 ng/ m <sup>3</sup>
Lead		0.02-50 µg/m <sup>3</sup>

**Noise Levels** : Noise levels were monitored at all air monitoring locations during day time as well as night time in a day . A totally portable measurement systems, Lutron SL 4001 with an internal calibrator and wind screen was used. The built-in internal oscillation system 1 KHz sine wave generator is used for on the spot calibration at 94.0 dB(A) at 1000 Hz. The basic unit of

measurement is A-weighted sound level, the most widely used scale. The measurements are taken in the fast mode and were sampled to yield statistical informations such as Leq (equivalent noise level).

**Water Quality :** Water samples of both surface and ground waters were collected during the survey period and analysed for physico-chemical and bacteriological parameters. Parameters like pH, conductivity, temperature, DO, etc. were measured in the field itself while collecting the samples using a microprocessor based Portable Water Analysis Kit (Elico Model PE136). Samples for chemical analysis were collected as per IS:2488. Sterilised bottles were used for collection of water samples for bacteriological analysis.

### Methodology Adopted for Water Analysis

Sl. No.	Parameter	Unit	Reference	Method
1	Taste & Odour	As perceived	IS:3025 (5/7)*	As perceived
2	pH	-	IS:3025 (11)	Digital pH meter
3	Colour	Hazen units	IS:3025 (4)	Comparison with Standards
4	Turbidity	NTU	IS:3025 (10)	Nephelometric
5	Total Dissolved Solids	mg/l	IS:3025 (16)	Gravimetric
6	Total Hardness	mg/l	IS:3025 (21)	Titrimetric (EDTA)
7	Iron (as Fe)	mg/l	32 of IS3025	Colorimetric (Phenanthroline)
8	Chlorides (as Cl)	mg/l	IS:3025 (32)	Titrimetric (Argentometric)
9	Residual Chlorine	mg/l	IS:3025 (26)	Titrimetric
10	Calcium (as Ca)	mg/l	IS:3025 (40)	Titrimetric (EDTA)
11	Magnesium (as Mg)	mg/l	IS:3025 (46)	Titrimetric (by difference between Total Hardness and Calcium Hardness)
12	Alkalinity (as CaCO <sub>3</sub> )	mg/l	IS:3025 (23)	Colour indicator titration
13	Dissolved Oxygen	mg/l	IS:3025 (38)	Winkler titrimetric-azide modification
14	Sulphate (as SO <sub>4</sub> )	mg/l	IS:3025 (24)	Turbidimetric/Gravimetric
15	Fluoride (as F)	mg/l	IS:2488 (II)*	Distillation followed by Colorimetric (SPADNS)
16	Nitrate (as NO <sub>3</sub> )	mg/l	IS:3025 (34)	Colorimetric (PDA)
17	Cyanide (as CN)	mg/l	IS:3025 (27)	Colorimetric (Pyridine-Bispyrazolone)
18	Pesticides	mg/	IS:2488 (III)	Gas chromatograph
19	Phenols (as C <sub>6</sub> H <sub>5</sub> OH)	mg/l	IS:3025 (43)	Distillation followed by colorimetric (4-Aminoantipyrine)
20	Manganese (as Mn)	mg/l	35 of IS3025	Colorimetric (Persulphate)
21	Chromium (as Cr <sup>6+</sup> )	mg/l	IS:2488 (II)	Colorimetric (Diphenyl carbazide)
22	Copper (as Cu)	mg/l	IS:3025 (42)	Atomic Absorption Spectrophotometric
23	Selenium (as Se)	mg/l	IS:2488 (II)	Atomic Absorption Spectrophotometric
24	Cadmium (as Cd)	mg/l	IS:3025 (41)	Atomic Absorption Spectrophotometric

Sl. No.	Parameter	Unit	Reference	Method
25	Arsenic (as As)	mg/l	IS:3025 (37)	Atomic Absorption Spectrophotometric
26	Boron (as B)	mg/l	IS:2488 (III)	Colorimetric (Curcumin)
27	Mercury (as Hg)	mg/l	IS:3025 (48)	Mercury analyser
28	Lead (as Pb)	mg/l	IS:3025 (47)	Atomic Absorption Spectrophotometric
29	Zinc (as Zn)	mg/l	IS:3025 (49)	Colorimetric (Dithizone)
30	Percent sodium	%	IS:2488 (V)	From Na, K, Ca & Mg values
31	BOD-3 days@27 °C	mg/l	IS:3025 (44)	3 days @ 27°C
32	COD	mg/l	IS:2488 (V)	Dichromate reflux
33	Oil & Grease	mg/l	IS:3025 (39)	Gravimetric
34	Coliforms	MPN/100 ml	IS:1622	Multiple tube fermentation (5 tubes)
35	Plate Counts	No. of Colonies/ml	IS:1622	Colony count in Agar-agar medium

\* : IS:3025 (Parts)-Methods of Sampling and Test (Physical and Chemical) for Water and Wastewater;

+ : IS:2488 (Parts)-Methods of Sampling and Test for Industrial Effluents.

**Soil Quality** : Samples at 3 depths viz. 0-30 cm, 30-60 cm and 60-90 cm were collected using sampling augers and field capacity apparatus. Soil extraction (10%) were used for analysis.

**Calibration** : The monitoring and analytical instruments are being calibrated periodically. The correction factors, if any, are being used in computation of the data.

**Flora-fauna** : A general ecological survey covering an area of 10 km radius area were conducted and reported. Faunal survey covers the Terrestrial Fauna, Avian Fauna and Aquatic Fauna. The survey was based on personal observation, enquiry with local population and records available. This study included the identification of endangered and rare species as per Red Book.

**Socio-Economic Survey** : The Socio-Economic profile of the population living in study area has been prepared based on Census 2011 data with field checks.

### 3.4 Micrometeorology

#### 3.4.1 Regional Status

Sub-tropical climate prevails over the study area. The nearest IMD station is Trichy Airport. The temperature is maximum during March to May and it drops from June onwards. The maximum temperature ranges from 40 °C to 44 °C and minimum temperature from 22 °C to 27 °C. As per TWAD Data, 70 year Normal Rainfall of nearby Ariyalur Rain Gauge Station is **1,096 mm** viz. Transitional Period (Jan.-May)-199 mm, SW Monsoon Period (Jun.-Sep.)-379 mm & NE Monsoon Period (Oct.-Dec.)-518 mm. Annual normal rainfall of Trichy Region is **883 mm**. The Region receives 50% of total rainfall during Northeast Monsoon periods (October-November months) with 20-25 rainy days. Remaining 50% of rainfall occurs during Southwest Monsoon and Transitional Periods with 30-40 rainy days.



### 3.4.2 Site Specific Status

The abstract of collected hourly meteorological data are presented in **Tables 3.1-3.3**. Based on the wind parameters, wind rose is drawn and presented as **Fig. 3.4**.

During the monitoring month of **December 2022** : The predominant winds were from ENE direction (84.8°). The mean Wind velocity was 6.3 kmph. The temperature values were ranging from 21.0 °C to 32.0 °C with a mean value of 26.0 °C. The mean maximum relative humidity value was 73.7%. Clear and Partly Cloudy skies was observed most of the times (2.5 oktas). The mean atmospheric pressure value was computed as 759.9 mm of mercury. There were 3 rainy days with total rainfall of 3.5 mm in this month.

During the monitoring month of **January 2023** : The predominant winds were from NE/ENE direction (78.6°). The mean Wind velocity was 6.2 kmph. The temperature values were ranging from 18.0 °C to 31.5 °C with a mean value of 25.0 °C. The mean maximum relative humidity value was 73.2%. Clear and Partly Cloudy skies was observed most of the times (2.7 oktas). The mean atmospheric pressure value was computed as 759.9 mm of mercury. There were 1 rainy day with total rainfall of 0.5 mm in this month.

During the monitoring month of **February 2023** : The predominant winds were from NE/ENE directions (77.3°). The mean Wind velocity was 6.1 kmph. The temperature values were ranging from 19.0 °C to 35.0 °C with a mean value of 26.5 °C. The mean maximum relative humidity value was 69.5%. Clear skies was observed most of the times (2.0 oktas). The mean atmospheric pressure value was computed as 759.6 mm of mercury. There was 2 rainy days with total rainfall of 1.5 mm in this month.

#### **Interpretation :**

During the **Winter (2022-23) Season** : The predominant winds were from ENE & NE directions. The mean Wind velocity was 6.2 kmph. Calm condition was about 3.29%. The temperature values were ranging from 18.0 °C to 35.0 °C with a mean value of 25.8 °C. The mean maximum relative humidity value was 72.1%. Partly cloudy skies was observed most of the times (2.4 oktas). The mean atmospheric pressure value was computed to be 759.8 mm of mercury. There was 6 rainy days during the Season which accounted 5.5 mm of rainfall.

The monitored meteorological data were found to be **in compliance with local weather phenomena**. With the available data of Environmental Lapse Rate (ELR), Dry Adiabatic Lapse Rate will continue to rise and **no inversion** in the Study Area will take place. Mixing height (IMD Data) for the Region is utilized for Modelling Studies.

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**Table : 3.1 Micrometeorological Data – Dec. 2022**

Location : Mine Area

Date	Mean Wind Velocity, kmph	Pred. Wind Direction (Deg.)	Temperature, °C			Relative Humidity (Mean), %	Cloud Cover, oktas	Atm. Pressure, mm of Hg	Rain-fall, mm
			Min.	Max.	Mean				
01.12.2022	5.3	52	24.0	31.0	26.7	72	2.4	759.4	0
02.12.2022	6.1	54	24.0	31.5	26.9	78	2.1	759.1	0
03.12.2022	6.4	57	24.5	32.0	26.3	75	2.4	760.0	0
04.12.2022	5.5	40	23.0	31.5	24.5	81	2.2	760.5	1.5
05.12.2022	4.9	95	22.5	30.0	25.9	76	2.7	760.4	0
06.12.2022	7.6	40	23.0	30.5	26.3	72	2.6	760.5	0
07.12.2022	4.1	117	22.0	30.0	25.8	78	2.8	760.3	0
08.12.2022	11.0	73	21.5	29.5	24.3	73	2.7	760.0	0
09.12.2022	13.3	75	21.0	29.0	24.0	74	2.5	760.2	0
10.12.2022	7.6	107	22.0	29.0	25.4	74	2.4	759.7	0
12.12.2022	3.2	116	22.5	31.0	26.3	73	2.3	759.8	0
12.12.2022	4.1	140	23.0	31.5	26.1	75	2.9	759.0	0
13.12.2022	4.0	64	23.0	30.5	25.2	80	2.6	759.2	0
14.12.2022	4.8	58	22.0	30.0	25.9	76	2.7	758.5	1.0
15.12.2022	6.1	95	23.0	30.5	25.8	74	2.6	759.6	0
16.12.2022	4.9	97	21.0	31.0	26.1	77	3.0	759.7	0
17.12.2022	5.8	100	21.5	30.5	26.0	70	2.4	760.0	0
18.12.2022	7.5	132	23.0	30.5	26.1	73	2.2	760.5	0
19.12.2022	7.8	67	21.0	30.0	26.3	75	2.5	760.2	0
20.12.2022	7.4	120	22.5	30.0	26.0	77	2.3	759.6	0
21.12.2022	7.1	110	22.0	30.0	26.2	75	2.3	759.9	0
22.12.2022	7.6	80	21.5	31.0	26.4	66	2.7	760.1	0
23.12.2022	6.3	91	21.5	32.0	26.5	65	2.9	760.5	0
24.12.2022	7.7	116	22.0	31.5	27.0	67	2.2	761.2	0
25.12.2022	6.9	78	23.0	32.0	26.7	70	2.7	760.5	0
26.12.2022	8.0	59	23.5	30.5	25.9	75	2.3	759.9	1.0
27.12.2022	5.9	60	24.0	30.5	26.8	74	2.5	759.1	0
28.12.2022	5.6	68	23.0	31.0	26.1	71	2.6	760.0	0
29.12.2022	4.6	89	23.0	31.5	26.5	73	2.4	760.5	0
30.12.2022	4.4	92	22.5	31.5	26.1	75	3.1	760.4	0
31.12.2022	3.8	86	22.0	32.0	26.5	72	2.7	760.1	0
<b>Monthly Abs.</b>	<b>6.3</b>	<b>84.8</b>	<b>21.0</b>	<b>32.0</b>	<b>26.0</b>	<b>73.7</b>	<b>2.5</b>	<b>759.9</b>	<b>3.5</b>

Note : Abstract values are taken from the hourly readings (00:00-24:00 hrs.) recorded continuously during the monitoring period.

**Table : 3.2 Micrometeorological Data – Jan. 2023**

Location : Mine Area

Date	Mean Wind Velocity, kmph	Pred. Wind Direction (Deg.)	Temperature, °C			Relative Humidity (Mean), %	Cloud Cover, oktas	Atm. Pressure, mm of Hg	Rain-fall, mm
			Min.	Max.	Mean				
01.01.2023	4.3	65	22.0	31.5	25.8	73	3.0	760.5	0
02.01.2023	5.1	42	21.5	31.0	25.3	77	2.2	760.3	0
03.01.2023	5.5	40	20.5	30.5	25.1	76	2.1	759.7	0
04.01.2023	6.1	37	21.5	30.5	25.4	77	2.6	759.4	0
05.01.2023	7.3	60	21.0	31.0	25.6	75	3.3	760.1	0
06.01.2023	9.2	83	22.0	30.0	25.9	74	3.2	760.7	0
07.01.2023	8.4	62	22.5	31.0	26.0	73	2.5	760.2	0
08.01.2023	5.1	45	21.0	31.0	24.7	78	2.7	760.1	0
09.01.2023	7.2	83	20.0	30.5	24.5	72	2.3	759.7	0
10.01.2023	6.2	92	19.5	30.0	23.9	75	3.1	760.3	0
11.01.2023	4.9	66	19.0	30.0	24.3	70	2.4	760.2	0
12.01.2023	5.0	59	19.0	30.0	24.6	72	2.2	759.9	0
13.01.2023	5.3	88	19.5	30.5	24.1	74	2.6	758.9	0
14.01.2023	5.0	91	19.0	30.0	24.5	73	2.4	759.3	0
15.01.2023	5.7	77	18.0	29.5	24.1	75	2.7	759.9	0
16.01.2023	6.1	90	18.5	30.0	24.3	75	3.0	759.6	0
17.01.2023	5.6	75	19.0	30.5	24.2	72	2.9	760.0	0
18.01.2023	6.4	80	19.5	30.0	24.5	73	3.0	759.9	0
19.01.2023	5.7	105	19.5	30.0	24.9	70	3.2	759.5	0
20.01.2023	6.2	76	19.0	30.5	24.5	68	2.8	760.0	0
21.01.2023	7.4	88	20.0	31.0	25.3	73	2.9	760.2	0
22.01.2023	7.9	66	20.5	31.0	25.2	69	3.0	761.0	0
23.01.2023	6.3	110	21.0	30.5	25.1	74	2.6	760.2	0
24.01.2023	7.0	116	20.5	30.5	25.4	74	3.3	760.5	0
25.01.2023	5.5	66	20.0	31.5	25.1	75	2.5	760.0	0
26.01.2023	5.9	60	20.5	31.0	25.3	72	3.0	759.7	0
27.01.2023	6.3	87	21.0	30.5	25.4	71	3.2	759.8	0
28.01.2023	6.1	110	19.5	31.0	24.9	70	2.7	759.3	0
29.01.2023	6.8	106	20.0	31.0	25.4	68	2.1	759.9	0
30.01.2023	6.0	113	21.5	31.0	24.7	75	2.1	759.0	0.5
31.01.2023	7.7	98	21.5	30.5	26.1	76	2.3	759.8	0
<b>Monthly Abs.</b>	<b>6.2</b>	<b>78.6</b>	<b>18.0</b>	<b>31.5</b>	<b>25.0</b>	<b>73.2</b>	<b>2.7</b>	<b>759.9</b>	<b>0.5</b>

Note : Abstract values are taken from the hourly readings (00:00-24:00 hrs.) recorded continuously during the monitoring period.

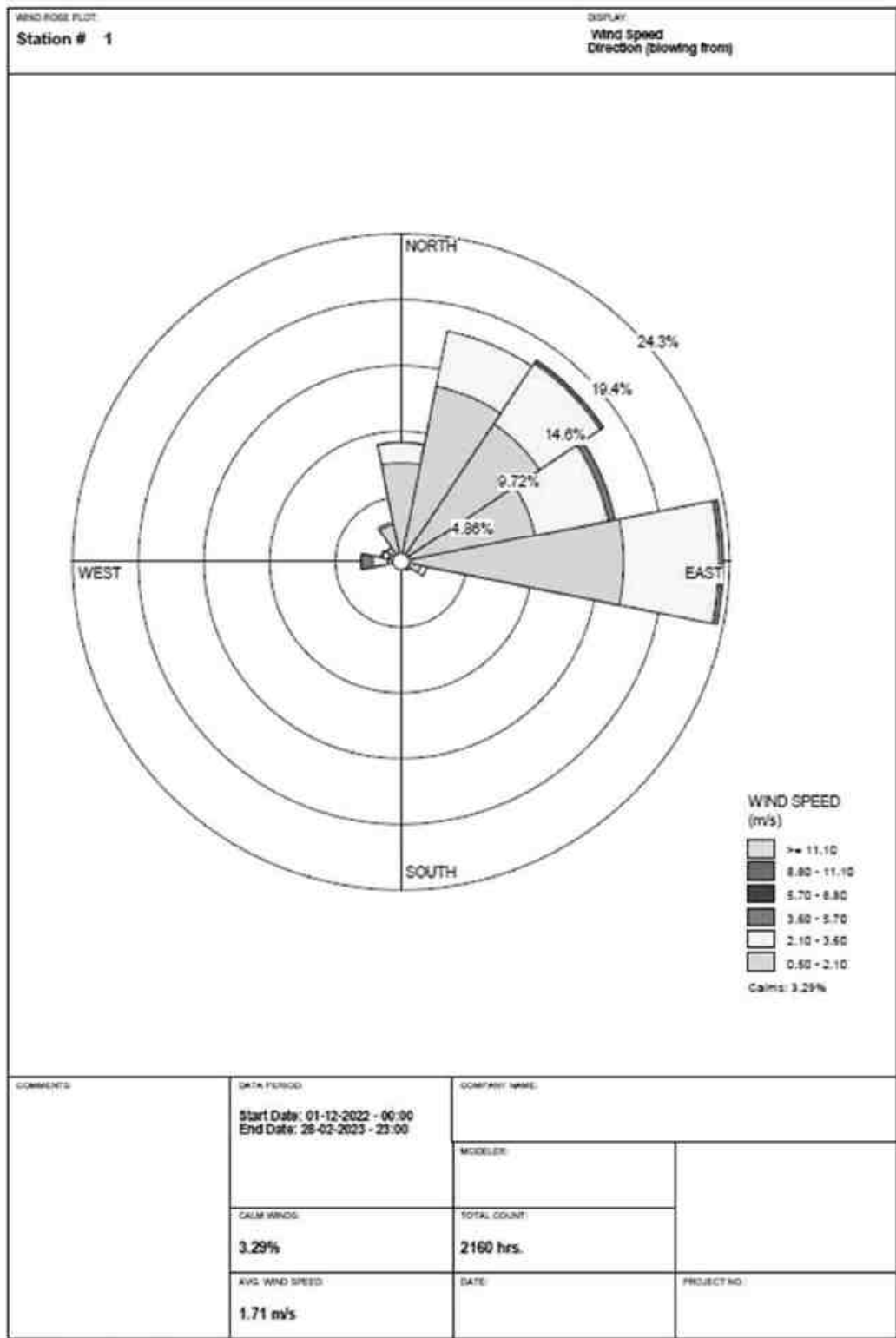
**Table : 3.3 Micrometeorological Data – Feb. 2023**

Location : Mine Area

Date	Mean Wind Velocity, kmph	Pred. Wind Direction (Deg.)	Temperature, °C			Relative Humidity (Mean), %	Cloud Cover, oktas	Atm. Pressure, mm of Hg	Rain-fall, mm
			Min.	Max.	Mean				
01.02.2023	6.0	117	24.0	30.0	28.2	75	2.4	759.4	0
02.02.2023	5.2	62	23.5	30.5	26.3	77	2.1	760.3	0
03.02.2023	5.9	75	22.0	29.0	25.2	69	2.3	759.9	0.5
04.02.2023	6.5	75	22.0	30.0	25.7	72	1.8	758.7	1.0
05.02.2023	6.4	102	21.5	31.0	26.4	73	1.9	758.7	0
06.02.2023	5.1	60	20.5	31.5	26.1	75	1.8	759.7	0
07.02.2023	5.5	58	21.0	32.0	26.8	78	2.3	759.3	0
08.02.2023	4.9	64	21.5	33.0	26.6	70	2.4	759.7	0
09.02.2023	5.8	88	20.0	32.5	26.4	76	2.5	760.5	0
10.02.2023	5.5	73	20.0	32.0	27.2	74	3.1	760.6	0
11.02.2023	4.9	74	21.5	33.0	26.5	69	2.4	760.8	0
12.02.2023	5.6	68	19.5	32.5	26.1	68	2.1	760.4	0
13.02.2023	5.8	82	19.0	33.0	25.9	72	2.0	760.6	0
14.02.2023	4.9	71	19.0	33.0	25.8	73	1.8	759.7	0
15.02.2023	5.5	60	20.5	32.0	26.4	70	2.2	759.1	0
16.02.2023	6.8	68	20.0	32.5	26.1	67	2.6	760.0	0
17.02.2023	6.3	72	20.0	33.0	26.8	68	1.8	760.4	0
18.02.2023	5.9	88	19.5	33.0	27.2	65	1.9	760.5	0
19.02.2023	7.2	69	22.0	33.0	26.5	64	1.5	760.1	0
20.02.2023	5.4	73	22.0	33.5	26.9	66	1.9	760.0	0
21.02.2023	6.2	68	21.0	33.5	27.1	69	1.2	760.4	0
22.02.2023	6.9	74	20.0	34.0	26.3	63	1.0	759.3	0
23.02.2023	5.8	65	20.0	34.0	27.2	65	0.9	759.0	0
24.02.2023	5.5	90	22.0	34.5	26.6	67	1.8	759.2	0
25.02.2023	7.5	102	20.5	33.5	26.3	70	1.5	758.3	0
26.02.2023	8.2	80	19.5	35.0	26.6	64	2.0	758.9	0
27.02.2023	7.0	92	20.0	34.0	27.1	61	1.8	758.0	0
28.02.2023	7.3	94	21.0	34.5	26.7	69	1.6	758.3	0
<b>Monthly Abs.</b>	<b>6.1</b>	<b>77.3</b>	<b>19.0</b>	<b>35.0</b>	<b>26.5</b>	<b>69.6</b>	<b>2.0</b>	<b>759.6</b>	<b>1.5</b>

Note : Abstract values are taken from the hourly readings (00:00-24:00 hrs.) recorded continuously during the monitoring period.

**Fig : 3.4 Seasonal Wind Rose**



WRPLOT Vae - Lata Environmental Software

### 3.5 Ambient Air Quality

#### 3.5.1 Monitoring Locations

AAQ Monitoring Stations were selected based on the **Upwind & Downwind directions for that Season (Table 3.4)**. Mobile Stations were also established for the monitoring.

**Table : 3.4 Ambient Air Quality Monitoring Stations-Location & Bearing**

Sl. No.	Location	North Latitude	East Longitude	Direction from Center Location	Distance, km	Location Scenario
1	A1-Kallakudi Mines	10°58'52.4"	78°56'56.5"	-	-	Core Zone
2	A2-Kovandakurichi Mines	10°57'24.2"	78°55'47.7"	-	-	Core Zone
3	A3-DCBL DPM Plant	10°58'15.2"	78°56'58.8"	-	-	Core Zone
4	A4-Kallakudi	10°58'51.5"	78°57'00.3"	NNE	0.5	Upwind
5	A5-Pullambadi	10°56'58.2"	78°54'55.1"	SW	4.7	Downwind
6	A6-Tappai	10°59'23.7"	78°54'49.9"	WNW	4.0	Downwind
7	A7-Kil Arasur	11°00'37.5"	78°58'50.3"	NNE	6.0	Upwind
8	A8-Palanganatham	10°57'43.1"	78°57'49.2"	E	3.0	Upwind
9	A9-Kovil Esanai	10°56'28.3"	78°59'52.2"	SE	6.4	Upwind
10	A10-Kovandakurichi	10°56'38.0"	78°56'52.2"	S	3.3	Downwind
11	A11- Vandalaikudalur	10°58'06.0"	78°53'18.4"	WSW	5.9	Downwind
12	A12-Varaguppai	11°01'12.4"	78°55'37.5"	NW	6.0	Crosswind

Legend : NAAQ Category-National Ambient Air Quality Norms & Category stipulated by CPCB; GL-Ground Level.

#### 3.5.2 AAQ Status

Existing DCBL Cement & Power Plants and Captive Mines are the major industries in operation within the Study Area. All 12 AAQ parameters (**24/8/1 hourly basis**) were monitored in compliance with NAAQ norms. During the study, each 288 samples were collected, analysed and reported. The monitored ambient air quality data are presented in **Tables 3.5-3.16**. The abstract of those monitored data is given as **Table 3.17** and the ambient air quality status in the study area as **Table 3.18**. On the synthesized data of 288 Samples, the following observations are made :

**PM2.5** values (24 hours Time Weighted) were monitored in the range between 10-46 microgram/cu.m ( $\mu\text{g}/\text{m}^3$ ) in the Study Area with the **mean value of 21.6  $\mu\text{g}/\text{m}^3$**  against the NAAQ Norm value of **60  $\mu\text{g}/\text{m}^3$**  (24 hours Time Weighted).

**PM10** values were monitored in the range between 17-74  $\mu\text{g}/\text{m}^3$  with the **mean value of 38.9  $\mu\text{g}/\text{m}^3$**  against the NAAQ Norm value of **100  $\mu\text{g}/\text{m}^3$**  (24 hours Time Weighted).

**SO<sub>2</sub>** values were monitored in the range between 6-22  $\mu\text{g}/\text{m}^3$  with the **mean value of 10.9  $\mu\text{g}/\text{m}^3$**  against the NAAQ limit value of **80  $\mu\text{g}/\text{m}^3$**  (24 hours Time Weighted).

**NO<sub>x</sub>** values were monitored in the range between 7-26  $\mu\text{g}/\text{m}^3$  with the **mean value of 13.2  $\mu\text{g}/\text{m}^3$**  against the NAAQ limit value of **80  $\mu\text{g}/\text{m}^3$**  24 hours Time Weighted).

**O<sub>3</sub>** concentrations (**hourly samples reported for 8-hour average**) were monitored <10-22.8  $\mu\text{g}/\text{m}^3$  at the monitoring locations against the NAAQ limit value of 100  $\mu\text{g}/\text{m}^3$  (8 hours Time Weighted).

**Ammonia (NH<sub>3</sub>)** concentrations were monitored <5  $\mu\text{g}/\text{m}^3$  at all the monitoring locations against the NAAQ limit value of 400  $\mu\text{g}/\text{m}^3$  (24 hours Time Weighted).

**CO** : The monitored CO values were <1  $\text{mg}/\text{m}^3$  (<1000  $\mu\text{g}/\text{m}^3$ ) during the study period against the NAAQ limit value of 2  $\text{mg}/\text{m}^3$  (2,000  $\mu\text{g}/\text{m}^3$ ) (8 hours Time Weighted).

**Particulate Lead (Pb)** concentrations were monitored <0.1  $\mu\text{g}/\text{m}^3$  at all the monitoring locations against the NAAQ limit value of 1.0  $\mu\text{g}/\text{m}^3$  (24 hours Time Weighted).

**Arsenic (As)** concentrations were monitored <1 **nanogram/cu.m (ng/m<sup>3</sup>)** at all the monitoring locations against the NAAQ limit value of 6  $\text{ng}/\text{m}^3$  (annual mean).

**Nickel (Ni)** concentrations were monitored <1  $\text{ng}/\text{m}^3$  at all the monitoring locations against the NAAQ limit value of 20  $\text{ng}/\text{m}^3$  (annual mean).

**Benzene (C<sub>6</sub>H<sub>6</sub>)** concentrations were monitored <0.01  $\mu\text{g}/\text{m}^3$  at all the monitoring locations against the NAAQ limit value of 5  $\mu\text{g}/\text{m}^3$  (annual mean).

**Benzo(a) Pyrene (BaP)** concentrations were monitored <0.1  $\text{ng}/\text{m}^3$  at all the monitoring locations against the NAAQ limit value of 1.0  $\text{ng}/\text{m}^3$  (annual mean).

While comparing with the National Ambient Air Quality (NAAQ) Standards revised as per GSR 826(E) dated 16.11.2009, **all monitored values were found to be well within the respective limit values for 24-hourly periods** for Industrial, Residential, Rural and other Areas.

**Exceedance Factor (EF)** : (Monitored Avg. Value of criteria Pollutant/NAAQ Norm of the Pollutant) : Critical Pollution if EF is 1.5; High Pollution if EF is between 1.0-<1.5, Moderate Pollution if EF is between 0.5-<1.0 and Low Pollution if EF is <0.5. **Study Area is falling under Low Pollution** as monitored Pollutant Levels were <0.5 EF.

Pollutant	Mean Concentration	NAAQ Norm	Exceedance Factor (EF)	Pollution Category
PM2.5, $\mu\text{g}/\text{m}^3$	22.9	60	0.38	Low
PM10, $\mu\text{g}/\text{m}^3$	38.9	100	0.39	Low
SO <sub>2</sub> , $\mu\text{g}/\text{m}^3$	10.9	80	0.14	Low
NO <sub>2</sub> , $\mu\text{g}/\text{m}^3$	13.2	80	0.16	Low

**Table : 3.5 Ambient Air Quality Data at A1-Kallakudi Mines (on NH-81)**

Monitoring		Particulates, µg/m <sup>3</sup>		Gaseous Pollutants, µg/m <sup>3</sup>					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO <sub>2</sub>	NOx	O <sub>3</sub> (8-hly Avg.)	NH <sub>3</sub>	CO (8-hly Avg.)	Pb, µg/m <sup>3</sup>	As, ng/m <sup>3</sup>	Ni, ng/m <sup>3</sup>	C <sub>6</sub> H <sub>6</sub> , µg/m <sup>3</sup>	BaP, ng/m <sup>3</sup>
01-02.12.2022	06:00-06:00	37	62	15	20	12.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.12.2022	06:00-06:00	35	56	12	13	12.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.12.2022	06:00-06:00	41	64	11	13	17.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.12.2022	06:00-06:00	38	61	14	17	14.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.12.2022	06:00-06:00	36	55	13	15	12.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.12.2022	06:00-06:00	42	66	12	14	13.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.12.2022	06:00-06:00	40	63	16	17	14.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.12.2022	06:00-06:00	37	57	13	15	12.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.01.2023	06:00-06:00	34	55	14	19	12.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
03-04.01.2023	06:00-06:00	39	59	12	15	11.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.01.2023	06:00-06:00	46	74	10	13	12.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
11-12.01.2023	06:00-06:00	41	70	13	16	11.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.01.2023	06:00-06:00	38	67	14	18	13.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
19-20.01.2023	06:00-06:00	40	71	12	15	12.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.01.2023	06:00-06:00	33	53	16	21	12.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
27-28.01.2023	06:00-06:00	35	56	18	23	11.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
01-02.02.2023	06:00-06:00	32	50	14	19	10.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.02.2023	06:00-06:00	37	58	16	21	10.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.02.2023	06:00-06:00	35	53	18	23	10.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.02.2023	06:00-06:00	40	62	21	24	11.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.02.2023	06:00-06:00	43	63	18	21	10.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.02.2023	06:00-06:00	33	58	19	23	10.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.02.2023	06:00-06:00	36	62	21	24	11.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.02.2023	06:00-06:00	37	68	22	26	13.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
<b>Range (Minimum-Maximum)</b>		<b>32-46</b>	<b>50-74</b>	<b>10-22</b>	<b>13-26</b>	<b>10.2-17.1</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>Mean Value</b>		<b>37.7</b>	<b>61.0</b>	<b>15.2</b>	<b>18.5</b>	<b>12.4</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>NAAQ Norms*</b>		<b>60</b> (24 hrs.)	<b>100</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>100</b> (8 hrs.)	<b>400</b> (24 hrs.)	<b>2,000</b> (8 hrs.)	<b>1.0</b> (24 hrs.)	<b>6.0</b> (annual)	<b>20</b> (annual)	<b>5.0</b> (annual)	<b>1.0</b> (annual)

Legend : **PM2.5**-Particulate Matter size less than 2.5 µm; **PM10**-Respirable Particulate Matter size less than 10 µm; **SO<sub>2</sub>**-Sulphur dioxide; **NOx**-Oxides of Nitrogen; **O<sub>3</sub>**-Ozone; **NH<sub>3</sub>**-Ammonia; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C<sub>6</sub>H<sub>6</sub>**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. µg-microgram & ng-nanogram.

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



**Table : 3.6 Ambient Air Quality Data at A2-Kovandakurichi Mines**

Monitoring		Particulates, µg/m <sup>3</sup>		Gaseous Pollutants, µg/m <sup>3</sup>					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO <sub>2</sub>	NOx	O <sub>3</sub> (8-hly Avg.)	NH <sub>3</sub>	CO (8-hly Avg.)	Pb, µg/m <sup>3</sup>	As, ng/m <sup>3</sup>	Ni, ng/m <sup>3</sup>	C <sub>6</sub> H <sub>6</sub> , µg/m <sup>3</sup>	BaP, ng/m <sup>3</sup>
01-02.12.2022	06:00-06:00	35	60	14	15	12.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.12.2022	06:00-06:00	30	54	12	17	18.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.12.2022	06:00-06:00	36	57	13	16	15.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.12.2022	06:00-06:00	33	61	11	15	14.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.12.2022	06:00-06:00	27	48	12	15	11.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.12.2022	06:00-06:00	34	60	14	18	13.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.12.2022	06:00-06:00	30	55	12	14	11.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.12.2022	06:00-06:00	38	62	13	16	12.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.01.2023	06:00-06:00	32	56	12	14	11.9	<5	<1000	<0.1	<1	<1	<0.01	<0.1
03-04.01.2023	06:00-06:00	31	53	14	16	12.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.01.2023	06:00-06:00	27	45	11	13	14.0	<5	<1000	<0.1	<1	<1	<0.01	<0.1
11-12.01.2023	06:00-06:00	35	58	12	14	12.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.01.2023	06:00-06:00	24	41	13	15	11.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
19-20.01.2023	06:00-06:00	30	50	15	18	11.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.01.2023	06:00-06:00	25	43	14	17	10.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
27-28.01.2023	06:00-06:00	28	47	16	20	12.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
01-02.02.2023	06:00-06:00	33	55	13	15	14.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.02.2023	06:00-06:00	27	45	12	15	15.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.02.2023	06:00-06:00	34	58	14	18	10.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.02.2023	06:00-06:00	31	53	12	15	11.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.02.2023	06:00-06:00	27	48	14	18	10.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.02.2023	06:00-06:00	25	44	12	14	11.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.02.2023	06:00-06:00	35	57	13	16	10.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.02.2023	06:00-06:00	30	51	15	17	10.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
<b>Range (Minimum-Maximum)</b>		<b>24-38</b>	<b>41-62</b>	<b>11-16</b>	<b>13-20</b>	<b>10.4-18.4</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>Mean Value</b>		<b>30.7</b>	<b>52.5</b>	<b>13.0</b>	<b>15.9</b>	<b>12.6</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>NAAQ Norms*</b>		<b>60</b> (24 hrs.)	<b>100</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>100</b> (8 hrs.)	<b>400</b> (24 hrs.)	<b>2,000</b> (8 hrs.)	<b>1.0</b> (24 hrs.)	<b>6.0</b> (annual)	<b>20</b> (annual)	<b>5.0</b> (annual)	<b>1.0</b> (annual)

Legend : **PM2.5**-Particulate Matter size less than 2.5 µm; **PM10**-Respirable Particulate Matter size less than 10 µm; **SO<sub>2</sub>**-Sulphur dioxide; **NOx**-Oxides of Nitrogen; **O<sub>3</sub>**-Ozone; **NH<sub>3</sub>**-Ammonia; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C<sub>6</sub>H<sub>6</sub>**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. µg-microgram & ng-nanogram.

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

**Table : 3.7 Ambient Air Quality Data at A3-DCBL DPM Plant**

Monitoring		Particulates, µg/m <sup>3</sup>		Gaseous Pollutants, µg/m <sup>3</sup>					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO <sub>2</sub>	NO <sub>x</sub>	O <sub>3</sub> (8-hly Avg.)	NH <sub>3</sub>	CO (8-hly Avg.)	Pb, µg/m <sup>3</sup>	As, ng/m <sup>3</sup>	Ni, ng/m <sup>3</sup>	C <sub>6</sub> H <sub>6</sub> , µg/m <sup>3</sup>	BaP, ng/m <sup>3</sup>
01-02.12.2022	06:00-06:00	31	57	16	18	15.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.12.2022	06:00-06:00	27	51	12	15	12.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.12.2022	06:00-06:00	34	63	14	18	21.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.12.2022	06:00-06:00	32	57	17	20	18.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.12.2022	06:00-06:00	28	52	15	18	18.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.12.2022	06:00-06:00	31	55	18	22	22.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.12.2022	06:00-06:00	35	66	14	18	20.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.12.2022	06:00-06:00	33	58	16	20	21.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.01.2023	06:00-06:00	42	71	18	23	20.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
03-04.01.2023	06:00-06:00	30	55	13	15	22.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.01.2023	06:00-06:00	27	47	14	18	17.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
11-12.01.2023	06:00-06:00	32	55	12	14	21.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.01.2023	06:00-06:00	34	59	12	14	17.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
19-20.01.2023	06:00-06:00	37	61	10	13	18.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.01.2023	06:00-06:00	33	56	14	16	20.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
27-28.01.2023	06:00-06:00	41	63	12	14	22.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
01-02.02.2023	06:00-06:00	38	58	14	19	20.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.02.2023	06:00-06:00	34	55	15	18	19.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.02.2023	06:00-06:00	36	57	17	19	18.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.02.2023	06:00-06:00	33	51	18	23	18.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.02.2023	06:00-06:00	35	62	14	18	21.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.02.2023	06:00-06:00	31	57	12	15	20.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.02.2023	06:00-06:00	34	59	14	17	22.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.02.2023	06:00-06:00	30	55	13	15	20.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
<b>Range (Minimum-Maximum)</b>		<b>27-42</b>	<b>47-71</b>	<b>10-18</b>	<b>13-23</b>	<b>12.7-22.8</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>Mean Value</b>		<b>33.3</b>	<b>57.5</b>	<b>14.3</b>	<b>17.5</b>	<b>19.8</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>NAAQ Norms*</b>		<b>60</b> (24 hrs.)	<b>100</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>100</b> (8 hrs.)	<b>400</b> (24 hrs.)	<b>2,000</b> (8 hrs.)	<b>1.0</b> (24 hrs.)	<b>6.0</b> (annual)	<b>20</b> (annual)	<b>5.0</b> (annual)	<b>1.0</b> (annual)

Legend : **PM2.5**-Particulate Matter size less than 2.5 µm; **PM10**-Respirable Particulate Matter size less than 10 µm; **SO<sub>2</sub>**-Sulphur dioxide; **NO<sub>x</sub>**-Oxides of Nitrogen; **O<sub>3</sub>**-Ozone; **NH<sub>3</sub>**-Ammonia; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C<sub>6</sub>H<sub>6</sub>**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. µg-microgram & ng-nanogram.

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

**Table : 3.8 Ambient Air Quality Data at A4-Kallakudi**

Monitoring		Particulates, µg/m <sup>3</sup>		Gaseous Pollutants, µg/m <sup>3</sup>					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO <sub>2</sub>	NOx	O <sub>3</sub> (8-hly Avg.)	NH <sub>3</sub>	CO (8-hly Avg.)	Pb, µg/m <sup>3</sup>	As, ng/m <sup>3</sup>	Ni, ng/m <sup>3</sup>	C <sub>6</sub> H <sub>6</sub> , µg/m <sup>3</sup>	BaP, ng/m <sup>3</sup>
01-02.12.2022	06:00-06:00	32	57	10	12	10.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.12.2022	06:00-06:00	30	53	12	15	10.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.12.2022	06:00-06:00	25	47	12	14	10.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.12.2022	06:00-06:00	22	45	10	12	11.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.12.2022	06:00-06:00	26	49	10	13	10.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.12.2022	06:00-06:00	24	45	11	13	11.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.12.2022	06:00-06:00	27	51	13	15	12.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.12.2022	06:00-06:00	23	43	11	12	10.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.01.2023	06:00-06:00	30	54	12	14	11.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
03-04.01.2023	06:00-06:00	26	43	14	18	10.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.01.2023	06:00-06:00	22	40	11	13	11.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
11-12.01.2023	06:00-06:00	25	45	10	12	10.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.01.2023	06:00-06:00	27	48	13	15	10.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
19-20.01.2023	06:00-06:00	30	51	11	12	10.9	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.01.2023	06:00-06:00	22	38	10	12	11.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
27-28.01.2023	06:00-06:00	25	41	13	15	12.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
01-02.02.2023	06:00-06:00	21	36	10	13	10.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.02.2023	06:00-06:00	26	43	14	16	11.9	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.02.2023	06:00-06:00	24	41	16	21	12.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.02.2023	06:00-06:00	26	47	15	17	11.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.02.2023	06:00-06:00	27	50	10	13	14.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.02.2023	06:00-06:00	32	53	13	15	12.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.02.2023	06:00-06:00	28	48	11	12	13.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.02.2023	06:00-06:00	25	43	15	17	14.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
<b>Range (Minimum-Maximum)</b>		<b>21-32</b>	<b>36-57</b>	<b>10-16</b>	<b>12-21</b>	<b>10.1-14.1</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>Mean Value</b>		<b>26.0</b>	<b>46.3</b>	<b>12.0</b>	<b>14.2</b>	<b>11.6</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>NAAQ Norms*</b>		<b>60</b> (24 hrs.)	<b>100</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>100</b> (8 hrs.)	<b>400</b> (24 hrs.)	<b>2,000</b> (8 hrs.)	<b>1.0</b> (24 hrs.)	<b>6.0</b> (annual)	<b>20</b> (annual)	<b>5.0</b> (annual)	<b>1.0</b> (annual)

Legend : **PM2.5**-Particulate Matter size less than 2.5 µm; **PM10**-Respirable Particulate Matter size less than 10 µm; **SO<sub>2</sub>**-Sulphur dioxide; **NOx**-Oxides of Nitrogen; **O<sub>3</sub>**-Ozone; **NH<sub>3</sub>**-Ammonia; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C<sub>6</sub>H<sub>6</sub>**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. µg-microgram & ng-nanogram.

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

Table : 3.9 Ambient Air Quality Data at A5-Pullambadi

Monitoring		Particulates, µg/m <sup>3</sup>		Gaseous Pollutants, µg/m <sup>3</sup>					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO <sub>2</sub>	NOx	O <sub>3</sub> (8-hly Avg.)	NH <sub>3</sub>	CO (8-hly Avg.)	Pb, µg/m <sup>3</sup>	As, ng/m <sup>3</sup>	Ni, ng/m <sup>3</sup>	C <sub>6</sub> H <sub>6</sub> , µg/m <sup>3</sup>	BaP, ng/m <sup>3</sup>
01-02.12.2022	06:00-06:00	25	38	11	15	10.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.12.2022	06:00-06:00	20	36	12	16	12.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.12.2022	06:00-06:00	22	39	14	18	13.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.12.2022	06:00-06:00	27	42	10	13	12.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.12.2022	06:00-06:00	24	40	12	15	15.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.12.2022	06:00-06:00	31	44	11	14	13.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.12.2022	06:00-06:00	25	42	13	16	12.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.12.2022	06:00-06:00	28	45	10	12	14.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.01.2023	06:00-06:00	32	48	11	15	13.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
03-04.01.2023	06:00-06:00	31	51	13	17	12.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.01.2023	06:00-06:00	25	42	12	14	10.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
11-12.01.2023	06:00-06:00	27	45	15	18	11.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.01.2023	06:00-06:00	33	56	12	15	10.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
19-20.01.2023	06:00-06:00	26	40	10	13	11.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.01.2023	06:00-06:00	24	44	13	16	10.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
27-28.01.2023	06:00-06:00	27	49	11	14	12.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
01-02.02.2023	06:00-06:00	31	52	14	18	19.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.02.2023	06:00-06:00	25	41	12	15	10.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.02.2023	06:00-06:00	24	37	16	19	12.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.02.2023	06:00-06:00	22	38	11	13	10.9	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.02.2023	06:00-06:00	26	45	15	18	11.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.02.2023	06:00-06:00	21	36	14	16	12.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.02.2023	06:00-06:00	23	39	12	15	12.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.02.2023	06:00-06:00	28	44	13	15	11.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
<b>Range (Minimum-Maximum)</b>		<b>20-33</b>	<b>36-56</b>	<b>10-16</b>	<b>12-19</b>	<b>10.5-19.7</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>Mean Value</b>		<b>26.1</b>	<b>43.0</b>	<b>12.4</b>	<b>15.4</b>	<b>12.5</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>NAAQ Norms*</b>		<b>60</b> (24 hrs.)	<b>100</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>100</b> (8 hrs.)	<b>400</b> (24 hrs.)	<b>2,000</b> (8 hrs.)	<b>1.0</b> (24 hrs.)	<b>6.0</b> (annual)	<b>20</b> (annual)	<b>5.0</b> (annual)	<b>1.0</b> (annual)

Legend : **PM2.5**-Particulate Matter size less than 2.5 µm; **PM10**-Respirable Particulate Matter size less than 10 µm; **SO<sub>2</sub>**-Sulphur dioxide; **NOx**-Oxides of Nitrogen; **O<sub>3</sub>**-Ozone; **NH<sub>3</sub>**-Ammonia; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C<sub>6</sub>H<sub>6</sub>**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. µg-microgram & ng-nanogram.

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

Table : 3.10 Ambient Air Quality Data at A6-Thappai

Monitoring		Particulates, µg/m <sup>3</sup>		Gaseous Pollutants, µg/m <sup>3</sup>					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO <sub>2</sub>	NOx	O <sub>3</sub> (8-hly Avg.)	NH <sub>3</sub>	CO (8-hly Avg.)	Pb, µg/m <sup>3</sup>	As, ng/m <sup>3</sup>	Ni, ng/m <sup>3</sup>	C <sub>6</sub> H <sub>6</sub> , µg/m <sup>3</sup>	BaP, ng/m <sup>3</sup>
01-02.12.2022	06:00-06:00	20	36	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.12.2022	06:00-06:00	24	37	8	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.12.2022	06:00-06:00	21	33	12	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.12.2022	06:00-06:00	18	30	10	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.12.2022	06:00-06:00	23	37	11	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.12.2022	06:00-06:00	20	35	9	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.12.2022	06:00-06:00	24	38	11	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.12.2022	06:00-06:00	27	40	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.01.2023	06:00-06:00	22	36	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
03-04.01.2023	06:00-06:00	20	35	12	14	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.01.2023	06:00-06:00	23	38	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
11-12.01.2023	06:00-06:00	22	37	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.01.2023	06:00-06:00	21	34	10	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
19-20.01.2023	06:00-06:00	23	38	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.01.2023	06:00-06:00	25	41	11	14	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
27-28.01.2023	06:00-06:00	26	37	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
01-02.02.2023	06:00-06:00	22	35	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.02.2023	06:00-06:00	24	38	11	14	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.02.2023	06:00-06:00	21	37	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.02.2023	06:00-06:00	18	31	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.02.2023	06:00-06:00	22	34	11	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.02.2023	06:00-06:00	26	39	12	15	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.02.2023	06:00-06:00	27	41	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.02.2023	06:00-06:00	20	38	14	16	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
<b>Range (Minimum-Maximum)</b>		<b>18-27</b>	<b>30-41</b>	<b>8-14</b>	<b>9-16</b>	<b>&lt;10</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>Mean Value</b>		<b>22.5</b>	<b>36.5</b>	<b>10.0</b>	<b>12.1</b>	<b>&lt;10</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>NAAQ Norms*</b>		<b>60</b> (24 hrs.)	<b>100</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>100</b> (8 hrs.)	<b>400</b> (24 hrs.)	<b>2,000</b> (8 hrs.)	<b>1.0</b> (24 hrs.)	<b>6.0</b> (annual)	<b>20</b> (annual)	<b>5.0</b> (annual)	<b>1.0</b> (annual)

Legend : **PM2.5**-Particulate Matter size less than 2.5 µm; **PM10**-Respirable Particulate Matter size less than 10 µm; **SO<sub>2</sub>**-Sulphur dioxide; **NOx**-Oxides of Nitrogen; **O<sub>3</sub>**-Ozone; **NH<sub>3</sub>**-Ammonia; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C<sub>6</sub>H<sub>6</sub>**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. µg-microgram & ng-nanogram.

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

Table : 3.11 Ambient Air Quality Data at A7-Kil Arasur

Monitoring		Particulates, µg/m <sup>3</sup>		Gaseous Pollutants, µg/m <sup>3</sup>					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO <sub>2</sub>	NOx	O <sub>3</sub> (8-hly Avg.)	NH <sub>3</sub>	CO (8-hly Avg.)	Pb, µg/m <sup>3</sup>	As, ng/m <sup>3</sup>	Ni, ng/m <sup>3</sup>	C <sub>6</sub> H <sub>6</sub> , µg/m <sup>3</sup>	BaP, ng/m <sup>3</sup>
01-02.12.2022	06:00-06:00	23	42	13	16	14.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.12.2022	06:00-06:00	19	35	12	14	12.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.12.2022	06:00-06:00	22	40	15	18	11.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.12.2022	06:00-06:00	24	43	14	16	13.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.12.2022	06:00-06:00	27	46	11	13	14.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.12.2022	06:00-06:00	30	49	12	15	16.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.12.2022	06:00-06:00	26	42	15	21	14.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.12.2022	06:00-06:00	33	51	14	17	15.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.01.2023	06:00-06:00	27	44	12	15	11.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
03-04.01.2023	06:00-06:00	20	37	13	16	10.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.01.2023	06:00-06:00	17	33	11	14	10.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
11-12.01.2023	06:00-06:00	15	30	14	18	11.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.01.2023	06:00-06:00	19	34	12	15	10.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
19-20.01.2023	06:00-06:00	22	38	13	17	11.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.01.2023	06:00-06:00	17	35	11	15	12.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
27-28.01.2023	06:00-06:00	19	37	16	18	14.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
01-02.02.2023	06:00-06:00	23	40	13	15	12.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.02.2023	06:00-06:00	23	40	11	14	12.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.02.2023	06:00-06:00	21	37	14	17	14.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.02.2023	06:00-06:00	24	39	12	15	12.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.02.2023	06:00-06:00	27	42	14	17	15.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.02.2023	06:00-06:00	31	52	12	15	14.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.02.2023	06:00-06:00	26	40	15	18	13.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.02.2023	06:00-06:00	30	55	14	16	12.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
<b>Range (Minimum-Maximum)</b>		<b>15-33</b>	<b>30-55</b>	<b>11-16</b>	<b>13-21</b>	<b>10.6-16.3</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>Mean Value</b>		<b>23.5</b>	<b>40.9</b>	<b>13.0</b>	<b>16.0</b>	<b>13.0</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>NAAQ Norms*</b>		<b>60</b> (24 hrs.)	<b>100</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>100</b> (8 hrs.)	<b>400</b> (24 hrs.)	<b>2,000</b> (8 hrs.)	<b>1.0</b> (24 hrs.)	<b>6.0</b> (annual)	<b>20</b> (annual)	<b>5.0</b> (annual)	<b>1.0</b> (annual)

Legend : **PM2.5**-Particulate Matter size less than 2.5 µm; **PM10**-Respirable Particulate Matter size less than 10 µm; **SO<sub>2</sub>**-Sulphur dioxide; **NOx**-Oxides of Nitrogen; **O<sub>3</sub>**-Ozone; **NH<sub>3</sub>**-Ammonia; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C<sub>6</sub>H<sub>6</sub>**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. µg-microgram & ng-nanogram.

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

**Table : 3.12 Ambient Air Quality Data at A8-Palanganatham**

Monitoring		Particulates, µg/m <sup>3</sup>		Gaseous Pollutants, µg/m <sup>3</sup>					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO <sub>2</sub>	NOx	O <sub>3</sub> (8-hly Avg.)	NH <sub>3</sub>	CO (8-hly Avg.)	Pb, µg/m <sup>3</sup>	As, ng/m <sup>3</sup>	Ni, ng/m <sup>3</sup>	C <sub>6</sub> H <sub>6</sub> , µg/m <sup>3</sup>	BaP, ng/m <sup>3</sup>
01-02.12.2022	06:00-06:00	12	23	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.12.2022	06:00-06:00	13	25	8	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.12.2022	06:00-06:00	11	22	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.12.2022	06:00-06:00	15	26	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.12.2022	06:00-06:00	10	21	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.12.2022	06:00-06:00	14	26	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.12.2022	06:00-06:00	12	22	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.12.2022	06:00-06:00	11	20	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.01.2023	06:00-06:00	13	23	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
03-04.01.2023	06:00-06:00	10	21	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.01.2023	06:00-06:00	10	19	8	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
11-12.01.2023	06:00-06:00	18	31	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.01.2023	06:00-06:00	15	27	8	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
19-20.01.2023	06:00-06:00	13	22	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.01.2023	06:00-06:00	16	28	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
27-28.01.2023	06:00-06:00	12	22	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
01-02.02.2023	06:00-06:00	14	25	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.02.2023	06:00-06:00	15	23	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.02.2023	06:00-06:00	11	21	9	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.02.2023	06:00-06:00	13	24	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.02.2023	06:00-06:00	14	25	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.02.2023	06:00-06:00	12	20	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.02.2023	06:00-06:00	10	20	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.02.2023	06:00-06:00	12	21	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
<b>Range (Minimum-Maximum)</b>		<b>10-18</b>	<b>19-31</b>	<b>6-9</b>	<b>7-11</b>	<b>&lt;10</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>Mean Value</b>		<b>12.8</b>	<b>23.2</b>	<b>7.5</b>	<b>8.7</b>	<b>&lt;10</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>NAAQ Norms*</b>		<b>60</b> (24 hrs.)	<b>100</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>100</b> (8 hrs.)	<b>400</b> (24 hrs.)	<b>2,000</b> (8 hrs.)	<b>1.0</b> (24 hrs.)	<b>6.0</b> (annual)	<b>20</b> (annual)	<b>5.0</b> (annual)	<b>1.0</b> (annual)

Legend : **PM2.5**-Particulate Matter size less than 2.5 µm; **PM10**-Respirable Particulate Matter size less than 10 µm; **SO<sub>2</sub>**-Sulphur dioxide; **NOx**-Oxides of Nitrogen; **O<sub>3</sub>**-Ozone; **NH<sub>3</sub>**-Ammonia; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C<sub>6</sub>H<sub>6</sub>**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. µg-microgram & ng-nanogram.

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

**Table : 3.13 Ambient Air Quality Data at A9-Kovil Esanai**

Monitoring		Particulates, µg/m <sup>3</sup>		Gaseous Pollutants, µg/m <sup>3</sup>					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO <sub>2</sub>	NOx	O <sub>3</sub> (8-hly Avg.)	NH <sub>3</sub>	CO (8-hly Avg.)	Pb, µg/m <sup>3</sup>	As, ng/m <sup>3</sup>	Ni, ng/m <sup>3</sup>	C <sub>6</sub> H <sub>6</sub> , µg/m <sup>3</sup>	BaP, ng/m <sup>3</sup>
01-02.12.2022	06:00-06:00	11	17	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.12.2022	06:00-06:00	13	20	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.12.2022	06:00-06:00	10	18	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.12.2022	06:00-06:00	12	21	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.12.2022	06:00-06:00	17	27	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.12.2022	06:00-06:00	14	22	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.12.2022	06:00-06:00	11	20	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.12.2022	06:00-06:00	13	23	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.01.2023	06:00-06:00	10	21	7	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
03-04.01.2023	06:00-06:00	14	27	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.01.2023	06:00-06:00	11	20	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
11-12.01.2023	06:00-06:00	13	23	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.01.2023	06:00-06:00	15	26	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
19-20.01.2023	06:00-06:00	12	21	7	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.01.2023	06:00-06:00	14	22	9	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
27-28.01.2023	06:00-06:00	11	20	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
01-02.02.2023	06:00-06:00	10	18	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.02.2023	06:00-06:00	13	21	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.02.2023	06:00-06:00	15	26	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.02.2023	06:00-06:00	11	22	6	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.02.2023	06:00-06:00	13	21	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.02.2023	06:00-06:00	10	18	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.02.2023	06:00-06:00	14	22	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.02.2023	06:00-06:00	12	20	7	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
<b>Range (Minimum-Maximum)</b>		<b>10-17</b>	<b>17-27</b>	<b>6-9</b>	<b>7-11</b>	<b>&lt;10</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>Mean Value</b>		<b>12.5</b>	<b>21.5</b>	<b>7.3</b>	<b>8.4</b>	<b>&lt;10</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>NAAQ Norms*</b>		<b>60</b> (24 hrs.)	<b>100</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>100</b> (8 hrs.)	<b>400</b> (24 hrs.)	<b>2,000</b> (8 hrs.)	<b>1.0</b> (24 hrs.)	<b>6.0</b> (annual)	<b>20</b> (annual)	<b>5.0</b> (annual)	<b>1.0</b> (annual)

Legend : **PM2.5**-Particulate Matter size less than 2.5 µm; **PM10**-Respirable Particulate Matter size less than 10 µm; **SO<sub>2</sub>**-Sulphur dioxide; **NOx**-Oxides of Nitrogen; **O<sub>3</sub>**-Ozone; **NH<sub>3</sub>**-Ammonia; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C<sub>6</sub>H<sub>6</sub>**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. µg-microgram & ng-nanogram.

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



**Table : 3.14 Ambient Air Quality Data at A10-Kovandakurichi**

Monitoring		Particulates, µg/m <sup>3</sup>		Gaseous Pollutants, µg/m <sup>3</sup>					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO <sub>2</sub>	NOx	O <sub>3</sub> (8-hly Avg.)	NH <sub>3</sub>	CO (8-hly Avg.)	Pb, µg/m <sup>3</sup>	As, ng/m <sup>3</sup>	Ni, ng/m <sup>3</sup>	C <sub>6</sub> H <sub>6</sub> , µg/m <sup>3</sup>	BaP, ng/m <sup>3</sup>
01-02.12.2022	06:00-06:00	18	26	11	13	11.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.12.2022	06:00-06:00	13	21	12	15	10.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.12.2022	06:00-06:00	16	28	11	14	11.5	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.12.2022	06:00-06:00	12	20	10	12	10.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.12.2022	06:00-06:00	10	18	9	11	10.0	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.12.2022	06:00-06:00	14	22	9	10	10.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.12.2022	06:00-06:00	12	22	11	13	12.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.12.2022	06:00-06:00	13	25	8	10	10.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.01.2023	06:00-06:00	11	20	10	13	11.3	<5	<1000	<0.1	<1	<1	<0.01	<0.1
03-04.01.2023	06:00-06:00	14	26	11	15	10.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.01.2023	06:00-06:00	15	28	9	12	12.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
11-12.01.2023	06:00-06:00	18	31	10	14	12.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.01.2023	06:00-06:00	17	29	8	11	11.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
19-20.01.2023	06:00-06:00	20	33	11	13	10.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.01.2023	06:00-06:00	19	30	8	9	10.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
27-28.01.2023	06:00-06:00	15	27	10	12	10.4	<5	<1000	<0.1	<1	<1	<0.01	<0.1
01-02.02.2023	06:00-06:00	18	32	9	10	10.0	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.02.2023	06:00-06:00	18	28	9	11	11.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.02.2023	06:00-06:00	21	30	11	13	10.2	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.02.2023	06:00-06:00	17	27	8	10	10.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.02.2023	06:00-06:00	14	25	11	13	12.8	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.02.2023	06:00-06:00	16	28	10	12	14.1	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.02.2023	06:00-06:00	17	30	9	12	13.6	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.02.2023	06:00-06:00	15	27	11	14	11.7	<5	<1000	<0.1	<1	<1	<0.01	<0.1
<b>Range (Minimum-Maximum)</b>		<b>10-21</b>	<b>18-33</b>	<b>8-12</b>	<b>9-15</b>	<b>10.0-14.1</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>Mean Value</b>		<b>15.5</b>	<b>26.4</b>	<b>9.8</b>	<b>12.2</b>	<b>11.3</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>NAAQ Norms*</b>		<b>60</b> (24 hrs.)	<b>100</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>100</b> (8 hrs.)	<b>400</b> (24 hrs.)	<b>2,000</b> (8 hrs.)	<b>1.0</b> (24 hrs.)	<b>6.0</b> (annual)	<b>20</b> (annual)	<b>5.0</b> (annual)	<b>1.0</b> (annual)

Legend : **PM2.5**-Particulate Matter size less than 2.5 µm; **PM10**-Respirable Particulate Matter size less than 10 µm; **SO<sub>2</sub>**-Sulphur dioxide; **NOx**-Oxides of Nitrogen; **O<sub>3</sub>**-Ozone; **NH<sub>3</sub>**-Ammonia; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C<sub>6</sub>H<sub>6</sub>**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. µg-microgram & ng-nanogram.

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

**Table : 3.15 Ambient Air Quality Data at A11-Vandalaigudalur**

Monitoring		Particulates, µg/m <sup>3</sup>		Gaseous Pollutants, µg/m <sup>3</sup>					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO <sub>2</sub>	NOx	O <sub>3</sub> (8-hly Avg.)	NH <sub>3</sub>	CO (8-hly Avg.)	Pb, µg/m <sup>3</sup>	As, ng/m <sup>3</sup>	Ni, ng/m <sup>3</sup>	C <sub>6</sub> H <sub>6</sub> , µg/m <sup>3</sup>	BaP, ng/m <sup>3</sup>
01-02.12.2022	06:00-06:00	16	29	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.12.2022	06:00-06:00	20	33	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.12.2022	06:00-06:00	24	37	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.12.2022	06:00-06:00	18	30	10	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.12.2022	06:00-06:00	22	35	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.12.2022	06:00-06:00	19	32	11	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.12.2022	06:00-06:00	23	36	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.12.2022	06:00-06:00	21	31	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.01.2023	06:00-06:00	20	35	12	14	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
03-04.01.2023	06:00-06:00	16	28	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.01.2023	06:00-06:00	19	32	9	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
11-12.01.2023	06:00-06:00	22	36	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.01.2023	06:00-06:00	17	28	10	13	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
19-20.01.2023	06:00-06:00	20	33	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.01.2023	06:00-06:00	18	30	9	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
27-28.01.2023	06:00-06:00	22	33	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
01-02.02.2023	06:00-06:00	17	30	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.02.2023	06:00-06:00	20	36	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.02.2023	06:00-06:00	19	34	9	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.02.2023	06:00-06:00	21	37	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.02.2023	06:00-06:00	22	38	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.02.2023	06:00-06:00	15	28	10	12	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.02.2023	06:00-06:00	22	38	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.02.2023	06:00-06:00	19	34	9	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
<b>Range (Minimum-Maximum)</b>		<b>15-24</b>	<b>28-38</b>	<b>7-12</b>	<b>8-14</b>	<b>&lt;10</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>Mean Value</b>		<b>19.7</b>	<b>33.0</b>	<b>8.8</b>	<b>10.3</b>	<b>&lt;10</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>NAAQ Norms*</b>		<b>60</b> (24 hrs.)	<b>100</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>100</b> (8 hrs.)	<b>400</b> (24 hrs.)	<b>2,000</b> (8 hrs.)	<b>1.0</b> (24 hrs.)	<b>6.0</b> (annual)	<b>20</b> (annual)	<b>5.0</b> (annual)	<b>1.0</b> (annual)

Legend : **PM2.5**-Particulate Matter size less than 2.5 µm; **PM10**-Respirable Particulate Matter size less than 10 µm; **SO<sub>2</sub>**-Sulphur dioxide; **NOx**-Oxides of Nitrogen; **O<sub>3</sub>**-Ozone; **NH<sub>3</sub>**-Ammonia; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C<sub>6</sub>H<sub>6</sub>**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. µg-microgram & ng-nanogram.

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

**Table : 3.16 Ambient Air Quality Data at A12-Varaguppai**

Monitoring		Particulates, µg/m <sup>3</sup>		Gaseous Pollutants, µg/m <sup>3</sup>					Other Pollutants (Particulate Phase)				
Date	Period, hrs.	PM2.5	PM10	SO <sub>2</sub>	NOx	O <sub>3</sub> (8-hly Avg.)	NH <sub>3</sub>	CO (8-hly Avg.)	Pb, µg/m <sup>3</sup>	As, ng/m <sup>3</sup>	Ni, ng/m <sup>3</sup>	C <sub>6</sub> H <sub>6</sub> , µg/m <sup>3</sup>	BaP, ng/m <sup>3</sup>
01-02.12.2022	06:00-06:00	13	21	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.12.2022	06:00-06:00	16	28	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.12.2022	06:00-06:00	11	20	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.12.2022	06:00-06:00	14	24	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.12.2022	06:00-06:00	12	21	6	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.12.2022	06:00-06:00	16	25	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.12.2022	06:00-06:00	11	21	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.12.2022	06:00-06:00	14	25	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.01.2023	06:00-06:00	16	29	9	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
03-04.01.2023	06:00-06:00	13	24	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.01.2023	06:00-06:00	17	26	10	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
11-12.01.2023	06:00-06:00	14	27	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.01.2023	06:00-06:00	13	23	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
19-20.01.2023	06:00-06:00	15	28	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.01.2023	06:00-06:00	14	23	8	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
27-28.01.2023	06:00-06:00	11	20	9	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
01-02.02.2023	06:00-06:00	15	26	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
02-03.02.2023	06:00-06:00	17	28	8	10	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
09-10.02.2023	06:00-06:00	14	22	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
10-11.02.2023	06:00-06:00	18	28	9	9	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
17-18.02.2023	06:00-06:00	17	30	8	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
18-19.02.2023	06:00-06:00	19	31	7	7	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
25-26.02.2023	06:00-06:00	15	27	7	8	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
26-27.02.2023	06:00-06:00	20	33	10	11	<10	<5	<1000	<0.1	<1	<1	<0.01	<0.1
<b>Range (Minimum-Maximum)</b>		<b>11-20</b>	<b>20-33</b>	<b>6-10</b>	<b>7-11</b>	<b>&lt;10</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>Mean Value</b>		<b>14.8</b>	<b>25.4</b>	<b>7.8</b>	<b>8.7</b>	<b>&lt;10</b>	<b>&lt;5</b>	<b>&lt;1000</b>	<b>&lt;0.1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;0.01</b>	<b>&lt;0.1</b>
<b>NAAQ Norms*</b>		<b>60</b> (24 hrs.)	<b>100</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>80</b> (24 hrs.)	<b>100</b> (8 hrs.)	<b>400</b> (24 hrs.)	<b>2,000</b> (8 hrs.)	<b>1.0</b> (24 hrs.)	<b>6.0</b> (annual)	<b>20</b> (annual)	<b>5.0</b> (annual)	<b>1.0</b> (annual)

Legend : **PM2.5**-Particulate Matter size less than 2.5 µm; **PM10**-Respirable Particulate Matter size less than 10 µm; **SO<sub>2</sub>**-Sulphur dioxide; **NOx**-Oxides of Nitrogen; **O<sub>3</sub>**-Ozone; **NH<sub>3</sub>**-Ammonia; **CO**-Carbon monoxide; **Pb**-Particulate Lead; **As**-Particulate Arsenic; **Ni**-Particulate Nickel; **C<sub>6</sub>H<sub>6</sub>**-Benzene & **BaP**- Benzo (a) pyrene in particulate phase. µg-microgram & ng-nanogram.

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

**Table : 3.17 Abstract of Ambient Air Quality Data**

Sl. No.	Parameter	Pollutant Concentration, ug/m <sup>3</sup>							
		PM2.5	PM10	SO <sub>2</sub>	NO <sub>x</sub>	PM2.5	PM10	SO <sub>2</sub>	NO <sub>x</sub>
		A1-Kallakudi Mines				A2-Kovandakurichi Mines			
1	No. of Observations	24	24	24	24	24	24	24	24
2	Minimum	32	50	10	13	24	41	11	13
3	10 <sup>th</sup> Percentile Value	33	54	12	13	26	44	12	14
4	20 <sup>th</sup> Percentile Value	35	56	12	15	27	46	12	15
5	30 <sup>th</sup> Percentile Value	36	57	13	15	28	48	12	15
6	40 <sup>th</sup> Percentile Value	37	58	14	17	30	51	12	15
7	50 <sup>th</sup> Percentile Value	37	62	14	19	31	54	13	16
8	60 <sup>th</sup> Percentile Value	38	62	16	20	32	55	13	16
9	70 <sup>th</sup> Percentile Value	40	63	16	21	33	57	14	17
10	80 <sup>th</sup> Percentile Value	40	66	18	23	34	58	14	17
11	90 <sup>th</sup> Percentile Value	42	69	20	24	35	60	15	18
12	95 <sup>th</sup> Percentile Value	43	71	21	24	36	61	15	18
13	98 <sup>th</sup> Percentile Value	45	73	22	25	37	62	16	19
14	Maximum	46	74	22	26	38	62	16	20
15	<b>Arithmetic Mean</b>	<b>37.7</b>	<b>61.0</b>	<b>15.2</b>	<b>18.5</b>	<b>30.7</b>	<b>52.5</b>	<b>13.0</b>	<b>15.9</b>
16	Geometric Mean	37.6	60.7	14.8	18.1	30.5	52.2	13.0	15.8
17	Standard Deviation	3.5	6.2	3.4	4.0	3.9	6.2	1.3	1.7
18	<b>NAAQ Norms*</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>
19	<b>% Values exceeding Norms*</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
		A3-DCBL DPM Plant				A2-Kallakudi			
1	No. of Observations	24	24	24	24	24	24	24	24
2	Minimum	27	47	10	13	21	36	10	12
3	10 <sup>th</sup> Percentile Value	29	51	12	14	22	40	10	12
4	20 <sup>th</sup> Percentile Value	31	55	12	15	24	42	10	12
5	30 <sup>th</sup> Percentile Value	31	55	13	15	25	43	11	13
6	40 <sup>th</sup> Percentile Value	32	56	14	17	25	45	11	13
7	50 <sup>th</sup> Percentile Value	33	57	14	18	26	46	12	14
8	60 <sup>th</sup> Percentile Value	34	58	14	18	26	48	12	15
9	70 <sup>th</sup> Percentile Value	34	59	15	18	27	49	13	15
10	80 <sup>th</sup> Percentile Value	35	61	16	19	29	51	13	15
11	90 <sup>th</sup> Percentile Value	38	63	18	21	30	53	15	17
12	95 <sup>th</sup> Percentile Value	41	66	18	23	32	54	15	18
13	98 <sup>th</sup> Percentile Value	42	69	18	23	32	56	16	20
14	Maximum	42	71	18	23	32	57	16	21
15	<b>Arithmetic Mean</b>	<b>33.3</b>	<b>57.5</b>	<b>14.3</b>	<b>17.5</b>	<b>26.0</b>	<b>46.3</b>	<b>12.0</b>	<b>14.2</b>
16	Geometric Mean	33.0	57.3	14.2	17.3	25.9	46.0	11.8	14.0
17	Standard Deviation	3.8	5.2	2.2	2.8	3.1	5.3	1.9	2.3
18	<b>NAAQ Norms*</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>
19	<b>% Values exceeding Norms*</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Legend : PM2.5-Particulate Matter size less than 2.5 um; PM10-Respirable Particulate Matter size less than 10 um; SO<sub>2</sub>-Sulphur dioxide; NO<sub>x</sub>-Oxides of Nitrogen. ug-microgram. O<sub>3</sub>-Ozone values are reported locationwise.

NH<sub>3</sub>-Ammonia; CO-Carbon monoxide; Pb-Particulate Lead; As-Particulate Arsenic; Ni-Particulate Nickel; C<sub>6</sub>H<sub>6</sub>-Benzene and BaP-Benzo (a) pyrene in particulate phase levels were monitored below respective detectable limits.

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

**Table : 3.17 (Contn.) Abstract of Ambient Air Quality Data**

Sl. No.	Parameter	Pollutant Concentration, ug/m <sup>3</sup>							
		PM2.5	PM10	SO <sub>2</sub>	NOx	PM2.5	PM10	SO <sub>2</sub>	NOx
		A5-Pullambadi				A6-Tappi			
1	No. of Observations	24	24	24	24	24	24	24	24
2	Minimum	20	36	10	12	18	30	8	9
3	10 <sup>th</sup> Percentile Value	22	37	10	13	20	33	8	10
4	20 <sup>th</sup> Percentile Value	24	39	11	14	20	35	9	11
5	30 <sup>th</sup> Percentile Value	24	40	11	15	21	35	9	11
6	40 <sup>th</sup> Percentile Value	25	41	12	15	22	36	9	11
7	50 <sup>th</sup> Percentile Value	26	42	12	15	22	37	10	12
8	60 <sup>th</sup> Percentile Value	27	44	13	16	23	37	10	13
9	70 <sup>th</sup> Percentile Value	27	45	13	16	24	38	11	13
10	80 <sup>th</sup> Percentile Value	29	46	14	17	24	38	11	13
11	90 <sup>th</sup> Percentile Value	31	50	15	18	26	40	12	14
12	95 <sup>th</sup> Percentile Value	32	52	15	18	27	41	12	15
13	98 <sup>th</sup> Percentile Value	33	54	16	19	27	41	13	16
14	Maximum	33	56	16	19	27	41	14	16
15	<b>Arithmetic Mean</b>	<b>26.1</b>	<b>43.0</b>	<b>12.4</b>	<b>15.4</b>	<b>22.5</b>	<b>36.5</b>	<b>10.0</b>	<b>12.1</b>
16	Geometric Mean	25.9	42.7	12.3	15.3	22.3	36.4	9.9	12.0
17	Standard Deviation	3.5	5.2	1.7	1.9	2.6	2.8	1.5	1.7
18	<b>NAAQ Norms*</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>
19	<b>% Values exceeding Norms*</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
		A7-Kil Arasur				A8-Palanganatham			
1	No. of Observations	24	24	24	24	24	24	24	24
2	Minimum	15	30	11	13	10	19	6	7
3	10 <sup>th</sup> Percentile Value	18	34	11	14	10	20	6	7
4	20 <sup>th</sup> Percentile Value	19	36	12	15	11	21	7	8
5	30 <sup>th</sup> Percentile Value	21	37	12	15	12	21	7	8
6	40 <sup>th</sup> Percentile Value	22	39	12	15	12	22	7	8
7	50 <sup>th</sup> Percentile Value	23	40	13	16	13	23	8	9
8	60 <sup>th</sup> Percentile Value	24	42	14	16	13	23	8	9
9	70 <sup>th</sup> Percentile Value	26	42	14	17	14	25	8	9
10	80 <sup>th</sup> Percentile Value	27	45	14	17	14	25	8	9
11	90 <sup>th</sup> Percentile Value	30	50	15	18	15	27	9	10
12	95 <sup>th</sup> Percentile Value	31	52	15	18	16	28	9	11
13	98 <sup>th</sup> Percentile Value	32	54	16	20	17	30	9	11
14	Maximum	33	55	16	21	18	31	9	11
15	<b>Arithmetic Mean</b>	<b>23.5</b>	<b>40.9</b>	<b>13.0</b>	<b>16.0</b>	<b>12.8</b>	<b>23.2</b>	<b>7.5</b>	<b>8.7</b>
16	Geometric Mean	23.1	40.4	13.0	16.0	12.6	23.0	7.4	8.6
17	Standard Deviation	4.8	6.2	1.5	1.8	2.1	2.9	0.9	1.1
18	<b>NAAQ Norms*</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>
19	<b>% Values exceeding Norms*</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Legend : PM2.5-Particulate Matter size less than 2.5 um; PM10-Respirable Particulate Matter size less than 10 um; SO<sub>2</sub>-Sulphur dioxide; NOx-Oxides of Nitrogen. ug-microgram. O<sub>3</sub>-Ozone values are reported locationwise.

NH<sub>3</sub>-Ammonia; CO-Carbon monoxide; Pb-Particulate Lead; As-Particulate Arsenic; Ni-Particulate Nickel; C<sub>6</sub>H<sub>6</sub>-Benzene and BaP-Benzo (a) pyrene in particulate phase levels were monitored below respective detectable limits.

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

**Table : 3.17 (Contn.) Abstract of Ambient Air Quality Data**

Sl. No.	Parameter	Pollutant Concentration, ug/m <sup>3</sup>							
		PM2.5	PM10	SO <sub>2</sub>	NOx	PM2.5	PM10	SO <sub>2</sub>	NOx
		A9-Kovil Esanai				A10-Kovandakurichi			
1	No. of Observations	24	24	24	24	24	24	24	24
2	Minimum	10	17	6	7	10	18	8	9
3	10 <sup>th</sup> Percentile Value	10	18	6	7	12	20	8	10
4	20 <sup>th</sup> Percentile Value	11	20	7	8	13	22	9	11
5	30 <sup>th</sup> Percentile Value	11	20	7	8	14	25	9	11
6	40 <sup>th</sup> Percentile Value	12	21	7	8	15	26	9	12
7	50 <sup>th</sup> Percentile Value	13	21	7	8	16	27	10	12
8	60 <sup>th</sup> Percentile Value	13	22	7	9	17	28	10	13
9	70 <sup>th</sup> Percentile Value	13	22	8	9	17	28	11	13
10	80 <sup>th</sup> Percentile Value	14	23	8	9	18	30	11	13
11	90 <sup>th</sup> Percentile Value	15	26	8	10	19	31	11	14
12	95 <sup>th</sup> Percentile Value	15	27	9	10	20	32	11	15
13	98 <sup>th</sup> Percentile Value	16	27	9	11	21	33	12	15
14	Maximum	17	27	9	11	21	33	12	15
15	<b>Arithmetic Mean</b>	<b>12.5</b>	<b>21.5</b>	<b>7.3</b>	<b>8.4</b>	<b>15.5</b>	<b>26.4</b>	<b>9.8</b>	<b>12.2</b>
16	Geometric Mean	12.3	21.3	7.2	8.3	15.3	26.1	9.8	12.1
17	Standard Deviation	1.9	2.8	0.8	1.1	2.9	4.1	1.2	1.7
18	<b>NAAQ Norms*</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>
19	<b>% Values exceeding Norms*</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
		A11-Vandalaikudalur				A12-Varaguppai			
1	No. of Observations	24	24	24	24	24	24	24	24
2	Minimum	15	28	7	8	11	20	6	7
3	10 <sup>th</sup> Percentile Value	16	28	7	8	11	21	7	7
4	20 <sup>th</sup> Percentile Value	18	30	8	9	13	22	7	8
5	30 <sup>th</sup> Percentile Value	19	31	8	9	14	23	7	8
6	40 <sup>th</sup> Percentile Value	19	32	8	10	14	24	7	8
7	50 <sup>th</sup> Percentile Value	20	33	9	10	15	26	8	9
8	60 <sup>th</sup> Percentile Value	20	34	9	11	15	27	8	9
9	70 <sup>th</sup> Percentile Value	21	35	9	11	16	28	8	9
10	80 <sup>th</sup> Percentile Value	22	36	10	12	17	28	8	9
11	90 <sup>th</sup> Percentile Value	22	37	10	13	18	30	9	10
12	95 <sup>th</sup> Percentile Value	23	38	11	13	19	31	10	11
13	98 <sup>th</sup> Percentile Value	24	38	12	14	20	32	10	11
14	Maximum	24	38	12	14	20	33	10	11
15	<b>Arithmetic Mean</b>	<b>19.7</b>	<b>33.0</b>	<b>8.8</b>	<b>10.3</b>	<b>14.8</b>	<b>25.4</b>	<b>7.8</b>	<b>8.7</b>
16	Geometric Mean	19.5	32.9	8.7	10.2	14.6	25.2	7.7	8.6
17	Standard Deviation	2.4	3.3	1.3	1.7	2.4	3.6	1.1	1.1
18	<b>NAAQ Norms*</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>
19	<b>% Values exceeding Norms*</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Legend : PM2.5-Particulate Matter size less than 2.5 um; PM10-Respirable Particulate Matter size less than 10 um; SO<sub>2</sub>-Sulphur dioxide; NOx-Oxides of Nitrogen. ug-microgram. O<sub>3</sub>-Ozone values are reported locationwise.

NH<sub>3</sub>-Ammonia; CO-Carbon monoxide; Pb-Particulate Lead; As-Particulate Arsenic; Ni-Particulate Nickel; C<sub>6</sub>H<sub>6</sub>-Benzene and BaP-Benzo (a) pyrene in particulate phase levels were monitored below respective detectable limits.

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

**Table : 3.18 Ambient Air Quality Status**

Season : Winter 2022-23

No. of Locations : 12

Sample Size : 24-Hourly

Sl. No	Parameter	Pollutant Concentration, ug/m <sup>3</sup>			
		PM2.5	PM10	SO <sub>2</sub>	NO <sub>x</sub>
1	No. of Observations	288	288	288	288
2	Minimum	10	17	6	7
3	10 <sup>th</sup> Percentile Value	12	21	7	8
4	20 <sup>th</sup> Percentile Value	14	25	8	9
5	30 <sup>th</sup> Percentile Value	17	28	9	10
6	40 <sup>th</sup> Percentile Value	20	34	10	12
7	50 <sup>th</sup> Percentile Value	22	37	11	13
8	60 <sup>th</sup> Percentile Value	25	41	12	14
9	70 <sup>th</sup> Percentile Value	27	47	12	15
10	80 <sup>th</sup> Percentile Value	31	53	14	16
11	90 <sup>th</sup> Percentile Value	35	58	15	18
12	95 <sup>th</sup> Percentile Value	38	62	16	20
13	98 <sup>th</sup> Percentile Value	41	66	18	23
14	Maximum	46	74	22	26
15	<b>Arithmetic Mean</b>	<b>22.9</b>	<b>38.9</b>	<b>10.9</b>	<b>13.2</b>
16	Geometric Mean	21.6	36.9	10.6	12.7
17	Standard Deviation	8.5	13.8	3.1	4.0
18	<b>NAAQ Norms*</b>	<b>60</b>	<b>100</b>	<b>80</b>	<b>80</b>
19	<b>% Values exceeding NAAQ Norms</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Legend : PM2.5-Particulate Matter size less than 2.5 um; PM10-Respirable Particulate Matter size less than 10 um; SO<sub>2</sub>-Sulphur dioxide; NO<sub>x</sub>-Oxides of Nitrogen. ug-microgram. O<sub>3</sub>-Ozone values are reported locationwise.

NH<sub>3</sub>-Ammonia; CO-Carbon monoxide; Pb-Particulate Lead; As-Particulate Arsenic; Ni-Particulate Nickel; C<sub>6</sub>H<sub>6</sub>-Benzene and BaP-Benzo (a) pyrene in particulate phase levels were monitored below respective detectable limits.

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

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

1. 24-hly./8-hly. values should be met 98% of the time in a year; however, 2% of the time it may exceed but not on two consecutive days.

2. Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24-hourly at uniform interval.

### 3.5.3 RSPM Analysis

With samples of Respirable Suspended Particulate Matter (RSPM or PM<sub>10</sub>) monitored, the main focus is on characterization of PM<sub>10</sub> to have a better understanding and correlation between the RSPM fraction at source and receptor. The results are tabulated in **Table 3.19**.

**Table : 3.19 RSPM Analytical Data**

Parameter	Percentage in RSPM Content	
	Upwind Direction (Location A8)	Downwind Direction (Location A6)
Loss on Ignition	11.8	12.2
Iron oxides (Fe <sub>2</sub> O <sub>3</sub> )	12.5	12.1
Calcium oxide (CaO)	30.1	29.7
Magnesium oxide (MgO)	3.2	3.0
Sodium oxide (Na <sub>2</sub> O)	0.32	0.30
Potassium oxide (K <sub>2</sub> O)	0.14	0.13
Aluminium oxide (Al <sub>2</sub> O <sub>3</sub> )	9.1	9.3
Titanium oxide (TiO <sub>2</sub> )	0.10	0.08

There was no significant variation in the characteristics of RSPM values in the upwind and downwind direction locations. Silica Content was found to be 1.8% of RSPM that monitored in the Study Area.

**Free Respirable Silica Content (FTIR Method) : 1.8 %.**

### 3.6 Noise Levels

The Study area represents Industrial, Commercial and Residential Areas to compare with the MoEF&CC Ambient Noise Norms. Industrial & Mining activities and the traffic flow are main source of Noise in the area. The abstract of monitored monthly noise data are presented in **Table 3.20**. Workzone Noise Levels are given in **Table 3.21**.

Ambient Noise Levels were ranging from 32.9 dB(A) to 98.7 dB(A) during day times and from 31.5 dB(A) to 99.5 dB(A) during night times on the monitoring days. Day Equivalent Noise (Leq-d) level was found to be 43.6 dB(A) and Night Equivalent Noise (Leq-n) level was 41.8 dB(A). While comparing with the MoEF&CC Leq Norms for day and night times, the monitored **ambient noise levels were well within the limit values** for their respective Category Area.

Workzone Noise Levels within the Plant and Mines at a distance of 1.0-1.5 m from the source is maintained at **<85 db(A)** well within **OSHA Standard of 85 dB(A) for 8-hours exposure**. However, Noise levels at the boundaries were <55 dB(A) during day times and <45 dB(A) during night times.



**Table : 3.20 Ambient Noise Level Data (Abstract)**

Monitoring Dates : 09-10.12.2022; 11-12.01.2023 &amp; 09-10.02.2023

Sl. No.	Location	Area	Noise Levels, dB(A)					
			Day Time (06:00-22:00 hrs.)			Night Time (22:00-06:00 hrs.)		
			Lmin.	Lmax.	Leq	Lmin.	Lmax.	Leq
1	A1-Kallakudi Mines	Industrial	35.0	98.7	<b>46.9</b>	34.0	99.5	<b>44.2</b>
2	A2-Kovandakurichi Mines	Industrial	33.8	92.7	<b>44.3</b>	33.2	90.6	<b>42.7</b>
3	A3-DCBL DPM Plant	Industrial	35.9	97.4	<b>47.3</b>	34.6	98.2	<b>44.5</b>
4	A4-Kallakudi	Residential	34.1	96.3	<b>44.7</b>	32.9	90.1	<b>42.6</b>
5	A5-Pullambadi	Commercial	33.8	98.4	<b>45.3</b>	32.7	92.6	<b>43.1</b>
6	A6-Tappai	Residential	33.0	92.7	<b>42.1</b>	31.8	90.1	<b>40.4</b>
7	A7-Kil Arasur	Residential	33.7	94.8	<b>43.5</b>	32.1	92.2	<b>41.8</b>
8	A8-Palanganatham	Residential	33.1	92.2	<b>41.6</b>	31.9	89.4	<b>40.2</b>
9	A9-Kovil Esanai	Residential	33.2	90.4	<b>41.5</b>	31.5	87.8	<b>40.0</b>
10	A10-Kovandakurichi	Residential	33.6	93.7	<b>43.3</b>	32.1	90.5	<b>41.1</b>
11	A11- Vandalaikudalur	Residential	33.0	92.0	<b>42.0</b>	32.4	88.6	<b>40.7</b>
12	A12-Varaguppai	Residential	32.9	90.4	<b>40.7</b>	31.8	85.4	<b>39.8</b>
<b>Study Area</b>			<b>32.9</b>	<b>98.7</b>	<b>43.6</b>	<b>31.5</b>	<b>99.5</b>	<b>41.8</b>
<b>MoEF&amp;CC Norms* for Residential Areas</b>			-		<b>55</b>	-		<b>45</b>
<b>MoEF&amp;CC Norms for Commercial Areas</b>			-		<b>65</b>	-		<b>55</b>
<b>MoEF&amp;CC Norms for Industrial Areas</b>			-		<b>75</b>	-		<b>70</b>

\* : MoEF&CC Norms-Ministry of Environment, Forest & Climate Change Ambient Noise Norms (Leq).  
Day time is reckoned in between 6 a.m and 10 p.m. and Night time is reckoned in between 10 p.m. and 6 a.m.

**Table : 3.21 Work Noise Level Data**

Equipment	Location	Noise Level (Leq), dB(A)
Rock Breakers, Operating	Operator's Position	80-85
Dumper, operating	10 m away	70
Dozer & Dumper both, operating	10 m away	85-90

### 3.7 Water Environment

#### 3.7.1 Geology

The limestone deposit covered in Kallakudi & Kovandakurichi area is of sedimentary origin and referable to Uttathur Stage of Upper Cretaceous Formation and are of marine transgressional series. The basement rocks are of Archean with granite and granitic gneiss. The order of superposition of the rocks have the Archean as the basement with conglomerate and sand stone, the massive coral limestone followed by bedded clastic limestone and bedded marl and soft marl with black clay or red earth as top soil.

Geomorphic features of the study area such as buried pediments (deep and shallow), flood plain (pediments) and sedimentary plain. A major portion of the area is occupied by **sedimentary plain** (northern region) followed by **buried pediments** (southern region). Flood plain is present in the course of Kollidam (Coleroon) River.

#### 3.7.2 Hydrogeology

EIA Coordinator and Officials of M/s. Thrust Geo-consultants Private Limited, an **Accredited Ground Water Professionals** for 'Hydrogeological Report for Mining Projects' by Central Ground Water Authority (CGWA) have carried out the Hydrogeological Survey including a Pumping Test during 03-04.09.2022 and submitted the Report.



Study Area falls in both Trichy and Ariyalur Districts. Sub-tropical climate prevails over the study area. The temperature is maximum during March to May and it drops from June onwards. The mean-maximum temperature ranges from 28.7°C to 42.7°C and the mean-minimum temperature from 20.7°C to 30.6°C. As per TWAD Data, 70 years Normal Rainfall of nearby Ariyalur Rain Gauge Station is 1,096 mm. The 70 years normal annual rainfall of nearby Pullambadi Station is around 756.6 mm. Around 52% of the rainfall occurs during Northeast monsoon period.

The surface and ground water flow pattern for KLK mine is in the NW-SE direction. The study area has a simple drainage network pattern including major and minor rivers and their respective drainage basins. There are first order, second order, third order, fourth order and fifth order streams in the area. Low drainage density is noticed in regions of high resistance with permeable soil under dense vegetation cover and low relief. Further, high drainage density is observed in region, which are highly impermeable with high relief. A high drainage density indicates high rate of surface runoff and low infiltration. This also indicates an impermeable layer at the top of the aquifer.

Hard rocks like granites and gneisses which are resistant to stream erosion tend to give higher drainage density in weak formulations such as shales and clays, even a small watershed can supply enough runoff from channel erosion and limited in filtration.

Water Level Survey has been taken up for the Area covering 5 km radius from the Mine boundary. About 11 Borewells (BW) & 2 Dugwells (DW) are identified within 1-km Area, another 4 Borewells in 1-3 km Area and another 4 Borewells and 1 Dugwell in 3-5 km Area. Thus, there are 19 Borewells and 3 Dugwells in the Mine vicinity



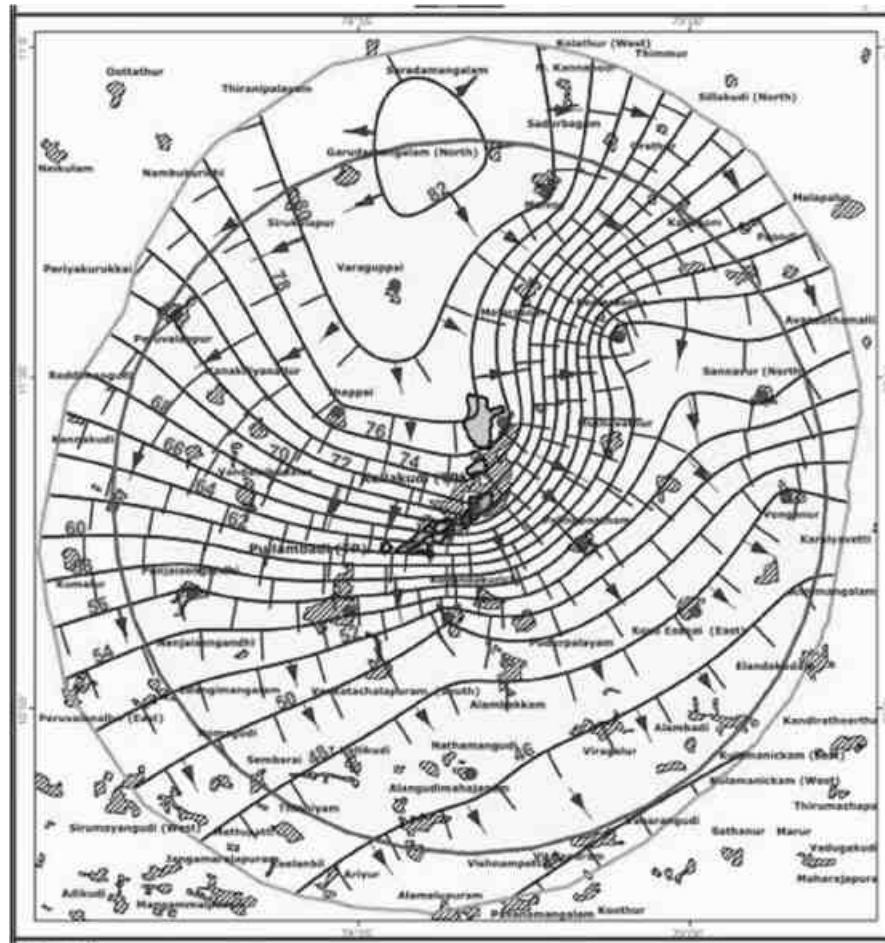
**Table : 3.22 Monitored Ground Water Level Data**

Sl. No.	Well ID	Date	Time, hrs.	Location	Coordinates	From KLK Pit-1		Elevation (aMSL), m	Well Depth, m	Water Level at, m	
						Distance	Direction			BGL	RL
1	BW1	03.09.2022	16:03:26	DCBL KVK Mine Office	10°57'34.45" N 78°55'46.81" E	2.35	SSW	79	90.9	16.27	62.73
2	BW2	03.09.2022	16:30:48	Pullambadi RG Nagar	10°56'33.71" N 78°54'53.61" E	4.80	SSW	62	30.0	2.54	59.46
3	DW1	03.09.2022	16:51:43	Kovandakurichi (KLK Road)	10°56'30.26" N 78°56'28.40" E	3.70	S	62	9.0	4.47	57.53
4	BW3	03.09.2022	17:02:53	Pudurpalayam near Ganesh Stores	10°56'41.67" N 78°56'57.35" E	3.30	S	63	60.0	4.39	58.61
5	BW4	03.09.2022	17:20:41	Palanganatham Borewell (by DCBL)	10°57'36.13" N 78°57'53.12" E	2.70	SE	59	60.0	2.64	56.36
6	BW5	03.09.2022	17:32:10	AVK Colony, Kallakudi near Plant	10°58'09.81" N 78°57'15.15" E	0.90	SE	76	45.0	4.52	71.48
7	DW2	03.09.2022	17:39:21	Mr Siva House near Dalmia Refractories Gate	10°58'29.08" N 78°57'22.51" E	0.80	E	74	4.5	2.10	71.90
8	BW6	03.09.2022	17:45:22	Kallakudi near Pechi Amman Periyandavar Temple	10°58'32.65" N 78°57'14.40" E	0.50	ENE	75	40.0	2.22	72.78
9	DW3	03.09.2022	17:57:06	Dalmia Township near Kalamman Temple	10°58'26.37" N 78°57'14.48" E	0.60	NE	77	4.0	2.24	74.76
10	BW7	04.09.2022	11:05:07	Dalmia Farm Borewell-1 (Reference Well)	10°58'26.04" N 78°57'18.21" E	0.72	ESE	78	60.0	2.13	75.87
11	BW8	04.09.2022	11:09:05	Dalmia Farm Borewell-2 (Pumping Test Well)	10°58'24.86" N 78°57'17.63" E	0.71	ESE	78	60.0	1.82	76.18

Sl. No.	Well ID	Date	Time, hrs.	Location	Coordinates	from KLK Pit-1		Elevation (aMSL), m	Well Depth, m	Water Level at, m	
						Distance	Direction			BGL	RL
12	BW9	04.09.2022	13:59:08	Kallakudi TP Office	10°58'27.38" N 78°56'58.30" E	0.20	E	83	55.0	8.05	74.95
13	BW10	04.09.2022	14:10:21	Kallakudi EB Road Vanniar Colony	10°58'25.30" N 78°56'49.56" E	0.25	SE	84	50.0	6.00	78.00
14	BW11	04.09.2022	14:15:36	Kallakudi Palaniyandi Nagar	10°58'25.92" N 78°56'38.23" E	0.15	S	84	45.0	3.92	80.08
15	BW12	04.09.2022	14:28:35	Kallakudi Narasiyappa Colony (Western side of NH-81)	10°58'13.04" N 78°56'22.87" E	0.75	SSW	78	28.5	24.0	54.00
16	BW13	04.09.2022	14:51:50	Kallakudi Vet. Hospital	10°58'47.09" N 78°56'57.42" E	0.11	N	81	40.0	6.79	74.21
17	BW14	04.09.2022	14:56:50	Kallakudi Pathiriyar Koil Street	10°58'37.09" N 78°56'58.38" E	0.07	NE	87	60.0	13.82	73.18
18	BW15	04.09.2022	16:18:32	Kallakudi Pit-2 Borewell-1 (Western Boundary)	10°59'10.31" N 78°56'34.76" E	0.90	NW	95	42.5	16.73	76.27
19	BW16	04.09.2022	16:45:08	Kallakudi Pit-2 Borewell-2 (Northern Boundary)	10°59'35.04" N 78°56'40.00" E	1.52	NNW	91	39.0	11.00	80.00
20	BW17	04.09.2022	16:58:28	Kallakudi New Samathuvapuram	10°59'14.42" N 78°57'17.31" E	1.10	NNE	79	70.0	5.81	73.19
21	BW18	04.09.2022	17:40:52	Thappai Village	10°59'23.30" N 78°54'44.25" E	3.75	WNW	85	30.0	0.80	84.20
22	BW19	04.09.2022	17:30:36	Varakuppai Village	11°01'11.30" N 78°55'27.62" E	6.04	NNW	89	30.0	1.70	87.30

The ground water in the region occurs in three different geological formations viz. River Alluvium, Marine Limestone and Tertiary Formations. In Limestone Mines, the aquifer zone is from 45 m BGL. Monitored Ground Water Levels in this Premonsoon-2022 Season, were in-between 1.82 m BGL (Dalmia Farm Borewell-2) - 18.73 m BGL (Kallakudi Pit-2 Western Boundary) within 1-km from Kallakudi Pit-1 other than BW12 located on a seasonal nalla. In Kallakudi Village, monitored Water Levels were in-between 2.22 m- 8.05 m BGL or 71.78 m RL to 80.08 m Reduced Level (RL). In 1-3 km Area, monitored Ground Water Levels were in-between 2.64 m BGL (Palanganatham) - 11.00 m BGL (Kallakudi Pit-2 Northern Boundary). The monitored Water Levels were in-between 56.36 m RL – 80.00 m RL. In 3-5 km Area, monitored Ground Water Levels were in-between 0.80 m BGL (Thappai Village) - 16.27 m BGL (KVK Mine Office). The monitored Water Levels were in-between 57.53 m RL – 87.30 m RL in 3-5 km Area. Thus, the **operating Mines for the last 8 decades do not have any impact on the Ground Water-table Levels** in their vicinity. Ground Water Level Contours are shown in Fig. 3.5.

Fig. : 3.5 Ground Water Level Contours



**Pumping Test :** An Aquifer Performance Test was conducted on 04.09.2022 to determine the hydraulic character of the aquifer in the Mine vicinity. DCBL's Borewell No. 1 (Reference Well) and Borewell No. 2 in their Farm have been selected for the Pumping Test.

Well ID	Location	Coordinates	From KLK Pit-1		Elevation (aMSL), m	Well Depth, m	Static Water Level at, m BGL
			Distance	Direction			
BW7	Dlamia Farm Borewell-1 (Reference Well)	10°58'26.04" N 78°57'18.21" E	0.72	ESE	78	60.0	2.13
BW8	Dlamia Farm Borewell-2 (Pumping Test Well)	10°58'24.86" N 78°57'17.63" E	0.71	ESE	78	60.0	1.82

The depth of the Borewell-2 is 60 m and is pumped with a 5 HP submersible pump. The average discharge of the pump was set for 4.2 cu.m/hour. Pump discharge was made at 110 m away (westerly) from Pumping Borewell. Pumping was done for a total duration of 66 minutes and the recovery was monitored for about 67 minutes. The water level in the pumping well was monitored at regular intervals along with discharge. The static water level was at 1.82 m before the starting of the test and went down upto 50.09 m. The Water Level in Reference Borewell (@ 35 m distance) in an hour was 2.04 m i.e. (-) 0.5 m which was recovered in another one hour time. The drawdown of water levels in the well was measured and given in the **Table 3.23**. The plot of Drawdown vs Time (Drawdown) and the plot of Residual Drawdown vs t/t' (Recovery) (Fig. 4.1) was done using the pump test data and the draw down per log cycle was estimated in each plot. The transmissivity value is estimated using the formula :

$$T = \frac{2.30 \times Q}{4 \times \pi \times \Delta S}$$

Where, T is Transmissivity in m<sup>2</sup>/day

Q is the pumping rate in m<sup>3</sup>/day

π is : 3.14

Δ S is drawdown per log cycle.

Based on drawdown data the estimated T value for the estimated Δ S = 30 m

$$T = \frac{2.30 \times 100.8}{4 \times 3.14 \times 30} = 0.615 \text{ m}^2/\text{day}$$

Based on recovery data the estimated T value for the estimated Δ S = 24 m

$$T = \frac{2.30 \times 100.8}{4 \times 3.14 \times 24} = 0.769 \text{ m}^2/\text{day}$$

**Average "T" value of the Aquifer is estimated to be 0.692 m<sup>2</sup>/ day**

Table : 3.23 Pumping Test

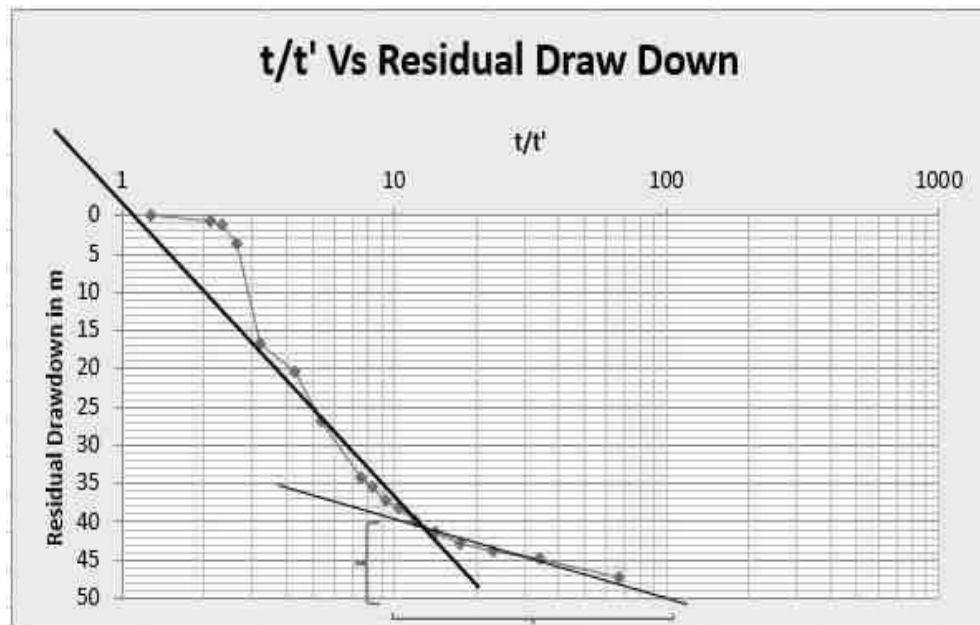
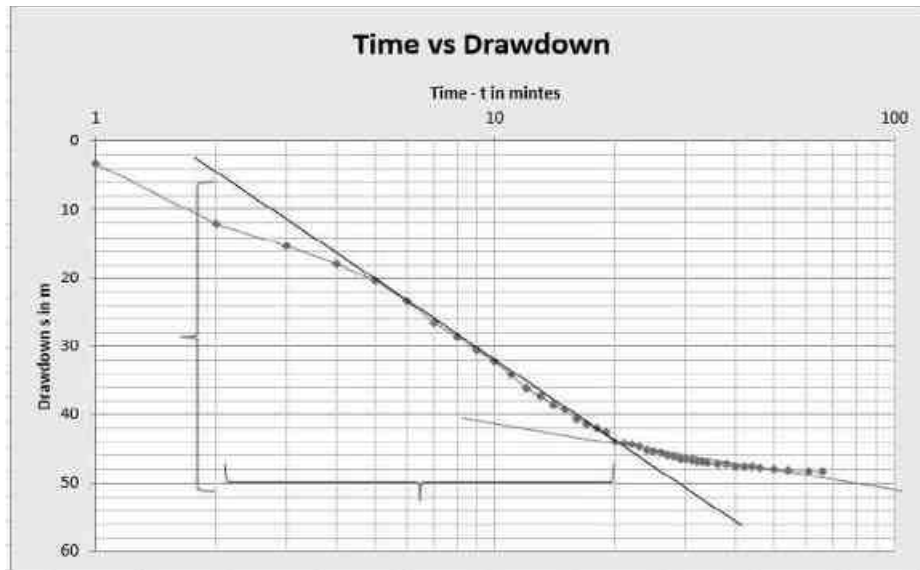
04.09.2022 Time, hrs.	Time since Pumping started - t in minutes	Water Level in m	Drawdown	Time since pumping stopped - t' in minutes	Residual Drawdown	W'	Remarks
11:10	0	1.82	0.00				SWL
11:45	1	4.99	3.17				Pump Started
11:46	2	13.99	12.17				
11:47	3	17.12	15.30				
11:48	4	19.79	17.97				Yield, 5.5 cu.m/hr
11:49	5	22.22	20.40				
11:50	6	25.2	23.38				
11:51	7	28.39	26.57				Yield, 3.8 cu.m/hr
11:52	8	30.4	28.58				Yield, 3.3 cu.m/hr
11:53	9	32.34	30.52				
11:54	10	34	32.18				
11:55	11	35.9	34.08				
11:56	12	38.03	36.21				
11:57	13	39.03	37.21				
11:58	14	40.3	38.48				
11:59	15	41.1	39.28				
12:00	16	42.52	40.70				
12:01	17	43.13	41.31				
12:02	18	43.71	41.89				
12:03	19	44.36	42.54				
12:04	20	45.75	43.93				
12:05	21	45.91	44.09				
12:06	22	46.17	44.35				
12:07	23	46.5	44.68				
12:08	24	46.98	45.16				
12:09	25	47.26	45.44				
12:10	26	47.42	45.60				

04.09.2022 Time, hrs	Time since Pumping started - t in minutes	Water Level in m	Drawdown	Time since pumping stopped - t' in minutes	Residual Drawdown	W'	Remarks
12:11	27	47.74	45.92				
12:12	28	47.91	46.09				
12:13	29	48.29	46.47				
12:14	30	48.36	46.54				
12:15	31	48.5	46.68				
12:16	32	48.59	46.77				
12:17	33	48.7	46.88				
12:18	34	48.8	46.98				
12:20	36	48.94	47.12				
12:22	38	49.08	47.26				
12:24	40	49.37	47.55				
12:26	42	49.41	47.59				
12:28	44	49.39	47.57				
12:30	46	49.49	47.67				
12:34	50	49.7	47.88				
12:38	54	49.88	48.06				
12:45	61	50.07	48.25				Ref. Well WL-2.04m
12:50	66	50.09	48.27	0	48.27		Pump Stopped
12:51	67	49.12	47.30	1	47.30	67.0	
12:52	68	46.6	44.78	2	44.78	34.0	
12:53	69	45.69	43.87	3	43.87	23.0	
12:54	70	44.7	42.88	4	42.88	17.5	
12:55	71	43.17	41.35	5	41.35	14.2	
12:56	72	41.68	39.86	6	39.86	12.0	
12:57	73	40.09	38.27	7	38.27	10.4	
12:58	74	38.9	37.08	8	37.08	9.3	

04.09.2022 Time, hrs.	Time since Pumping started - t in minutes	Water Level in m	Drawdown	Time since pumping stopped - t' in minutes	Residual Drawdown	W'	Remarks
12:59	75	37.20	35.38	9	35.38	8.3	
13:00	76	35.97	34.15	10	34.15	7.6	
13:05	81	28.52	26.7	15	26.70	5.4	
13:10	86	22.30	20.48	20	20.48	4.3	
13:20	96	18.53	16.71	30	16.71	3.2	
13:30	106	5.34	3.52	40	3.52	2.7	
13:40	116	3.00	1.18	50	1.18	2.3	Ref. Well WL-2.13 m
13:50	126	2.38	0.56	60	0.56	2.1	
13:57	133	1.82	0	67	0.00	1.9	Test Concluded
				***			

**Drawdown Graphs :**

Discharge	70 lpm
Time	66 min
Drawdown	50.09 m
Specific Capacity	1.40 lpm/m drawdown
Transmissivity	0.692 m <sup>2</sup> /day





### 3.7.3 Stage of Development

The ground water in Ariyalur region occurs in three different geological formations viz. River Alluvium, Marine Limestone and Tertiary Formations (Central Ground Water Board - CGWB District Brochure; March 2009). In the river alluvium, the ground water occurs under water table condition. The average thickness of the river alluvium varies from 12 m to 22 m. The ground water in these formations serves as irrigation and drinking water sources. In the Cretaceous limestone formations the ground water occurs in water table conditions. The depth of the wells in these formations ranges between 10-20 m and some area has high ground water potential due to the presence of limestone cavities. In the Tertiary formations, the ground water occurs predominantly in semi-confined and confined conditions which yield good quantity and quality of waters. The depth of bore wells in these formation ranges from 30 to 120 m bgl.

#### CGWB Data :

Specific Yield	0.3-2.56 %
Transmissivity	33 to 772 m <sup>2</sup> /day
Hydraulic Conductivity	10-66 m/day
Discharge	1.1 to 3.5 lits./sec

The ground water **Stage of Development of Ariyalur Block is <70% & SAFE Category** and the **Stage of Development of Pullambadi Block is 49% (<70%)** and falls in **SAFE Category**.

### 3.7.4 Water Quality

The Central Pollution Control Board (CPCB) has identified Five **Designated Best Use of Surface Waters** viz. **Class A** (Drinking Water Source without Conventional Treatment but after Disinfection), **B** (Out Door Bathing-Organised), **C** (Drinking Water Source after Conventional Treatment and Disinfection), **D** (Propagation of Wild life and Fisheries) & **E** (Irrigation, Industrial Cooling, Controlled Waste Disposal) and stipulated the Norms for the Classes; for few Parameters (**Table 3.24**).

Further, Bureau of Indian Standards (BIS) had also recommended Tolerance Limits for Inland Surface Waters for the different uses (**IS 2296:1982**). Even though, IS 2296:1982 has been withdrawn, the analysed data are compared with this Standard to have better understanding about the Surface Water Quality in the Study Area. The Ground Water Quality Parameters were compared with **BIS 10500:2012 Standards** of Acceptable and Permissible Limits for Drinking purpose with Ground Water as source.

**Table : 3.24 CPCB Criteria for Designated Best Use of Water**

Parameter	Designated Best Use Class & Required Criteria				
	A	B	C	D	E
pH	6.5-8.5	6.5-8.5	6.5-9.0	6.5-8.5	6.5-8.5
EC, umhos/cm (max.)	-	-	-	-	2,250
DO, mg/l	6 or more	5 or more	4 or more	4 or more	6 or more
BOD-3 days @ 27 °C	2 or less	3 or less	3 or less	-	2 or less
Total Coliforms, MPN/100 ml	50 or less	500 or less	5000 or less	-	50 or less
Free Ammonia (as N), mg/l	-	-	-	1.2 or less	-
Boron, mg/l (max.)	-	-	-	-	2
Sodium Absorption Ratio (max.)	-	-	-	-	26

- : Not included/Not specified.

The monitored water quality data are presented in **Tables 3.25-3.26** and the abstract of those data is given as **Table 3.27**.

The **surface water** samples were monitored with pH in the range 7.41-7.66 against the Limit value of 6.5-8.5. DO levels were in the range 5.1-5.8 mg/l against the minimum requirement value of 4.0-6.0 mg/l for Surface Waters. TDS values were monitored in the range of 240-330 mg/l against the Limit values of 500/2100 mg/l. Chloride values ranging from 64 mg/l to 86 mg/l. Iron content was found to be in the range 0.05-0.08 mg/l. Oil and grease, phenolic compounds, cyanides, sulphides and insecticides were found to be absent. Trace metals were found to be in traceable levels. BOD and COD values were found to be <2 mg/l and 4-12 mg/l respectively. The surface water quality were found to be within the prescribed CPCB Norms.

The pH of **mine pit water** samples were ranging from 7.57-7.78 against the BIS Norm of 6.5-8.5. TDS and Chloride values were found to be in the range 340-540 mg/l (Norm 500 mg/l or 2,000 mg/l in the absence of alternate source) and 74-108 mg/l (Norm 250/1000 mg/l) respectively. Iron content was found to be in the range 0.05-0.10 mg/l. Oil & Grease, Cyanides, Phenols, Pesticides, etc. were found to be absent. Most of the trace metals were monitored to be below their detectable limits. In general, the water quality of ground waters were found to be within the prescribed IS 10500:2015 Norms for Drinking in the absence of an alternative source and TNPCB Norms for **Onland Irrigation**.

The pH of the **ground water** samples were ranging from 7.51-7.70 against the BIS Norm of 6.5-8.5. TDS and Chloride values were found to be in the range 340-420 mg/l (Norm 500 mg/l or 2,000 mg/l in the absence of alternate source) and 74-106 mg/l (Norm 250/1000 mg/l) respectively. Iron content was found to be in the range 0.05-0.10 mg/l. Oil & Grease, Cyanides, Phenols, Pesticides, etc. were found to be absent. Most of the trace metals were monitored to be below their detectable limits. In general, the water quality of ground waters were found to be within the prescribed IS 10500:2015 Norms for Drinking in the absence of an alternative source.

**Table : 3.25 Surface Water Quality Data**

Monitoring Dates : 11.12.2022; 13.01.2023 & 11.02.2023  
(Mean & Worst case values are reported)

Sl. No.	Parameter	W1	W2	W3	W4	W5	W6	W7	W8	CPCB Norms*
1	pH	7.41	7.51	7.58	7.50	7.62	7.66	7.53	7.63	6.5-8.5
2	Colour, Hazen units	<2	<2	<2	<2	<2	<2	<2	<2	10-30
3	Temperature, °C	27.6	27.7	27.6	27.4	27.7	27.5	27.4	27.5	-
4	Turbidity, NTU	0.8	1.1	1.0	2.1	1.2	1.0	1.3	2.4	-
5	Residual Chlorine, mg/l	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	-
6	Dissolved Oxygen, mg/l	5.8	5.4	5.2	5.5	5.4	5.6	5.4	5.1	4.0-6.0
7	Total Suspended Solids, mg/l	12	14	14	24	14	12	14	26	-
8	Electrical Conductivity, umhos/cm	380	480	520	400	420	470	480	520	-
9	Total Dissolved Solids, mg/l	240	310	330	260	270	300	300	330	500-2100
10	Total Hardness (as CaCO <sub>3</sub> ), mg/l	90	120	130	120	120	130	120	130	-
11	Calcium Hardness, mg/l	50	50	70	60	70	70	60	60	-
12	Magnesium Hardness, mg/l	40	70	60	60	50	60	60	70	-
13	Calcium (as Ca), mg/l	20	20	28	24	28	28	24	24	-
14	Magnesium (as Mg), mg/l	10	17	14	14	12	14	14	17	-
15	Sodium (as Na), mg/l	16	27	33	20	24	22	24	28	-
16	Potassium (as K), mg/l	1	1	2	1	1	1	1	1	-
17	Chlorides (as Cl), mg/l	64	82	86	72	65	70	64	78	250-600
18	Sulphates (as SO <sub>4</sub> ), mg/l	16	20	20	20	21	24	21	32	400-1000
19	Total Alkalinity (as CaCO <sub>3</sub> ), mg/l	30	60	60	50	60	60	60	70	-
20	BOD-3 days @ 27°C, mg/l	<2	<2	<2	<2	<2	<2	<2	<2	<3
21	COD, mg/l	4	8	10	6	8	6	8	12	-
22	Oil & Grease, mg/l	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	-
23	Iron (as Fe), mg/l	0.05	0.06	0.06	0.05	0.07	0.05	0.06	0.08	0.3-5.0
24	Fluorides (as F), mg/l	0.08	0.11	0.14	0.14	0.11	0.12	0.11	0.14	1.5
25	Nitrates (as NO <sub>3</sub> ), mg/l	0.50	0.56	0.50	0.60	0.50	0.56	0.58	0.65	20-50
26	Phosphates (as PO <sub>4</sub> ), mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
27	Cyanides (as CN), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
28	Pesticides (as Malathion), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
29	Phenols (as C <sub>6</sub> H <sub>5</sub> OH), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
30	Manganese (as Mn), mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
31	Chromium (as Cr), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
32	Copper (as Cu), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.5
33	Selenium (as Se), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
34	Aluminium (as Al), mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-
35	Cadmium (as Cd), mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-
36	Arsenic (as As), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05-0.2
37	Boron (as B), mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	2
38	Mercury (as Hg), mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-
39	Lead (as Pb), mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.1
40	Zinc (as Zn), mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	1.5-15
41	Percent Sodium, %	27.6	32.6	35.1	26.4	30.1	26.7	30.1	31.7	-
42	Total Coliforms, MPN/100 ml	10	14	17	38	26	21	40	70	50-5000
43	Faecal Coliforms, MPN/100 ml	6	10	8	26	17	14	21	36	-
44	E. Coli, MPN/100 ml	2	8	4	21	11	7	14	21	-

**Legend : W1-Coleroon River; W2-Nandiyar River; W3-Nalla near Plant; W4-Pullambadi Canal; W5-Man Odai; W6-Andi Odai; W7-Pond, Kovandakurichi & W8-Pond, Varakuppai (Varaguppai).**

\* : CPCB Norms-Central Pollution Control Board Norms for Surface Waters. - : Not included/Not available.

**Table : 3.26 Water Quality Data - Mine Pits Water & Plant Raw Water**

Monitoring Dates : 11.12.2022; 13.01.2023 &amp; 11.02.2023

(Mean &amp; Worst case values are reported)

Sl. No.	Parameter	Mine Pits Water			W12 Plant Raw Water	IS:10500 Norms*	TNPCB Norms**
		W9 Kallakudi Pit No. 2	W10 Vadugarpettai Pit	W11 Kovandakurichi Pit			
1	pH	7.74	7.61	7.78	7.57	6.5-8.5	5.5-9.0
2	Colour, Hazen units	<2	<2	<2	<2	5/15#	-
3	Temperature, °C	27.0	27.3	27.0	27.6	-	-
4	Turbidity, NTU	1.8	1.2	1.0	0.6	1/5	-
5	Residual Chlorine, mg/l	Nil	Nil	Nil	Nil	0.2/1.0	-
6	Dissolved Oxygen, mg/l	3.9	5.0	4.0	5.4	-	-
7	Total Suspended Solids, mg/l	22	14	12	10	-	30
8	Electrical Conductivity, umhos/cm	780	520	840	520	-	-
9	Total Dissolved Solids, mg/l	510	340	540	340	500/2000	2100
10	Total Hardness (as CaCO <sub>3</sub> ), mg/l	210	150	230	130	200/600	-
11	Calcium Hardness, mg/l	110	80	130	70	-	-
12	Magnesium Hardness, mg/l	100	70	100	60	-	-
13	Calcium (as Ca), mg/l	44	32	52	28	75/200	-
14	Magnesium (as Mg), mg/l	24	17	24	14	30/100	-
15	Sodium (as Na), mg/l	56	36	61	28	-	-
16	Potassium (as K), mg/l	6	2	7	1	-	-
17	Chlorides (as Cl), mg/l	112	84	118	74	250/1000	1000
18	Sulphates (as SO <sub>4</sub> ), mg/l	54	33	63	21	200/400	1000
19	Total Alkalinity (as CaCO <sub>3</sub> ), mg/l	100	70	110	80	200/600	-
20	BOD-3 days @ 27°C, mg/l	<2	<2	<2	<2	-	20
21	COD, mg/l	12	8	14	4	-	250
22	Oil & Grease, mg/l	Nil	Nil	Nil	Nil	-	10
23	Iron (as Fe), mg/l	0.10	0.08	0.06	0.05	0.3	0.3-5.0
24	Fluorides (as F), mg/l	0.24	0.20	0.14	0.08	1.0/1.5	2.0
25	Nitrates (as NO <sub>3</sub> ), mg/l	0.70	0.55	0.50	0.50	45	-
26	Phosphates (as PO <sub>4</sub> ), mg/l	<0.05	<0.05	<0.05	<0.05	-	-
27	Cyanides (as CN), mg/l	<0.01	<0.01	<0.01	<0.01	0.05	-
28	Pesticides (as Malathion), mg/l	<0.01	<0.01	<0.01	<0.01	Abs./0.001	-
29	Phenols (as C <sub>6</sub> H <sub>5</sub> OH), mg/l	<0.01	<0.01	<0.01	<0.01	0.001/0.002	-
30	Manganese (as Mn), mg/l	<0.05	<0.05	<0.05	<0.05	0.1/0.3	-
31	Chromium (as Cr), mg/l	<0.01	<0.01	<0.01	<0.01	0.05	-
32	Copper (as Cu), mg/l	<0.01	<0.01	<0.01	<0.01	0.05/1.5	-
33	Selenium (as Se), mg/l	<0.01	<0.01	<0.01	<0.01	0.01	-
34	Aluminium (as Al), mg/l	<0.03	<0.03	<0.03	<0.03	0.03/0.2	-
35	Cadmium (as Cd), mg/l	<0.005	<0.005	<0.005	<0.005	0.003	-
36	Arsenic (as As), mg/l	<0.01	<0.01	<0.01	<0.01	0.01/0.05	-
37	Boron (as B), mg/l	<0.005	<0.005	<0.005	<0.005	0.5/1.0	-
38	Mercury (as Hg), mg/l	<0.005	<0.005	<0.005	<0.005	0.001	-
39	Lead (as Pb), mg/l	<0.005	<0.005	<0.005	<0.005	0.01	-
40	Zinc (as Zn), mg/l	<0.10	<0.10	<0.10	<0.10	5/15	-
41	Percent Sodium, %	35.9	33.9	35.7	31.7	-	-
42	Total Coliforms, MPN/100 ml	-0-	<2	-0-	-0-	Absent	-
43	Faecal Coliforms, MPN/100 ml	-0-	-0-	-0-	-0-	Absent	-
44	E. Coli, MPN/100 ml	-0-	-0-	-0-	-0-	Absent	-

\* : IS:10500 :2015-Drinking Water Standards; # : Requirement/Permissible Limit in the absence of alternate source.

\*\* : TNPCB Norms-Tamil Nadu Pollution Control Board Norms for Onland Irrigation. - : Not included/Not available.

**Table : 3.26 (Contn) Ground Water Quality Data**

Monitoring Dates : 11.12.2022; 13.01.2023 &amp; 11.02.2023

(Mean &amp; Worst case values are reported)

Sl. No.	Parameter	Borewells at						IS:10500 Norms*
		W13	W14	W15	W16	W17	W18	
1	pH	7.51	7.59	7.57	7.62	7.70	7.59	6.5-8.5
2	Colour, Hazen units	<2	<2	<2	<2	<2	<2	5/15#
3	Temperature, °C	27.4	27.1	27.0	27.1	27.2	27.0	-
4	Turbidity, NTU	0.8	1.2	1.1	0.9	1.4	0.8	1/5
5	Residual Chlorine, mg/l	Nil	Nil	Nil	Nil	Nil	Nil	0.2/1.0
6	Dissolved Oxygen, mg/l	4.6	4.1	4.4	4.6	4.1	4.4	-
7	Total Suspended Solids, mg/l	10	14	14	12	18	10	-
8	Electrical Conductivity, umhos/cm	580	640	580	540	650	520	-
9	Total Dissolved Solids, mg/l	370	400	360	340	420	340	500/2000
10	Total Hardness (as CaCO <sub>3</sub> ), mg/l	150	170	150	150	170	130	200/600
11	Calcium Hardness, mg/l	80	90	80	70	80	70	-
12	Magnesium Hardness, mg/l	70	80	70	80	90	60	-
13	Calcium (as Ca), mg/l	32	36	32	28	32	28	75/200
14	Magnesium (as Mg), mg/l	17	19	17	19	22	14	30/100
15	Sodium (as Na), mg/l	36	47	34	32	41	33	-
16	Potassium (as K), mg/l	1	2	1	1	2	1	-
17	Chlorides (as Cl), mg/l	84	102	92	85	106	74	250/1000
18	Sulphates (as SO <sub>4</sub> ), mg/l	32	48	34	41	40	28	200/400
19	Total Alkalinity (as CaCO <sub>3</sub> ), mg/l	70	80	80	70	80	70	200/600
20	BOD-3 days @ 27°C, mg/l	<2	<2	<2	<2	<2	<2	-
21	COD, mg/l	6	8	6	10	8	6	-
22	Oil & Grease, mg/l	Nil	Nil	Nil	Nil	Nil	Nil	-
23	Iron (as Fe), mg/l	0.05	0.07	0.06	0.07	0.10	0.06	0.3
24	Fluorides (as F), mg/l	0.12	0.10	0.09	0.14	0.14	0.12	1.0/1.5
25	Nitrates (as NO <sub>3</sub> ), mg/l	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	45
26	Phosphates (as PO <sub>4</sub> ), mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
27	Cyanides (as CN), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
28	Pesticides (as Malathion), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Abs./0.001
29	Phenols (as C <sub>6</sub> H <sub>5</sub> OH), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.001/0.002
30	Manganese (as Mn), mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1/0.3
31	Chromium (as Cr), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
32	Copper (as Cu), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05/1.5
33	Selenium (as Se), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
34	Aluminium (as Al), mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03/0.2
35	Cadmium (as Cd), mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.003
36	Arsenic (as As), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01/0.05
37	Boron (as B), mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.5/1.0
38	Mercury (as Hg), mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.001
39	Lead (as Pb), mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01
40	Zinc (as Zn), mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	5/15
41	Percent Sodium, %	34.1	37.2	32.8	31.5	34.1	35.3	-
42	Total Coliforms, MPN/100 ml	-0-	-0-	-0-	-0-	-0-	-0-	Absent
43	Faecal Coliforms, MPN/100 ml	-0-	-0-	-0-	-0-	-0-	-0-	Absent
44	E. Coli, MPN/100 ml	-0-	-0-	-0-	-0-	-0-	-0-	Absent

**Legend : Borewells at :- W13-Kallakudi; W14-Kilarasur; W15-Palanganatham; W16-Kovandakurichi; W17-Pullambadi & W18-Tappay (Tappai).**

\* : IS:10500 :2015-Drinking Water Standards; # : Requirement/Permissible Limit in the absence of alternate source.

**Table : 3.27 Water Quality Status**

Monitoring Dates : 11.12.2022; 13.01.2023 &amp; 11.02.2023

Sl. No.	Parameter	Concentration Range & Norms			
		Surface Waters	CPCB Norms* for Surface Waters	Ground Waters	IS:10500 Norms** for Drinking Waters
1	pH	7.41-7.66	6.5-8.5	7.51-7.70	6.5-8.5
2	Total Dissolved Solids, mg/l	240-330	500/2100*	340-420	500-2000*
3	Dissolved Oxygen, mg/l	5.1-5.8	4-6	4.1-4.6	-
4	BOD (3 days @ 27 °C), mg/l	<2	2/3	<2	-
5	COD, mg/l	4-12	-	6-10	-
6	Oil & Grease, mg/l	Nil	-	Nil	-
7	Chlorides (as Cl), mg/l	64-86	250/600	74-106	250-1000
8	Iron (as Fe), mg/l	0.05-0.08	0.3/5.0	0.05-0.10	0.3/1.0
9	Trace Metals, mg/l	<0.001-<0.01	<0.001-<0.01	<0.001-<0.01	<0.001-<0.01
10	Total Coliforms, MPN/100 ml	10-70	50/5000	Absent	Absent

\* : CPCB Norms-Central Pollution Control Board Norms; - : Not included/Not available.

\*\* : IS:10500 :2015-Drinking Water Standards; # : Requirement/Permissible Limit in the absence of alternate source.

### 3.8 Land Environment

#### 3.8.1 Soil Status

The major soil types encountered in the district are black cotton soils, red sandy to loamy soils and alluvial soils. A thin layer of red sandy soils overlies the western and southern parts of the district. Alluvial soils of considerable thickness occur in the central part. Black cotton soils are observed in the northern parts.

The monitored soil quality data are given as **Table 3.28**. Soils with medium compaction and Silty loam texture are dominant in the study area. Soil pH values were found to be in alkaline range (7.75-7.92) and Electrical Conductivity values were in the range 1.12-1.52 mmhos/cm. There was significant moisture content at all the monitoring locations. Significant levels of Nitrogen, Phosphorous and Potassium (NPK) values were monitored at all locations. Sodium Absorption Ratio was in the range 2.40-2.94 (desirable value being <5).

There was **no heavy metals intrusion/leaching** into the ground strata. Wilting coefficient in significant levels would mean that these soils would support the vegetation, if amended suitably.

**Table : 3.28 Soil Status**

Monitoring Date : 24.01.2023

Sl. No.	Parameter	S1	S2	S3	S4	S5	S6	Desirable Range*
i	Colour	Grey	Grey	Light Red	Brown	Black	Light Yellow	-
ii	Compaction	Medium	Medium	Medium	Medium	Medium	Medium	-
1	pH (10% Solution)	7.76	7.84	7.76	7.75	7.83	7.92	<b>5.5-9.0</b>
2	Electrical Conductivity, mmhos/cm	1.33	1.28	1.12	1.24	1.37	1.52	<b>0.2-0.5</b>
3	Natural Moisture Content, %	12.4	10.7	10.4	10.2	9.1	8.4	-
4	Organic Carbon, %	0.98	0.92	1.01	1.04	0.90	0.78	<b>&gt;0.75</b>
5	Nitrogen (as N), %	0.011	0.010	0.012	0.012	0.010	0.006	<b>0.01-0.02</b>
6	Phosphorus (as P), %	0.010	0.008	0.006	0.008	0.005	0.003	<b>0.002-0.004</b>
7	Potassium (as K), %	0.005	0.007	0.005	0.004	0.006	0.004	<b>&gt;0.01</b>
8	Sodium (as Na), ppm	140	160	140	150	140	160	-
9	Calcium (as Ca), ppm	80	90	80	100	90	120	-
10	Magnesium (as Mg), ppm	70	80	70	80	100	80	-
11	Chlorides (as Cl), ppm	220	240	210	230	220	260	-
12	Sulphates (as SO <sub>4</sub> ), ppm	60	90	80	80	110	120	-
13	Cation Exchange Capacity, meq/100 g	22.3	20.4	22.3	21.7	23.0	18.5	<b>10-30</b>
14	Grain Size Distribution :- Sand, %	28.4	26.6	24.3	25.7	26.1	27.2	-
15	Silt	63.6	65.8	67.5	63.6	62.6	67.4	-
16	Clay	8.0	7.6	8.2	10.7	11.3	5.4	-
17	Textural Class	Silty loam	Silty loam	Silty loam	Silty loam	Silty loam	Silty loam	<b>Loam</b>
18	Bulk Density, g/cc	1.31	1.34	1.32	1.35	1.34	1.30	-
19	Infiltration Rate, cm/hr	3.4	3.6	3.5	3.3	3.5	4.0	-
20	Field Capacity, %	24.5	24.6	25.2	27.3	24.2	21.0	-
21	Wilting Coefficient, %	1.2	1.1	1.2	2.0	1.7	0.9	<b>&gt;0.4</b>
22	Available Water Storage Capacity, %	23.3	23.5	24.0	25.3	22.5	20.1	-
23	Sodium Absorbing Ratio	2.75	2.94	2.75	2.70	2.40	2.76	<b>&lt;5</b>

**Legend : S1-Green Belt, Kallakudi Mine; S2-Green Belt, Plant Area; S3-Green Belt, Kovandakurichi Mines; S4-Agri. Land, Kovandakurichi; S5-Dry Agri. Land, Tappai & S6-Barren Land, Kil Arasur.**

\* :Desirable Range for High Production Soil.

### 3.8.2 Land Use

For Land Use study of the Study Area, IRS P6-LIS IV dated 14.03.2022 Satellite Digital Data of NRSA, Hyderabad was used (Fig. 3.8). Visual interpretation technique has been adopted for land use classification based on the interpretation keys suggested in guidelines of NNRMS, Bangalore. Level-3 Classification with 1:50,000 scale was made for the preparation of land use mapping (Fig. 3.9).

Land Use Pattern of the Study Area is given in Table 3.29.

**Table : 3.29 Land Use Pattern**

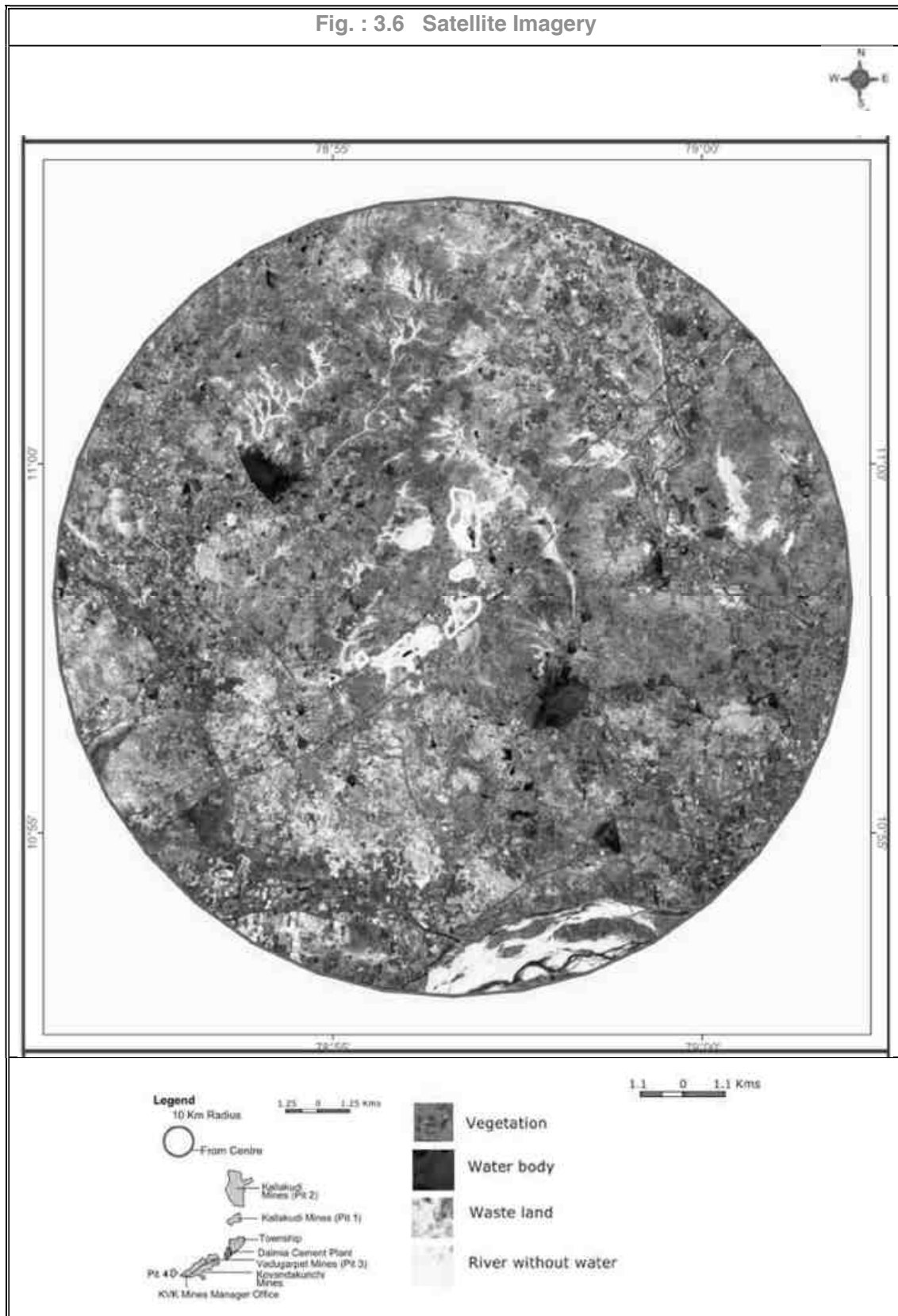
<b>Land Use</b>	<b>Percentage</b>
Built-up Land	4.08
Wet Crop	8.32
Dry Crop	57.18
Fallow Land	2.32
Land with Scrub	4.14
Land without Scrub	0.10
Mines	0.66
Plantation	5.87
Salt affected Land	5.00
Revenous Land	3.78
Water Bodies	8.55
<b>Total</b>	<b>100</b>

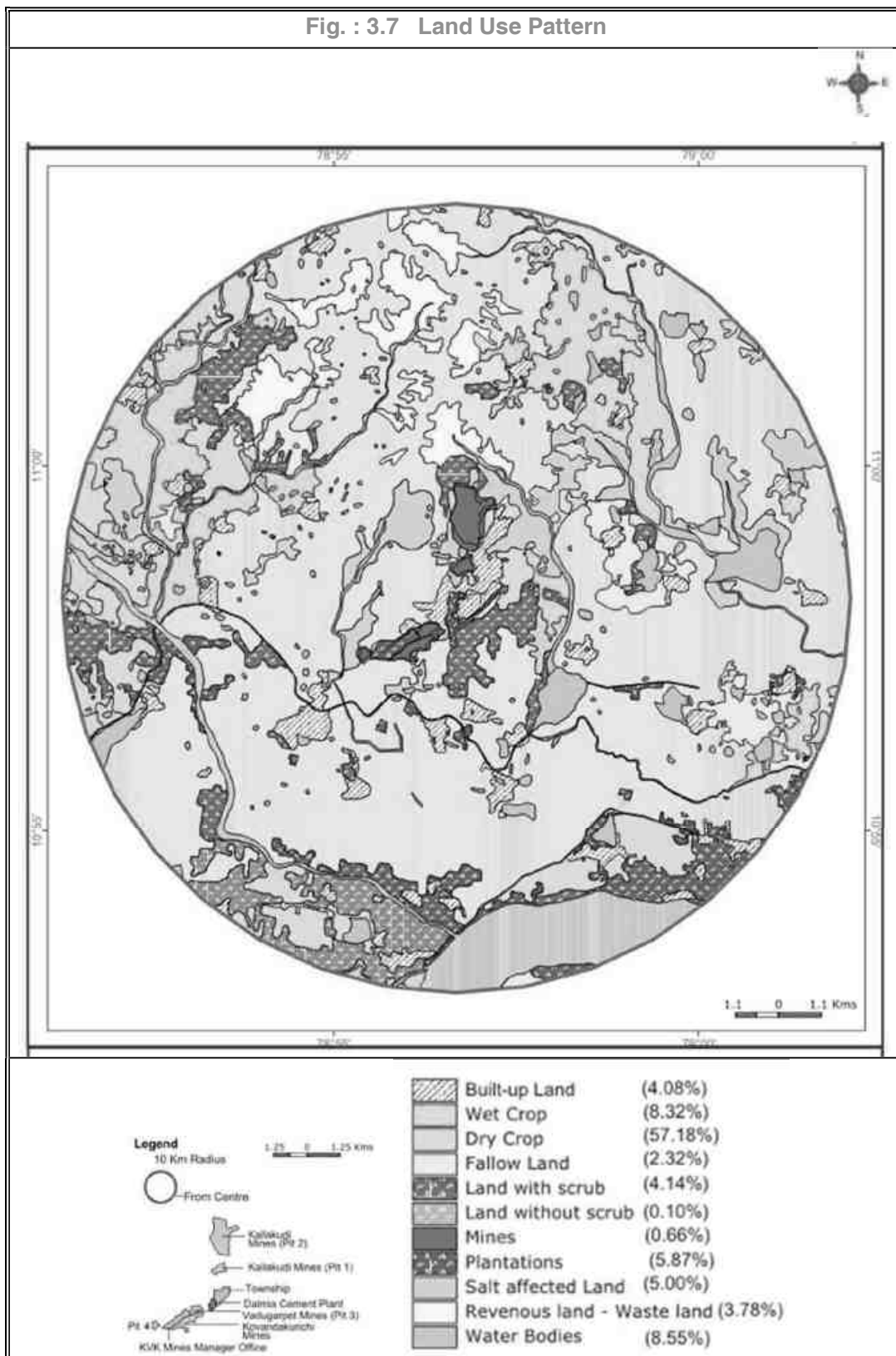
The dry crop occupies the majority of the study area which is about 57.18% of the study area. The wet crop is noticed along the flood plains which is about 8.32% of the study area. Most of the tanks and river in the study area contributes wet crop.

Water body occupies about 8.55% of the study area, which indicates the economic development. About 4.08% of the study area is covered by built-up land and about 2.32% land remains fallow.

The Mines occupies about 0.66% of the study area. The salt affected land occupies about 5.00% and about 5.87% of the study area is occupied with plantations. The Revenous land occupies about 3.78% of the study area and 4.14% land is with scrub whereas 0.10% land is without scrub.







### 3.9 Flora and Fauna

#### 3.9.1 Flora

There is no Reserved Forests in the Area. The list of plant species in the Core & Buffer Zones are presented in Table 3.30.

**Table : 3.30 List of Flora - Core & Buffer Zones**

S. No.	Name of the plant (scientific)	Name of the Family	Common Name	Habit
<b>Core Zone (along the Boundaries)</b>				
1	<i>Abutilon indicum</i>	Malvaceae	Tutti	Herb
2	<i>Acacia arabica</i>	Mimosoideae	Karuvelam	Tree
3	<i>Acalypha indica</i>	Euphorbiaceae	Kuppaimeni	Herb
4	<i>Achyranthes aspera</i>	Amaranthaceae	Nayuruvi	Herb
5	<i>Aerva lanata</i>	Amaranthaceae	Sirupulai	Herb
6	<i>Azadirachta indica</i>	Maliaceae	Neem	Tree
7	<i>Borassus flabellifer</i>	Palmae(Arecaeae)	Palmyrah	Tree
8	<i>Bougainvillea spectabilis</i>	Nyctaginaceae	Kaakithapoo	Shrub
9	<i>Butea monsperma</i>	Fabaceae	Flame of the Forest	Tree
10	<i>Caesalpinia pulcherima</i>	Caesalpiniaceae	Mayilkondrai	Tree
11	<i>Calotropis gigantea</i>	Asclepiadeceae	Erukku	Shrub
12	<i>Cleome viscosa</i>	Cleomaceae	Dog mustard	Herb
13	<i>Cocos nucifera</i>	Palmae	Coconut	Tree
14	<i>Codiaeum variegatum</i>	Euphorbiaceae	Croton	Herb
15	<i>Croton sparsiflorus</i>	Euphorbiaceae	Reilpoondu	Herb
16	<i>Cyanodon dactylon</i>	Poaceae	Arugampul	Herb
17	<i>Datura metel</i>	Solanaceae	Oomathai	Shrub
18	<i>Delonix regia</i>	Caesalpiniaceae	Gulmohar	Tree
19	<i>Euphorbia hirta</i>	Euphorbiaceae	Asthma Weed	Herb
20	<i>Jatropha glandulifera</i>	Euphorbiaceae	Kattamanakku	Shrub
21	<i>Mimosa pudica</i>	Mimosaceae	Thottal surungi	Herb
22	<i>Morinda tinctoria</i>	Rubiaceae	Nuna	Tree
23	<i>Pongamia pinnata</i>	Fabaceae	Pungam	Tree
24	<i>Prosopis juliflora</i>	Fabaceae	Seemai karuvel,	Tree
25	<i>Samanea saman</i>	Mimosoideae	Thoongumoonij maram	Tree
26	<i>Sida cordifolia</i>	Malvaceae	Country Mallow	Herb
27	<i>Thespesia populnea</i>	Malvaceae	Puvarasu	Tree
28	<i>Tridax procumbens</i>	Asteraceae	Vettukayappoondu	Herb
29	<i>Vinca rosea</i>	Apocynaceae	Nithyakalyani	Herb
<b>Buffer Zone</b>				
<b>Agricultural Crops</b>				
1	<i>Allium cepa</i>	Amaryllidaceae	Onion	Herb
2	<i>Arachis hypogea</i>	Fabaceae	Groundnut	Herb
3	<i>Capsicum frutescens</i>	Solanaceae	Milagaai	Herb
4	<i>Cucurbita pepo</i>	Cucurbitaceae	Pumpkin	Creeper
5	<i>Cyamopsis tetragonoloba</i>	Fabaceae	Cluster bean	Shrub
6	<i>Hibiscus esculentus</i>	Malvaceae	Lady's finger Vendai	Herb
7	<i>Lagenaria vulgaris</i>	Cucurbitaceae	Bottle gourd	Creeper
8	<i>Lycopersicon esculentum</i>	Solanaceae	Tomato	Herb
9	<i>Momordica charantia</i>	Cucurbitaceae	Bittergourd	Creeper
10	<i>Moringa oleifera</i>	Moringaceae	Drumstick	Tree

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S. No.	Name of the plant (scientific)	Name of the Family	Common Name	Habit
11	<i>Musa paradisiaca</i>	Musaceae	Plantain	Tree
12	<i>Oryza sativa</i>	Poaceae	Rice	Herb
13	<i>Phaseolus mungo</i>	Fabaceae	Black gram	Herb
14	<i>Sacharum officinarum</i>	Poaceae	Sugarcane	Herb
15	<i>Sesamum indicum</i>	Pedaliaceae	Seasame, Ellu	Herb
16	<i>Solanum melongena</i>	Solanaceae	Brinjal	Herb
17	<i>Solanum torvum</i>	Solanaceae	Turkey berry	Shrub
18	<i>Trichosanthes cucurmina</i>	Cucurbitaceae	Snake gourd	Creeper
19	<i>Vicia faba</i>	Fabaceae	Broad Bean	Creeper
20	<i>Zea mays</i>	Poaceae	Maize	Herb
<b>Commercial Crops</b>				
1	<i>Citrus limon</i>	Rutaceae	Lemon	Tree
2	<i>Cocos nucifera</i>	Arecaceae	Coconut, Thennai	Tree
3	<i>Curcuma longa</i>	Zingiberaceae	Turmeric	Shrub
4	<i>Gossypium arboreum</i>	Malvaceae	Cotton, Paruthi	Shrub
5	<i>Mangifera indica</i>	Anacardiaceae	Mango	Tree
6	<i>Ricinus communis</i>	Euphorbiaceae	Castor Bean Plant	Shrub
<b>Plantations</b>				
1	<i>Casuarina equisetifolia</i>	Casuarinaceae	Casuarina, Savukku	Tree
2	<i>Eucalyptus sp.</i>	Myrtaceae	Eucalyptus	Tree
3	<i>Mangifera indica</i>	Anacardiaceae	Mango	Tree
4	<i>Tectona grandis</i>	Lamiaceae	Teak	Tree
<b>Natural Vegetation</b>				
1	<i>Abrus precatorius</i>	Fabaceae	Coral bead vine, Rosary pea,	Climber
2	<i>Abutilon indicum</i>	Malvaceae	Country Mallow, Tutti	Herb
3	<i>Acacia arabica</i>	Mimosoideae	Karvelam	Tree
4	<i>Acacia leucophloea</i>	Mimosaceae	Velvelam, White babool	Tree
5	<i>Acacia nilotica</i>	Mimosaceae	Babul, Karvelam	Tree
6	<i>Acalypha indica</i>	Euphorbiaceae	Kuppaimeni	Herb
7	<i>Acanthospermum hispidum</i>	Asteraceae	Seruppadithazhai,	Herb
8	<i>Achchyranthes aspera</i>	Amaranthaceae	Prickly Chaff flower, Nayuruvi	Herb
9	<i>Adathoda vasica</i>	Acanthaceae	Vasaca, Adathodai	Shrub
10	<i>Adina cordifolia</i>	Rubiaceae	Manjakadambu	Tree
11	<i>Aegle marmelos</i>	Rutaceae	Wood Apple, vilvam	Tree
12	<i>Aerva lanata</i>	Amaranthaceae	Sirupulai	Herb
13	<i>Agave americana</i>	Agavaceae	Century Plant, Karunkattralai	Shrub
14	<i>Ageratum conyzoides</i>	Asteraceae	Goat weed, Pump pillu	Herb
15	<i>Ailanthus excelsa</i>	Simaroubaceae	Indian Tree of Heaven,	Tree
16	<i>Alangium salvifolium</i>	Alangiaeeae	Azhinjal	Tree
17	<i>Albizia amara</i>	Mimosaceae	Usilamaram	Tree
18	<i>Albizia lebbek</i>	Mimosaceae	Siris Tree, Vagai	Tree
19	<i>Albizia odoratissima</i>	Fabaceae	Karuvagai	Tree
20	<i>Aloe vera</i>	Liliaceae	Kathalai	Herb
21	<i>Alternanthera sessilis</i>	Amaranthaceae	Dwarf Copperleaf,	Herb
22	<i>Amaranthus spinosus</i>	Amaranthaceae	Mullukkirai	Herb
23	<i>Amaranthus viridis</i>	Amaranthaceae	Kuppaikeerai	Herb
24	<i>Ammannia baccifera</i>	Lythraceae	Acrid weed, Kalluruvi	Herb
25	<i>Anacardium occidentale</i>	Anacardiaceae	Cashew	Tree
26	<i>Anona squamosa</i>	Anonaceae	Custard apple	Tree
27	<i>Apluda mutica</i>	Poaceae	Mauritian Grass	Herb
28	<i>Arachis hypogea</i>	Faboideae	Ground nut	Herb
29	<i>Argemone mexicana</i>	Papaveraceae	Prickly poppy, Kudiyotti	Shrub

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S. No.	Name of the plant (scientific)	Name of the Family	Common Name	Habit
30	<i>Aristida adscensionis</i>	Poaceae	Coomon Needle grass	Herb
31	<i>Aristolochia indica</i>	Aristolochiaceae	Isvaramuli	Shrub
32	<i>Artocarpus heterophyllus</i>	Moraceae	Jackfruit	Tree
33	<i>Asparagus racemosus</i>	Asparaceae	Satawari, tanneervittan	Climber
34	<i>Azadirachta indica</i>	Meliaceae	Neem, Vembu	Tree
35	<i>Bambusa arundanacea</i>	Poaceae	Bamboo, Mungil	Tree
36	<i>Barleria prionitis</i>	Acanthaceae	Porcupine flower, Kundan	Herb
37	<i>Bassia latifolia</i>	Sapotaceae	Iluppai	Tree
38	<i>Bauhinia racemosa</i>	Fabaceae	Bidi leaf tree, Aatti	Tree
39	<i>Bidens biternata</i>	Asteraceae	Spanish needles	Herb
40	<i>Biophytum sensitivium</i>	Oxalidaceae	Telegraph plant	Herb
41	<i>Blumea lacera</i>	Asteraceae	Kattumullangi,	Herb
42	<i>Boerheavia diffusa</i>	Nyctaginaceae	Pig weed, Mukkarattai Keerai	Herb
43	<i>Borassus flabellifer</i>	Arecaceae	Palmyra Palm	Tree
44	<i>Bougainvillea spectabilis</i>	Nyctaginaceae	Kaakithapoo	Shrub
45	<i>Bulbostylis barbatta</i>	Cyperaceae	Mukkutikorei	Herb
46	<i>Butea monosperma</i>	Fabaceae	Flame of Forest	Tree
47	<i>Caesalpinia pulcherrima</i>	Caesalpiniaceae	Peacock Flower,	Tree
48	<i>Calendula officinalis</i>	Asteraceae	Marigold	Herb
49	<i>Calophyllum inophyllum</i>	Clusiaceae	Punnai	Tree
50	<i>Calotropis gigantea</i>	Asclepiadaceae	Crown Flower, Erukku	Shrub
51	<i>Calotropis procera</i>	Asclepiadaceae	Vellerukku	Shrub
52	<i>Canna indica</i>	Cannaceae	Indian shot, Kalvalai	Shrub
53	<i>Capparis sepiaria</i>	Capparaceae	Kattukkathiri	Shrub
54	<i>Capsicum frutescens</i>	Solanaceae	Milagaai	Herb
55	<i>Carica papaya</i>	Caricaceae	Pappaali	Tree
56	<i>Carissa carandas</i>	Apocynaceae	Karanda, Kalakkai	Shrub
57	<i>Cassia auriculata</i>	Fabaceae	Aavarampoo	Shrub
58	<i>Cassia fistula</i>	Fabaceae	Golden shower tree, Kondrai	Tree
59	<i>Cassia occidentalis</i>	Caesalpiniaceae	Coffee weed, Payaverai	Herb
60	<i>Cassia siamea</i>	Caesalpiniaceae	Manja konnai	Tree
61	<i>Cassia tora</i>	Caesalpiniaceae	Sickle senna, Tagarai	Herb
62	<i>Casuarina equisetifolia</i>	Casuarinaceae	Whistling Pine, Savukku	Tree
63	<i>Cayrata pedata</i>	Vitaceae	Pannikkodi	Herb
64	<i>Ceiba pentandra</i>	Bombacaceae	Silk-Cotton Tree,	Tree
65	<i>Cenchrus ciliaris</i>	Poaceae	Buffel grass	Grass
66	<i>Cenchrus setigerus</i>	Poaceae	Birdwood Grass, Black	Grass
67	<i>Chloris dolichostachya</i>	Poaceae	Finger grass, Kuruthupillu	Grass
68	<i>Chromolaena odorata</i>	Asteraceae	Devil Weed, Siam Weed	Shrub
69	<i>Chrysanthemum sp.</i>	Asteraceae	Chrysanthemum, Samanthi	Herb
70	<i>Cissus quadrangularis</i>	Vitaceae	Devil's Backbone, Pirandai	Climber
71	<i>Citrus limon</i>	Rutaceae	Lemon	Tree
72	<i>Cleome gynandra</i>	Cleomaceae	Wild Spider flower, Nalvelai	Herb
73	<i>Cleome viscosa</i>	Cleomaceae	Tickweed, Naikkaduku	Herb
74	<i>Clitoria ternatea</i>	Fabaceae	Sankupushpam	Climber
75	<i>Cloroylon swietenia</i>	Rutaceae	Porasu	Shrub
76	<i>Coccinia indica</i>	Cucurbitaceae	Kovai	Climber
77	<i>Cocculus hirsutus</i>	Menispermaceae	Broom Creeper, Kattukkodi	Climber
78	<i>Cocos nucifera</i>	Palmae	Coconut	Tree
79	<i>Codiaeum variegatum</i>	Euphorbiaceae	Croton	Shrub
80	<i>Commelina benghalensis</i>	Commelinaceae	Dew Flower, Kanavachai	Herb
81	<i>Corchorus olitorius</i>	Tiliaceae	Perattikkirai	Shrub

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S. No.	Name of the plant (scientific)	Name of the Family	Common Name	Habit
82	<i>Crotalaria retusa</i>	Fabaceae	Rattlepod	Herb
83	<i>Croton sparsiflorus</i>	Euphorbiaceae	Reilpoondu	Herb
84	<i>Cucumis melo</i>	Cucurbitaceae	Musk melon, Thumattikai	Herb
85	<i>Cucumis sativus</i>	Cucurbitaceae	Cucumber	Climber
86	<i>Cuscuta reflexa</i>	Convolvulaceae	Verillakothan, Kodyagundal	Climber
87	<i>Cymbopogon</i> sp.	Poaceae	Lemon grass	Grass
88	<i>Cynodon dactylon</i>	Poaceae	Bermuda grass, Arugampul	Grass
89	<i>Cyperus difformis</i>	Cyperaceae	Smallflower umbrella-sedge	Grass
90	<i>Cyprus rotundus</i>	Cyperaceae	Korai, Nut grass	Grass
91	<i>Datura metel</i>	Solanaceae	Thorn apple, Oomathai	Shrub
92	<i>Delonix elata</i>	Fabaceae	White Gulmohr,	Tree
93	<i>Delonix regia</i>	Fabaceae	Gulmohar	Tree
94	<i>Dendrocalamus</i> sp.	Poaceae	Stone Bamboo, Sirumungil	Shrub
95	<i>Dendrophthoe falcata</i>	Loranthaceae	Honey Suckle Mistletoe,	Herb
96	<i>Desmodium gangeticum</i>	Faboideae	Pulladi	Herb
97	<i>Dichanthium annulatum</i>	Poaceae	Marvel grass	Grass
98	<i>Dichrostachis cinerea</i>	Fabaceae	Sickle Bush, Veduttalam	Tree
99	<i>Digetaria adscendens</i>	Poaceae	Crab grass	Herb
100	<i>Digetaria bicornis</i>	Poaceae	Finger grass	Herb
101	<i>Dodonaea viscosa</i>	Sapindaceae	Hop Bush, Virali	Shrub
102	<i>Eclipta alba</i>	Asteraceae	Bhringaraj, Karisalankanni	Herb
103	<i>Eclipta prostrata</i>	Asteraceae	False daisy, Karisalankanni	Herb
104	<i>Eleusine coracana</i>	Poaceae	Finger millet	Herb
105	<i>Emblica officinalis</i>	Phyllanthaceae	Indian gooseberry, Nelli	Tree
106	<i>Enicostemma axillare</i>	Gentianaceae	Vellarugu	Herb
107	<i>Eragrostis spectabilis</i>	Poaceae	Bunchgrass	Herb
108	<i>Erythrina indica</i>	Fabaceae	Mullu murungai	Tree
109	<i>Erythrina variegata</i>	Fabaceae	Indian coral tree,	Tree
110	<i>Erythroxylum monogynum</i>	Erythroxylaceae	Bastard Sandal, Sembulichan	Shrub
111	<i>Eucalyptus globulus</i>	Myrtaceae	Blue gum	Tree
112	<i>Euphorbia antiquorum</i>	Euphorbiaceae	Kalli, Triangular Spurge	Tree
113	<i>Euphorbia heterophylla</i>	Euphorbiaceae	Painted euphorbia	Herb
114	<i>Euphorbia hirta</i>	Euphorbiaceae	Asthma weed, Ammam	Herb
115	<i>Euphorbia tirucalli</i>	Euphorbiaceae	Pencil cactus, Thirukalli	Shrub
116	<i>Evolvulus alsinoides</i>	Convolvulaceae	Dwarf Morning Glory,	Herb
117	<i>Ficus benghalensis</i>	Moraceae	Banyan, Alamaram	Tree
118	<i>Ficus religiosa</i>	Moraceae	Peepal, Arasamaram	Tree
119	<i>Gardenia jasminoides</i>	Rubiaceae	Cape jasmine, Kumbai	Shrub
120	<i>Gisekia pharnaceoides</i>	Aizoaceae	Manal keerai	Herb
121	<i>Gloriosa superba</i>	Colchicaceae	Flame lily, Kallappai kilangu	Herb
122	<i>Gomphrena globosa</i>	Amaranthaceae	Globe Amaranth, Vaadamalli	Herb
123	<i>Grewia abutilifolia</i>	Tiliaceae	Palicamaram	Shrub
124	<i>Gymnosporia montana</i>	Celastraceae	Mountain Spike thorn,	Shrub
125	<i>Hardwickia binata</i>	Ceasalpiniaceae	Anjan, Acchamaram	Tree
126	<i>Heliotropium indicum</i>	Boraginaceae	Indian heliotrope, Thel	Herb
127	<i>Hemidesmus indicus</i>	Apocynaceae	Indian sarasaparilla, Nannari	Herb
128	<i>Heteropogon contortus</i>	Poaceae	Bunch Speargrass	Grass
129	<i>Heterostemma tanjorensis</i>	Asclepiadaceae	Palakeerai	Herb
130	<i>Hibiscus cannabinus</i>	Malvaceae	Pulichakeerai	Shrub
131	<i>Hibiscus esculentus</i>	Malvaceae	Lady's finger, Vendai	Herb
132	<i>Hibiscus micranthus</i>	Malvaceae	Tiny Flower Hibiscus	Herb
133	<i>Hibiscus rosasinensis</i>	Malvaceae	Shoeflower, Sembaruthi	Shrub

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S. No.	Name of the plant (scientific)	Name of the Family	Common Name	Habit
134	<i>Holoptelea integrifolia</i>	Ulmaceae	Indian Elm Tree, Aya	Tree
135	<i>Hygrophila auriculata</i>	Acanthaceae	Marsh Barbel, Neermulli	Herb
136	<i>Hyptis suaveolens</i>	Lamiaceae	Pignut	Shrub
137	<i>Impatiens balsamina</i>	Balsaminaceae	Garden Balsam,	Herb
138	<i>Indigofera tinctoria</i>	Fabaceae	Cassia Indigo, Avuri	Shrub
139	<i>Ipomea carnea</i>	Convolvulaceae	Bush Morning Glory	Shrub
140	<i>Ipomea hederfolia</i>	Convolvulaceae	Kanavalikkodi	Herb
141	<i>Ipomea obscura</i>	Convolvulaceae	Obscure morning glory,	Herb
142	<i>Ipomea reniformis</i>	Convolvulaceae	Roundleaf bindweed,	Climber
143	<i>Ixora coccinea</i>	Rubiaceae	Ixora, Vedchi	Shrub
144	<i>Ixora parviflora</i>	Rubiaceae	Torch tree, Shulundu	Tree
145	<i>Jasminum officinale</i> L.	Oleaceae	Jasmine	Shrub
146	<i>Jasminum arborescens</i>	Oleaceae	Shrubby Jasmine,	Shrub
147	<i>Jatropha glandulifera</i>	Euphorbiaceae	Kaatuamanakku	Shrub
148	<i>Jatropha gossypifolia</i>	Euphorbiaceae	Seemaianakku	Shrub
149	<i>Kyllinga triceps</i>	Cyperaceae	Spikes edge, Velutta Nirbasi	Herb
150	<i>Lannea coromandelica</i>	Anacardiaceae	Indian Ash Tree,	Tree
151	<i>Lantana camara</i>	Verbenaceae	Lantana, Unnchedi	Shrub
152	<i>Lawsonia inermis</i>	Lythraceae	Henna, Maruthondri	Shrub
153	<i>Lepidagathis cristata</i>	Acanthaceae	Karappanpoondu	Herb
154	<i>Leucaena leucocephala</i>	Fabaceae	Periyatagarai, Horse	Shrub
155	<i>Leucas aspera</i>	Lamiaceae	Common Leucas, Thumbai	Herb
156	<i>Limonia acidissima</i>	Rutaceae	Wood apple, Vilampazham	Tree
157	<i>Lycopersicon esculentum</i>	Solanaceae	Thakkali	Herb
158	<i>Madhuca indica</i>	Sapotaceae	Indian Butter Tree, Iluppai	Tree
159	<i>Malvastrum coromandelianum</i>	Malvaceae	False Mallow	Herb
160	<i>Mangifera indica</i>	Anacardiaceae	Mango	Tree
161	<i>Marselia quadrifolia</i>	Marsileaceae	Four Leaf Clover,	Herb
162	<i>Martyna annua</i>	Pedaliaceae	Kaaka Mookkuchedi	Shrub
163	<i>Melia azadirachta</i>	Meliaceae	Indian Liliac, Malaivembu	Tree
164	<i>Merremia emarginata</i>	Convolvulaceae	Kidney Leaf Morning Glory,	Herb
165	<i>Millingtonia hortensis</i>	Bignoniaceae	Tree Jasmine, Katmalli	Shrub
166	<i>Mimosa hamata</i>	Mimosaceae	Hooked Mimosa	Shrub
167	<i>Mimosa pudica</i>	Mimosaceae	Touch-me-not,	Herb
168	<i>Morinda tinctoria</i>	Rubiaceae	Nuna	Tree
169	<i>Moringa oleifera</i>	Moringaceae	Drumstick, Murungai	Tree
170	<i>Murraya koengii</i>	Rutaceae	Curry leaf, Karuveppilai	Shrub
171	<i>Musa paradisiaca</i>	Musaceae	Banana	Tree
172	<i>Nerium indicum</i>	Apocynaceae	Sevvarali	Shrub
173	<i>Nerium oleander</i>	Apocynaceae	Oleander, Arali	Shrub
174	<i>Ocimum americanum</i>	Lamiaceae	Hoary Basil, Nai Thulasi	Herb
175	<i>Ocimum basilicum</i>	Lamiaceae	Sweet Basil, Thirunitruthulasi	Herb
176	<i>Ocimum gratissimum</i>	Lamiaceae	Wild Basil, Peruntulasi	Herb
177	<i>Ocimum sanctum</i>	Lamiaceae	Holy Basil, Thulasi	Herb
178	<i>Oldenlandia umbellata</i>	Rubiaceae	Choyroot, Chayaver	Herb
179	<i>Opuntia dillenii</i>	Cactaceae	Prickly Pear, Chappathikkalli	Shrub
180	<i>Opuntia elatior</i>	Cactaceae	Prickly Pear, Chappattukalli	Shrub
181	<i>Opuntia vulgaris</i>	Aizoaceae	Pricklypear	Shrub
182	<i>Oryza sativa</i>	Poaceae	Rice	Herb
183	<i>Oxalis corniculata</i>	Oxalidaceae	Creeping Wood	Climber
184	<i>Pandanus odoratissimus</i>	Pandanaceae	Thazhai	Shrub
185	<i>Parthenium hysterophorus</i>	Asteraceae	Congress grass	Herb

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S. No.	Name of the plant (scientific)	Name of the Family	Common Name	Habit
186	<i>Passiflora foetida</i>	Passifloraceae	Stinking passionflower,	Climber
187	<i>Pavetta indica</i>	Rubiaceae	Indian Pavetta, Kattukkarana	Shrub
188	<i>Pavonia zeylanica</i>	Malvaceae	Sittamutti, Thengai poondu	Shrub
189	<i>Peltophorum pterocarpum</i>	Fabaceae	Copperpod, Perunkondrai	Tree
190	<i>Pergularia daemia</i>	Asclepiadaceae	Pergularia, Uttamani,	Climber
191	<i>Phoenix acaulis</i>	Arecaceae	Stemless Date Palm	Shrub
192	<i>Phoenix sylvestris</i>	Arecaceae	Eecham	Tree
193	<i>Phyla nodifolia</i>	Verbanaceae	Poduthalai	Herb
194	<i>Phyllanthus niruri</i>	Phyllanthaceae	Keelanelli, Seed under leaf	Herb
195	<i>Phyllanthus reticulatus</i>	Phyllanthaceae	Black-berried featherfoil,	Herb
196	<i>Physalis minima</i>	Solanaceae	Ground Cherry, Kupanti	Herb
197	<i>Pithecellobium dulce</i>	Mimosaceae	Sweet tamarind,	Tree
198	<i>Plumeria acutifolia</i>	Apocynaceae	Sampangi	Tree
199	<i>Polyalthia longifolia</i>	Annonaceae	Indian mast tree, Vansulam	Tree
200	<i>Pongamia pinnata</i>	Fabaceae	Indian Beech, Pungam	Tree
201	<i>Portulaca oleracea</i>	Portulacaceae	Common Purslane, Paruppu	Herb
202	<i>Prosopis glandulosa</i>	Mimosodeae	Vaelikkaruvai	Tree
203	<i>Prosopis juliflora</i>	Fabaceae	Algaroba, Seemaikaruvel	Tree
204	<i>Psidium gujava</i>	Myrtaceae	Guava	Tree
205	<i>Punica granatum</i>	Lythraceae	Pomegranate, Mathulai	Shrub
206	<i>Rosa indica</i>	Rosaceae	Rose	Herb
207	<i>Saccharum munja</i>	Poaceae	Munja grass	Herb
208	<i>Saccharum officinarum</i>	Poaceae	Sugarcane	Herb
209	<i>Saccharum spontaneum</i>	Poaceae	Kans grass, Pekkirimpu	Herb
210	<i>Samanea saman</i>	Mimosodeae	Thoongumoonij maram	Tree
211	<i>Sapindus emarginatus</i>	Sapindaceae	Notched Leaf Soapnut,	Tree
212	<i>Securinega virosa</i>	Phyllanthaceae	Common Bush Weed, Pula	Herb
213	<i>Sesbania grandiflora</i>	Fabaceae	Agathikeerai	Tree
214	<i>Sida acuta</i>	Malvaceae	Common Wireweed,	Herb
215	<i>Sida cordifolia</i>	Malvaceae	Country Mallow, Kurunthotti	Herb
216	<i>Sida rhombifolia</i>	Malvaceae	Wild mallow, Jelly Leaf	Herb
217	<i>Solanum nigrum</i>	Solanaceae	Black-berry night	Herb
218	<i>Solanum surattense</i>	Solanaceae	Kandan kattiri	Herb
219	<i>Solanum torvum</i>	Solanaceae	Turkey berry, Sundaikkai	Shrub
220	<i>Solanum trilobatum</i>	Solanaceae	Thoodhuvalai	Shrub
221	<i>Solanum xanthocarpum</i>	Solanaceae	Yellow berried nightshade,	Shrub
222	<i>Sorghum bicolor</i>	Poaceae	Fox tail millet, Maize	Herb
223	<i>Sterculia urens</i>	Sterculiaceae	Gum Karaya, Kavalam	Tree
224	<i>Sterculia villosa</i>	Sterculiaceae	Anainaar	Tree
225	<i>Strychnos nuxvomica</i>	Loganaceae	Poison Nut, Ettimaram	Tree
226	<i>Syzygium cumini</i>	Myrtaceae	Jamun, Navalpazham	Tree
227	<i>Tabernaemontana coronaria</i>	Apocynaceae	Nandiyarvattam	Shrub
228	<i>Tamarindus indicus</i>	Fabaceae	Tamarind, Puliyamaram	Tree
229	<i>Tectona grandis</i>	Lamiaceae	Teak	Tree
230	<i>Tephrosia purpurea</i>	Fabaceae	Fish poison, Kollukkai Velai	Herb
231	<i>Terminalia chebula</i>	Combretaceae	Kadullai	Tree
232	<i>Thespesia lampas</i>	Malvaceae	Common Mallow,	Herb
233	<i>Thespesia populnea</i>	Malvaceae	Indian Tulip Tree, Poovarasu	Tree
234	<i>Thevetia peruviana</i>	Apocynaceae	Yellow Oleander, Arali	Tree
235	<i>Tinospora cordifolia</i>	Menispermaceae	Guduchi, Shindilakodi	Climber
236	<i>Tribulus terrestris</i>	Zygophyllaceae	Puncture Vine, Nerunji	Herb
237	<i>Tridax procumbens</i>	Asteraceae	Tridax daisy,	Herb



S. No.	Name of the plant (scientific)	Name of the Family	Common Name	Habit
238	<i>Typha angustata</i>	Typhaceae	Cat tail reed	Herb
239	<i>Vernonia cinerea</i>	Asteraceae	Purple Fleabane,	Herb
240	<i>Vicoa indica</i>	Asteraceae	Mukkuthipoo	Herb
241	<i>Vinca rosea</i>	Apocynaceae	Nithyakalyani	Herb
242	<i>Vitex negundo</i>	Lamiaceae	Nochi	Shrub
243	<i>Wrightia tinctoria</i>	Apocynaceae	Dyers Oleander, Paalai	Tree
244	<i>Xanthium strumarium</i>	Asteraceae	Common Cocklebur,	Shrub
245	<i>Ziziphus jujube</i>	Rhamnaceae	Jujube, Elandhai	Tree
246	<i>Ziziphus oenoplia</i>	Rhamnaceae	Jackal Jujube, Suraimullu	Shrub
<b>Medicinal Species</b>				
1	<i>Abrus precatorius</i>	Fabaceae	Coral bead vine, Kundumani	Creepers
2	<i>Achchyranthes aspera</i>	Amaranthaceae	Prickly Chaff flower, Nayuruvi	Herb
3	<i>Adathoda vasica</i>	Acanthaceae	Vasaca, Adathodai	Shrub
4	<i>Aegle marmelos</i>	Rutaceae	Wood Apple, vilvam	Tree
5	<i>Aloe vera</i>	Liliaceae	Kathalai	Herb
6	<i>Alternanthera sessilis</i>	Amaranthaceae	Dwarf Copperleaf,	Herb
7	<i>Amaranthus viridis</i>	Amaranthaceae	Kuppaikeerai	Herb
8	<i>Asparagaus racemosus</i>	Asparagaceae	Satawari, Tannir muttan	Herb
9	<i>Azadirachta indica</i>	Meliaceae	Neem, Vembu	Tree
10	<i>Calotropis gigantea</i>	Asclepiadaceae	Crown Flower, Erukku	Shrub
11	<i>Cassia auriculata</i>	Fabaceae	Tanners cassia, Avaram	Shrub
12	<i>Cissus quadrangularis</i>	Vitaceae	Devil's Backbone, Pirandai	Climber
13	<i>Cynodon dactylon</i>	Poaceae	Bermuda grass, Arugampul	Herb
14	<i>Eclipta alba</i>	Asteraceae	Bhringaraj, Karisalankanni	Herb
15	<i>Enicostemma axillare</i>	Gentianaceae	Vellarugu	Herb
16	<i>Euphorbia hirta</i>	Euphorbiaceae	Asthma weed, Ammam	Herb
17	<i>Leucas aspera</i>	Lamiaceae	Common Leucas, Thumbai	Herb
18	<i>Ocimum sanctum</i>	Lamiaceae	Holy Basil, Thulasi	Herb
19	<i>Solanum surattense</i>	Solanaceae	Yellow-berried Nightshade,	Herb
20	<i>Solanum trilobatum</i>	Solanaceae	Thoodhuvilai	Shrub
21	<i>Tridax procumbens</i>	Asteraceae	Tridax daisy,	Herb
22	<i>Vitex negundo</i>	Lamiaceae	Nochi	Shrub

**Endangered Species : Nil**

**Endemic Species : Nil**

The nature of shrubs and trees in the study areas were of drought resistant types. Besides the natural vegetation, the agricultural and commercial crops were cultivated in and around the study area.

Plant species with pin pointed leaves are found to have higher dust accumulation potential. Plants form a surface capable of absorbing particulate matter and dust thereby acting as a sink for pollution. Rough leaves in canopy trap pollutants directly on their surface thus effectively reducing their concentrations in ambient environment. *Aegle marmelos*, *Albizia lebbek*, *Azadirachta indica*, *Delonix regia*, *Psidium guajava*, *Cassia siamea*, *Ficus benghalensis*, *Ficus religiosa*, *Eucalyptus sp*, *Polyalthia longifolia*, *Mangifera indica*, *Pongamia pinnata*, *Tamarindus indica*, etc., are some of the Air Pollution tolerant plant species in the study area.

### 3.9.2 Fauna

The details of fauna found in the Study Area are given in Table 3.31.

**Table : 3.31 Fauna in the Study Area**

Sl. No.	Scientific Name	Common Name	Status	WPA Schedule
<b>Insects</b>				
1	Agrion sp & Petalura sp	Dragon fly	C	IV
2	Apis indica	Honey bee	C	IV
3	Aranea sp	Spider	C	IV
4	Carausius sp	Stick insect	C	IV
5	Cicada sp.	Cicade	C	IV
6	Coccinella septempunctata	Lady bird beetle	C	IV
7	Coenagrion sp & Ischnura	Damsel fly	C	IV
8	Danaus chiysippus	Plain tiger	C	IV
9	Danaus plexippus	Striped tiger	C	IV
10	Eumenus	Wasp	C	IV
11	Euthalia nais	Baronet	C	IV
12	Hamitermes silvestri	Termite	C	IV
13	Hieroglyphus sp	Grasshopper	C	IV
14	Mantis religiosa	Praying mantis	C	IV
15	Monomorium indicum	Ant	C	IV
16	Myremeleon	Ant lion larva	C	IV
17	Palamnaeus swammerdam	Scorpion	C	IV
18	Scolopendra sp.	Centipede	C	IV
19	Telchinia violae	Tawny coster	C	IV
20	Terias hecabe	Grass yellow	C	IV
<b>Fish</b>				
1	Amblypharyngodon sp.	Carplet	C	IV
2	Catla catla	Catla	C	IV
3	Chela sp.	Trout	C	IV
4	Cirrhinus mrigala	Mrigal	C	IV
5	Cyprinus carpio	Common Carp	C	IV
6	Labeo rohita	Rohu	C	IV
7	Ophiocephalus punctatus	Kuravai	C	IV
8	Oreochromis mossambicus	Tilapia	C	IV
<b>Amphibians</b>				
1	Bufo melanrostictus	Common Indian Toad	C.R	IV
2	Euphyctis cyanophlyctis	Skittering frog	C.R	IV
3	Euphyctis hexadactylus	Indian Pond frog	C.R	IV
4	Microhyla ornata	Ornatic microhybid	C.R	IV
<b>Reptiles</b>				
1	Ahaetulla nasuta	Common Green whip snake	C, R	IV
2	Bangarus caeruleus	Common Indian Krait	C, R	IV
3	Calotes versicolor	Common Garden lizard	C.R	IV
4	Daboia russelii	Russels viper	C, R	III
5	Gongylophis conicus	Rough tailed Sand boa, Pudaiyan	C, R	IV
6	Hemidactylus frenatus	Southern house gecks	C.R	IV
7	Lissemys punctata	Indian mud turtle	C.R	IV
8	Lygosoma punctata	Spotted supple skink	C.R	IV
9	Mabuya carinata	Brahminy Skink	C, R	II
10	Naja naja	Indian Cobra	C, R	IV
11	Passerita mycterizaris	Common Green Snake	C, R	IV
12	Sauria lacertidae	Lizard	C	IV
13	Xenochrophis piscator	Checkered Keelback	C.R	IV

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Sl. No.	Scientific Name	Common Name	Status	WPA Schedule
<b>Birds</b>				
1	<i>Acridotheres tristis</i>	Common Myna	C, R	IV
2	<i>Alcedo atthis</i>	Common kingfisher	C	IV
3	<i>Anas acuta</i>	Common teal	C,R	IV
4	<i>Ardea alba</i>	Large Egret	C	IV
5	<i>Ardeola grayii</i>	Pond Heron or PaddyBird	C.R	IV
6	<i>Athene brama</i>	Spotted Owlet	C.R	IV
7	<i>Bubo bubo</i>	Indian great horned owl	C	IV
8	<i>Bubulcus ibis</i>	Cattle egret	C	IV
9	<i>Caprimulgus asiaticus</i>	Common Indian jar	C	IV
10	<i>Centropus sinensis</i>	Crow-Pheasant or coucal	C, R	IV
11	<i>Cinnyris asiatica</i>	Purple sunbird	C	IV
12	<i>Columbus livibus</i>	Pigeon	C	IV
13	<i>Copsychus saularis</i>	Magpie robin	C	IV
14	<i>Coracias benghalensis</i>	Indian Roller	C.R	IV
15	<i>Corvus macrohynchos</i>	Jungle Crow	C.R	V
16	<i>Corvus splendens</i>	House Crow	C, R	V
17	<i>Coryllis vaeralis</i>	Lorikeet	C	V
18	<i>Cuculus varius</i>	Common-Hawk Cuckoo	C, R	IV
19	<i>Cypsiurus parvus</i>	Palm Swift	C.R	IV
20	<i>Dendrocitta vagabunda</i>	Indian Tree pie	C, R	IV
21	<i>Dicaeum erythrorhynchos</i>	Tickell's Flowerpecker	C, R	IV
22	<i>Dicrurus adsimilis</i>	Black Drongo	C, R	IV
23	<i>Egretta garzetta</i>	Little egret	C	IV
24	<i>Eudynamys scolopacea</i>	Koel	C, R	IV
25	<i>Fringilla pondicerianus</i>	Grey Partridge	C, R	IV
26	<i>Gallus gallus</i>	Red Jungle Fowl	R	IV
27	<i>Gallus sonneratii</i>	Grey jungle fowl	R	IV
28	<i>Halcyon smyrnensis</i>	Whitebreasted Kingfisher	C.R	IV
29	<i>Haliastur Indus</i>	Brahmny kite	C	IV
30	<i>Hierococys varius</i>	Common hawk cuckoo	C	IV
31	<i>Lonchura malacca</i>	Blackheaded Munia	C, R	IV
32	<i>Megalaima merulinus</i>	Indian cuckoo	C	IV
33	<i>Merops orientalis</i>	Green Bee-Eater	C.R	IV
34	<i>Microfus affinis</i>	House swift	C	IV
35	<i>Milyus migrans</i>	Common kite	C	IV
36	<i>Mirafra erythroptera</i>	Redwinged Bushlark	C.R	IV
37	<i>Motacilla maderaspatensis</i>	Large pied wagtail	C	IV
38	<i>Nectarina asiatica</i>	Purple Sunbird	C	IV
39	<i>Orthotomus sutorius</i>	Tailor Bird	C, R	IV
40	<i>Passer domesticus</i>	House Sparrow	C, R	IV
41	<i>Phalacrocorax carbo</i>	Cormorant	C.R	IV
42	<i>Ploceus Philippines</i>	Weaver bird	C	IV
43	<i>Prinia subflava</i>	Plain Wren-Warbler	C, R	IV
44	<i>Psittacula krameri</i>	RoseRinged Parakeet	C, R	IV
45	<i>Pycnonotus cafer</i>	Redvented BulBul	C, R	IV
46	<i>Quills contronix</i>	Grey quail	C	IV
47	<i>Saxicoloides fulicata</i>	Indian Robin	C, R	IV
48	<i>Streptopelia chinensis</i>	Spotted Dove	C	IV
49	<i>Streptopelia decaocto</i>	Indian Ring Dove	C, R	IV
50	<i>Tchitrea paradisi</i>	Paradise Flycatcher	C	IV
51	<i>Temenuchus pagodarum</i>	Brahmny myna	C	IV
52	<i>Tephrodornis pondicerianus</i>	Common wood shrike	C	IV
53	<i>Turdoides striatus</i>	White headed babler	C	IV

Sl. No.	Scientific Name	Common Name	Status	WPA Schedule
54	<i>Uroloncha striata</i>	Spotted munia	C	IV
<b>Mammals</b>				
1	<i>Bandicota indica</i>	Bandicoot	C.R	IV
2	<i>Bos indicus</i>	Cow	C	IV
3	<i>Bubalus bubalis</i>	Buffalo	C	IV
4	<i>Canis auries</i>	Jackal	C.R	III
5	<i>Canis familiaris</i>	Dog	C	-
6	<i>Capra hircus</i>	Goat	C	-
7	<i>Felis chaus</i>	Jungle cat	C	II
8	<i>Felis rubiginosa</i>	Rusty spotted Cat	C	IV
9	<i>Funambulus palmarum</i>	Indian Palm squirrel	C.R	IV
10	<i>Herpestes auropunctatus</i>	Mongoose	C.R	IV
11	<i>Macaca radiata</i>	Bonnet macaque	C.R	II
12	<i>Mus booduga</i>	Indian Field Mouse	C	V
13	<i>Ovis aries</i>	Sheep	C	-
14	<i>Paradoxurus hermaphroditus</i>	Common palm civet	C.R	II
15	<i>Pteropus giganteus</i>	Bat, Indian Flying Fox	C	V
16	<i>Rattus norvegicus</i>	Field mouse	C.R	IV
17	<i>Rattus rattus</i>	House Rat	C	IV
18	<i>Sorex caerulescens</i>	Common mush shrew	C	IV
19	<i>Tatera indica</i>	Indian Gerbil	C	V
20	<i>Vulpus benghalensis</i>	Indian Fox	C.R	II
<b>Molluscans</b>				
1	<i>Ariophanta shell</i>	Ariophanta shell	C	IV
2	<i>Limnaea shell</i>	Pond snail shell	C	IV
3	<i>Pila globosa</i>	Apple snail	C	IV
4	<i>Planorbis shell</i>	Freshwater snail shell	C	IV

Legend : C- Common, M- Migratory, R- Resident, T- Threatened

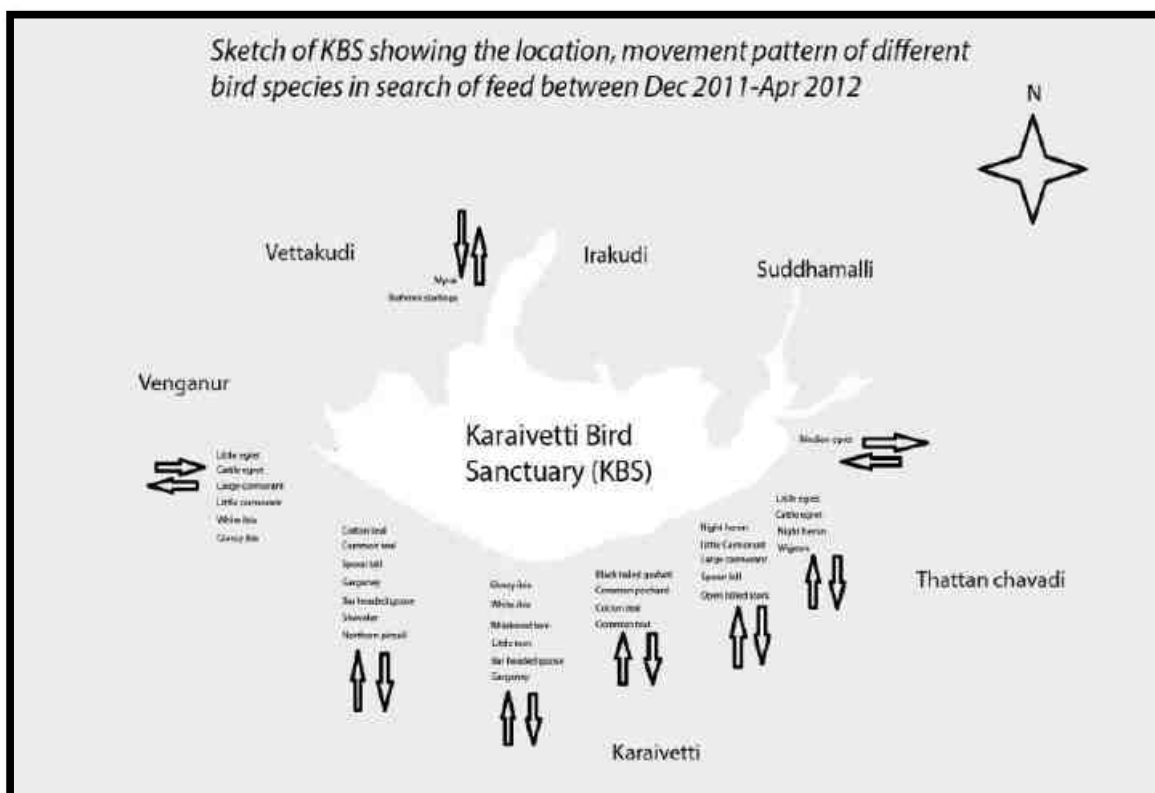
**Endangered Species:** Based on the Wildlife Protection Act, 1972 (WPA 1972, Anonymous. 1991, Upadhyay 1995, Chaturvedi and Chaturvedi 1996), species were short-listed as Schedule II or I and considered as endangered species. Species listed in Ghosh (1994) are considered as Indian Red List species. Among the fauna recorded, **most of them are common resident population and no endangered species encountered** in the study area.

### **Karaivetti Bird Sanctuary-Flora & Fauna**

Aquatic vegetation includes Ganthian spp., Sedge sp., Bullrush and Hydrilla. Shoreline trees include Wattle, Neem, Indian beech sp., and Casuarina sp. These trees provide habitats necessary for breeding waterbirds. The Social Forestry Department has planted Cassia trees along the northern and western shores of the reservoir.

Important water birds visiting the sanctuary includes the high flying bar-headed goose, white stork, woolly-necked stork, rosy pelican, spoonbill, openbill stork, grey heron, night heron, Pond heron, purple heron, egrets and glossy ibis. Birds start arriving in November and stay on till May. Population of migratory birds is maximum in the month of January. Upto 50,000 birds have been recorded visiting the sanctuary during peak season. Nearly 100 species of land birds have been recorded in the sanctuary. Important land birds visiting sanctuary include the Rosy Pastor,

Peregrine Falcon, Osprey, Marsh Harrier, Tawny Eagle, etc., The diving birds little cormorant, kingfisher, and indian cormorant and sixteen species of ducks, including spot-billed duck, common pochard, tufted pochard and northern shoveler and twenty three species of waders, including whiskered tern, gull-billed tern, and little tern, sandpipers, little ringed plover and kentish plover have been recorded in the sanctuary (Ref. : TN Forest Dept. Publication)..



### 3.10 Socio-economic Environment

Ariyalur District consists of two Revenue Divisions viz., Ariyalur and Udayarpalayam, three Taluks viz., Ariyalur, Udayarpalayam and Sendurai comprising of 195 Revenue Villages. The District has six blocks viz. Ariyalur, Thirumanur, Sendurai, Jayankondam, Andimadam and T.Palur comprising 201 Village Panchayats. There are two Municipalities viz. Ariyalur & Jayankondam and two Town Panchayats viz. Udayarpalayam & Varadharajanpettai.

There are 50 Census villages and 2 Town Panchayats in the study area of 10 km radius. The relevant socio-economic data such as demographic features including population distribution, literacy rate, occupational status, educational facilities and medical facilities were collected from Census 2011 Data and presented as **Tables 3.32-3.38**.

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**Table : 3.32 Demographic Profile- 2011 Census**

Sl. No.	Name of the Village	No. of House holds	Population			Scheduled Castes			Scheduled Tribes			Literates			Illiterates		
			Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
1	Kallakudi (TP)	3,178	11,604	5,661	5,943	1,222	610	612	3	2	1	9,277	4,804	4,473	2,327	857	1,470
2	Kovandakurichi	1,614	6,288	2,813	3,475	204	70	134	6	0	6	4,899	2,315	2,584	1,389	498	891
3	Palinganatham	980	3,538	1,743	1,795	198	92	106	0	0	0	2,671	1,449	1,222	867	294	573
4	Pudurpalayam	758	2,900	1,433	1,467	116	63	53	0	0	0	2,074	1,146	928	826	287	539
5	Pullampadi (TP)	2,628	10,241	4,868	5,373	555	258	297	63	29	34	7,838	3,990	3,848	2,403	878	1,525
6	Alambakkam	905	3,120	1,510	1,610	228	113	115	0	0	0	2,066	1,127	939	1,054	383	671
7	Keelarasoor	675	2,284	1,133	1,151	900	462	438	13	7	6	1,384	778	606	900	355	545
8	Melarasoor	654	2,216	1,095	1,121	529	267	262	0	0	0	1,402	787	615	814	308	506
9	Muthuvathur	377	1,426	704	722	149	82	67	16	6	10	828	477	351	598	227	371
10	Thoppai	445	1,622	826	796	120	66	54	0	0	0	1,160	664	496	462	162	300
11	Vandalaikudalur	806	3,023	1,462	1,561	332	163	169	14	7	7	2,058	1,086	972	965	376	589
12	Varaguppai	351	1,222	617	605	236	115	121	1	0	1	838	473	365	384	144	240
13	Venkatachalapuram (South)	653	2,230	1,119	1,111	80	38	42	1	1	0	1,636	905	731	594	214	380
14	Alambadi	443	1,452	686	766	434	204	230	0	0	0	948	524	424	504	162	342
15	Alangudimahajanam	369	1,381	672	709	362	181	181	75	38	37	978	516	462	403	156	247
16	Ariyur	873	3,385	1,701	1,684	777	375	402	0	0	0	2,335	1,285	1,050	1,050	416	634
17	Edangimangalam	888	3,365	1,696	1,669	460	233	227	27	16	11	2,639	1,415	1,224	726	281	445
18	Elandakudam	1,221	4,559	2,218	2,341	663	330	333	0	0	0	3,062	1,694	1,368	1,497	524	973
19	Garudamangalam (North)	304	995	472	523	455	214	241	8	6	2	569	308	261	426	164	262
20	Garudamangalam (South)	532	1,969	964	1,005	659	345	314	5	4	1	1,253	666	587	716	298	418
21	Kallagam	757	2,818	1,386	1,432	650	315	335	0	0	0	1,923	1,081	842	895	305	590
22	Kanakiliyanallur	742	2,675	1,292	1,383	275	132	143	0	0	0	1,758	976	782	917	316	601
23	Kannakudi	658	2,518	1,247	1,271	926	469	457	0	0	0	1,363	781	582	1,155	466	689
24	Keelanbil	464	1,692	814	878	765	371	394	0	0	0	1,293	677	616	399	137	262
25	Komagudi	246	974	481	493	130	56	74	0	0	0	729	386	343	245	95	150
26	Kovil Esanai (East)	541	1,834	879	955	540	255	285	0	0	0	1,156	634	522	678	245	433
27	Kovil Esanai (West)	508	1,711	793	918	165	73	92	0	0	0	1,100	592	508	611	201	410

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**Table : 3.32 (Cont.) Demographic Profile- 2011 Census**

Sl. No.	Name of the Village	No. of House holds	Population			Scheduled Castes			Scheduled Tribes			Literates			Illiterates		
			Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
28	Kumalur	867	3,636	1,735	1,901	352	166	186	1	0	1	2,582	1,344	1,238	1,054	391	663
29	M. Kannanoor	491	1,557	755	802	385	203	182	0	0	0	993	546	447	564	209	355
30	Malvoy	701	2,318	1,075	1,243	227	107	120	1	0	1	1,499	801	698	819	274	545
31	Mettupatti	258	938	465	473	404	197	207	0	0	0	739	377	362	199	88	111
32	Nanjaisengandhi	298	1,066	503	563	1,061	501	560	0	0	0	749	390	359	317	113	204
33	Nathamangudi	561	2,162	1,093	1,069	36	20	16	0	0	0	1,639	916	723	523	177	346
34	Orathur	549	2,175	1,075	1,100	650	325	325	0	0	0	1,151	629	522	1,024	446	578
35	Peruvalanallur (East)	1,076	3,870	1,840	2,030	1,779	873	906	0	0	0	2,916	1,523	1,393	954	317	637
36	Peruvalanallur (West)	445	1,700	845	855	248	120	128	0	0	0	1,224	676	548	476	169	307
37	Peruvalappur	1,022	3,334	1,646	1,688	429	212	217	32	17	15	2,284	1,269	1,015	1,050	377	673
38	Poondi	1,147	4,149	1,949	2,200	361	168	193	20	10	10	2,758	1,474	1,284	1,391	475	916
39	Punjaisengandhi	710	2,582	1,246	1,336	310	156	154	6	3	3	1,890	1,015	875	692	231	461
40	Reddimangudi	786	2,855	1,439	1,416	478	237	241	0	0	0	1,975	1,105	870	880	334	546
41	Sadurbagam	162	554	286	268	475	246	229	0	0	0	379	217	162	175	69	106
42	Sannavur (North)	477	1,520	734	786	313	142	171	0	0	0	770	432	338	750	302	448
43	Sannavur (South)	544	1,920	956	964	525	251	274	80	41	39	1,242	676	566	678	280	398
44	Saradamangalam	391	1,372	647	725	383	175	208	0	0	0	741	390	351	631	257	374
45	Sembarai	549	2,365	1,189	1,176	643	303	340	0	0	0	1,874	999	875	491	190	301
46	Sirukalapur	479	1,835	918	917	563	283	280	0	0	0	1,215	688	527	620	230	390
47	Sirumayangudi (West)	949	3,645	1,778	1,867	977	470	507	54	32	22	2,847	1,479	1,368	798	299	499
48	Sirumayangudi (East)	665	2,374	1,132	1,242	894	425	469	0	0	0	1,858	953	905	516	179	337
49	Thinniyam	576	2,243	1,121	1,122	667	322	345	0	0	0	1,958	994	964	285	127	158
50	Vellanur	250	1,007	519	488	181	86	95	5	4	1	842	465	377	165	54	111
51	Venganur	1,194	4,163	2,059	2,104	1,762	880	882	11	7	4	2,755	1,490	1,265	1,408	569	839
52	Viragalur	1,163	4,466	2,285	2,181	113	55	58	12	8	4	3,601	1,971	1,630	865	314	551
	<b>Total</b>	<b>38,880</b>	<b>142,848</b>	<b>69,575</b>	<b>73,273</b>	<b>26,346</b>	<b>12,875</b>	<b>13,471</b>	<b>454</b>	<b>238</b>	<b>216</b>	<b>101,718</b>	<b>54,355</b>	<b>47,363</b>	<b>41,130</b>	<b>15,220</b>	<b>25,910</b>
	<b>Percentage (%)</b>	-	-	<b>48.7</b>	<b>51.3</b>	<b>18.4</b>	<b>9.0</b>	<b>9.4</b>	<b>0.3</b>	<b>0.2</b>	<b>0.2</b>	<b>71.2</b>	<b>38.1</b>	<b>33.2</b>	<b>28.8</b>	<b>10.7</b>	<b>18.1</b>

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**Table : 3.33 Occupation of Population and Work Forces**

Sl. No.	Name of the Census Village	Total Population	Workers			Non-Workers			Main Workers				Marginal Workers			
			Total	Male	Female	Total	Male	Female	Cultivators	Agricultural Labourers	Household Industrial Workers	Other Workers	Cultivators	Agricultural Labourers	Household Industrial Workers	Other Workers
1	Kallakudi (TP)	11,604	4,256	3,290	966	7,348	2,371	4,977	90	71	65	2,992	24	204	39	771
2	Kovandakurichi	6,288	2,506	1,560	946	3,782	1,253	2,529	303	371	42	1,109	20	277	21	363
3	Palinganatham	3,538	1,433	1,003	430	2,105	740	1,365	66	128	7	340	50	683	10	149
4	Pudurpalayam	2,900	1,370	852	518	1,530	581	949	349	488	25	327	10	70	21	80
5	Pullampadi (TP)	10,241	4,440	2,845	1,595	5,801	2,023	3,778	338	916	30	2,283	24	583	12	254
6	Alambakkam	3,120	1,648	929	719	1,472	581	891	352	848	14	312	13	70	9	30
7	Keelarasoor	2,284	1,274	674	600	1,010	459	551	208	102	5	223	14	628	12	82
8	Melarasoor	2,216	1,394	664	730	822	431	391	857	328	23	136	16	8	6	20
9	Muthuvathur	1,426	816	415	401	610	289	321	76	1	1	71	6	255	1	405
10	Thoppai	1,622	919	539	380	703	287	416	335	437	4	138	2	0	2	1
11	Vandalaikudalur	3,023	1,561	850	711	1,462	612	850	345	818	3	247	25	108	1	14
12	Varaguppai	1,222	826	413	413	396	204	192	578	91	0	138	4	9	0	6
13	Venkatachalapuram (South)	2,230	1,237	672	565	993	447	546	426	561	2	236	10	2	0	0
14	Alambadi	1,452	779	413	366	673	273	400	147	454	26	126	2	18	0	6
15	Alangudimahajanam	1,381	652	372	280	729	300	429	76	405	3	152	0	12	0	4
16	Ariyur	3,385	1,611	933	678	1,774	768	1,006	168	493	15	237	108	339	6	245
17	Edangimangalam	3,365	1,590	941	649	1,775	755	1,020	384	567	14	304	21	260	3	37
18	Elandakudam	4,559	1,911	1,171	740	2,648	1,047	1,601	890	796	13	108	5	79	5	15
19	Garudamangalam (North)	995	537	279	258	458	193	265	119	41	6	60	12	286	1	12
20	Garudamangalam (South)	1,969	907	565	342	1,062	399	663	415	375	21	77	1	9	2	7
21	Kallagam	2,818	1,318	769	549	1,500	617	883	133	492	16	196	15	402	14	50
22	Kanakiliyanallur	2,675	1,399	752	647	1,276	540	736	834	391	12	148	2	2	1	9
23	Kannakudi	2,518	1,468	759	709	1,050	488	562	604	525	7	61	11	220	0	40
24	Keelanbil	1,692	968	517	451	724	297	427	22	393	6	262	8	12	94	171
25	Komagudi	974	676	325	351	298	156	142	113	271	6	266	4	6	0	10
26	Kovil Esanai (East)	1,834	1,088	559	529	746	320	426	650	178	11	73	47	107	2	20
27	Kovil Esanai (West)	1,711	844	478	366	867	315	552	186	321	2	63	48	219	0	5



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**Table : 3.33 (Cont.) Occupation of Population and Work Forces**

Sl. No.	Name of the Census Village	Total Population	Workers			Non-Workers			Main Workers				Marginal Workers			
			Total	Male	Female	Total	Male	Female	Cultivators	Agricultural Labourers	Household Industrial Workers	Other Workers	Cultivators	Agricultural Labourers	Household Industrial Workers	Other Workers
28	Kumalur	3,636	1,691	914	777	1,945	821	1,124	393	456	17	248	10	501	8	58
29	M. Kannanoor	1,557	958	453	505	599	302	297	348	411	8	43	17	128	0	3
30	Malvoy	2,318	1,298	619	679	1,020	456	564	626	358	20	85	11	181	0	17
31	Mettupatti	938	374	281	93	564	184	380	29	196	0	63	0	38	0	48
32	Nanjaisengandhi	1,066	667	317	350	399	186	213	14	469	17	115	1	44	2	5
33	Nathamangudi	2,162	1,221	678	543	941	415	526	301	589	15	154	2	104	6	50
34	Orathur	2,175	1,039	589	450	1,136	486	650	268	553	6	134	6	23	2	47
35	Peruvalanallur (East)	3,870	1,982	1,065	917	1,888	775	1,113	245	582	3	471	9	640	1	31
36	Peruvalanallur (West)	1,700	933	516	417	767	329	438	100	337	1	209	27	211	1	47
37	Peruvalappur	3,334	2,019	1,037	982	1,315	609	706	1,028	777	10	201	0	1	0	2
38	Poondi	4,149	2,302	1,181	1,121	1,847	768	1,079	1,050	463	14	245	19	403	0	108
39	Punjaisengandhi	2,582	1,341	776	565	1,241	470	771	323	720	11	272	2	10	0	3
40	Reddimangudi	2,855	1,561	867	694	1,294	572	722	434	714	22	190	10	170	5	16
41	Sadurbagam	554	391	203	188	163	83	80	273	82	2	4	0	27	0	3
42	Sannavur (North)	1,520	951	460	491	569	274	295	625	53	20	69	38	139	2	5
43	Sannavur (South)	1,920	1,121	571	550	799	385	414	104	22	9	114	7	820	2	43
44	Saradamangalam	1,372	800	412	388	572	235	337	679	70	0	32	9	4	1	5
45	Sembarai	2,365	1,094	617	477	1,271	572	699	242	181	9	154	25	330	4	149
46	Sirukalapur	1,835	1,101	580	521	734	338	396	603	369	2	44	3	78	1	1
47	Sirumayangudi (West)	3,645	1,488	1,055	433	2,157	723	1,434	72	418	21	632	19	171	7	148
48	Sirumayangudi (East)	2,374	1,013	675	338	1,361	457	904	57	582	15	203	11	107	4	34
49	Thinniyam	2,243	1,293	772	521	950	349	601	200	836	13	123	12	67	0	42
50	Vellanur	1,007	267	243	24	740	276	464	0	113	15	38	1	87	7	6
51	Venganur	4,163	2,405	1,265	1,140	1,758	794	964	797	698	39	274	182	338	26	51
52	Viragalur	4,466	1,788	1,202	586	2,678	1,083	1,595	273	863	14	164	49	337	20	68
	<b>Total</b>	<b>142,848</b>	<b>70,526</b>	<b>40,887</b>	<b>29,639</b>	<b>72,322</b>	<b>28,688</b>	<b>43,634</b>	<b>18,148</b>	<b>21,774</b>	<b>682</b>	<b>14,966</b>	<b>972</b>	<b>9,827</b>	<b>361</b>	<b>3,796</b>
	<b>Percentage (%)</b>	<b>-</b>	<b>49.4</b>	<b>28.6</b>	<b>20.7</b>	<b>50.6</b>	<b>20.1</b>	<b>30.5</b>	<b>12.7</b>	<b>15.2</b>	<b>0.5</b>	<b>10.5</b>	<b>0.7</b>	<b>6.9</b>	<b>0.3</b>	<b>2.7</b>

Note : Others category includes Constructions, Trade & Commerce, Transport Storage & Communications, Other Services, etc.  
 \*-Main and Marginal Workers.

DCBL EC for Expn. of Kallakudi-Kovandakurichi Limestone Mine GO No. 76 (Extent 166.005 Ha), Trichy Dist.

**Table : 3.34 Educational Facilities in the Study Area**

Sl. No.	Name of the Village	PPS*	PS*	MS*	SS*	SSS*	DC*	EC*	MC*	MI*	PT*	VTS*	SSD*
1	Kovandakurichi	1	1	1	1	1	c	c	c	c	b	1	1
2	Palinganatham	1	1	1	1	b	c	c	c	c	c	b	b
3	Pudurpalayam	1	1	1	1	1	c	c	c	c	b	b	b
4	Alambakkam	1	1	1	a	a	c	c	c	c	b	b	b
5	Keelarasoor	1	1	1	b	b	c	c	c	c	b	c	c
6	Melarasoor	1	1	1	a	a	c	c	c	c	c	b	b
7	Muthuvathur	1	1	1	b	b	c	c	c	c	b	c	c
8	Thoppai	1	1	1	b	b	c	c	c	c	c	b	b
9	Vandalaikudalur	1	1	1	b	b	c	c	c	c	c	a	a
10	Varaguppai	1	1	b	b	b	c	c	c	c	c	b	b
11	Venkatachalapuram (South)	1	1	b	b	b	c	c	c	c	c	b	b
12	Alambadi	1	1	a	a	a	c	c	c	c	b	c	c
13	Alangudimahajanam	1	1	b	b	b	c	c	c	c	c	b	b
14	Ariyur	1	1	1	1	a	b	c	c	c	b	c	c
15	Edangimangalam	1	1	1	1	a	b	c	c	c	b	a	a
16	Elandakudam	1	1	1	1	b	c	c	c	c	c	c	c
17	Garudamangalam (North)	1	1	b	b	b	c	c	c	c	c	c	c
18	Garudamangalam (South)	1	1	1	a	b	c	c	c	c	c	c	c
19	Kallagam	1	1	1	1	1	c	c	c	c	c	c	c
20	Kanakiliyanallur	1	1	1	1	1	c	b	c	b	b	b	b
21	Kannakudi	1	1	a	a	a	c	b	b	b	b	b	b
22	Keelanbil	1	1	1	1	1	b	c	c	c	b	b	c
23	Komagudi	1	1	1	a	a	b	c	c	c	b	b	b
24	Kovil Esanai (East)	1	1	1	1	b	c	c	c	c	c	c	c
25	Kovil Esanai (West)	1	1	1	a	b	c	c	c	c	c	b	b
26	Kumalur	1	1	1	a	a	c	1	b	b	b	b	b
27	M. Kannanoor	1	1	a	a	a	c	c	c	c	c	c	c

DCBL EC for Expn. of Kallakudi-Kovandakurichi Limestone Mine GO No. 76 (Extent 166.005 Ha), Trichy Dist.

**Table : 3.34 (Cont.) Educational Facilities in the Study Area**

Sl. No.	Name of the Village	PPS*	PS*	MS*	SS*	SSS*	DC*	EC*	MC*	MI*	PT*	VTS*	SSD*
28	Malvoy	1	1	1	1	1	c	c	c	c	c	c	c
29	Mettupatti	1	1	a	a	a	b	c	c	c	b	b	b
30	Nanjaisengandhi	1	1	a	a	a	b	c	c	c	b	a	a
31	Nathamangudi	1	1	1	a	a	c	c	c	c	c	b	b
32	Orathur	1	1	a	a	a	c	c	c	c	b	c	c
33	Peruvalanallur (East)	1	1	1	1	a	b	b	b	b	b	b	b
34	Peruvalanallur (West)	1	1	1	a	a	b	b	b	b	b	b	b
35	Peruvalappur	1	1	1	1	1	c	b	c	b	b	c	c
36	Poondi	1	1	1	1	b	c	c	c	c	c	c	c
37	Punjaisengandhi	1	1	1	1	a	c	c	c	c	c	a	a
38	Reddimangudi	1	1	1	b	b	c	b	b	b	b	b	b
39	Sadurbagam	1	1	a	a	a	c	c	c	c	c	c	c
40	Sannavur (North)	1	1	1	a	b	c	c	c	c	c	c	c
41	Sannavur (South)	1	1	1	a	b	c	c	c	c	c	c	c
42	Saradamangalam	1	1	1	a	a	c	c	c	c	c	c	c
43	Sembarai	1	1	1	1	1	b	c	c	c	b	b	b
44	Sirukalapur	1	1	1	1	b	c	b	c	b	b	c	c
45	Sirumayangudi (West)	1	1	1	a	a	b	c	c	c	b	a	c
46	Sirumayangudi (East)	1	1	a	a	a	b	c	c	c	b	b	b
47	Thinniyam	1	1	a	a	a	c	c	c	c	c	b	b
48	Vellanur	1	1	1	1	a	b	c	c	c	b	a	a
49	Venganur	1	1	1	a	a	c	c	c	c	b	b	c
50	Viragalur	1	1	1	1	1	c	c	c	c	b	b	b

PPS-Pre-Primary School  
 PS-Primary School  
 MS-Middle School  
 SS-Secondary School

SSS-Senior Secondary School  
 DC-Degree College  
 EC-Engineering College  
 MC-Medical College

MI-Management College / Institute  
 PT-Polytechnic  
 VTS-Vocational School/ITI  
 SSD-Special School for Disabled

1-Available  
 a-Facility available at <5 Kms  
 b-Facility available at 5-10 Kms  
 c-Facility available at >10 Kms

**Table : 3.35 Medical Facilities in the Study Area**

Sl. No.	Name of the Village	CHC	PHC	PHSC	MCW	TB	HA	HAM	D	VH	FWC
1	Kovandakurichi	a	a	1	a	c	c	c	a	a	a
2	Palinganatham	b	a	1	b	b	c	c	a	b	a
3	Pudurpalayam	b	b	1	b	c	c	c	b	a	b
4	Alambakkam	b	b	1	b	c	c	c	b	1	b
5	Keelarasoor	c	a	1	a	c	c	c	a	1	a
6	Melarasoor	b	1	1	1	1	c	c	1	a	1
7	Muthuvathur	c	b	b	b	c	c	c	b	1	b
8	Thoppai	b	b	1	b	c	c	c	b	b	b
9	Vandalaikudalur	a	a	1	a	c	c	c	a	a	a
10	Varaguppai	b	b	1	b	c	c	c	b	b	b
11	Venkatachalapuram (South)	b	b	1	b	c	c	c	b	b	b
12	Alambadi	c	c	1	c	c	c	c	c	c	c
13	Alangudimahajanam	b	b	1	b	c	c	c	b	b	b
14	Ariyur	c	a	1	a	b	b	b	a	a	a
15	Edangimangalam	a	a	1	a	b	b	b	a	1	a
16	Elandakudam	c	c	1	c	c	c	c	c	1	c
17	Garudamangalam (North)	c	a	1	a	c	c	c	a	a	a
18	Garudamangalam (South)	c	1	1	1	1	c	c	1	1	1
19	Kallagam	c	a	1	a	c	c	c	a	a	a
20	Kanakiliyanallur	b	1	1	1	1	c	c	1	1	1
21	Kannakudi	b	a	1	a	c	c	c	a	a	a
22	Keelanbil	c	1	1	1	1	b	b	1	a	1
23	Komagudi	b	a	1	a	b	b	b	a	b	a
24	Kovil Esanai (East)	b	b	b	b	b	c	c	b	a	b
25	Kovil Esanai (West)	b	b	b	b	b	c	c	b	a	b
26	Kumalur	a	a	1	a	c	c	c	a	1	a
27	M. Kannanoor	c	a	1	a	c	c	c	a	b	a

**Table : 3.35 (Cont.) Medical Facilities in the Study Area**

Sl. No.	Name of the Village	CHC	PHC	PHSC	MCW	TB	HA	HAM	D	VH	FWC
28	Malvoy	c	a	1	a	c	c	c	a	b	a
29	Mettupatti	b	a	1	a	b	b	b	a	a	a
30	Nanjaisengandhi	a	a	1	a	b	b	b	a	a	a
31	Nathamangudi	b	b	b	b	c	c	c	b	b	b
32	Orathur	c	1	1	1	1	c	c	1	a	1
33	Peruvalanallur (East)	b	a	1	a	b	b	b	a	a	a
34	Peruvalanallur (West)	b	a	a	a	b	b	b	a	1	a
35	Peruvalappur	c	1	1	1	1	c	c	1	1	1
36	Poondi	c	b	1	b	c	c	c	b	a	b
37	Punjaisengandhi	a	a	1	a	c	c	c	a	a	a
38	Reddimangudi	b	b	1	b	c	c	c	b	b	b
39	Sadurbagam	c	a	1	a	c	c	c	a	1	a
40	Sannavur (North)	c	a	1	a	c	c	c	a	b	a
41	Sannavur (South)	c	a	1	a	c	c	c	a	b	a
42	Saradamangalam	c	b	b	b	c	c	c	b	a	b
43	Sembarai	b	a	a	a	b	b	b	a	1	a
44	Sirukalapur	c	a	a	a	c	c	c	a	a	a
45	Sirumayangudi (West)	b	1	1	1	1	b	b	1	1	1
46	Sirumayangudi (East)	b	a	1	a	b	b	b	a	a	a
47	Thinniyam	b	a	1	a	c	c	c	a	a	a
48	Vellanur	a	a	a	a	b	b	b	a	b	a
49	Venganur	a	a	1	a	a	b	b	a	a	a
50	Viragalur	b	b	1	b	c	c	c	b	1	b

CHC-Community Health Centre  
 PHC-Primary Health Centre  
 PHSC-Primary Health Sub Centre  
 MCW- Maternity and Child Welfare

TBC-TB Clinic  
 HA-Aallopathic Hospital  
 HAM- Alternative Medicine  
 D-Dispensary

VH-Veterinary Hospital  
 FWC-Family Welfare Centre

1-Available  
 a-Facility available at <5  
 b-Facility available at 5-  
 c-Facility available at >10

DCBL EC for Expn. of Kallakudi-Kovandakurichi Limestone Mine GO No. 76 (Extent 166.005 Ha), Trichy Dist.

**Table : 3.36 Communication & Transport Facilities in the Study Area**

Sl. No.	Name of the Village	PO	SPO	P&T	T	PCO	MP	IC	PCF	BS	PBS	RS	NH	SH	MDR	BTR	GR	AWR
1	Kovandakurichi	a	1	a	1	1	1	a	a	1	1	a	a	c	1	1	1	1
2	Palinganatham	b	1	b	1	b	1	b	b	1	b	1	1	1	1	1	1	1
3	Pudurpalayam	b	1	b	1	1	1	b	a	1	1	a	a	b	1	1	1	1
4	Alambakkam	b	1	b	1	1	1	b	b	1	1	b	b	c	1	1	1	1
5	Keelarasoor	a	1	a	1	1	1	b	b	1	1	b	1	c	1	1	1	1
6	Melarasoor	a	1	a	1	1	1	a	a	1	a	a	a	c	1	1	1	1
7	Muthuvathur	b	a	b	1	1	1	b	b	1	1	b	1	c	1	1	1	1
8	Thoppai	a	1	a	1	1	1	b	b	1	1	a	a	c	1	1	1	1
9	Vandalakudalur	a	1	a	1	1	1	a	a	1	1	a	a	c	1	1	1	1
10	Varaguppai	b	1	b	1	b	1	b	b	1	1	b	b	c	1	1	1	1
11	Venkatachalapuram (South)	a	1	a	1	1	1	b	b	a	b	b	a	c	1	1	1	1
12	Alambadi	b	1	b	1	1	c	c	1	1	1	c	c	b	1	1	1	1
13	Alangudimahajanam	b	1	b	1	1	1	b	b	1	b	b	b	c	1	1	1	1
14	Ariyur	a	1	a	1	1	1	b	b	1	a	b	b	b	1	1	1	1
15	Edangimangalam	a	1	a	1	1	1	a	a	1	1	1	1	b	1	1	1	1
16	Elandakudam	b	1	b	1	1	1	c	b	1	1	c	c	c	a	1	1	1
17	Garudamangalam (North)	b	1	b	1	1	1	c	c	1	1	c	b	c	1	1	1	1
18	Garudamangalam (South)	b	1	b	1	1	1	b	b	1	1	c	b	c	1	1	1	1
19	Kallagam	1	a	1	1	1	1	b	b	1	1	1	1	c	1	1	1	1
20	Kanakiliyanallur	b	1	b	1	1	1	b	b	1	1	b	b	c	1	1	1	1
21	Kannakudi	b	1	b	1	1	1	b	b	1	1	b	b	c	1	1	1	1
22	Keelanbil	1	a	1	1	1	1	b	b	1	1	b	b	a	1	1	1	1
23	Komagudi	a	a	a	1	1	1	b	b	1	1	b	a	b	1	1	1	1
24	Kovil Esanai (East)	b	1	b	1	1	1	c	c	1	1	b	c	c	1	1	1	1
25	Kovil Esanai (West)	b	a	b	1	1	1	a	c	1	1	b	b	b	1	1	1	1
26	Kumalur	b	1	b	1	1	1	b	b	1	1	b	b	c	1	1	1	1
27	M. Kannanoor	b	1	b	1	1	1	b	b	1	b	b	b	c	1	1	1	1

DCBL EC for Expn. of Kallakudi-Kovandakurichi Limestone Mine GO No. 76 (Extent 166.005 Ha), Trichy Dist.

**Table : 3.36 (Cont.) Communication & Transport Facilities in the Study Area**

SI. No.	Name of the Village	PO	SPO	P&T	T	PCO	MP	IC	PCF	BS	PBS	RS	NH	SH	MDR	BTR	GR	AWR
28	Malvoy	b	1	b	1	1	1	b	b	1	b	b	b	c	1	1	1	1
29	Mettupatti	b	1	b	1	1	1	a	a	1	1	b	a	b	1	1	1	1
30	Nanjaisengandhi	a	a	a	1	1	1	a	a	1	1	a	1	c	1	1	1	1
31	Nathamangudi	b	1	b	1	1	1	b	b	1	a	b	b	b	1	1	1	1
32	Orathur	b	a	b	1	1	1	b	b	1	1	b	a	c	1	1	1	1
33	Peruvalanallur (East)	a	1	a	1	1	1	b	b	1	1	b	1	b	1	1	1	1
34	Peruvalanallur (West)	a	1	b	1	1	1	b	b	1	1	b	a	b	1	1	1	1
35	Peruvalappur	b	1	b	1	1	1	c	c	1	1	c	b	c	1	1	1	1
36	Poondi	b	1	1	1	1	1	b	b	1	1	b	1	1	1	1	1	1
37	Punjaisengandhi	a	1	a	1	1	1	a	a	1	1	a	a	c	1	1	1	1
38	Reddimangudi	b	1	b	1	1	1	c	c	1	1	c	b	c	1	1	1	1
39	Sadurbagam	b	1	b	1	1	1	b	b	1	1	b	b	c	1	1	1	1
40	Sannavur (North)	c	a	c	1	1	1	c	c	1	1	c	c	c	1	1	1	1
41	Sannavur (South)	b	a	b	1	1	1	b	b	1	1	b	b	b	1	1	1	1
42	Saradamangalam	b	a	b	1	1	1	b	b	1	a	c	b	c	1	1	1	1
43	Sembarai	a	a	a	1	1	1	b	b	1	1	b	b	b	1	1	1	1
44	Sirukalapur	b	1	b	1	1	1	b	b	1	1	b	b	c	1	1	1	1
45	Sirumayangudi (West)	a	1	a	1	1	1	b	b	1	1	1	a	c	1	1	1	1
46	Sirumayangudi (East)	a	1	b	1	1	1	a	b	1	1	a	a	b	1	1	1	1
47	Thinniyam	b	1	b	1	1	1	c	1	1	b	c	b	b	1	1	1	1
48	Vellanur	a	1	a	1	1	1	b	b	1	1	b	1	b	1	1	1	1
49	Venganur	a	1	a	1	1	1	a	a	a	a	c	a	a	1	1	1	1
50	Viragalur	1	1	1	1	1	1	b	b	1	1	b	b	a	1	1	1	1

PO-Post Office

SPO-Sub Post Office

P&amp;T-Post/Telegraph Office

T-Telephones (landlines)

PCO- Public Call Office/Mobile PCO)

MP- Mobile Phone Coverage

IC-Internet Cafes / Common Service Centre

PCF-Private Courier Facility

BS-Public Bus Service

PBS-Private Bus Service

RS-Railway Station

NH-National Highway

SH-State Highway

MDR-Major District Road

BTR-Black Topped (Pucca) Roads

GR-Gravel (kuchha) Roads

AWR-All Weather Road

\*-Status

1-Available

2-Not Available

a-Facility available at &lt;5 Kms

b-Facility available at 5-10 Kms

c-Facility available at &gt;10 Kms





**Table : 3.37 (Cont.) Water & Drainage Facilities in the Study Area**

Sl. No.	Name of the Village	TP	CW	UCW	HP	TW/BH	S	R/C	T/P/L	CD	OD	CT
28	Malvoy	1	1	1	1	1	1	1	1	1	1	2
29	Mettupatti	1	1	1	1	1	1	1	1	1	1	2
30	Nanjaisengandhi	1	1	1	1	1	1	1	1	1	1	1
31	Nathamangudi	1	1	1	1	1	1	1	1	1	1	1
32	Orathur	1	1	1	1	1	1	1	1	1	2	1
33	Peruvalanallur (East)	1	1	1	1	1	1	1	1	2	1	2
34	Peruvalanallur (West)	1	1	1	1	1	1	1	1	1	1	2
35	Peruvalappur	1	1	1	1	1	1	1	1	1	1	2
36	Poondi	1	2	2	2	1	2	2	2	1	1	1
37	Punjaisengandhi	1	1	1	1	1	1	1	1	1	1	2
38	Reddimangudi	1	1	1	1	1	1	1	1	2	1	1
39	Sadurbagam	1	1	1	1	1	1	1	1	1	1	2
40	Sannavur (North)	1	1	1	2	1	2	2	2	1	1	2
41	Sannavur (South)	2	2	2	1	2	2	2	2	2	1	2
42	Saradamangalam	1	1	1	1	1	1	1	1	1	1	1
43	Sembarai	1	1	1	1	1	1	1	1	1	1	1
44	Sirukalapur	1	2	1	1	1	1	1	1	1	1	1
45	Sirumayangudi (West)	1	1	1	1	1	1	1	1	1	1	2
46	Sirumayangudi (East)	1	1	1	1	1	1	1	1	1	1	2
47	Thinniyam	1	1	1	1	1	1	1	1	1	1	1
48	Vellanur	1	1	1	1	1	1	1	1	1	1	2
49	Venganur	1	1	1	1	1	2	1	2	2	1	2
50	Viragalur	1	1	1	1	1	1	1	1	1	1	1

T-Tap Water  
 CW-Covered Well  
 UCW-Uncovered Well  
 HP-Hand Pump

TW/BH-Tube Well/Bore Well  
 S-Spring  
 R/C- River/Canal  
 T/P/L-Tank/Pond/Lake

CD-Covered Drainage  
 OD-Open Drainage  
 CT-Community Toilet Complex for General

\*-Status  
 1-Available  
 2-Not

DCBL EC for Expn. of Kallakudi-Kovandakurichi Limestone Mine GO No. 76 (Extent 166.005 Ha), Trichy Dist.

**Table : 3.38 Other Facilities in the Study Area**

Sl. No.	Name of the Village	ATM	CB	COB	ACS	SHG	PDS	RM	AMS	NC	NC-AC	CC	SF	PL	NP	APS	BDRO	PS
1	Kovandakurichi	a	a	1	1	1	1	c	b	1	1	1	1	1	1	1	1	1
2	Palinganatham	b	b	b	1	1	1	b	c	1	1	1	1	b	1	1	1	1
3	Pudurpalayam	a	a	a	a	1	1	c	c	1	1	1	1	1	1	1	1	1
4	Alambakkam	b	b	a	a	1	1	c	c	1	1	b	1	1	1	1	1	1
5	Keelarasoor	b	b	b	b	1	1	c	c	1	1	a	1	1	1	1	1	1
6	Melarasoor	a	a	a	a	1	1	b	b	1	1	a	1	1	1	1	1	1
7	Muthuvathur	b	b	b	b	1	1	c	c	1	1	1	1	1	1	1	1	1
8	Thoppai	a	a	1	1	1	1	b	b	1	1	b	1	1	1	1	1	1
9	Vandalaikudalur	a	a	a	a	1	1	c	c	1	1	a	1	1	1	1	1	1
10	Varaguppai	b	b	a	a	1	1	b	b	1	1	b	1	1	1	1	1	1
11	Venkatachalapuram (South)	b	b	1	1	1	1	a	a	1	1	a	1	1	1	1	1	1
12	Alambadi	c	b	c	b	1	1	c	c	1	1	a	a	c	1	1	1	1
13	Alangudimahajanam	b	b	1	1	1	1	c	c	1	1	1	b	b	1	1	1	1
14	Ariyur	b	a	1	b	1	1	b	b	1	1	a	1	1	1	1	1	1
15	Edangimangalam	a	a	1	1	1	1	b	b	1	1	1	1	a	1	1	1	1
16	Elandakudam	c	b	1	c	1	1	c	c	1	1	b	1	1	1	1	1	1
17	Garudamangalam (North)	c	b	b	b	1	1	c	c	1	1	a	b	b	1	1	1	1
18	Garudamangalam (South)	b	1	1	1	1	1	c	c	1	1	1	1	1	1	1	1	1
19	Kallagam	b	b	b	b	1	1	b	b	1	1	1	1	1	1	a	1	1
20	Kanakiliyanallur	b	b	1	1	1	1	b	b	1	1	b	1	1	1	1	1	1
21	Kannakudi	b	b	a	b	1	1	c	c	1	1	b	1	1	1	1	1	1
22	Keelanbil	b	1	1	1	1	1	b	b	1	1	1	1	1	1	1	1	1
23	Komagudi	b	b	a	a	1	1	b	b	1	1	a	1	1	1	1	1	1
24	Kovil Esanai (East)	b	c	a	a	1	1	c	c	1	1	a	1	1	1	1	1	1
25	Kovil Esanai (West)	c	c	a	a	1	1	c	c	1	1	1	b	1	1	1	1	1
26	Kumalur	b	b	a	1	1	1	c	c	1	1	1	1	1	1	1	1	1
27	M. Kannanoor	b	a	a	a	1	1	c	c	1	1	a	1	b	1	1	1	1

**Table : 3.38 (Cont.) Other Facilities in the Study Area**

Sl. No.	Name of the Village	ATM	CB	COB	ACS	SHG	PDS	RM	AMS	NC	NC-AC	CC	SF	PL	NP	APS	BDRO	PS
b	Malvoy	b	1	1	1	1	1	c	1	1	1	1	1	b	1	1	1	1
29	Mettupatti	a	a	a	a	1	1	b	b	1	1	a	1	1	1	1	1	1
30	Nanjaisengandhi	b	b	a	a	1	1	b	a	1	1	1	1	a	1	a	1	1
31	Nathamangudi	b	b	a	a	1	1	c	c	1	1	1	1	b	1	1	1	1
32	Orathur	b	a	a	a	1	1	c	c	1	1	a	1	1	1	1	1	1
33	Peruvalanallur (East)	b	a	1	a	1	1	b	b	1	1	1	1	1	1	1	1	1
34	Peruvalanallur (West)	b	a	a	a	1	1	b	b	1	1	a	1	a	1	1	1	1
35	Peruvalappur	1	1	b	1	1	1	c	c	1	1	1	1	1	1	1	1	1
36	Poondi	b	b	b	b	1	1	c	c	1	1	1	1	1	1	1	1	1
37	Punjaisengandhi	a	a	a	1	1	1	a	a	1	1	1	1	1	1	1	1	1
38	Reddimangudi	b	b	b	b	1	1	c	c	1	1	b	1	1	1	1	1	1
39	Sadurbagam	b	1	1	1	1	1	b	c	1	1	1	a	1	1	1	1	1
40	Sannavur (North)	b	b	b	a	1	1	c	c	1	1	a	1	a	1	1	1	1
41	Sannavur (South)	b	b	b	a	1	1	c	c	1	1	1	1	1	1	1	1	1
42	Saradamangalam	b	b	b	b	1	1	c	c	1	1	b	1	b	1	1	1	1
43	Sembarai	b	b	a	a	1	1	a	b	1	1	a	1	1	1	1	1	1
44	Sirukalapur	c	a	a	a	1	1	c	c	1	1	a	1	1	1	1	1	1
45	Sirumayangudi (West)	b	1	1	1	1	1	b	b	1	1	1	1	1	1	1	1	1
46	Sirumayangudi (East)	b	a	a	a	1	1	b	a	1	1	a	1	1	1	1	1	1
47	Thinniyam	c	b	1	1	1	1	c	1	1	1	a	1	1	1	1	1	1
48	Vellanur	b	a	a	1	1	1	b	b	1	1	1	1	1	1	1	1	1
49	Venganur	a	a	a	1	1	1	c	c	1	1	a	a	b	1	1	1	1
50	Viragalur	b	b	b	1	1	1	c	c	a	1	1	1	b	a	1	1	1

CB-Commercial Bank  
COB-Co-operative Bank  
ACS-Agricultural Credit Societies  
SHG-Self Help Group  
ATM-Automatic Teller Machine

PDS-Public Distribution System (Shop)  
RM-Regular Market  
AMS-Agricultural Marketing Society  
NC-Nutritional Centres-ICDS

NC-AC-Nutritional Centres-Anganwadi Centre  
CC-Community Centre with/without TV  
SF-Sports Field  
PL-Public Library

NP-Daily Newspaper Supply  
APS-Assembly Polling Station  
BDRO-Birth and Death Registration Office  
PS-Power Supply

a-Facility available at <5 Kms  
b-Facility available at 5-10 Kms  
c-Facility available at >10 Kms  
1-Available  
2-Not Available

During the FGD, the following demands/expectations were observed from the public:

- ❖ Job opportunities.
- ❖ Training of local youths for suitable jobs.
- ❖ Training in computer typing, driving heavy vehicles, etc.
- ❖ Facilities like ambulance, health care, educational, community centers, etc.

### **3.11 Summary of Baseline Status**

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.
- ❖ Monitored Ambient Noise Levels (Leq) during day and night times were found to be well within the MoEF&CC Norms.
- ❖ 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 BIS:10500-2015 Norms.
- ❖ The soil in the study area would very well support vegetation after amending it suitably.
- ❖ Karaivetti Bird Sanctuary is in the Study Area and its ESZ is at 8.7 km from the Lease. No Reserved Forests in the Region. Domesticated animals only exist.
- ❖ The area is thinly populated and basic amenities are available almost in all villages.

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

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## 4.0 Anticipated Environmental Impact and Mitigation Measures

### 4.1 Identification of Impacts

Environmental Impacts are categorized as primary or secondary impacts. Primary impacts are those which are attributed directly to the project and secondary impacts are those which are indirectly induced by the proposed Project. 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.

Identification of all potential environmental impacts due to the Proposal are critically examined and major impacts (**both beneficial & adverse**) are assessed. 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. 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.

### 4.2 Construction Phase

Being an existing Mine, it does not involve any major establishment or construction. Site Offices exist in the Lease. Thus, Construction Phase Impacts are not there for Impact Assessment and Environmental Management Plan (EMP).

#### 4.2.1 Scientific Study on Slope Stability

The **Department of Mining Engineering**, Anna University, Chennai has carried out the scientific investigation on "Design of Safe Bench Geometry and Evaluation of Slope Stability of existing benches and also the proposed working benches for ensuring safety of men and machinery deployed in the Lease. The scope of the work involves the followings :

- ❖ Studying the existing mine geology, bench configuration and other mining activities of the proposed study area.
  - ❖ To assess the slope stability of existing and proposed benches.
  - ❖ To suggest the suitable slope monitoring system as per the provisions given in the DGMS circular No. 2, 09.01.2020 in "Kallakudi and Kovandakurichi Limestone Mine.
  - ❖ Analyzing the physico-mechanical properties of refilling/back-filling materials and core specimen.
  - ❖ Evaluating the slope mass rating (SMR) based on RMR system to assess the stability of the existing bench slope.
  - ❖ Determining the slope stability analysis of each geological section in the working condition.
  - ❖ Suggest methods for monitoring the stability of the existing and proposed slopes.
-

The following observations & recommendations are made:

- i. In the existing mine, the slope stability of walls is evaluated in terms of critical SRF value. Based on the analysis of Bishop method, FoS values of Kallakudi and Kovandakurichi are 1.4-1.5.
- ii. In the existing bench configuration, it has been observed that all the side of working walls are in safe and stable condition with factor of safety of more than 1.5.
- iii. So, it has been suggested to increase the mine depth of all the pits up to 120 m with the bench configuration of 9\*9 m with the bench slope angle of 70-80°.
- iv. It is strongly suggested to install the slope monitoring system and also bench stabilization techniques to be adopted in the weaker and weathered zones of benches.
- v. Installed slope monitoring system shall be monitored and verified once in six months.
- vi. The groundwater levels as well as pore pressure shall be constantly monitored to assist in the assessment of slope stability by installing the Piezometers as a part of mine dewatering programme in the surface level of the mine.

#### 4.2.2 Scientific Study on Geothermal/Hydrothermal Effect

The **Department of Geology**, College of Engineering, Anna University, Chennai has carried out the Scientific Study on Geothermal/Hydrothermal effect and Sediment Geochemistry as required for the EIA.

Land surface temperature (LST) is an important factor in many areas like climate change, urban land use/land cover, heat balance studies and also a key input for climate models. In this study, the LST has been estimated with respect to Normalized Difference Vegetation Index (NDVI) values determined from the Red and Near Infrared bands. The Land Surface Emissivity (LSE) is retrieved directly from the Thermal Infrared bands. This study focuses on Raster functions and Raster calculation in GIS environment using the LANDSAT 8, Thermal Bands (10 & 11). The decrease of land surface temperature (LST) in reclaimed mining site can be taken as an indication of environmental quality improvement. Remote sensing technology can be used to assess the effect of land-cover characteristic of mining-affected landscape on LST. The increase in the emission of carbon dioxide (CO<sub>2</sub>) in the atmosphere has been identified as a driving cause of global climate change. The findings are :

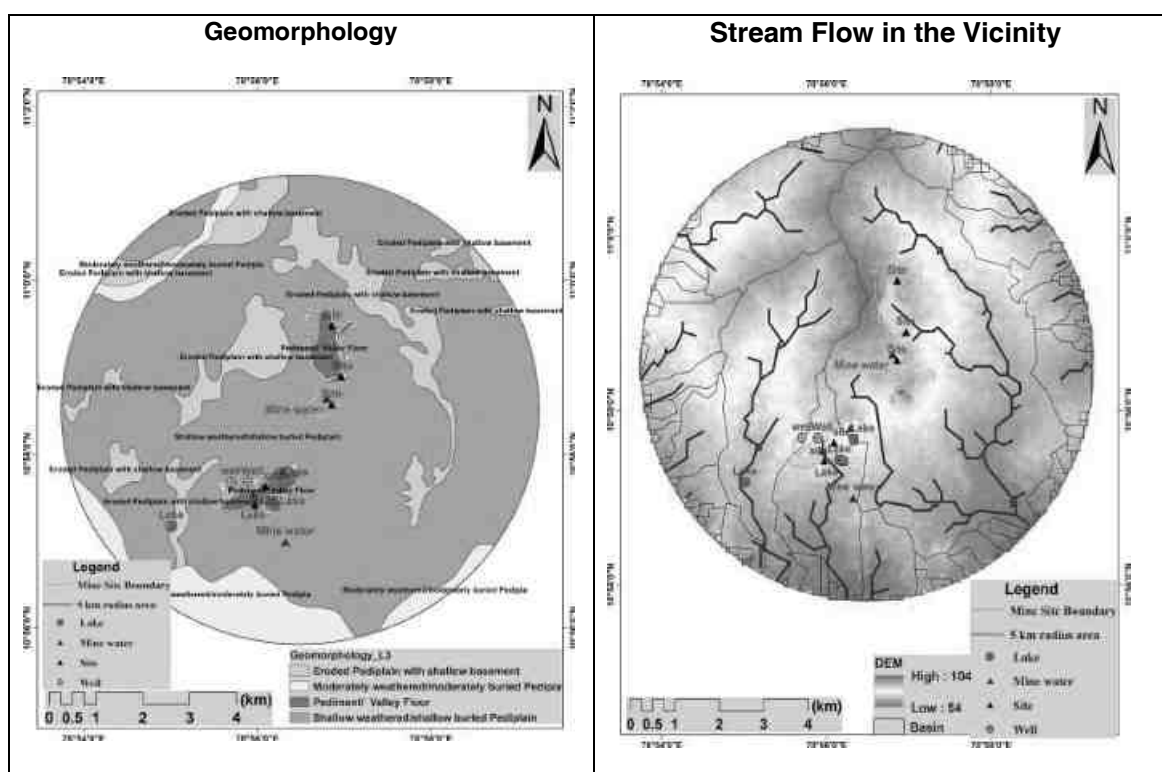
- ❖ Through remote sensing, different parameters such as the LULC, LST and carbon stocks and sequestration capacity over two decades (2001–2023) have been assessed and examined to understand the correlations from conducting in the Kallakudi and Kovandakurichi Limestone mine of Trichy district.
- ❖ Due to the rapid growth in population and urbanisation experiencing, the land use/land cover pattern keeps changing over the study area. Also, the LST trend over the mining region has seen a small increment in temperature over multiple datasets used in the study.

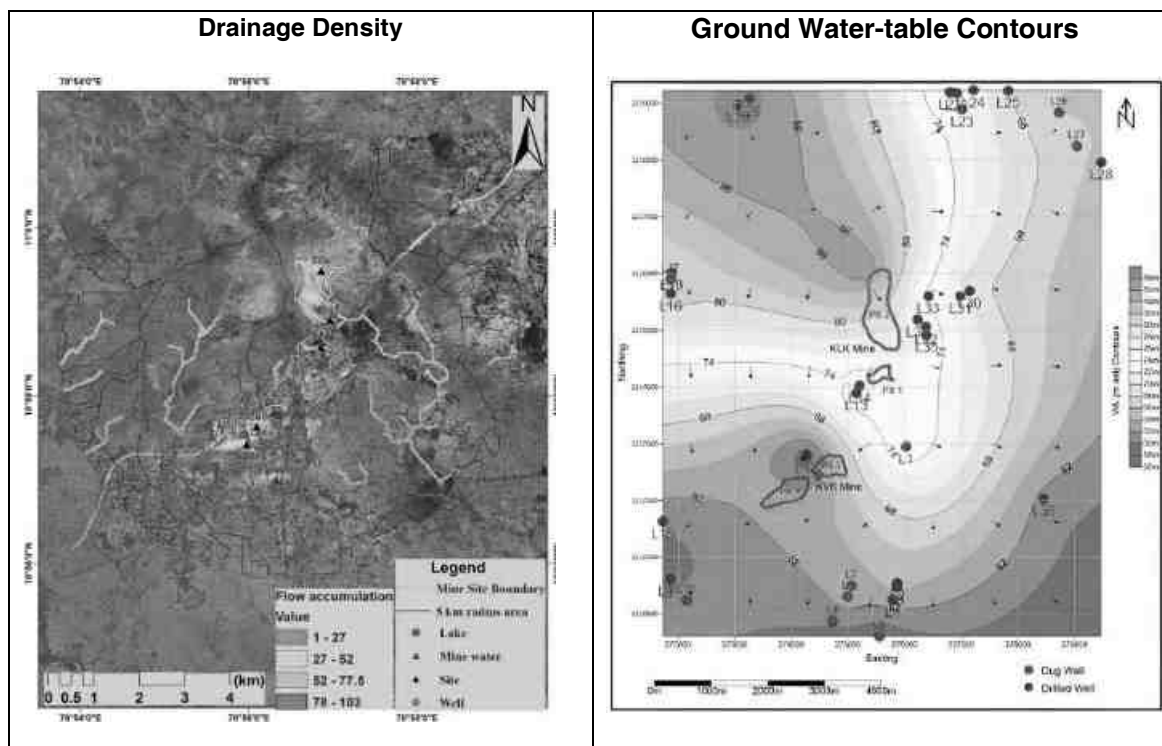
The LST and carbonstocks distribution over the mining region can be observed for different land use/land cover changepatterns in the region (i.e., urban/built-up area to vegetated area).

- ❖ A characteristic relationship between the different parameters generated in the study can be observed related to different land use/land cover patterns, climate conditions (in LST) and soilcarbon density. The results revealed that the Trichy district has indeed experienced significant classes – wide warming in both maximum and minimum temperatures over the last decade and distributions of carbon densities over the study area.
- ❖ However, the carbon sequestration will occur based on the land use/land cover pattern of the district which will keep changing with respect to growth in urbanisation and climatic conditionof the near future.

#### 4.2.2 Scientific Study on Hydrological and Hydrogeological Conditions

The **Department of Geology**, College of Engineering, Anna University, Chennai has also carried out the Scientific Study on Hydrological and Hydrogeological conditions for the Lease.





#### Findings of the Study are :

- ❖ The ground water-table in the mine vicinity is found to be at 45 m below ground level (BGL) during Post-monsoon season and 50 m BGL during Pre-monsoon season. The proposed ultimate pit depth will be 118 m BGL. Thus, the mining will intersect the ground water-table.
- ❖ There is a need of ground water management plan to be developed for sustainable development of the study area.
- ❖ The streamline and seasonal-odai during the rainy season need special caution with proper monitoring of piezo-metric readings.
- ❖ The project management shall implement a proper recharge mechanism to protect water environment. For instance, abandoned mine void can be used as water storage.
- ❖ Proper drainage measures shall be adopted in the mines including maintenance of garland drains in the top benches to direct the water away from the pit.
- ❖ Horizontal drainage drill holes can be drilled in the heavily saturated areas to remove water from the benches before working on them.
- ❖ The water pressure in the excavating benches shall be monitored by installing simple stand-pipe piezometers or using remote-monitoring vibrating-wire type piezometers at strategic locations of the highwall benches.
- ❖ There are number of water conservation, storage and recharge structures already is developed inside and around the mine pit for beneficiary of the adjacent village people. With the developed water conservation and storage scheme, the mining activities in the core zone



does not cause any water depletion nearby villages in the buffer zone.

- ❖ Furthermore, the construction of garland drains and silt traps serves the purpose of arresting silt flow from overburden to the mine pit which also collects the rain water in the mine void, open land and allows recharge to ground water system.
- ❖ The green belt development with ridges and furrows, circular pits around trees depending on slope and spacing of trees is also recommended.
- ❖ With this laboratory study of water samples and rainfall data interpretations, it is clearly found that the quality of groundwater has no impact of mining activities for the last decades.

### 4.3 Impacts during Operation Phase

Dalmiapuram Cement Plant and Captive Power Plants are the major industries near Local Mines. There are 5 Mining Leases/GOs over an extent of 111.985 Ha in Kallakudi (Pits 1 & 2) and 79.28 Ha in Kovandakurichi (Pits 3 & 4) villages. Pit No. 1 of Kallakudi Limestone Mine (about **19.32 Ha**) comprises of four Mining Leases namely GO No. 76 (earlier GO No. 1; 166.005 Ha in KLK & KVK Pits-about 7.355 Ha in Pit No. 1), GO No. 143 (earlier GO No. 258; 10.545 Ha), **GO No. 262** (1.135 Ha-in Temporary Discontinuance) and **GO No. 263** (0.285 Ha--in Temporary Discontinuance).

For **Cumulative Impact Assessment**, existing industrial activities in the Study Area are considered and their contribution are also assessed. Cumulative Impact has been assessed for identified Industries and assumed that **pollution due to existing Industrial and Mining activities have already been covered under baseline environmental status** and continue to remain same till operation of the Project.

#### Industrial Activities considered for Cumulative Impact

Sl. No.	Industry / Mine	Consented Production/ Extent	Bearing & Contribution for Cumulative Impact
1	DCBL DPM Cement & Power Plants along with Kallakudi-Kovandakurichi (Local) Captive Mines	DPM Cement Plant existing operation: Clinker : 2.304 MTPA Cement : 3.40 MTPA CPPs : 50 MW Local Captive Mines : 5 Leases. Total Extent-191.265 Ha & Total Consented Prodn. : <b>2.97 MTPA</b> <b>KLK-KVK Mines :-</b> <b>GO No. 76 –166.005 Ha in all 4 Pits &amp; 2.0 MTPA</b> GO No. 1158 – 13.295 Ha & 0.75 MTPA GO No. 143 - 10.545 Ha & 0.20 MTPA GO No. 262 – 1.135 Ha & 10,000 TPA GO No. 263 – 0.285 Ha & 10,368 TPA <b>Apportioned Production considered :</b> KLK Pit No. 1 : 0.308 MTPA KLK Pit No. 2 : 1.208 MTPA	Activities are considered cumulatively as Core Zone.

Sl. No.	Industry / Mine	Consented Production/ Extent	Bearing & Contribution for Cumulative Impact
		KVK Pit Nos. 3 & 4 : 1.454 MTPA	
2	Dalmia Refractories Ltd.	-	Adjacent to DPM Plant and covered in the Baseline Status.
3	Dhandapani Cement's Venkatachalapuram & Pullambadi Mines	Venkatachalapuram MLs Extent & (Production) 3.253 Ha (73,250 TPA) & 2.235 Ha (28,850 TPA) Pullambadi ML: Extent : 1.870 Ha Production : 61,000 TPA	<b>Non-operative Mines</b> in Downwind Direction and not contributing.

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

- ❖ Land Use Pattern.
- ❖ Traffic Impact.
- ❖ Air Quality.
- ❖ Noise Levels.
- ❖ Water Environment.
- ❖ Solid Wastes.
- ❖ Biological Environment.
- ❖ Socio-economics.

#### 4.3.1 Land Use Pattern

**Anticipated Impacts** : There is no additional Land requirement for the Proposal. The total extent of the Cement Plant Complex is 65.725 Ha. Local KVK-KVK Mines are located in a total extent of 191.265 Ha. Thus, Industrial activities are being carried out in an extent of 256.990 Ha in the Core Zone. There is no Drilling and Blasting proposed and thus, no vibration impact due to mining.

The excavated area shall be 123.230 Ha at the end of mining operation. The mined out pit area will be partly backfilled to an extent of 14.50 Ha and remaining area of 108.730 Ha will be converted into artificial pond/reservoir to harvest rain water. About 26.00 Ha will be under Green Belt and another 14.50 Ha will be backfilled & afforested. Total Green Belt Coverage will be **40.50 Ha (24.40%) - Table 4.1**. There will not be any significant change to existing Land Environment due to the Proposal..

**Table : 4.1 Land Use Pattern**

Land Use	Land Extent, Ha				
	Cement Plant	CPPs	Township	Local Mines	Total
Builtup Area / Mine Pits Area	17.280	1.322	6.257	126.545	<b>151.404</b>
Solid Waste Storage/Disposal Area	0.500	1.200	-	16.352	<b>18.052</b>
Green Belt	4.105	1.244	9.746	28.707	<b>43.802</b>
Railway Siding, Roads & Parking Areas	12.550	-	-	2.089	<b>14.639</b>
Vacant Area	10.580	0.044	0.897	17.572	<b>29.093</b>
<b>Grand Total</b>	<b>45.055</b>	<b>3.770</b>	<b>16.900</b>	<b>191.265</b>	<b>256.990</b>

There is **no Drilling and Blasting** proposed and thus, no vibration impact due to mining. **There will not be any significant change to existing Land Environment** due to the Proposal.

#### Mitigating Measures :-

- ❖ Green Belt has to be developed and maintained along the Lease boundary and Safety Barriers.
- ❖ Earthen bunds are to be strengthened along the boundaries to arrest wash-offs.
- ❖ Garland drains are to be maintained around the Lease.
- ❖ Desilting of garland drains shall be carried out periodically.
- ❖ The mined out Pit shall be converted into a Water Reservoir to harvest Rain Water and to recharge the Ground Water-table in the vicinity. Mine Pit water shall be gainfully utilised.

#### 4.3.2 Traffic Impact

**Anticipated Impacts:** Cement Plant Raw and Finished Materials are being transported by both Rail and Road Modes. However, Road traffic has been considered as Worst-Case Scenario. Local Mines are presently supplying about 55% of the Plant's Limestone demand. There will be 1,914 Truck movements in a day (2-ways) (**Table 4.2**). Traffic intensity is **79.73 Trucks/hour**.

**Table : 4.2 Traffic Volume in Core Zone**

Sl. No.	Raw Material	On Expansion (5.0 MTPA), TPD	Mode of Transportation	No. of Trucks per Day		No. of Trucks per Hour
				One Way	2-Ways	
1	Limestone	14000 (7700 TPD from Local Mines)	By 25 T Tipplers to Crusher	560	1120	46.66
2	Clay	450	Covered 18 Ton Trucks by road	25	50	2.08

3	Lignite / Petcoke / Coal	2200 1250 1800	Covered 15 Ton Trucks by road	147	294	12.25
4	Gypsum	450	Covered 18 Ton Trucks by road	25	50	2.08
5	Fly ash	4700	40 Tons Bowsers	118	236	9.83
6	Slag	375	Covered 18 Ton Trucks by road	21	42	1.75
7	Blue Metal	150	Covered 15 Ton Trucks by road	10	20	0.83
8	CPP : Lignite / Coal	762 590	Covered 15 Ton Trucks by road	51	102	4.25
<b>Total</b>				<b>957</b>	<b>1914</b>	<b>79.73</b>

**Baseline Status :** For assessing the baseline status, the Traffic Survey based on Indian Road Congress-IRC: 64/106 Norms were carried out at all NH81-Material Gate Road Junction during a Week Day (Wednesday; 18.01.2023) and also during the Week end (Sunday; 22.01.2023). Based on the Survey, the existing Traffic Volumes at the Junction is computed in Passenger Car Units (PCUs) and given in **Table 4.3**. The existing traffic volume in the Project vicinity was found to be **6,173 PCU/day @ 257.20 PCU/hr..**

Tippers from Local Mines to Dalmiapuram as well as Govindapuram Cement Plants and Tippers from PTK & PNR Group Mines were covered in the Baseline Status.

**Table : 4.3 Existing Traffic Volume - Baseline Status**

Type of Vehicle	No. of Vehicles/day*			Average Traffic at NH-Plant Road Junction, PCU/day*
	Week Day (08.01.2020; Wed)	Week End (12.01.2020; Sun)	Avg. Traffic	
2-wheelers	1140	1224	1152.0	576.0
Autos	66	52	64.0	76.8
Vans/Tempos	168	132	162.9	228.0
Cars	384	456	394.3	394.3
Buses	240	216	236.6	520.5
Trucks	1672	1496	1646.9	3623.1
Trailers	212	48	188.6	754.3
<b>Total</b>	<b>3,882</b>	<b>3,624</b>	<b>3,845.1</b>	<b>6,172.9</b>

\* - Including the existing Traffic Volume to & from Local Mines.

In the Post-Project Scenario, there will be an addition of 600 Vehicles (1,200 in 2 ways) i.e. **2,640 PCU/day** due to the expansion of GO 76 Lease to the existing traffic. Cumulatively, the traffic volume in the Project vicinity will be **8,813 PCU/day @ 367.20 PCU/hr.** (Table 4.4). The existing Roads/NH are adequate to handle the proposed traffic volume due to the Project..

**Table : 4.4 Projected Traffic Volume in the Vicinity**

Type of Vehicle	Avg. Traffic, No. of Vehicles/day	Proposed Addition, No. of Vehicles/day	Cumulative Volume, No. of Vehicles/day	PCU Factor as per IRC:106	Post Project, No. of vehicles in PCU/day
2-wheelers	1152.0	0	1152.0	0.5	<b>576.0</b>
Autos	64.0	0	64.0	1.2	<b>76.8</b>
Vans/Tempos	162.9	0	162.9	1.4	<b>228.0</b>
Cars	394.3	0	394.3	1.0	<b>394.3</b>
Buses	236.6	0	236.6	2.2	<b>520.5</b>
Trucks	1646.9	1200	2846.9	2.2	<b>6,263.2</b>
Trailers	188.6	0	188.6	4.0	<b>754.3</b>
<b>Total</b>	<b>3,845.1</b>	<b>6</b>	<b>3,851.1</b>	-	<b>8,813.1</b>

**Level of Service (LOS)** : Capacity Standards of Roads are fixed in relation with the LOS which is commonly designated from A (best operating condition) to F (forced or breakdown flow). Normally LOS-C will be adopted for smooth traffic flow in Urban/Rural Areas. At this Level, traffic volume will be 0.7 times of the maximum capacity. Capacity/Design Service Volume is the maximum hourly volume at which a vehicle can be expected to transfer a point/section of a road at a given time period. Ratio of existing Volume of PCU on road (V) and its Capacity (C) with corresponding LOS and their performance is given in Table 4.5. Thus, there will not be any impact on the existing baseline traffic volume due to the Proposal (Table 4.6). Also, established 4-Lane NH-81 and Bypass works will reduce the Traffic Volume significantly in the vicinity.

**Table : 4.5 Level of Service & Performance of a Road (IRC:64-1990 Norms)**

Volume/Capacity Ratio	Level of Service	Performance of the Road
0-0.2	A	Excellent
0.2-0.4	B	Very Good
0.4-0.6	C	Good/Average/Fair
0.6-0.8	D	Poor
0.8-1.0	E	Very Poor

**Table : 4.6 Predicted Traffic Scenario at the Junction**

Road	Volume, PCU/hr.	Capacity of the Road, PCU/hr.	V/C Ratio	Level of Service	Performance of the Road
<b>Existing:-</b>					
NH-81	257.2	3600	0.07	A	Excellent
<b>Proposed :-</b>					
NH-81	367.2	3600	0.102	A	Excellent

**Mitigating Measures :** Adequate parkings are provided in the Plant. Facilities for **drivers (rest room, toilet, etc.)** are also provided. Other Measures are :

- ❖ Green Belt with thick foliage along the Plant/Ore Haulage/Transportation roads.
- ❖ Security Guards at the Road Junction to handle the inward and outward vehicles from the Plant to the Highway.
- ❖ All Trucks are to be fully covered with Tarpaulin to avoid any spillage on transportation.
- ❖ Restriction of over loading of Trucks/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.
- ❖ Compliance to 'Pollution under Control' Certification has to be ensured and to be checked periodically.

### 4.3.3 Air Quality

**Emissions from Cement Plant & CPPs :** Adequate Air Pollution Control Measures (APC) measures to control PM emissions are provided in the Cement Plant viz. Electrostatic Precipitators (ESPs) to Clinker Cooler & Boilers, Bag House to Raw Mill/Kiln, Coal Mill, Cement Mill, etc. to control PM emission <30 mg/Nm<sup>3</sup>. Electrostatic Precipitators are provided for Boiler Stacks in CPPs to control PM emission <50 mg/Nm<sup>3</sup>.

Fully Covered Sheds and RCC Silos are provided for Raw Materials, Clinker and Cement Storages in the Cement Plant. All material transportations are done in fully closed/covered conveyors and environmentally complaint. Cement Plant operations are in compliance with new Emission Standards issued by MoEF&CC for Cement Industry vide Notifications dated 25.08.2014 and amended on 09.05.2016 & 10.05.2016 as below :

PM Emissions from all Major Stacks : <30 mg/Nm<sup>3</sup>.

SO<sub>2</sub> Emissions from all Major Stacks : <100 mg/Nm<sup>3</sup> (pyritic Sulphur is <0.25%).

NO<sub>x</sub> Emissions from all Major Stacks : <800 mg/Nm<sup>3</sup> for the rotary Kiln In-Line Calciner.

Online Stack Monitoring Systems are provided to all main Stacks in the Cement Plant & Boiler Stacks in CPPs to monitor PM & gaseous emissions (SO<sub>2</sub> and NO<sub>x</sub>) and the real time emission data are being transmitted to CARE Air Centre of TNPCB & CPCB. Two numbers Continuous Ambient Air Quality Monitoring Stations (CAAQMS) are installed at the Plant in Upwind & Downwind directions for PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub> & NO<sub>x</sub> and the data are being transmitted to CPCB and CARE Air Centre of TNPCB.

Pollutants Emission Levels from the Cement Plant & CPPs are given in **Table 4.7**.

**Table : 4.7 Pollutants Emissions on Modernization – Cement & CPPs**

Pollutant	Cement Plant	CPPs	Total
PM, g/sec	27.64	6.33	33.97
SO <sub>2</sub> , g/sec	17.93	33.29	51.22
NO <sub>x</sub> , g/sec	215.17	17.44	232.61

**Emissions from Local Mines :** Mining, Loading and Transporting activities would generate both fugitive dust emissions and smoke from HEM Machineries/Equipments & Transporting Tippers. Fugitive emissions are 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. The equations for various activities are:

<u>Activity</u>	<u>Equation</u>
Excavation of Waste & Limestone	23.6 kg/hr particulate matter for every 1000 tonnes per hour material handling Dust emission = Pa x 23.6 / Wd x Wh x 1000
Limestone & Waste transportation	0.2 kg/vehicle/km. DT = Tv x 0.2 x d DT = Dust emission in kg/hr Tv = No. of transport vehicles plying in one hour

Accordingly, the computed values of PM Emission for various activities (other Pollutants are in insignificant levels from Mining activities) are given in **Table 4.8**.

**Table : 4.8 PM Emissions from Local Mines**

Parameter	KLK Pit No. 1	KLK Pit No. 2	KVK Pit No. 3 (EB)	KVK Pit No. 3 (WB)	KVK Pit No. 4	Total
Extent, Ha	18.495	93.490	33.230	39.025	7.025	<b>191.265</b>
Production, MTPA	0.31	3.96	1.4	1.80	0.29	<b>2.970</b>
Production, TPD	940	12000	4240	5455	880	<b>9910</b>
<b>Controlled PM10 Emission, g/sec:-</b>						
Mineral Excavation	0.00000013	0.00000035	0.00000015	0.00000019	0.00000003	0.00000085
Loading	0.000000163	0.000000435	0.000000198	0.000009013	0.000002863	0.00001267
Ore Transportation	2.78201E-07	5.32725E-06	3.13716E-06	2.90601E-05	1.00271E-05	0.00004783
<b>Total</b>	<b>0.00000057</b>	<b>0.00000612</b>	<b>0.00000348</b>	<b>0.00003826</b>	<b>0.00001292</b>	<b>0.00006135</b>

As site specific mixing heights were not available, mixing heights based on CPCB publication, "Spatial Distribution of Hourly Mixing Depth over Indian Region", PROBES/88/2002-03 has been considered (Table 4.9).

**Table : 4.9 Maximum Mixing Height (meter) with Standard Deviation over Indian Region**

Name of Station	Seasons					
	Winter		Pre-monsoon		Post-monsoon	
	Mixing Ht.	Std. Dev.	Mixing Ht.	Std. Dev.	Mixing Ht.	Std. Dev.
Chennai	1063.75	153.92	1274.45	111.79	1010.5	109.39

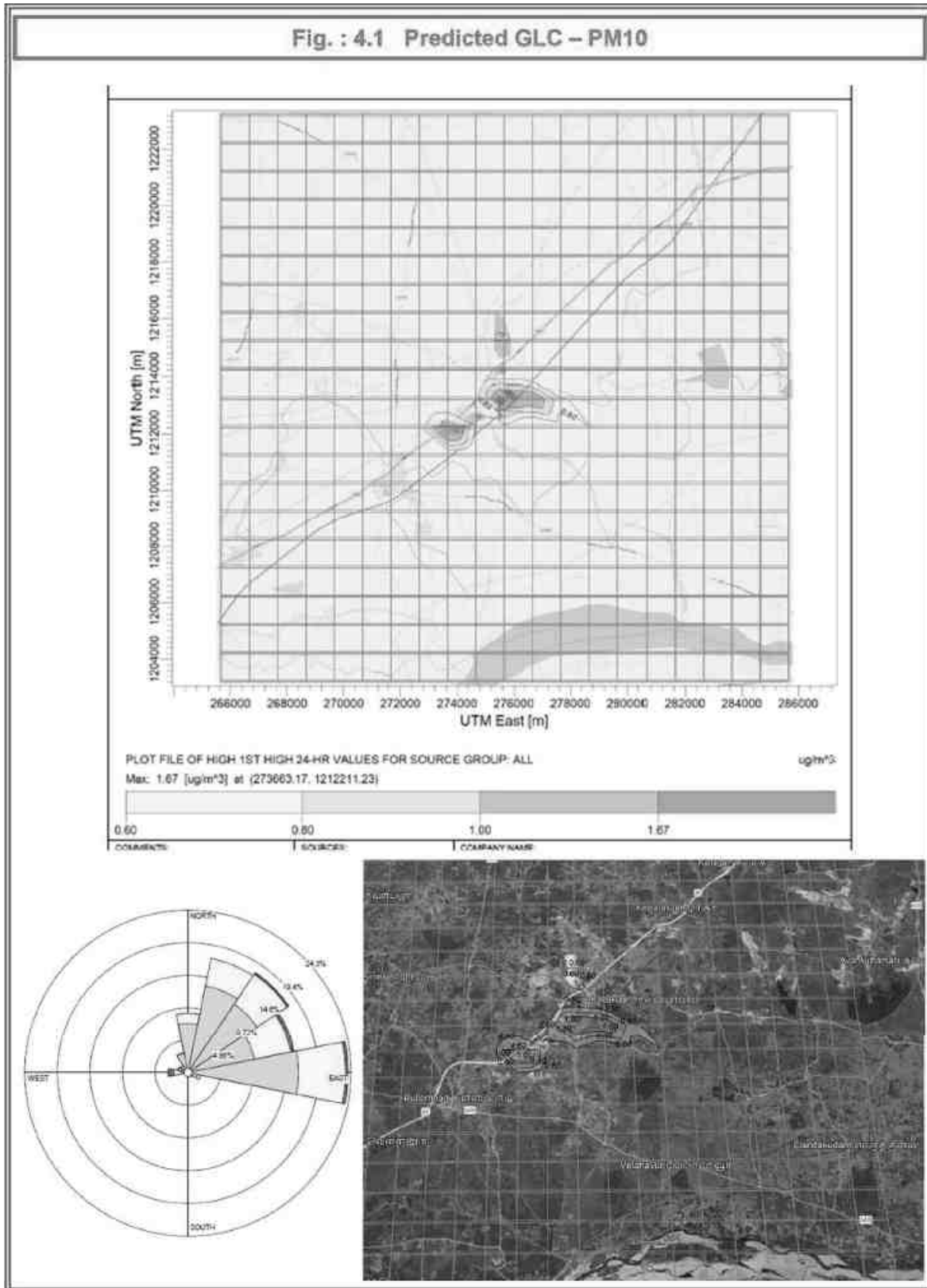
**Prediction Modelling : AERMOD View** Software is used for Predicting the maximum Ground Level Concentrations (GLCs) including **Transportation Impact**. PM10 values are considered as SO<sub>2</sub> & NO<sub>x</sub> generation from the Mine is insignificant. Model Inputs and Outputs are appended. The predicted GLCs are given in Table 4.10.

**Table : 4.10 Predicted GLCs**

Sl. No.	Pollutant	Background Concentration (24-hly. Avg.), ug/m <sup>3</sup>	Max. Predicted Ground Level Concentration, ug/m <sup>3</sup>	Distance from the Plant (max.), km	Total Concentration, ug/m <sup>3</sup>	Revised NAAQ Norms, ug/m <sup>3</sup>	Buffer Available in the Atmosphere
1	PM10	38.90	1.67	2.1	40.57	100	59.43

The predicted maximum PM10 GLCs for cumulative operation of Plants & Mining activities is 1.67 ug/m<sup>3</sup> and found to be confined locally i.e. within 2.1 km radius from the boundaries. Also, **adequate Buffer Level available** in the Air Environment for the Proposal.





**PM10 – Input & Output****Source Pathway - Source Inputs**

AERMOD

## Point Sources

Source Type	Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation (Optional)	Release Height [m]	Emission Rate [g/s]	Gas Exit Temp. [K]	Gas Exit Velocity [m/s]	Stack Inside Diameter [m]
POINT	STK1	275773.17 Kiln-IRM	1213465.23	74.84	72.00	0.63800	397.00	15.00	2.80
POINT	STCK2	275836.69 Coal Mill-I	1213450.62	74.53	35.80	0.15000	348.00	14.00	1.40
POINT	STCK3	275868.10 Cooler-I	1213374.18	74.00	30.00	0.32500	527.00	18.00	3.00
POINT	STCK4	275464.34 Kiln-II/IRM	1213210.59	74.27	130.00	0.97600	389.00	15.00	4.40
POINT	STCK5	275490.07 Coal Mill-II	1213183.28	73.68	130.00	0.24000	355.00	14.00	2.30
POINT	STCK6	275597.15 Cooler-II	1213143.08	72.21	50.00	0.36100	519.00	18.00	3.40
POINT	STCK7	275899.78 CM VRM-I	1213278.45	72.68	89.00	0.52500	354.00	13.00	2.80
POINT	STCK8	275560.24 CM VRM-II	1213118.83	72.51	89.00	0.77500	362.00	14.00	3.60
POINT	STCK9	275997.39 CM II&III	1213278.89	72.73	42.00	0.15800	363.00	22.00	1.42
POINT	STCK10	275516.31 CPP-I	1212614.57	71.00	90.00	0.46700	426.00	14.70	2.10
POINT	STCK11	275464.77 CPP-II	1212853.28	71.00	80.00	0.48100	415.00	14.50	2.00

**Source Pathway - Source Inputs**

AERMOD

## Open Pit Sources

Source Type	Source ID	X Coordinate [m]	Y Coordinate [m]	Base Elevation (Optional)	Release Height [m]	Emission Rate [g/(s-m <sup>2</sup> )]	Length of X Side [m]	Length of Y Side [m]	Volume of Open Pit [m <sup>3</sup> ]	Orientation Angle from North [deg]
OPEN PIT	PIT1	275610.82 KLK Pit-1	1214202.73	57.00	0.50	5.70E-7	10.00	10.00	100.00	0.00
OPEN PIT	PIT2	275582.39 KLK Pit-2	1215454.71	73.00	0.50	5.12E-6	10.00	10.00	100.00	0.00
OPEN PIT	PIT3E	274752.97 KVK Pit-3 (EB)	1212618.42	25.00	0.50	3.48E-6	10.00	10.00	100.00	0.00
OPEN PIT	PIT3W	273988.09 KVK Pit-3 WB	1212149.72	76.00	0.50	0.00004	10.00	10.00	100.00	0.00
OPEN PIT	KVKP4	273540.11 KVK Pit-4	1212316.14	98.00	0.50	0.00001	10.00	10.00	100.00	0.00

## Results Summary

PM10 - Concentration - Source Group: ALL

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
24-HR	1ST	1.66922	ug/m <sup>3</sup>	273663.17	1212211.23	90.00	0.00	90.00	07-12-2022, 24
24-HR	2ND	1.47971	ug/m <sup>3</sup>	273677.09	1212204.20	90.00	0.00	90.00	30-12-2022, 24
24-HR	3RD	1.12870	ug/m <sup>3</sup>	273677.09	1212204.20	90.00	0.00	90.00	20-02-2023, 24
24-HR	4TH	1.10747	ug/m <sup>3</sup>	275664.44	1213279.66	90.00	0.00	90.00	30-12-2022, 24
24-HR	5TH	1.06763	ug/m <sup>3</sup>	275664.41	1213213.13	90.00	0.00	90.00	30-12-2022, 24
24-HR	6TH	1.05461	ug/m <sup>3</sup>	275677.11	1213200.40	90.00	0.00	90.00	09-02-2023, 24
24-HR	7TH	1.03627	ug/m <sup>3</sup>	275664.41	1213213.13	90.00	0.00	90.00	31-01-2023, 24
24-HR	8TH	1.03033	ug/m <sup>3</sup>	275677.11	1213200.40	90.00	0.00	90.00	29-12-2022, 24
24-HR	9TH	1.02001	ug/m <sup>3</sup>	275664.41	1213213.13	90.00	0.00	90.00	05-02-2023, 24
24-HR	10TH	0.98671	ug/m <sup>3</sup>	275664.44	1213279.66	90.00	0.00	90.00	07-02-2023, 24
PERIOD		0.67439	ug/m <sup>3</sup>	275664.44	1213279.66	90.00	0.00	90.00	

**Mitigating Measures :** As mitigative measure to control air pollution, the following measures are to be implemented effectively :

- ❖ Water sprinkling on the Mining areas, loading point, haul roads, etc. has to be carried out.
- ❖ Covering of Trucks/Tippers with tarpaulin shall be ensured during Mineral transportation.
- ❖ Over loading of Tippers has to be avoided to control the spillages during transportation.
- ❖ Periodical maintenance and replacement of worn out accessories in the mine equipments.
- ❖ Tippers are to be maintained periodically.
- ❖ Periodical checkup of vehicles for 'Emission Under Control' Certificate is to be ensured.
- ❖ Effective Green Belt with thick foliage has to be developed along the boundaries and haul roads and maintained.

### 4.3.4 Noise Levels

In the Cement & Power Plants, Noise levels from kiln, turbine, fans, centrifugal pumps, electric motors, etc, are kept below the permissible level of 85 dB (A) at 1.0-1.5 m away from the sources by proper design. Noise from safety valves, start-up vents, steam jet ejectors of condensers, etc, are reduced by providing silencers at the outlet of down steam piping in compliance with the Occupational Safety and Health Association (OSHA) Norms. Noise level at the Plant boundaries will be <55 dB(A) during day times and <45 dB(A) during night times i.e. within MoEF&CC Noise Norms for Residential Areas.

In the Mines, **Vibro silenced model of Rock Breakers are used.** The noise level due to Mining Equipments during operation, is being maintained at <90 db(A) at a distance of 1.5 m from the sources (**Table 4.11**). In general, noise generated by these sources is within the limit of 90 dB(A) prescribed by Director General of Mines Safety (DGMS), Dhanbad. The work force is exposed to <85 dB(A) levels during the 8-hours Shift. Noise level at the nearest Lease boundary will be <55

dB(A) during day times and <45 dB(A) during night times and which will be within the MoEF&CC Norms for Residential and Rural Areas.

**Table : 4.11 Source Noise Levels - Mine Machineries**

Equipment	Location	Noise Level (Leq), dB(A)
Rock Breakers, Operating	Operator's Position	80-85
Dumper, operating	10 m away	70
Dozer & Dumper both, operating	10 m away	85-90

**Mitigating Measures :**

- ❖ Deploying mining equipments shall be with in-built mechanism for reducing noise.
- ❖ Provision of silencers to modulate the noise generated by the machines.
- ❖ Providing Air conditioned cabin for operators.
- ❖ 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 will act as acoustic barriers.

**4.3.5 Water Environment**

**Anticipated Impacts on Surface Waters :** The Micro Watershed Atlas of India aims at identifying and recognizing each Micro Watershed in India with distinct spatial extent and Unique National Code. The state wise spatial data is available with Soil and Land Use Survey of India (SLUSI). The **Micro Watershed Atlas of India** has been designed in such a way that user shall be able to locate and identify the Micro Watershed falling in different Districts of different States of India. As per Micro Watershed Atlas of India, the Area falls in Micro Watershed Map **4B1B3r4** (appended).

**Man Odai drains the area** which flows NW to SE direction. **There is no impact due to the Seasonal Discharges of Man Odai** due to DCBL activities in the vicinity.

**Waste Waters Generation, Treatment & Disposal :** ML-I will require about 142 KLD water which will be met from seepage water accumulated in the Mine Pits :

Domestic Consumption	:	10 KLD
Workshop	:	2 KLD
Dust Control Measures	:	50 KLD (including Tipper Washing)
Green Belt use	:	80 KLD (well grown trees)
		-----
Total	:	142 KLD
		-----

Domestic Sewage generation from the Mines will be only **9 KLD** which will be treated in **individual Septic Tanks** followed by dispersion trenches. Workshop effluent of 2.0 KLD will be treated in a Upflow Filter for Oil & Grease removal and the treated water will be connected to the Septic Tank for further dispersion.

Mine Pits dewatering quantity is about 3,780 KLD during Premonsoon and 8,340 KLD during Postmonsoon Periods. The excess seepage water as well as Rain water collected from the Working Pits are pumped into Non-working Pits and stored for further utilization. In an average, about 6,060 KLD from the Mine Pits is being dewatered. The balance quantity of 4,860 KLD, after own consumption, **is pumped to Kallakudi Irrigation Tank** for Agriculture purpose. Thus, Mine Pits water is gainfully utilised.

There is no nallah crossing in the Mines vicinity. There is no effluent discharge from the Mines to the drains in the vicinity. Mine Pits water is gainfully utilized. Thus, **there will not be any impact on the Surface Waters due to the Mining activities.**

Surface Runoffs from the Plant Area is estimated as per Manual of Artificial Recharge of Ground Water (CGWB, 2007) for 70 year Normal Rainfall of 1,096 mm (**Table 4.12**).

**Table : 4.12 Estimation of Quantum of Runoff within the Complex**

Sl. No.	Land Use	Area, sq.m	Rainfall, m	Runoff Coefficient*	Quantum of Runoff Available, KL/Annum
1	Roof Top of building/Sheds	265590	1.096	0.85	247423.644
2	Road/Paved area	125500	1.096	0.65	89406.200
3	Open Land	115210	1.096	0.20	25254.032
4	Green Belt	150950	1.096	0.15	24816.180
<b>Total</b>		<b>657250</b>	<b>-</b>	<b>-</b>	<b>3,86,900.056</b>

\* Ref: Manual of Artificial Recharge of Ground Water (CGWB, 2007).

About 3,86,900 KL/Year viz. **1,060 KLD** is effectively harvested and utilised in the Complex. **Roof Top Collection (RCT)** of 2,47,423 KL/Year viz. **678 KLD** is directly collected in RCC Sumps of 500 KL capacity and utilised as Raw Water. Surface Drains of **382 KLD** from the Complex are being collected in Water Harvesting Structures (3 Nos.) and utilized for Green Belt development and Dust suppression Measures.

#### **Mitigating Measures :**

- ❖ Earthen bunds are to be provided along the boundaries to arrest wash-offs.
- ❖ Garland drains are to be constructed around the Lease.
- ❖ Settling Pond has to be provided to the Garland Drains, to settle the Suspended Solids, before letting into the natural drains.
- ❖ Periodical maintenance/desilting of garland drains shall be done.

- ❖ Green Belt shall be developed and maintained along the Lease boundaries and Safety Barriers.
- ❖ Mined out area shall be converted into a Water Reservoir to recharge the Ground Water-table in the vicinity.
- ❖ Earthen banks shall be provided on non-operating side of dumps to arrest wash-off.
- ❖ Saplings shall also be planted along the foot and unused slopes to arrest / prevent erosion.

#### 4.3.6 Solid Wastes

There are 7 Existing Dumps (of 9 m maximum height) in ML-I with 1,39,792 cu. m of Marl and 5,25,589 cu. m of Mineral Rejects, total **6,65,381 cu. m** (Table 4.13).

**Table : 4.13 Existing Dump Details**

Sl. No.	Dump ID	Dump Material	Height, m	Quantity, cu. m	Location of the Dump
1	Dump-1	Marl	6	90,435	North of Pit No. 2
2	Dump-2	Mineral Rejects	9	84,075	North of Pit No. 2
3	Dump-3	Mineral Rejects	8	2,47,834	NE of Pit No. 2
4	Dump-4	Marl	5	49,357	NE of Pit No. 2
5	Dump-6	Mineral Rejects	5	66,400	South of Pit No. 3 (EB)
6	Dump-7	Mineral Rejects	4	4,080	South of Pit No. 3 (WB)
7	Dump-8	Mineral Rejects	7	1,23,200	South of Pit No. 3 (EB)
<b>Total</b>				<b>6,65,381</b>	-

During the Plan Period, **32,82,831 cu. m of Mineral Rejects** will be dumped temporarily over an extent of **11.461 Ha** in Existing as well as Proposed Dumps (Table 4.14) with a maximum height of **16.5 m**. As such **no back filling and reclamation** is envisaged.

**Table : 4.14 Proposed Dump Details**

Sl. No.	Dump ID	Material	Area, sq.m	Height, m	Quantity, cu. m	Location
1	Dump-3	Mineral Rejects	18,848	16.5	6,84,694	NE of Pit No. 2
2	Dump-5	Mineral Rejects	43,610	14.3	13,76,140	East of Pit No. 2
3	Dump-6	Mineral Rejects	23,295	11.0	5,63,747	South of Pit No. 3 (EB)
4	Dump-9	Mineral Rejects	6,030	14.0	1,85,721	South of Pit No. 3 (EB)
5	Dump-10	Mineral Rejects	22,827	11.5	4,72,529	South of Pit No. 3 (EB)
<b>Total</b>			<b>1,14,610</b>	-	<b>32,82,831</b>	

Post Plan Period and till Conceptual Stage, another 8,15,363 cu. m of OB and 72,51,559 cu. m of Mineral Rejects (total 80,66,922 Tonnes) will be generated and dumped temporarily in the Dumps. In total, **85,00,000 Tonnes of Mineral Rejects** will be temporarily kept in Dumps for future utilisation.

**Mitigating Measures :**

- ❖ Construction/maintenance of garland drains at foot of dump and around mine areas shall be done.
- ❖ Earthen banks shall be provided on non-operating side of dumps to arrest wash-offs.
- ❖ Coco filters shall also be used to arrest silt being carried to water bodies/natural drains.
- ❖ Saplings will also be planted along the foot and unused slopes to arrest / prevent erosion.
- ❖ After the mine reaches the ultimate depth, developmental wastes and rejects stacked in the earmarked locations shall be backfilled and the topsoil shall be spread and afforested.
- ❖ Organic wastes (dry leaves, food wastes, etc.) shall be subjected to vermi composting and used as manure for the Green Belt.
- ❖ Inorganic wastes (papers and other wastes) are to be properly disposed of.

**4.3.7 Biological Environment**

There is no habitat fragmentation or blocking of migratory corridors due to Project activities since there is no wild life movement or migratory birds movement in the study area. Also, there is **no Schedule-I Fauna exists** in the vicinity and thus, **no Conservation Plan is envisaged**. Thus, there will not be any significant impact on the existing flora-fauna of the area. DCBL has developed an effective Green Belt in Plants & Mines which will have significant long term positive impact on the environment (**Table 4.15**).

**Table : 4.15 Green Belt Developed - Plant**

Description	No. of Trees Planted		Total No. of Trees	Predominant Species
	Inside Campus	Outside Campus		
Till Mar. 2014	2,051	5,000	7,051	Neem, Ashoka, Pungan, Kulmohar, Casuarina, Mahagani, etc. in consultation with local DFO
2014-15	1,041	3,000	4,041	
2015-16	2,025	6,000	8,025	
2016-17	3,350	6,500	9,850	
2017-18	605	2,000	2,605	
2018-19	832	1,000	1,832	
<b>Total</b>	<b>9,904</b>	<b>23,500</b>	<b>33,404</b>	

Effective Green Belt is developed in all Lease Areas as per CPCB guidelines (**Table 4.16**). About, **47,287 trees** (predominantly local species) are planted @ **1,650 trees/Ha** and maintained with the survival rate of 90% at these Mines. Normally in these areas Neem, pungan, Gulmohar, Acacia, etc. are planted which gives 90% survival rate.

**Table : 4.16 Green Belt Development - Local Mines**

Name of Mine	Area, Ha	No. of Trees Planted
Kallakudi& Kovandakurichi Limestone Mines	28.707	47287

**Anticipated Impacts on Agriculture:** ML area is surrounded by Mineral bearing areas, barren lands and dry agricultural lands within 1.0 km area. As the baseline AAQ are in lower levels as well as Predicted GLC is very low/insignificant, there **will not be any impact on the surrounding dry agricultural lands** due to the Project.

**Mitigating Measures :**

- ❖ Existing trees are to be numbered and maintained.
- ❖ There should not be any tree cutting due to the Proposal.
- ❖ Effective Green Belt has to be developed all along the boundaries, haul roads, waste dumps, etc. and maintained with good Survival Rate till Conceptual Stage.
- ❖ Native species shall be preferred for Green Belt development.
- ❖ Fruit bearing trees may also be preferred.
- ❖ Afforestation in backfilled & reclaimed areas shall be undertaken.

**4.3.8 Socioeconomics**

DCBL CSR Committee exists as per provisions notified by the **Ministry of Corporate Affairs on February 27, 2014**. Based on the CSR Committee and declared CSR Policy of the Company, the following CSR activities will be covered and Reported (also displayed in the Company website) :

- ❖ Eradicating extreme hunger and poverty.
- ❖ Promotion of education & vocational skills.
- ❖ Ensuring environmental sustainability.
- ❖ Contribution to the Prime Minister's National Relief Fund or any other fund set up by the Central Government or the State Governments for socioeconomic development and relief.

CSR initiatives of DCBL and CSR Budget spent in the last 6 years period are given in **Table 4.17**.

**Table : 4.17 CSR Budget Spent**

Sl. No.	Program	CSR/CER Amount Spent in Rs.					
		2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
1	Soil & Water Conservation	12,85,125	22,20,756	18,89,957	15,76,188	16,39,750	20,22,000
2	Energy Conservation	4,58,700	75,000	0	15,990	0	3,60,000
3	Livelihood	7,93,975	12,05,500	12,42,000	17,82,545	1,95,220	23,82,000
4	Social Development	10,61,147	15,70,256	1,80,534	13,61,696	21,50,516	48,00,000
5	Execution Cost	3,29,314	3,45,127	3,06,200	3,00,000	3,00,000	3,20,000
<b>Total</b>		<b>39,28,261</b>	<b>54,16,639</b>	<b>36,18,691</b>	<b>50,36,419</b>	<b>42,85,486</b>	<b>98,84,000</b>



### Mitigating Measures :

- ❖ CSR activities shall be carried out by providing social and welfare measures for the local residents and nearby villages around the mine area.
- ❖ The prime focus will be on the creating and maintaining of drinking water facilities for the students at the nearby Government Schools, establishing toilets especially for girl students at the schools, setting up of computer centres, maintenance of village roads & ponds, providing solar street lights, conducting free medical camps, etc.
- ❖ Adequate budget shall be earmarked for Corporate Environmental Responsibility (CER) Budget for covering Public Hearing issues.
- ❖ As per MMDR Act 2015, 30% of Royalty Amount will be earmarked for District Mineral Foundation (DMF) and the amount will be spent for benefit of local villages.
- ❖ **Public Health** will be monitored on conducting periodical medical camps.

#### 4.3.9 Occupational Health

Occupational Health Centre (with qualified Occupational Health Specialist) is established at Dalmiapuram with all facilities. The **first aid boxes** are made available for immediate treatment. First aid training is imparted to the selected employees regularly. The list of first aid members is being displayed at strategic places. **Occupational health surveillance programme** is being carried out for all the employees regularly with the tests: Lung function test, ECG, Chest X-ray, Blood analysis, Urine analysis, Audiometry  
Colour blindness, Stool Analysis, Sputum (Optional).

The employees who are working at the time of initiation of this programme are covered for these tests. The baseline data on the health status of workmen in the Pre-recruitment stage was established. The same is being repeated periodically to update and to take action accordingly (Table 4.18).

**Table : 4.18 Details of Statutory Health Tests (Conducted in the last Year)**

Description	Total Completed Tests	General Medical Examination	Spirometer	Audiometer		Central Nervous System (CNS)
				Air Conduction	Bone Conduction	
Regular Officers , Staff	440	259	181	181	181	181
Regular Workmen	199	199	199	199	199	199
Mines Regular& contract workmen	301	301	301	301	301	301
Contract civil labour & Security	2,097	1,915	182	182	182	182
<b>Total</b>	<b>3,037</b>	<b>2,674</b>	<b>863</b>	<b>863</b>	<b>863</b>	<b>863</b>

The possible diseases likely to be associated with Limestone mining operations are :

- ❖ Mild silicosis which unattended, can turn into chronic type.
- ❖ Silico-tuberculosis
- ❖ Dust related pneumonia

Adequate care will be exercised to detect early incidences of occupational diseases for prompt treatment and cure.. Safety aspects are also ensured to reduce incidents, if any.

**Mitigating Measures :**

- ❖ 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.
- ❖ Standard operating procedures for all occupations and operations with respect to occupational safety and health.
- ❖ Provision of AC cabin for HEMM operators.
- ❖ 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 Shelter at mines.

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## **5.0 Analysis of Alternatives (Technology & Site)**

### **5.1 Technology**

- ❖ Eco friendly Mining with Rock Breakers and Surface Miners will be carried out with out any drilling and blasting.
- ❖ At Conceptual stage, it is proposed to utilise the Mine Pit to harvest the rain water so as to recharge the ground water-table.

### **5.2 Alternative Sites Considered**

This is a Mineral bearing area and Mineral deposits are site specific. Thus, site selection criteria is not required.

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## 6.0 Environmental Monitoring Programme

### 6.1 Environment Cell and Compliances

For effective implementations of Environmental Management Plan (EMP), DCBL has the Monitoring Cell. The quality of air, noise, water, soil, etc. are being monitored at the identified locations as per MoEF&CC/TNPCB Norms by appointing an accredited external agency.

### 6.2 Post Project Monitoring

For the Lease, periodical monitoring of Ambient Air Quality (6 locations), Fugitive emissions/Workzone Air Quality (8 locations), Ambient & Workzone Noise Levels (each at 4 locations), Water (4 Surface, 4 Ground waters & 4 Mine Pit waters and Soil Quality (4 Locations) shall be undertaken. The monitoring details are given in **Table 6.1**.

**Table : 6.1 Post Project Monitoring Schedule**

	Environmental Component				
	Ambient Air Quality	Fugitive Emissions	Noise Levels	Water Quality	Soil Quality
No. of Locations	6 (in & around Mine-Upwind & Downwind directions)	8 (Excavation area, Loading Area, Haul Road & Pit Edge)	Ambient-4 Workzones-4	Surface waters-4 Ground waters-4 Mine Pit waters-4	4
Frequency	24-hourly once in fortnight continuously for whole year	Two 8-hourly samples, once in a week for 2 weeks in a Season	Once in a month	Surface & Ground Waters-Once in a Season Mine Pit water-Monthly once	Once in a Season
Parameters	All 12 Parameters	PM10, SPM, SO <sub>2</sub> , NO <sub>x</sub> & CO	Day & Night Leq Noise levels dB(A)	Physico-chemical & Trace Metals	Physico-chemical & Nutrients
Norms to be Complied	NAAQ Norms	IBM Norms for Limestone Mine	MoEF&CC and DGMS Norms	CPCB/IS:10500 & TNPCB Norms	Soil Fertility

About **Rs.14 Lakhs/annum** will be allotted for the Monitoring Works. The periodical reports shall be submitted to TNPCB monthly, IBM Quarterly and MoEF&CC Monitoring Cell & SEIAA as Half Yearly Status Reports.

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## 7.0 Additional Studies

### 7.1 Hazards Identification & Risk Assessment

Hazards Identification & Risk Assessment (**HIRA**) is the Tool to identify the potential Hazards due to the proposed activities and assessment of the Risks to propose the Emergency Preparedness Plan (EPP). There is no storage of Hazardous Chemicals in the Mine and thus, no Modelling is warranted. The mine activities, fire, water inundation, electrical shock, natural calamities, etc. are the risks associated with the mining activities (**Table 7.1**).

**Table : 7.1 Potential Hazards due to Proposal**

Potential Hazard	Probable Impact
<b>Manmade :-</b>	
Accident due to Mining Activities	Can occur at any time during the Mining.
<b>Natural :-</b>	
Natural Calamities	Can occur at any time.
<b>Others :-</b>	
Medical Emergency	Can occur at any time during the Operational Phase.

The objective of Risk Assessments are :

- ❖ Identifying hazardous activities.
- ❖ Assessment of risk level and severity in different operations.
- ❖ Identification of control measures.
- ❖ Setting monitoring process.
- ❖ Reduce the impact of mishaps of all kinds.
- ❖ Reduce the inherent potential for major accidents.

The identified risks and their control measures are given in **Table 7.2**.

It shall be ensured that engaged Personnel are aware of the Hazards involved and are trained in responding to the Disasters. **First Aid Kits and Medical Supplies** should be maintained at the Lease. All personnel shall use **Personal Protective Equipment (PPEs)** like Safety Shoes, Helmets, Safety glasses, etc. They should be trained in Safety Procedures to ensure that accidents and injuries are minimised. Government Hospitals in the vicinity will be used for any Medical Emergencies.

**Table : 7.2 Risks Control Measures**

Sl. No.	Factors	Causes of Risks	Control Measures
1	Removal of OB/Side Burden	Bench may slide due to its unconsolidated nature. Vibration due to movement of vehicles in the benches.	Not Applicable for this Lease.
2	Drilling & Blasting	a)Due to high pressure of compressed air hoses may burst. b)Drill rod may broken due to improper maintenance of the rod. c) Fly rock, ground vibration and noise etc. d) Improper charging of explosives	Not Applicable for this Lease.
3	Excavation of Ore	a)Hauling and loading equipment are in such proximity while excavation b)Swinging of bucket over the body of tipper  c) Driving of un authorized person	Operator shall not operate the machine when person & vehicles are in such proximity. Shall not swing the bucket over the cab and operator leaves the machine after ensuring the bucket is on ground. Shall not allow any unauthorized person to operate the machine by effective supervision.
4	Transportation of ore	Operating the vehicle " nose to tail"  Overloading of material While reversal & overtaking of vehicle Operator of truck leaving his cabin when it is loaded	It will be ensured that all these causes will be nullified by giving training to the operators No over loading Audio visual reverse horn will be provided Proper training will be given
5	Fire due to electricity	Due to the short circuit of cables & other electrical parts	No electrically operated machines, compressors, etc. are proposed. Hence the danger due to electrical mishaps are not applicable in this case.
6	Water inundation	Inrush of storm water due to heavy rain  Unusual seepage of water into pit  Sudden collapse of peripheral bund due to torrential pour	Guard will keep a continuous watch on water level and when touches danger mark immediately inform to the mine official. Withdraw all the persons from the mine via shortest route in an orderly manner Work shall not be resumed except with the prior permission of the Manager unless all the working places thoroughly examined by a competent person.
7	Natural calamities	Unexpected happenings	The mine management is capable to deal with the situation

## 7.2 Disaster Management Plan

Disasters are of natural as well as man-made. **Natural Disasters** include Earthquakes, Floods, River Erosion, Cyclones, Tsunami, Landslides, Fires, etc. and the **Man Made Disasters** include Nuclear, Chemical, Mines, Biological, Cyber Terrorism, Environmental Disasters, etc. A Disaster Management Plan (DMP) has been prepared for the Dalmiapuram Cement Plant Complex & Local Mines and the **System is in Place** to tackle any event of disaster.

The management is able to deal with any disaster efficiently. The purpose of DMP is to restore the normalcy for early resumption of mining operations. The salient features are elaborated in detail for :

- Emergency Response Team
- Communication System
- Action on the Site
- Facilities available at site.

### Structure of the Disaster Management Plan:-

**System of Communication** : An internal communication system for the department head and to the persons concerned telephone line are provided. Telephone nos. and addresses of adjoining mines, rescue station, police station, Fire service station, local hospital, electricity supply agency and standing consultative committee members are provided

**Consultative Committee** : A standing consultative committee is formed under the Head of Mines Manager. The members consists of safety officer / medical officer / Asst. manager/ public relation officer/ Foreman/ and environmental engineer.

**Facilities & Accommodation** : Accommodation and facilities for medical centre, rescue room and for various working groups are identified/provided.

**First Aid & Medical Facilities** : The mine management is having first aid / medical centre for use in emergency situation. All casualties would be registered and will be given first aid. The centre will have facilities for first aid & minor treatment, resuscitation, ambulance and transport. It will have proper telephone / wireless set for quick communication with hospitals where the complicated cases are to be sent.

**Stores and Equipment** : A detailed list of equipment available its type & capacity and items reserved for emergency are made available.

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**Transport Services** :A well defined transport control system is provided to deal with the situation.

**Functions of Public Relations Group :**

- ❖ To make a cordial relation with government officials and other social service organization and working groups.
- ❖ To liaise with representatives of the mine to ameliorate the situation of panic, tension, sentiments, grievances and misgivings created by any disaster.
- ❖ To ameliorate the injured, survivors and family members of affected persons by providing material, moral support and establishing contact with relatives of victims.

**Security** : Manning of security posts.

**Catering & Refreshment** : Arrangement to be made for the victims, rescue teams and others.

**Care and Maintenance during Temporary Discontinuance** : If the mine will be discontinued temporarily for more than 120 days, notice will be given 30 days before the date of such discontinuance to the concerned authorities. During discontinuance period safety arrangement and fencing will be provided to avoid the entry of unauthorised persons. The accessibility to the mine from the surface will be prevented by providing fencing arrangement.

**Emergency Plan** : Following officers of the mines will be responsible for co ordination in case of emergency situated in any section of the mine.

Person	Responsibility
Head of the Department/Mine Agent	Site Controller
Shift In charge/Section In charge	Accident Controller/ Communication officer
Employee who gives the first information about the accident/accident	Primary Controller
P & A Dep't. (HOD)	Liaison officer

Key Personnel and their responsibility :

**Site Controller** : The head of the department/Mine agent shall have overall responsibility for controlling the incident/accident and directing the personnel.

- ❖ To prepare full proof plan for control of accident like, landslides, subsidence flood and other natural calamities.
- ❖ To inform statutory bodies of the State and central Government.



- ❖ To inform communication officer about the emergency, control centre and assembly point.
- ❖ To provide all assistance and call for Fire Squad, Security Officer and other services required for removing/control of danger.
- ❖ To ensure that all necessary personnel to be assemble at assembly point.

#### **Accident Controller/Shift In charge :**

- ❖ Mock rehearsal of plan prepared for accident.
- ❖ To withdraw men/machines from the affected area with priority for safety of personnel minimize damage to the machines, environment and loss of material.
- ❖ To act as accident controller to all the later arrived.
- ❖ To make a report based on the facts and figure and submit to the Site Controller.

#### **Primary Controller :**

- ❖ To inform the Accident Controller / shift in charge from the nearest means of communication about the location and the nature of accident.
- ❖ To assist in clearing any obstruction in relief of accident.
- ❖ To carry out all instructions of accident controller.

#### **Capability of Lessee:** Following facilities are available at DCB Plant :

- ❖ Public addressing system
- ❖ Telephones/ Mobile handsets
- ❖ Runners/messenger
- ❖ Emergency alarm
- ❖ Fire fighting equipments & accessories with trained manpower
- ❖ Full fledge dispensary at DCB
- ❖ Training centre
- ❖ Fire Tender, Ambulance.

#### **Emergency Contact Numbers in OHC**

Sl. No.	Name of Person	Contact No.	
		Intercom	Mobile
1	Chief Medical Officer	226 (O) 326 (R)	9865150919
2	Medical Officer	224 (O) 324 (R)	9865475145
3	Medical Officer	610 (O) 327 (R)	9500882581

#### **Flow/Sequence of Communication**

- ❖ Ambulance - if the informer ask for ambulance due to any injury cases, 9865160055
- ❖ Fire Tender - if the informer informed about Fire Emergency, 7373711533
- ❖ Security Havildar, 9865125176

- ❖ HOD - Safety, 9865188229
- ❖ Chief Security Officer (CSO), 7540020300
- ❖ Concerned Area Responsible HOD
- ❖ Chief Medical Officer (CMO), Hospital, 9865164900
- ❖ HOD - HR, 9865133922

DCLB Mine is not likely to pose any offsite emergency and hence does not call for any preparation of an **off-site emergency plan**. However, considering extreme situation, District Authority including Police would be informed about any offsite emergency if situation arises. As per this off site emergencies, actions are promptly initiated to deal with, in-consultation with District Collector and other revenue/civic officials.

#### Facilities available out side DCBL :

- ❖ Nearest Government Hospital is at Lalgudi (20 km).
- ❖ Nearest Fire Brigade Station is at Pullambadi (6 km).
- ❖ Nearest Police Station is at Kallakudi (0.5 km).

#### Fire Brigade :

Sl. No.	Name of Fire Brigade	Location of the Station	Distance form Factory	Contact Person	Contact No.
1	Tamil Nadu Fire & Rescue Service	Pullambadi	3 km	Fire officer	04329-241380
2	Tamil Nadu Fire & Rescue Service	Lalgudi	18 km	Fire officer	0431-2542101
3	Tamil Nadu Fire & Rescue Service	Trichy	35 km	Divisional Fire Officer	9486478353
4	Tamil Nadu Fire & Rescue Service	Ariyalur	25 km	Fire Officer	04329-222100

#### Nearby Hospitals :

Hospital	KMC	KMC-Specialty	Maruthi	ABC	CSI	Sagayamada
Contact No.	4022555	4000661 4077777	2793141	2750238	2760672	241304
No. of Doctors	200	200	200	175	200	100
Scan Facility	42	50	26	69	30	6
X-ray Facility	Yes	Yes	Yes	Yes	Yes	Yes
Lab Facility	Yes	Yes	Yes	Yes	Yes	Yes
Blood Bank	Yes	Yes	Yes	Yes	Yes	No
Ambulance	Yes	Yes	Yes	Yes	Yes	Yes
Working Hrs.	24	24	24	24	24	24
Pharmacy Attached	Yes	Yes	Yes	Yes	Yes	Yes
Operation Theatre	2	2	2	4	3	1
ICU Beds	10	10	20	20	10	2
Plastic Surgery	Yes	Yes	Yes	Yes	No	No

DCBL      EC for Expn. of Kallakudi-Kovandakurichi Limestone Mine GO No. 76 (Extent 166.005 Ha), Trichy Dist.

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**Mutual Aid Scheme :** DCBL factory is surrounded by three or four factories nearby. All these industries are pooling their resources and help each other in case of requirements if any.

<b>Sl. No.</b>	<b>Name of the Industry</b>	<b>Location</b>	<b>Contact Number</b>
1	Kothari Sugars	Lalgudi	98424 78922 0431-2541224
2	Chettinad Cements	Ariyalur	98654 90416
3	Dalmia Cement	Ariyalur	73737 11237
4	Ultratech Cement	Reddipalayam	90878 75716

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## 8.0 Project Benefits

**Environmental Benefits** : The proposal ensures the continuous limestone supply to Cement Plants. Effective utilization of the Minerals for Cement manufacturing is a Conservation Measure.

**Social Benefits** : Project will employ about 296 persons directly and indirectly. The direct & indirect employment, CSR/CER activities, etc., will have a positive impact on the Socioeconomic Structure of the area. **About 2% of the Project Cost – Rs.20.00 Lakhs** has been earmarked for Corporate Environmental Responsibility (CER) Budget and to address Public Hearing Issues.

**Financial Benefits** : The Proposal will contribute about **Rs.515.00 Crores as Royalty** to State Government (on prevailing rate/Tonne). As per MMDR Act 2015, 30% of Royalty Amount (about **Rs.154.50 Crores**) will be earmarked for **District Mineral Foundation (DMF)** and the amount will be spent for benefit of Kallakudi & Kovandakurichi Villages by the District Administration.

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.

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## 9.0 Environmental Cost Benefit Analysis

**Cost Benefit Analysis** is not applicable for the Proposal as there is no forest land is envisaged for the Project and also no tree cutting is proposed. Also, it was not awarded during the Scoping Process.

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## 10.0 Environmental Management Plan

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

### 10.1 EMP for Construction Phase

Being existing Mine, there will be **no Construction Phase** for the Project.

### 10.2 EMP for Operation Phase

Mining operations will be carried out scientifically as per approved Mining Plan, stipulated EC & CFO Conditions, IBM Approvals, DGMS Norms, etc. EMP Measures for Operation Phase are proposed below :

#### Land Use :

- ❖ Green Belt has to be developed and maintained along Lease boundary and Safety Barriers.
- ❖ Earthen bunds are to be strengthened along the boundaries to arrest wash-offs.
- ❖ Garland drains are to be maintained around the Lease.
- ❖ Desilting of garland drains shall be carried out periodically.

#### Traffic Impact :

- ❖ Adequate parkings are provided in the Plant.
- ❖ Facilities for drivers (rest room, toilet, etc.) are also provided.
- ❖ Green Belt with thick foliage along the Plant/Ore Haulage/Transportation roads.
- ❖ Security Guards at Road Junction to handle the inward and outward vehicles from Highway.
- ❖ All Trucks are to be fully covered with Tarpaulin to avoid any spillage on transportation.
- ❖ Restriction of over loading of Trucks/Tippers shall be enforced.
- ❖ Speed restrictions shall be enforced.
- ❖ No Truck parking in the Highway and Public Roads shall be enforced.
- ❖ Regular and preventive maintenance of transport vehicles are to be ensured.
- ❖ Compliance to 'Pollution under Control' Certification has to be ensured and to be checked periodically.

#### Air Environment :

- ❖ Non-Conventional method of mining is adopted. Rock breakers are utilised for the mining.
  - ❖ Eco friendly mining shall be continued.
  - ❖ Water sprinkling on the Mining areas, loading point, haul roads, etc. has to be carried out.
  - ❖ Covering of Trucks/Tippers with tarpaulin shall be ensured during Mineral transportation.
  - ❖ Over loading of Tippers has to be avoided to control the spillages during transportation.
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- ❖ Periodical maintenance and replacement of worn out accessories in the mine equipments.
- ❖ Effective Green Belt with thick foliage has to be developed along boundaries and haul roads.
- ❖ Periodical Air Quality Monitoring shall be carried out and Reports submitted to the Authorities.

**Noise Levels :**

- ❖ No drilling and blasting will be done as proposed.
- ❖ Deploying mining equipments shall be with in-built mechanism for reducing noise.
- ❖ Providing sound proof operator's cabin of equipments.
- ❖ Provision of ear muffs/ear plugs to the workers in higher noise zones.
- ❖ Periodical Noise Monitoring shall be carried out and Reports submitted to the Authorities.

**Water Environment :**

- ❖ Proper Mine Pit Water management on Ground Water-table intersection shall be adopted.
- ❖ Settling Pond has to be provided to garland drains, to settle the Suspended Solids.
- ❖ The water collected in the garland drains shall be utilized for green belt and dust control measures.
- ❖ The mined out Pit shall be converted into a Water Reservoir to harvest Rain Water and to recharge the Ground Water-table in the vicinity. Mine Pit water shall be gainfully utilised.
- ❖ Periodical monitoring of mine pit water shall be carried out and Reports submitted.

**Land Environment – Solid Wastes :**

- ❖ Construction and maintenance of garland drains at foot of dump and around mine areas shall be done.
- ❖ Saplings will also be planted along the foot and unused slopes to arrest / prevent erosion.
- ❖ After the mine reaches the ultimate depth, developmental wastes and rejects stacked, if any, shall be backfilled and topsoil shall be spread and afforested.
- ❖ Organic wastes (dry leaves, food wastes, etc.) shall be subjected to vermi composting and used as manure for the Green Belt.
- ❖ Inorganic wastes (papers and other wastes) are to be properly disposed of.

**Biological Environment :**

- ❖ Effective Green Belt has to be developed all along the boundaries, haul roads, waste dumps, etc. and maintained with good Survival Rate till Conceptual Stage.
- ❖ Native species shall be preferred for Green Belt development.
- ❖ Fruit bearing trees may also be preferred.
- ❖ Afforestation in backfilled & reclaimed areas shall be undertaken.

**Social Measures :**

- ❖ CSR activities shall be carried out by providing social and welfare measures for the local residents and nearby villages around the mine area.
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- ❖ The prime focus will be on the creating and maintaining of drinking water facilities for the students at the nearby Government Schools, establishing toilets especially for girl students at the schools, setting up of computer centres, maintenance of village roads & ponds, providing solar street lights, conducting free medical camps, etc.
- ❖ Joining Hands with District Administration in implementing Govt. Schemes.
- ❖ Development of Infrastructure Facilities in the Region.
- ❖ Provision of Ambulance for the villages.
- ❖ Medical Camps and extending medical facilities.
- ❖ Contribution to Education.
- ❖ Drinking Water Supply.
- ❖ Supporting to Sports development.
- ❖ Extending support during natural calamities.
- ❖ An amount of Rs.5.00 Lakhs per Annum has been earmarked for Corporate Social Responsibility (CSR)/Corporate Environmental Responsibility (CER) Budget for covering Public Hearing issues.

#### **Occupational Health Measures :**

- ❖ 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.
- ❖ Standard operating procedures for all occupations and operations with respect to occupational safety and health.
- ❖ 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 Shelter at mines.

**Plastic Waste Management :** There will be ban on one time use and throw away Plastic usage in the Plant in compliance with Tamil Nadu, Environment and Forests (EC-2) Department, G.O.(D) No. 84 dated 25.06.2018. DCBL will encourage the use of eco friendly alternatives such as banana leaf, areca nut palm plate, stainless steel glass, porcelain plates / cups, cloth bag etc.

### **10.3 EMP Budget**

The capital cost of the Project is **Rs.10.00 Crores**. A budget of Rs.50.00 Lakhs has been earmarked as EMP Capital Budget and Rs.25.32 Lakhs per Annum as Operating Cost towards EMP measures, Green Belt development & maintenance, Environmental Monitoring, etc. Also, adequate budget be allotted as **Corporate Environmental Responsibility (CER) Budget** in compliance with MoEF&CC OM dated 01.05.2018 for execution within 2 years period.

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## 11.0 Summary & Conclusions

M/s. Dalmia Cement (Bharat) Limited (DCBL) are operating Cement Plants at Dalmiapuram & Ariyalur in Tamil Nadu. The limestone requirement of both Cement Plants is being met from Captive Limestone Mines in Ariyalur and Trichy Districts. Kallakudi-Kovandakurichi (KLK-KVK) Mine Leases were granted under 5 Leases in 4 Pits. Kallakudi Mines are in operation since 1939 and Kovandakurichi Mine Pits are in operation since 1952.

Kallakudi & Kovandakurichi Limestone Mining Lease-I (KLK-KVK ML-I) is having an extent of 166.005 Ha falling in Survey Nos. 39/8, 40,41/1, 47/1,4 7/3, 47/11, 49, 50, 51, 52, etc. of Kallakudi Village, Survey Nos. 54/1, 54/2, 55, 56, 57, 60, 75,81/1B, etc. of Kovandakurichi Village and Survey No. 32 of Venkatachalapuram Village, Lalgudi Taluk, Tiruchirapalli District of Tamil Nadu (Fig. 1.1). The non-mining area of 1.23 Ha in Venkatachalapuram Village is now under the purview of State Government and the Lease grant has to be amended/updated accordingly. ML-I Lease is accessible from Trichy-Chidambaram National Highway (NH)-81 at Kallakudi and is 38 km from Trichy.

EC for the Production Enhancement from 1.0 MTPA to 2.0 MTPA of ML-I has been obtained for 30 years vide MoEF&CC F No. J-11015/912/2007-1 A.II (M) dated 27.05.2008 (valid till 2038). Certified EC Compliance Status Report for ML-I has been issued by Integrated Regional Office (IRO), MoEF&CC, Chennai vide Letter EP 12.1/724/TN/966 dated 09.09.2022. Existing CTOs are 1908121917156 (Water Act) and 1908221917156 (Air Act) dated 13.09.2019 for 2.00 MTPA Limestone are valid upto 31.03.2024.

Expanded Cement Plants at Dalmiapuram & Ariyalur require about 9.0-10.0 MTPA Cement Grade Limestone. The production capacity of existing Captive Working Mines is about 7.05 MTPA and are in Conceptual Stage and will be completely exhausted in another 2-3 years period. Proved Mineable Reserves (111 Category) of KLK-KVK ML-I is 64,485,659 Tonnes as on 01.04.2022. ML-I alone is having the Reserves to support the Cement Plants comfortably for another 10 years. Thus, the production level of ML-I Limestone Mine has to be enhanced. Accordingly, the proposal is now for Production Enhancement of KLK-KVK ML-I Mine from 2.0 MTPA to 6.97 MTPA ROM within the existing Lease Area.

Modification in Modified Mining Plan along with Progressive Mine Closure (PMC) Plan for balance Period 2022-23 & 2023-24 for 6.97 MTPA has been approved by the Regional Controller of Mines, IBM, Chennai vide TN/TCR/LST/MMP-2088.MDS dated 19.08.2022.

The Limestone Mining will be over an extent of 166.005 Ha by fully Mechanized Opencast Non-conventional method of Mining by deploying Rock Breakers & Surface Miners for a production enhancement from existing 2.00 MTPA to 6.97 MTPA ROM (Limestone & Marl). Approved Modification in Modified Mining Plan (MMP) is for balance Period of 2023-24. However, the same

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Production Capacity of 6.97 MTPA ROM will be retained for subsequent Plan/Scheme Periods also. With the proposed Production of 6.97 MTPA ROM, Life of the Mine will be 9 years.

The Ultimate Pit Depth at Conceptual Stage will be 118.5 m BGL in KVK Pit No. 2, 117 m BGL in KVK Pit No. 3 (East Block), 108 m BGL in KVK Pit No. 3 (West Block), 58.8 m BGL in KVK Pit No. 1 and 47.0 m BGL in KVK Pit No. 4.

#### Mine Profile :

Minerals	:	Limestone & Marl as ROM
Mineable Reserves	:	Proved (111) 64,485,659 Tonnes (01.04.2022) 35,089,690 T Limestone & 29,395,969 T Marl
Proposed Production	:	6.97 MTPA ROM @ 21100 Tons per day (TPD)
No. of working days	:	330 (3 shifts)
Life of the Mine	:	9 years
Ore:OB Ratio-Plan Period	:	1:0.27
Bench Parameters	:	9 m Height & 10 m Width
Bench Slope	:	70° to 80° (Pit Slope 45-50°)
Ultimate Pit Limit-Conceptual	:	47 to 118.5 m BGL
Ground Water-table	:	60-65 m BGL (Postmonsoon)

Mining will intersect the ground water-table.

Proved Mineable Reserves as on 01.04.2022	:	64,485,659 Tonnes
Proposed ROM Production till Conceptual Stage	:	55,985,659 Tonnes
Sub Grade Materials for future Utilisation	:	8,500,000 Tonnes
Maximum ROM Production proposed	:	6.97 MTPA
Ore:OB Ratio (till Conceptual Stage)	:	1:0.27
Life of the Mining Lease	:	9 Years

Top Soil of 57,262 Tons will be fully utilized for Green Belt development. OB of 12,87,892 Tons and Sub Grade materials of 85,00,000 Tonnes will be temporarily dumped in earmarked Reject Dumps. Granite Gneiss of 54,19,365 Tons will be generated which will be sold after obtaining the required permissions and approvals.

Lease Area falls in Survey of India Topo Sheet No. 58 J/13 within the Coordinates 10°57'19.37"-10°59'40.36" North Latitudes & 78°55'29.67"-78°57'08.33" East Longitude. Karaivetti Bird Sanctuary, Notified Eco Sensitive Area (ESA) vide S.O. 1909(E) dated 31.05.2019, is located at a distance of 8.6 km in east direction from KVK Pit No. 2. The shortest Eco Sensitive Zone (ESZ) of Karaivetti Bird Sanctuary is 7.6 km in ENE direction from KVK Pit No. 1. As the ESZ is notified, no NOC from National Board for Wildlife (NBWL) is required for the Project.

For Cumulative Impact Assessment, existing industrial activities in the Study Area are considered and their contribution are also assessed. Cumulative Impact has been assessed for identified Industries and assumed that pollution due to existing Industrial and Mining activities have already been covered under baseline environmental status and continue to remain same till operation of the Project.

The excavated area shall be 123.230 Ha at the end of mining operation. The mined out pit area will be partly backfilled to an extent of 14.50 Ha and remaining area of 108.730 Ha will be converted into artificial pond/reservoir to harvest rain water. About 26.00 Ha will be under Green Belt and another 14.50 Ha will be backfilled & afforested. Total Green Belt Coverage will be 40.50 Ha (24.40%).

In the Post-Project Scenario, there will be an addition of 600 Vehicles (1,200 in 2 ways) i.e. 2,640 PCU/day due to the expansion of GO 76 Lease to the existing traffic. Cumulatively, the traffic volume in the Project vicinity will be 8,813 PCU/day @ 367.20 PCU/hr.. The existing Roads/NH are adequate to handle the proposed traffic volume due to the Project.

AERMOD View Software is used for Predicting the maximum Ground Level Concentrations (GLCs) including Transportation Impact. The predicted maximum PM10 GLCs for cumulative operation of Plants & Mining activities is  $1.67 \mu\text{g}/\text{m}^3$  and found to be confined locally i.e. within 2.1 km radius from the boundaries. Also, adequate Buffer Level available in the Air Environment for the Proposal.

In general, noise generated by these sources is within the limit of 90 dB(A) prescribed by Director General of Mines Safety (DGMS), Dhanbad. The work force is exposed to <85 dB(A) levels during the 8-hours Shift. Noise level at the nearest Lease boundary will be <55 dB(A) during day times and <45 dB(A) during night times and which will be within the MoEF&CC Norms for Residential and Rural Areas.

ML-I will require about 142 KLD water which will be met from seepage water accumulated in the Mine Pits. Domestic Sewage generation from the Mines will be only 9 KLD which will be treated in individual Septic Tanks followed by dispersion trenches. Workshop effluent of 2.0 KLD will be treated in a Upflow Filter for Oil & Grease removal and the treated water will be connected to the Septic Tank for further dispersion.

Mine Pits dewatering quantity is about 3,780 KLD during Premonsoon and 8,340 KLD during Postmonsoon Periods. The excess seepage water as well as Rain water collected from the Working Pits are pumped into Non-working Pits and stored for further utilization. In an average, about 6,060 KLD from the Mine Pits is being dewatered. The balance quantity of 4,860 KLD, after own consumption, is pumped to Kallakudi Irrigation Tank for Agriculture purpose. Thus, Mine Pits water is gainfully utilised.

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During the Plan Period, 32,82,831 cu, m of Mineral Rejects will be dumped temporarily over an extent of 11.461 Ha in Existing as well as Proposed Dumps with a maximum height of 16.5 m. As such no back filling and reclamation is envisaged. Post Plan Period and till Conceptual Stage, another 8,15,363 cu, m of OB and 72,51,559 cu, m of Mineral Rejects (total 80,66,922 Tonnes) will be generated and dumped temporarily in the Dumps. In total, 85,00,000 Tonnes of Mineral Rejects will be temporarily kept in Dumps for future utilisation.

There is no habitat fragmentation or blocking of migratory corridors due to Project activities. About, 47,287 trees (predominantly local species) are planted @ 1,650 trees/Ha and maintained with the survival rate of 90% at these Mines. Normally in these areas Neem, pungan, Gulmohar, Acacia, etc. are planted which gives 90% survival rate.

Adequate budget shall be earmarked for Corporate Environmental Responsibility (CER) Budget for covering Public Hearing issues. Occupational health surveillance programme is being carried out for all the employees regularly and will be continued.

**Environmental Benefits :** The proposal ensures the continuous limestone supply to Cement Plants. Effective utilization of the Minerals for Cement manufacturing is a Conservation Measure.

**Social Benefits :** Project will employ about 296 persons directly and indirectly. The direct & indirect employment, CSR/CER activities, etc., will have a positive impact on the Socioeconomic Structure of the area. About 2% of the Project Cost – Rs.20.00 Lakhs has been earmarked for Corporate Environmental Responsibility (CER) Budget and to address Public Hearing Issues.

**Financial Benefits :** The Proposal will contribute about Rs.515.00 Crores as Royalty to State Government (on prevailing rate/Tonne). As per MMDR Act 2015, 30% of Royalty Amount (about Rs.154.50 Crores) will be earmarked for District Mineral Foundation (DMF) and the amount will be spent for benefit of Kallakudi & Kovandakurichi Villages by the District Administration.

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

The capital cost of the Project is Rs.10.00 Crores. A budget of Rs.50.00 Lakhs has been earmarked as EMP Capital Budget and Rs.25.32 Lakhs per Annum as Operating Cost towards EMP measures, Green Belt development & maintenance, Environmental Monitoring, etc. Also, adequate budget be allotted as Corporate Environmental Responsibility (CER) Budget in compliance with MoEF&CC OM dated 01.05.2018 for execution within 2 years period.

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## 12.0 Disclosure of Consultants

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 vide Certificate NABET/EIA/1922/RA0155 dated 24.05.2022 with validity extended till **20.07.2023** vide Letter QCI/NABET/ENV/ACO/23/2742 dated 21.04.2023 (Sl. No. 3 of QCI/NABET List dated 08.05.2023).

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 03.04.2022 with validity till 02.04.2024. 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. DCBL has utilized the services of Ensyscon, Chennai for the coordination of the Study.

ABC comprises a team of highly talented professionals, who work in sync with clients ensuring that the defined assessment and survey or reporting is executed with high level of efficiency. The proficient team consists of Environmentalists, Policy makers, Geologists, Chemists, Engineers, Industrial hygienists, Technicians, Research Associates, Sociologists and others with expertise in various key areas.

ABC has a proven successful track record of working with industry & institutions and in executing multi faceted projects funded by organizations like World Bank, UNDP, MoEF&CC, amongst others. ABC Techno labs India Private Ltd has laid down new benchmarks in all its areas of strategic operations by the dedicated team of outstanding professionals and client-centric approach, clearly evident by the accomplishments/ clients list.

The **accredited Sectors and approved Experts** of ABC are appended.

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**QUALITY COUNCIL  
OF INDIA**  
Creating an Ecosystem for Quality



**National Accreditation Board  
for Education and Training**



## Certificate of Accreditation

**ABC Techno Labs India Private Limited**  
#400, 13th Street, SIDCO Industrial Estate (North Phase),  
Ambattur, Chennai, Tamil Nadu-600096

The organization is accredited as Category-A under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations, Version 3: for preparing EIA-EMP reports in the following Sectors –

Sl. No.	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including open cast/ underground mining	1	1 (a) (i)	A
2	Offshore and onshore oil and gas exploration, development & production	2	1 (d)	A
3	River Valley projects-irrigation projects only	3	1 (c)	A
4	Thermal power plants	4	1 (d)	A
5	Mineral beneficiation including pelletization	7	2 (d)	A
6	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	A
7	Cement plants	9	3 (b)	A
8	Petroleum refining industry	10	4 (a)	A
9	Asbestos milling and asbestos based products	12	4 (c)	A
10	Leather/skin/hide processing industry A	15	4 (f)	A
11	Chemical Fertilizers	16	5 (a)	A
12	Petro-chemical complexes	18	5 (c)	A
13	Petrochemical based processing	20	5 (e)	A
14	Synthetic organic chemicals industry	21	5 (f)	A
15	Distilleries	22	5 (g)	A
16	Sugar Industry	23	5 (i)	B
17	Oil & gas transportation pipeline	27	6 (a)	A
18	Isolated storage & handling of hazardous chemicals	28	-	B
19	Airports	29	7 (a)	A
20	Industrial estates/ parks/ complexes/ Areas, export processing zones (EPZ), Special economic zones (SEZ), Biotech parks, Leather complexes	31	7 (c)	A
21	Common hazardous waste treatment, storage and disposal facilities (TSDFs)	32	7 (d)	A
22	Ports, harbours, break waters and dredging	33	7 (e)	A
23	Highways	34	7 (f)	A
24	Common Effluent Treatment Plants (CETPs)	36	7 (h)	B
25	Common Municipal Solid Waste Management Facility (CMSWMP)	37	7 (i)	B
26	Building and construction projects	38	8 (a)	B
27	Townships and Area development projects	39	8 (b)	B

*Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RA AC minutes dated January 17, 2020, supplementary assessment minutes dated September 21, 2021 and April 12, 2022 posted on QCI-NABET website.*

*The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/20/1257 dated March 2, 2020. The accreditation needs to be renewed before the expiry date by ABC Techno Labs India Private Limited, Chennai following due process of assessment.*

  
Sr. Director, NABET  
Dated: April 19, 2023

Certificate No.  
NABET/EIA/1922/RA 0155 (Rev.01)

Valid up to  
May 24, 2022

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.



## National Accreditation Board for Education and Training



QCI/NABET/ENV/ACO/23/2742

April 21, 2023

To

**ABC Techno Labs India Private Limited**  
(formerly known as ABC Environ Solutions Pvt. Ltd.)  
# 400, 13<sup>th</sup> Street, SIDCO Industrial Estate (North Phase),  
Ambattur, Chennai - 600098

Sub.: Extension of Validity of Accreditation till July 20, 2023 – regarding  
Ref.: 1. Certificate no NABET/EIA/1922/RA0155  
2. Request e-mail dated April 21, 2023

Dear Sir/Madam

This has reference to the accreditation of your organization under QCI-NABET EIA Scheme, the validity **ABC Techno Labs India Private Limited** is hereby extended till July 20, 2023 or completion of assessment process, whichever is earlier.

The above extension is subject to the submitted documents/required information with respect to your application and timely submission and closure of NC/Obs during the process of assessment.

You are requested not to use this letter the after expiry of the above-stated date.

With best regards.

(A.K. Jha)  
Sr. Director, NABET

**NATIONAL ACCREDITATION BOARD FOR EDUCATION & TRAINING  
QUALITY COUNCIL OF INDIA**

6<sup>th</sup> Floor, ITPI Building, Ring Road, I.P. Estate, New Delhi  
Scheme for Accreditation of EIA Consultant Organizations  
Accreditation Committee Meeting for Supplementary Assessment held  
Through Video Conferencing on  
September 21, 2021

The following members were present during the meeting:

- |                        |            |
|------------------------|------------|
| 1. Mr. A. K. Ghose     | - Chairman |
| 2. Dr. G. K. Pandey    | - Member   |
| 3. Dr. P. Ahujarai     | - Member   |
| 4. Dr. J. S. Sharma    | - Member   |
| 5. Prof. D. K. Sharma  | - Member   |
| 6. Dr. Ranjini Warriar | - Member   |

Prof. Rajesh Khanna and Dr. Manoranjan Hota expressed their inability to attend the meeting.

Mr. A.K. Jha – Senior Director, Dr. S. K. Mishra – Joint Director, Dr. Pawan Kumar Singh – Assistant Director and Mr. Vipin Pant– Accreditation Officer from NABET-QCI were present in the meeting.

Following case was discussed and decisions taken thereof are:

## 1.0 Case of Supplementary Assessment

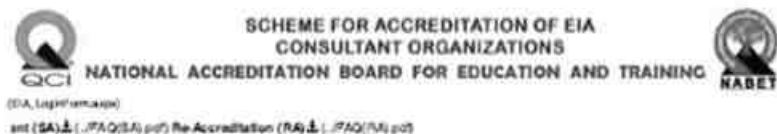
### 1.1 ABC Techno Labs India Private Limited, Chennai

The case of ABC Techno Labs India Private Limited, Chennai was discussed in RA AC meeting dated January 17, 2020 wherein ACO was accredited for sectors 1(A), 2(A), 3(A), 4(A), 7(B), 8(B), 9(A), 10(A), 12(A), 15(A), 16(A), 18(A), 20(A), 21(A), 22(A), 24(A), 25(B), 27(A), 28(B), 29(A), 31(A), 32(A), 33(A), 34(A), 36(B), 37(B), 38(B) and 39(B). ACO has proposed the following additional candidate for already approved sectors and functional areas. The assessment result of the same is as under:

#### 1.1.1 EIA Coordinators (ECs)

Sl. No	Name	Sectors			Cat.	Remarks
		Applied	Recommended	Approved		
<b>Empanelled</b>						
1	K. Sekar	1	Yes	Yes	A	Open cast only
		7	Yes	Yes	A	None
		9	Yes	Yes	A	
		31	Yes	Yes	A	
		33	Yes	Yes	A	

DCBL EC for Expn. of Kallakudi-Kovandakurichi Limestone Mine GO No. 76 (Extent 166.005 Ha), Trichy Dist.



search Q Search

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**ABC Techno Labs India Private Limited (formerly known as ABC Environ Solutions Pvt. Ltd.)**

S No	Name	Type	Description	Sector	PK	Remarks	Scan QR
1	Rameshwar V Mudaliar	Expanded	EC,FAE	2(A)2 1(A)32(A)3 700,300	SHW(A)DC(A) WPA		
2	Abhis Saha	In House	EC,FAE	2(A)3(A) 12 (A)21 (B)22(A)	WPA(2B(A) AP(B) SHW(A)		
3	Dr. N. K. Jayaraman	In House	EC,FAE	100,3 100,3 900,2 1(A)3 700	LUX(WPA)IG(A)SHW(A)		
4	Dr. B. Parasharam	In House	EC,FAE	3(A)3(A)	WPA(IG(A)		
5	Dr.Muthu Kumar Ray	Expanded	EC	1000 1(A) 406,300,27(A)			
6	Geetha S.	In House	/FAE		SC(B)		
7	Hareesh Parthasarathy	Expanded	EC,FAE	3(A)5,300,3700,3000,3000	AP(B) WPA(IG(A)		
8	K. Saha	Expanded	EC	1(A)7 (A)9(A) 7(A)3(A)		Operational mining only	
9	Karthi Jig	Expanded	EC,FAE	3(A)4 (B) 02 (A)25 (B)39 (B)	SHW(B) WPA(IG(B))		
10	M. Srinivasan	Expanded	EC,FAE	1(A)2 (A) 700,27(A)	Ge(A) IG(A)LU(A)W(B)	Continue only for sector-2. Operational mining only for sector-1.	
11	Muthiah Manjappan	Expanded	EC,FAE	4(A)1 6(A)1 5(A)1 6(A)23(A)	SHW(A)WPA		
12	P. Suresh	Expanded	EC	3(A)			
13	R. Rajendran	Expanded	EC,FAE	800,3000,3000,23(A)	SHW(B)AP(B)IG(B)DC(B)		
14	Shankar M. Gajjala	Expanded	EC	27(A) 3(A)			





		<b>National Accreditation Board for Testing and Calibration Laboratories</b>	
		<b>CERTIFICATE OF ACCREDITATION</b>	
<b>ABC TECHNO LABS INDIA PRIVATE LIMITED</b>			
has been assessed and accredited in accordance with the standard			
<b>ISO/IEC 17025:2017</b>			
<b>"General Requirements for the Competence of Testing &amp; Calibration Laboratories"</b>			
for its facilities at			
ABC TOWER, NO 400, 13TH STREET, SIDCO INDUSTRIAL ESTATE-NORTH PHASE, AMBATTUR, CHENNAI, TAMIL NADU, INDIA			
in the field of			
<b>TESTING</b>			
Certificate Number:	TC-5770	Valid Until:	02/04/2024
Issue Date:	03/04/2022		
This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL. (To see the scope of accreditation of this laboratory, you may also visit NABL website <a href="http://www.nabl-india.org">www.nabl-india.org</a> )			
Name of Legal Identity : ABC Techno Labs India Private Limited			
Signed for and on behalf of NABL			
	 <b>N. Venkateswaran</b> Chief Executive Officer		

F. No. Q-15018/04/2019-CPW  
 Government of India  
 Ministry of Environment, Forest and Climate Change  
 (CP Division)

Agni-233, Indra Paryavaran Bhavan,  
 For Bagh Road,  
 New Delhi – 110 003.  
 Dated, the 14<sup>th</sup> October, 2019

To

**M/s ABC Techno Labs India Private Limited**  
**ABC Tower No. 400, 13<sup>th</sup> Street, SIDCO**  
**Industrial Estate North Phase, Ambattur**  
**Chennai, TamilNadu-600098**

**Subject: -Recognition of M/s ABC Techno Labs India Private Limited, ABC Tower No. 400, 13<sup>th</sup> Street, SIDCO, Industrial Estate North Phase, Ambattur, Chennai, TamilNadu-600098, as Environmental Laboratory under the Environment (Protection) Act, 1986 – regarding.**

Sir,

I am directed to refer to your application dated 04.02.2019 for renewal of recognition of your laboratory under Environment (Protection) Act, 1986. Based on the recommendations of the Expert Committee for Recognition of Environmental Laboratories in its 60<sup>th</sup> meeting held on 30.08.2019 and your acceptance of the revised terms and conditions at Annexure-III & IV of the Guidelines for recognition of Environmental Laboratories, this Ministry approves the renewal of recognition of M/s ABC Techno Labs India Private Limited, ABC Tower No. 400, 13<sup>th</sup> Street, SIDCO, Industrial Estate North Phase, Ambattur, Chennai, TamilNadu-600098, for five years, as shall be notified in the Gazette of India.

2. As sought in your aforementioned application, M/s ABC Techno Labs India Private Limited, Chennai may undertake the following tests:

- i. **Physical Tests:** Conductivity, Colour, pH, Fixed & volatile solids, Total solids, Total dissolved solids, Total suspended solids, Turbidity, Temperature, Velocity & discharge measurement of industrial effluent stream, Flocculation test (Jar Test), Odour, Salinity, Settleable solids and Sludge volume index.
- ii. **Inorganic (General & Non-metallic):** Acidity, Alkalinity, Ammoniacal nitrogen, Chloride, Chlorine residual, Dissolved oxygen, Fluoride, Total hardness, Total kjeldahl nitrogen (TKN), Nitrite nitrogen, Nitrate nitrogen, Phosphate, Sulphate, Bromide, Carbon dioxide, Chlorine demand, Iodine, Sulphite, Silica, Cyanide and Sulphide.
- iii. **Inorganic (Trace metals):** Boron, Cadmium, Calcium, Chromium Total, Chromium Hexavalent, Copper, Iron, Lead, Magnesium, Mercury, Nickel, Potassium, Sodium, Sodium absorption ratio, Zinc, Arsenic, Aluminium, Beryllium, Barium, Lithium, Manganese, Selenium, Silver, Strontium, Tin, Antimony, Cobalt and Vanadium.
- iv. **Organics (General) and Trace Organics:** Bio-chemical oxygen demand (BOD), Chemical oxygen demand (COD), Oil & grease, Phenol, Pesticide ((Organo-chlorine, Organo nitrogen-phosphorous), Total organic carbon, Surfactants, Tannin & lignin, Poly-Chlorinated biphenyl (PCB's) each, Polynuclear aromatic hydrocarbon (PAH), Organic Carbon (in Solid) and Carbon/Nitrogen ratio.
- v. **Microbiological Tests:** Total Coliform, Faecal Coliform, Faecal streptococci, E. coli, Total Plate count and Enterococcus.
- vi. **Toxicological Tests:** Bioassay method for evaluation of toxicity using fish, Bio-accumulation, bio magnification and bio-transformation studies, Measurement of toxicity using Daphnia or other organism.
- vii. **Biological Tests:** Benthic organism identification and count, Planktonic identification count, Measurement of various diversity index, Chlorophyll and Primary productivity.
- viii. **Hazardous Waste:** Preparation of Leachate (TCLP extract/water extract), Corrosivity, Ignibility (Flash Point), Reactivity, Toxicity and Measurement of heavy metals/ pesticides in the waste/ leachate
- ix. **Soil/ Sludge/ Sediment and Solid Waste:** Boron, Cation Exchange Capacity (CEC), Electrical Conductivity, Nitrogen available, Organic carbon/ matter (chemical method), pH, Phosphorus

(available), Phosphate (ortho), Phosphate (total), Potassium, SAR in soil extract, Sodium, Soil moisture, TKN, Calorific value, Ammonia, Bicarbonate, Calcium, Calcium Carbonate, Chloride, Colour, Exchangeable Sodium Percentage, Heavy metal, Magnesium, Nitrate, Nitrite, PAH, Pesticide, Potash (available), Sulphate, Sulphur, TOC, Total water soluble salt and Water holding capacity.

- x. **Ambient Air/ Fugitive Emissions:** Nitrogen dioxide (NO<sub>2</sub>), Sulphur dioxide (SO<sub>2</sub>), Suspended particulate matter, Respirable suspended particulate matter (PM<sub>10</sub>), Ammonia, Carbon monoxide, Chlorine, Fluoride, Lead, Ozone, Benzene Toluene Xylene, Polycyclic aromatic hydrocarbon (PAH), Benzo(a)pyrene & others, Fine Particulate Matter PM<sub>2.5</sub> and Volatile Organics Compounds.
  - xi. **Stack Gases/ Source Emission:** Particulate matter, Sulphur dioxide, Velocity & flow, Carbon dioxide, Carbon Monoxide, Temperature, Oxygen, Oxides of nitrogen, Acid mist, Ammonia, Chlorine, Fluoride(Gaseous), Hydrochloric acid, Total Hydro Carbon, Hydrogen Sulphide.
  - xii. **Noise Level:** Noise level measurement (20 to 130 dba), Ambient Noise & Source-specific Noise.
  - xiii. **Meteorological:** Ambient temperature, Wind direction, Wind speed, Relative Humidity and Rainfall.
3. Further, the following analysts have been approved for recognition as Government Analysts.
    - (i) Mr. S. Ravi
    - (ii) Mr. K.G. Swaminathan
    - (iii) Mr. A. Robson Chinnadurai
  4. The laboratory shall compulsorily participate in the Analytical Quality Control (AQC) exercise conducted by the Central Pollution Control Board (CPCB) at least once a year to ascertain the capability of the laboratory and analyses carried out and shall submit quarterly progress reports to this Ministry.
  5. Periodic surveillance of the recognized environmental laboratory will be undertaken by this Ministry/ CPCB to assess its proper functioning, systematic operation and reliability of data generated at the laboratory.
  6. It is also mandatory for the laboratory to have requisite accreditations of the NABL/ ISO 9001 and OHSAS and its renewal as per accreditation rules. Permission in para 2 above is subject to such accreditations and renewal, as applicable.
  7. The laboratory should compulsorily follow the accepted Terms & Conditions. In case of serious non-compliance of any of the Terms and Conditions, the laboratory may be black-listed for a minimum period of two years and civil/ criminal proceedings, as applicable, may be initiated for performing functions on behalf of the Government in an unauthorized manner.

Yours faithfully,

  
(Dr. Susan George K.)  
Scientist 'D'  
Tel. No. 011-24695327  
Email: susan.george@nic.in

Copy to:

1. Member Secretary, Central Pollution Control Board, Parivesh Bhawan, East Arjun Nagar, New Delhi - 110032.
2. Member Secretary, Tamil Nadu Pollution Control Board (TNPCB), 76 Anna Salai, Guindy, Chennai-600032
3. Additional Principal Conservator of Forests (C), Ministry of Environment, Forest and Climate Change, Regional Office (SEZ), 1<sup>st</sup> and 2<sup>nd</sup> Floor, Handloom Export Promotion Council, 34, Cathedral Garden Road, Nungambakkam, Chennai-34.
4. Director, IT Division, MoEF&CC, New Delhi-110003; for uploading on MoEF&CC website

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### ABSTRACT

Industries- Mines and Minerals – Major Mineral - Limestone & Marl - Tiruchirapalli District – Laigudi Taluk – Kallakudi, Kovandakurichi and Venkatachalapuram Villages – Over an extent of 166.00.5 Hectares of Patta and Paramboke lands – Renewal of Mining lease granted to Tvl. Dalmia Cement (Bharat) Limited – Extension of Lease Period requested as per Section 8A (5) of the MM (D&R) Amendment Act, 2015 – Granted- Orders – Issued.

### **INDUSTRIES (MMA.1) DEPARTMENT**

**G.O.(Ms)No.76**

**Dated : 26.07.2018**

வினாப்பி, ஆடி திங்கள் 10  
திருவள்ளூர் ஆண்டு 2049

**Read:**

1. G.O. (3D) No.1, Industries (MMA.2) Department, dated: 08.01.2002 granting amalgamation of 6 existing mining leases co-terminus on 31.08.2004.
2. First Renewal of Mining Lease application preferred by Tvl. Dalmia Cement (Bharat) Limited, dated 16.04.2003
3. Grant of 1<sup>st</sup> renewal of amalgamated mining lease for 20 years in G.O(Ms)No.189, Industries (MMA1) Department, dated 11.12.2014
4. Mines and Minerals (Development and Regulation) Amendment Act, 2015 dated: 12.01.2015.
5. Tvl. Dalmia Cement (Bharat) Limited letter No. DP: MN: LL: Lst.01, dated 06.03.2015.
6. Environmental Clearance issued by Ministry of Environment and Forest in Letter No.J-11015/912 2007-1A, II(M), dated 27.05.2008.
7. The District Collector, Tiruchirapalli Letter No. 355 / G&M / 2003 dated: 19.03.2018.
8. From the Director of Geology and Mining, Letter No: 2269//MM1/2018, dated:15.05.2018.

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### **ORDER:**

In the reference first cited, Government had issued orders for Dalmia Cements limited for Amalgamating 6 existing Mining leases granted for Limestone over an extent of 173.03.5 Hectares of patta & paramboke lands in S.F. Nos. 39/8, 40 etc., of Kallakudi Village, S.F. Nos. 54/1,2, etc. of Kovandakurichi Village, S.F. No. 32 of Venkatachalapuram Village Laigudi

**M R RAJA  
RANJITH  
SINGH** (p.t.o)

Digitally signed by M R RAJA RANJITH SINGH  
DN: c=IN, o=PERSONAL, title=7191, pseudonym=8e676ddceb3b9df3e35ab5e90155e22cc12958da9580c1a62cd49f70f48d4ac, postalCode=621651, st=Tamil Nadu, serialNumber=23bd15f8fe6eb2046ee7d3eb0b275fe1250960af2fe00bd41d00d58337877, cn=M R RAJA RANJITH SINGH  
Date: 2022.07.04 18:18:57 +05'30'

Taluk, Tiruchirapalli District and the period of mining lease was made co-terminus with the G.O that expires first i.e. 31.8.2004 , as per the then Rule 38 of Mineral Concession Rules, 1960 as stated below:

G.O.No. / Date	Extent in Acres	Date of expiry	Status as per Rule 38 of MCR,1960
44/11.3.97	98.41	18.6.06	All the leases were amalgamated vide G.O. (3D) No. 1 Industries (MMA.2) Department, dated 08.01.2002 and lease expiring first on 31.8.2004.
109/11.7.97	64.00	18.6.06	
83/23.6.98	17.95	31.8.04	
195/11.11.97	170.32	31.8.05	
364/14.11.96	5.39	4.2.08	
366/19.11.96	71.4825	22.2.08	
	<u>427.5525</u>		
	(or)		
	<u>173.03.5</u>		
	Hec.		

2) In the reference second cited Tvl.Dalmia Cements Limited has preferred application for first renewal of mining lease through the District Collector, Tiruchirapalli to renew the mining lease for an extent of 166.00.5 Hectares of patta & poramboke lands after deleting 7.03.0 hectares in Kallakudi, Kovandakurichi and Venkatachalapuram Villages in Laigudi Taluk, Tiruchirapalli District.

3) In the reference third cited, Government has granted 1<sup>st</sup> renewal of amalgamated mining lease over a total extent of 166.00.5 hectares of patta and government poramboke lands in Kallakudi, Kovandakurichi and Venkatachalapuram villages, Laigudi taluk, Tiruchirapalli District for a period of 20 years from 1.9.2004 to 31.8.2024 subject to certain special conditions and other usual terms and conditions.

4) The mineral Marl was included in the five existing mining leases granted to Tvl.Dalmia Cements vide G.O. Ms. No. 8, Industries (MMA.1) dated 12.02.2008 including the subject area granted for first renewal of lease in G.O.Ms.No.189, Industries(MMA.1) Department, dated: 11.12.2014.

5) In the meantime, the Mines and Minerals (Development and Regulations) Amendment Act 2015 came into effect on 12.01.2015. Section 8 A (5) of Mines and Minerals (Development and Regulations) Amendment Act reads as follows:

"Notwithstanding anything contained in sub-sections (2), (3) and sub section (4), the period of lease granted before the date of commencement of the Mines and Minerals (Development and Regulation)Amendment Act, 2015 where mineral is used for captive purpose, shall be extended and be deemed to have been extended upto a period ending on the 31<sup>st</sup> March 2030 with effect

from the date of expiry of the period of renewal last made or till the completion of renewal period, if any, or a period of fifty years from the date of grant of such lease, whichever is later, subject to the condition that all the terms and conditions of the lease have been complied with\*.

6) In the reference fifth cited Tvl.Dalmia Cements Limited has submitted their representation to Government and requested to issue orders extending the lease period up to 31.3.2030 beyond 31.8.2024 as per the sub section (5) of section 8A of the Mines and Minerals (Development and Regulation)Amendment Act, 2015.

7) In the reference seventh cited, the District Collector, Tiruchirapalli has stated that the lessee company is manufacturing cement in their cement Plant located at Dalmiapuram and Tamaraikulam of Ariyalur District utilizing limestone as raw material mined from the subject area purely for its captive consumption and therefore, concluded that the subject mining lease granted under G.O.(Ms)No.189, Industries (MMA.1) Department, dated 11.12.2014 having validity from 01.09.2004 to 31.08.2024 is recommended for extension of lease period upto 31.03.2030 as per section 8 (A) (5) of the amended Mines and Minerals (Development and Regulation)Amendment Act, 2015 for the S.F.Nos mentioned in the enclosed statement over a total extent of 166.00.5 hectares of patta and Government poramboke lands in Kallakudi, Kovandakurichi and Venkatachalapuram villages of Laigudi Taluk, Tiruchirapalli District.

8) The details of lands are as follows;

S.No	Village	Patta Land (Hectares)	Govt. Poramboke land (Hectares)
1.	kallakudi	49.91.5	48.04.0
2.	Kovandakurichi	44.04.0	22.78.0
3.	Venkatachalapuram	-	1.23.0
	Total	93.95.5	72.05.0
Grand Total		166.00.5 Hectares	

9) In the reference eighth cited, the Director of Geology and Mining has forwarded the proposal recommending extension of lease period in respect of the mining lease granted for mining limestone and Marl to Tvl.Daimia Cements (Bharat) Limited vide G.O(Ms)No.189, Industries (MMA.2) Department, dated 11.12.2014 over an extent of 166.00.5 Hects in Patta & Poramboke lands in Kallakudi, Kovandakurichi and Venkatachalapuram

Villages, Lalgudi Taluk, Tiruchirapalli District for the period upto 31.03.2030 as per Section 8A(5) of Mines and Minerals (Development and Regulation) Amendment Act, 2015.

10) The Mining scheme of the subject lease has been approved by the Indian Bureau of Mines, Chennai vide Lr.No.TN/TCR/LST/MS-1028.MDS, dated: 08.04.2014. The District Collector, Tiruchirapalli has informed that the lease is in compliance with the terms and conditions of the lease deed.

11) Tvl.Dalmia Cements in their letter dated 02.05.2018 has informed that they have remitted the annual surface right compensation for the poramboke lands granted for mining lease to the tune of Rs.5,32,49,280/- in the State Bank of India, Tiruchirapalli vide challan No.4204 for the period from 01.09.2004 to till date.

12) The applicant company obtained the Environmental Clearance from the Ministry of Environment, Forest and Climate Change, Government of India vide their letter No.J.11015/912/2007-1A-II(M) dated 27.05.2008. The applicant company Dalmia Cements having valid Consent to Operate issued by Tamil Nadu Pollution Control Board vide Consent Order No. 170818121257, dated: 23.05.2017 under Water Act & Consent Order No.170828121257, dated: 23.05.2017 under Air Act for the lease hold area of 166.00.5 Hectares.

13) The District Collector, Tiruchirapalli has also informed that the lessee is manufacturing cement in their cement plant located at Dalmiapuram Village of Tiruchirapalli District and Tamaraikulam Village of Ariyalur District utilizing limestone as raw material mined from the subject area purely for its captive purpose. Hence, Tvl. Dalmia Cements Ltd is eligible for extension of lease period up to 31.03.2030 as per section 8A (5) of the Amended Act, 2015.

14) The Government after careful examination accepts the recommendations of the District Collector, Tiruchirapalli and the Director of Geology and Mining and hereby grant orders to extend the mining lease period from 01.09.2024 to 31.03.2030 to Tvl.Dalmia Cements (Bharat) Limited for mining Limestone and Marl over an extent of 166.00.5 Hectares of patta & poramboke lands as mentioned in the Appendix -I to this order in Kallakudi, Kovandakurichi, Venkatachaliapuram Villages of Lalgudi Taluk, Tiruchirapalli District as per the section 8-A (5) of Mines and Minerals (Development and Regulation) Amendment Act, 2015 in addition to the conditions already imposed in the original lease granting order subject to the following additional conditions.

- i) The District Collector, Tiruchirapalli is directed to raise the annual compensation from the original grant of lease and the lessee has to remit the amount in this regard.



- ii) The lessee should furnish an undertaking in the form of Affidavit stating all the dues related to the mining lease i.e., Annual compensation, District Mineral Foundation Trust, National Mineral Exploration Trust etc., will be paid whenever the demand raised by the authority.
- iii) Submission of environmental clearance for the extension of tenure of lease period for the remaining period (01.09.2024 to 31.03.2030).
- iv) Submission of approved scheme of mining plan for every five years to the District Collector and to remove the minerals as per the quantum indicated in the approved mining plan.
- v) Compliance of the conditions imposed in G.O(Ms)No.189, Industries MMAZ Department, dated 11.12.2014 should be adhered.
- vi) The lessee has to produce latest mining dues certificate in respect of the leases held by them in various districts of the State before execution of lease deed.
- vii) The lessee company has to execute the lease deed for the tenure of lease period from 01.09.2004 to 31.03.2030.
- vii) The District Collector should ensure that the mineral is utilized for captive industry.
- ix) The lessee has to abide the terms and conditions of the mining lease stipulated in rule 12 of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016.
- x) The District Collector to ensure compliance by the lessee with regard to the provisions of the Mineral conservation and Development Rules, 2017, Mines and Minerals (Development & Regulation) Amendment Act, 2015, Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 and other applicable Act and Rules and various directions issued by the Ministry of Mines, Government of India and the Hon'ble Supreme court of India, National Green Tribunal, Hon'ble High court and including Forest(Conservation)Act, 1980 and other related Acts before lease deed execution.

15) The District Collector, Tiruchirapalli is requested to take necessary further action for execution of the lease deed in the prescribed form, after satisfying the requirements mentioned in para. 14 above and to report the date of execution of the lease deed to the Government and Director of Geology and Mining as soon as the lease deed is executed. The District Collector is also requested to ensure compliance of the amended provision of the Mines and

6

Minerals (Development & Regulation) Amendment Act 2015, and the Mineral Concession Rules, 2016 and other applicable Acts and Rules including Forest Conservation Act, 1980 by the applicant firm before the lease deed is executed.

**(BY ORDER OF THE GOVERNOR)**

**K. GNANADESIKAN  
ADDITIONAL CHIEF SECRETARY TO GOVERNMENT**

To  
✓ Tvl., Dalmia Cement (Bharat) Limited  
Dalmiapuram- 621651,  
Tiruchirapalli District,  
The District Collector,  
Tiruchirapalli.

Copy to:

The Regional Controller of Mines,  
Indian Bureau of Mines, Chennai.

The Director of Geology and Mining,  
Guindy, Chennai-600 032.

Hon'ble Minister (Law, Courts and Prisons)  
Chennai-600 009.

Industries (OP.II) Department,  
Secretariat, Chennai - 600 009.  
SF/SCs.

// Forwarded / By Order //

*P. Javed Ali*  
**SECTION OFFICER.**

*P. Javed Ali*  
20/11/16

**APPENDIX - I****G.O.(Ms.) No. 76 , Industries (MMA, 1) Department Dated 26.07.2018****DETAILS OF THE AREA FOR EXTENSION OF MINING LEASE TILL 31.03.2030****KALLAKUDI,KOVANDAKURICHI AND VENKATACHALAPURAM VILLAGES**

Taluk:- Laloudi

Village:- Kallakudi

Survey Field Number	Extent (In hectares)	Classification
39/8	1.480	Patta
40	0.945	Government -Vari
41/1	3.665	Government - Karadu
47/1	0.395	Patta
47/3	0.735	Patta
47/4	0.255	Patta
47/11	0.120	Government -Tharisu
49	1.585	Patta
50	1.500	Government -Vari
51	0.280	Patta
52	7.265	Government - Karadu
53/1	0.500	Patta
55/1(part)	0.555	Patta
55/15	0.155	Government - Tharisu
101	0.950	Government -Vari
102/20	0.075	Government -Assessed Waste Dry
104/1A	1.405	Government - Karadu
104/15	0.080	Government - Tharisu
104/24	0.330	Government - Tharisu
110/2	0.200	Government - Tharisu
110/3	0.070	Government - Tharisu
110/4	0.115	Government - Tharisu
110/15	0.080	Government - Tharisu
111/1	1.350	Government - Vari
111/2	0.190	Government - Tharisu
112/1	2.240	Patta

112/8	0.265	Government - Tharisu
112/11B	0.140	Patta
112/12	0.305	Government - Tharisu
112/14A	0.045	Patta
112/15	0.415	Patta
113/1	5.160	Government - Karadu
113/3	3.040	Government - Karadu
114/1	3.430	Patta
114/6	0.155	Patta
114/7	0.365	Patta
114/11	0.160	Patta
114/12	0.140	Patta
114/13	0.485	Patta
114/14	0.255	Patta
114/15	0.030	Patta
114/17A	0.160	Patta
114/17B	0.385	Patta
114/18	0.130	Patta
114/19	0.040	Government - Tharisu
115/1	0.785	Patta
115/3	0.170	Patta
115/4	0.175	Patta
115/6	0.095	Patta
115/7	0.180	Patta
115/9	0.240	Patta
115/10	0.870	Patta
116/1	0.095	Government - Tharisu
116/2	0.435	Government - Tharisu
116/3	0.055	Government - Tharisu
117/1	0.130	Patta
117/2	0.245	Patta
117/3	0.210	Patta
117/4	0.760	Government - Tharisu
117/5	0.225	Patta

117/6	0.055	Government - Tharisu
117/7	0.465	Government - Tharisu
117/8	0.510	Government - Tharisu
118/1	3.540	Patta
118/3A	0.115	Patta
118/3C	0.145	Patta
118/5	0.015	Patta
118/10	0.200	Patta
119/1	5.130	Patta
119/19B	0.030	Patta
120	1.490	Patta
121/1	3.365	Patta
121/7A	0.105	Patta
121/18	0.090	Patta
121/19	0.080	Patta
122	1.110	Government - Cart track
135/1	3.865	Patta
135/2	0.750	Patta
136/1	2.130	Patta
136/3	0.280	Patta
136/7	0.055	Patta
136/10	0.270	Government - Cart track
136/11	0.350	Patta
136/12	0.690	Patta
136/13	0.230	Patta
136/14	0.370	Patta
137/1	1.790	Government - Kallankuthu
137/2	0.515	Patta
137/3	0.680	Patta
137/6	0.330	Patta
137/7	0.515	Patta
138/1	7.680	Government - Kallankuthu
138/2	0.105	Government - Tharisu
139/1	1.065	Government - Tharisu

139/2	0.825	Government - Tharisu
139/3	0.455	Patta
139/4	0.220	Patta
139/5	0.350	Government - Tharisu
139/6	0.085	Government - Tharisu
139/7	0.850	Government - Karadu
140/1	0.545	Patta
140/2	1.295	Patta
140/3	1.445	Patta
140/4	0.105	Government - Cart track
140/68	0.585	Patta
252	1.125	Government - Karadu
254/4	0.715	Patta
254/7	0.090	Patta
254/8	0.105	Patta
254/9	0.065	Patta
254/10	0.080	Patta
254/11	0.105	Patta
254/12	0.395	Patta
254/13	0.350	Patta
258/1	0.210	Patta
259/6	0.240	Government - Tharisu
260/3	0.200	Patta
260/7	0.055	Patta
260/9	0.070	Patta
260/13	0.265	Patta
260/16	0.055	Patta
260/18	0.230	Government - Tharisu
268/1 (part)	2.175	Government - Karadu
403	0.385	Government - Tharisu
Total	97.955	

Name of the village: - Kovandakurichi		
Taluk: - Laigudi		
Survey Field Number	Extent (In hectares)	Classification
54/1	0.830	Patta
54/2	0.250	Patta
55	1.410	Patta
56	4.155	Government - Kallankuthu
57	2.585	Patta
58 (Part)	1.450	Patta
59/1B (Part)	1.480	Patta
60	2.755	Patta
61/8	0.490	Patta
72/1	0.355	Patta
72/3 (Part)	1.480	Patta
73/1	1.065	Patta
73/3	0.160	Patta
73/5	0.135	Patta
74/1	1.575	Patta
75	1.025	Government - Kallankuthu
77/4 (part)	0.320	Patta
78/5(part)	0.165	Patta
78/7(Part)	0.365	Patta
78/8A	0.130	Patta
79/1A (part)	0.175	Patta
79/1B	0.305	Patta
79/2	0.350	Patta
79/6	1.545	Patta
80/1	4.995	Patta
81/1B	11.420	Government - Kallankuthu
81/3	0.340	Government - Tharisu
81/4	0.430	Patta
82	0.940	Patta
83	1.250	Patta
85/2	3.715	Patta
86/1	2.720	Patta
87	6.335	Patta

88/1	1.120	Patta
89/1	0.420	Patta
92 (part)	1.915	Government - Kallankuthu
93/1D	0.930	Patta
94/7 (part)	0.670	Patta
95/8(part)	0.270	Patta
140A/1	3.925	Government - Tharisu
147/1	0.870	Patta
Total	66.820	

Village:- Venkatachalapuram

Taluk:- Lalgudi

Survey Field Number	Extent (In hectares)	Classification
32	1.230	Government - Kallankuthu
Total	1.230	

ABSTRACT		
Village	Patta(hect)	Government land(hect)
1 Kallakudi	49.91.5	48.04.0
2 Kovandakurichi	44.04.0	22.78.0
3 Venkatachalapuram	-	1.23.0
Total	93.95.5	72.05.0
GRAND TOTAL	166.00.5	

**K. GNANADESIKAN**  
**ADDITIONAL CHIEF SECRETARY TO GOVERNMENT**

// True Copy //

*P. J. M. Ali*  
**SECTION OFFICER.**  






தமிழ்நாடு தமில்நாடு TAMILNADU

BK 715486

Dalmia Cement (Bharat) Limited,  
Dalmianuram - 621 551,  
Tiruchirappalli Dist.  
Tamil Nadu.

B. Rajarajasekaran J. A.  
உள்ளிட்ட மலர் 2/2011  
அலுவலர் - தமிழ்நாடு



100/-  
06-11-2019

D-2497  
2019

Supplementary Mining Lease Deed

- 1. G.O.(Ms.) No. 189 Industries (MMA1) Department dated 11.12.2014
- 2. G.O.(Ms.) No.76 Industries (MMA1) Department dated 26.07.2018.

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This INDENTURE made this 30<sup>th</sup> day of November, 2019 between the Governor of Tamil Nadu (hereinafter referred to as the "State Government" which expression shall where the context so admits, be deemed to include the successors and assigns) acting through the District Collector of the ONE PART,

And

For Dalmia Cement (B) Ltd

*R.A. Krishnakumar*  
R.A. Krishnakumar  
Executive Director  
**LESSEE**

*R. Rajarajasekaran*  
DISTRICT COLLECTOR  
LESSOR.



M R RAJA  
RANJITH  
SINGH

Digitally signed by M R RAJA  
RANJITH SINGH  
DN: c=IN, o=PERSONAL, title=7191,  
pseudonym=8e676ddceb3b9df3e  
35ab5e90155e22c12958da9580c1  
a62cd49f70f48d4ac,  
postalCode=621651, st=Tamil  
Nadu,  
serialNumber=23bd15f8fe6eb204  
6ee7d3ebb0b275fe125096af2fe0  
0bd41d000d5837877, cn=M R  
RAJA RANJITH SINGH  
Date: 2022.07.04 18:20:17 +05'30'



**Tvl. Dalmia Cement (Bharat) Limited** incorporated in India under the Companies Act, 1956/2013 with Corporate Identity Number U65191TN1996PLC035963 whose registered office is at Dalmiapuram, Lalgudi Taluk, Trichy District PIN Code: 621651 Tamil Nadu, India and principal place of business is at Dalmia Cement (Bharat) Limited, 11<sup>th</sup> & 12<sup>th</sup> Floor, Hansaiaya, 15, Barakhamba Road, New Delhi - 110 001. (the "Lessee") on the **OTHER PART**

For Dalmia Cement (B) Ltd:

*R.A.K.*  
R.A. Krishnakumar  
Executive Director

**LESSEE**

*Sanyal*  
DISTRICT COLLECTOR  
LESSOR.




WHEREAS the lessee had been granted mining lease for mining limestone and marl over a total extent of 166.005 Hectares of Patta (93.955 Hectares) & Poramboke (72.050 Hectares) lands in S.F. Nos. 39/8,40 etc., of Kallakudi village, S.F.No. 54/1, 2 etc. of Kovandakurichi Village, and S.F.No.32 of Venkatachalapuram village of Lalgudi Taluk, Tiruchirappalli District for a period up to 31.08.2004 vide G.O. (3D) No.1 Industries (MMA.2) Department dated 08.01.2002 under the Mines and Minerals (Development and Regulation) Act, 1957 (Central Act 67 of 1957) / the Mineral Concession Rules, 1960 and executed the lease deed on 44/11.03.97 on 11.12.98; 109/11.07.97 on 28.10.98; 83/23.06.98 on 10.07.99; 195/11.11.97 on 10.07.99; 364/14.11.96 on 10.07.99 and 366/19.11.96 on 29.08.97. Further, the lessee has been granted mining lease vide G.O.(Ms.) No.189 Industries (MMA1) Department dated 11.12.2014 for the lease period from 01.09.2004 to 31.08.2024

AND WHEREAS the Government of India has made amendments to the Mines and Minerals (Development and Regulation) Act, 1957 (Central Act 67 of 1957) which came into force on 12.01.2015 which provides for deemed extension of lease period as stipulated in sections 8A (3), 8A (5) and 8A (6) of the said Act and on expiry of lease period, the lease shall be put up for auction as per the procedure specified in the said Act.

NOW, THEREFORE, State Government has granted extension of mining lease as per sections 8A(3), 8A(5) and 8A(6) of the Mines and Minerals (Development and Regulation) Act, 1957 for mining limestone and marl over a total extent of 166.005 hectares comprising of patta lands over 49.915 hectares in S.F.Nos. 39/8, 47/1, 47/3 etc. and Poramboke lands over 48.040 hectares in S.F. Nos. 40, 41/1, 47/11 etc., of Kallakudi village, and patta lands over 44.040 hectares in S.F.Nos. 54/1, 54/2, 55 etc. and Poramboke lands over 22.780 hectares in S.F. Nos. 56, 75, 81/1B etc., of Kovandakurichi Village, and poramboke lands over 1.230 hectares in S.F.No.32 of Venkatachalapuram village of Lalgudi Taluk, Tiruchirappalli District for a period up to 31.03.2030 vide G.O.(Ms.)No.76 Industries (MMA1) Department dated 26.07.2018, subject to the conditions stipulated in the lease grant order and the conditions imposed in the original / renewal of mining lease.

1. The State Government acting through the District Collector is now executing this supplementary lease deed for grant of extension / renewal of lease period from 1.9.2004 to 31.3.2030 as per the Mines and Minerals (Development and Regulation) Act, 1957 (Central Act 67 of 1957), to the lessee, subject to the conditions imposed in the

For Daimia Cement (B) Ltd.

  
R.A. Krishnakumar  
Executive Director  
LESSOR

  
DISTRICT COLLECTOR  
LESSOR



- extension / renewal order and as well as the terms and conditions already executed in the lease deed by the lessee for the subject area;
- 2. The lessee as per original lease deed shall utilize the mineral / mines only for captive industrial purpose as per section 8A (5) and 8A (6) of the Mines and Minerals (Development and Regulation) Act, 1957 (Central Act 67 of 1957), for which the extension of lease period have been granted by the State Government;
- 3. The lessee shall comply with the provisions of the Mines and Minerals (Development and Regulation) Act, 1957 (Central Act 67 of 1957), and the Rules made thereunder and any other applicable law in force, from time to time, including the orders of the Hon'ble Supreme Court, dated 02.08.2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause Vs. Union of India and Ors. with Writ Petition (Civil) No. 194 of 2014 in the matter of Prafulla Samantra and Anr Vs. Union of India and Ors. Regarding compliance with statutory requirements / statutory clearances and other relevant judgments issued by Hon'ble Courts;
- 4. The Mining operations should strictly be in accordance with the approved mining plan of Indian Bureau of Mines on annual basis, not exceeding the quantum permitted. Any deviation will lead to declaration as illicit mining and any violation will be dealt with as per relevant Act and Rules and any associated minor mineral accrued during the process should not be lifted;
- 5. The lessee shall obtain the Environmental Clearance from Ministry of Environment and Forest / State Level Environment Assessment Authority / District Level Environment Assessment Authority as the case may be for the extended lease period and for the quantum to be excavated and for the enhanced quantum if any proposed;
- 6. The lessee shall pay the District Mineral Fund and National Mineral Exploration Trust fund as applicable and any other payments as prescribed by the Government of India and State Government, from time to time, and with interest for delayed payment.
- 7. The waste material generated during the mining operations should be dumped within the lease hold area earmarked for this purpose as indicated in the approved Mining Plan of Indian Bureau of Mines

For Dalmia Cement (B) Ltd.

*R. A. Krishnakumar*

R.A. Krishnakumar  
Executive Director

**LESSEE**

*Sampath Kumar* 24/11/19  
**DISTRICT COLLECTOR**  
**LEASOR**



8. If in any event the orders of the State Government are revised, reviewed or cancelled by the Central Government in pursuance of proceedings under the Minerals (Other than Atomic and Hydro Carbon Energy Minerals) Concession Rules, 2016, the lessee shall not be entitled to compensation for any loss sustained by the lessee in exercise of the powers and privileges conferred upon the lessee by these presents.
9. The lessee shall fully comply with the conditions imposed in the Government Order(s) issued granting the original lease/ renewal of lease.
- (i) G.O.(Ms.) No.189 Industries (MMA.1) Department dated 11.12.2014 – for 20 years from 01.09.2004 to 31.08.2024.

and the Original Lease deed executed on 44/11.03.97 on 11.12.98; 109/11.07.97 on 28.10.98; 83/23.06.98 on 10.07.99; 195/11.11.97 on 10.07.99; 364/14.11.96 on 10.07.99 and 366/19.11.96 on 29.08.97, as well as the conditions imposed in the extension G.O.(Ms.)No.76 Industries (MMA1) Department dated 26.07.2018,

10. For the purpose of stamp duty, -
- (a) In respect of cases where lease deed not executed but operated under deemed extension clause, stamp duty to be collected for the quantum of mineral already removed and consumed for the deemed extension period for which the lease deed was not executed by lessee and as well as for the proposed quantum to be excavated or removed as indicated in the approved mining plan in respect of the extended lease period as per sections 8A(3), 8A(5) and 8A(6) of the Mines and Minerals (Development and Regulation) Act, 1957 (Central Act 67 of 1957);
- (b) In respect of cases where lease deed was already executed under deemed extension clause as per Rule 24A of the erstwhile Mineral Concession Rules, 1960, the stamp duty will be liable to be charged for the extended period as per sections 8A (3), 8A (5) and 8A (6) of the Mines and Minerals (Development and Regulation) Act, 1957 (Central Act 67 of 1957) till 2020 / 2030 / expiry of 50 years, whichever is later as per the approved Mining Plan.

For Dalmia Cement (B) Ltd.

  
R.A. Krishnakumar  
Executive Director  
LESSEE

  
DISTRICT COLLECTOR  
LESSOR



- (c) In addition to the above, whenever the quantum of minerals are enhanced or modified, necessary enhanced stamp duty has to be paid accordingly during the period (a) and (b) above.
11. Every lessee has to furnish an undertaking to Indian Bureau of Mines / Director of Geology and Mining that on annual basis stating that no quantum of mineral in excess of the quantum mentioned in the mining plan is quarried and the quantum is removed as per the approved Mining Plan.
  12. The lessee is liable to pay annual compensation / dead rent as applicable from time to time.
  13. The lessee should clear all mining dues for all its leases.
  14. The lessee should obtain Tamil Nadu Pollution Control Board clearance from time to time as per Act and Rule provisions.
  15. The lessee should submit Mining Plan at least 180 days before the expiry of every five years' period as per Rule 17(2) of Minerals (Other than Atomic and Hydro Carbon Energy Minerals) Concession Rules, 2016.
  16. Any ratification for deviation to Mining Plan is not permissible as it will be violation of Hon'ble Supreme Court direction.
  17. **Special conditions imposed in G.O.(Ms.) No.76 Industries (MMA1) Department dated 26.07.2018**
    - a. The lessee has to pay a sum of Rs. 38,03,520/- towards the annual surface compensation for 72.05.0 Hectares of poramboke lands from 01.09.2004.
    - b. The lessee has to furnish the Environmental Clearance for the extension of tenure of lease period.
    - c. The lessee has to submit approved scheme of mining plan for every five years to the District Collector and to remove the minerals as per the quantum indicated in the approved mining plan.
    - d. Compliance of the conditions imposed in G.O.(Ms) No.189 Industries (MMA 1) Department dated 11.12.2014 should be adhered.
    - e. The lessee has to utilize the minerals Limestone and Marl only for the captive purposes.

For Dalmia Cement (B) Ltd.

*[Signature]*  
K.A. Krishnakumar  
Executive Director

**LESSEE**

*[Signature]*  
**DISTRICT COLLECTOR**  
**LESSOR**



- f. The lessee has to abide by the terms and conditions of the mining lease stipulated in Rule 12 of Minerals (Other than Atomic and Hydro Carbon Energy Minerals) Concession Rules, 2016
- g. The lessee shall comply with the provisions of Mineral Conservation and Development Rules, 2017 and Mines & Minerals (Development & Regulation) Amendment Act, 2015, Minerals (Other than Atomic and Hydro Carbon Energy Minerals) Concession Rules, 2016 and other applicable Act and Rules and various directions issued by the Ministry of Mines, Govt. of India and Hon'ble Supreme Court of India, National Green Tribunal, Hon'ble High Court, and including Forest Conservation Act, 1980 and other related Acts, before lease deed execution.

**18. Special conditions imposed in G.O. (Ms.) No.189 Industries (MMA.1) Department dated 11.12.2014.**

- a. Varakuppai road passing through S.F.No.s 118,120,121,122, 135/1 and 140/4 of Kallakudi village – A safety distance of 50 meters should be maintained
- b. Adjoining area to the Tiruchirappalli-Chidambaram State Highways in S.F.Nos. 104/1A of Kallakudi village and in S.F.Nos 72/3,73/5,75,93/1D and in S.F.No.32 of Venkatachalapuram village – A safety distance of 50 meters should be allowed and maintained.
- c. There are Power lines (HT/LT) in S.F.Nos 72/1 and 73/1 of Kovandakurichi village. Hence, a safety distance of 50 meters should be maintained on either side of the power lines.
- d. As one cart track in S.F.No.251 is running in North-South direction which is in use and is adjoining to S.F.No.252 (area applied for renewal). Hence a safety distance of 10 meters to be allowed in S.F.No.252 of Kallakudi village
- e. Dump Area in S.F.Nos. 41/1, 47/1,3,4 of Kallakudi village and S.F.No.87 of Kovandakurichi village- A safety distance of 7.5 meters should be allowed.

For Dalmia Cement (B) Ltd.

*R.A. Krishnakumar*

R.A. Krishnakumar  
Executive Director

**LESSEE**

*S. Srinivasan*  
DISTRICT COLLECTOR  
LESSOR.



- f. S.F.Nos 79/1A,1B,2 and 59/1B of Kovandakurichi village – Though 50 meters from the abutting State High ways are now maintained by the applicant company as safety zone and is under active afforestation. This should be continued till the lease is over.
- g. In S.F.No.92 of Kovandakurichi, an area of 0.10.0 Hectares is occupied by means of Grave-Yard. Hence, this area is recommended for deletion from the present area applied for mining lease. However, a safety distance of 50 meters should be maintained from the Grave-yard
- h. In S.F.No.268/1 of Kallakudi village an area of 0.82.5 Hectares of lands is under occupation by means of Sri Ayyapan Temple, overhead tank and proposed co-operative society building and a panchayat road. Hence, this area of 0.82.5 Hectares is recommended for deletion from the present area applied for mining lease. Therefore, only an area of 2.175 Hectares is now recommended for renewal of Mining Lease. However, a safety distance of 50 meters should be maintained from the above features.

**19. General Conditions imposed in G.O.(Ms). No.189 Industries (MMA.1) Department dated 11.12.2014.**

1. The transport permit (with dispatch slip, if necessary in the case of bulk permits) may be issued at the request of the lessee on collection of royalty for the quantity of mineral mined from the lease hold area and ready to be transported. No bulk permit for larger quantity in anticipation of mining of the minerals should be issued, as this may lead to advance collection of royalty which has been objected to by the Government of India, unless the lessee is willing to pay in advance for his own convenience. The accounts relating to the collection of actual royalty or dead rent should be reconciled at the end of the financial year before 10th of April of the succeeding year.
2. The lessee shall pay before the expiry of the lease or its sooner determination by either part of amount equal to the annual dead rent or such high amount as may be fixed by the Collector

For Dalmia Cement (B) Ltd.

  
R.A. Krishnakumar  
Executive Director  
**LESSEE**





of the District at his discretion as compensation for damage to the land covered by the lease;

- 3. The lessee shall not fell trees, if any, without the previous permission of the District Collector and if it is found that he has fell any trees without such permission he shall pay the value of the trees together with a compounding fee subject to a maximum of ten times the value of the said trees.
- 4. The lessee shall not operate on the surface of any area prohibited by any authority by laying roads, erecting buildings, machinery etc., without the previous permission of such authority of the State Government.
- 5. The lessee shall not use land for surface occupation without giving proper notice to the Collector.
- 6. The lessee shall provide and shall keep at all times at or near the pit head full equipment of weighing machines of modern types to the satisfaction of the District Collector for weighing the minerals collected by him.
- 7. The lessee will exercise the liberties and powers hereby granted in such manner as to offer no unnecessary or reasonably avoidable obstruction or interruption to the development and working of any minerals not included in this lease and will at all times afford to the Governor and to the holder of prospecting licenses or mining leases in respect of any such minerals or any minerals within any lands adjacent passage upon and across the said lands to such minerals for the purposes of getting, working, developing, and carrying away the same.
- 8. The lessee shall take such precautions as are necessary to secure pits and shafts by putting up wire fencing or such other protection to the satisfaction of the Collector to prevent accidents;
- 9. That on the occurrence of any accident the lessee shall report such accident immediately to the nearest police station, the nearest mines inspector and the Labor Commissioner.
- 10. The lessee shall execute an indemnity bond to Government against the claims of third parties,

For Dalmia Cement (B) Ltd.

*R.A. Krishnakumar*  
 R.A. Krishnakumar  
 Executive Director  
**LESSEE**


*Srinivasulu Reddy*  
**DISTRICT COLLECTOR**  
**LESSOR.**



11. The lessee will at the expiration or sooner determination of the said term deliver up to the Governor all mines, pits shafts, including drifts, levels, waterways, airways and other work (now existing), thereafter to be sunk or made under the said lands (except such as may have been abandoned with the sanction of the Government or in any ordinary and fair course of working) and all (engine, machinery, Plant buildings, structures and other work and conveniences which at the commencement of the said terms were upon or under the said lands and all) Engines, Machinery, Plant and Fixtures setup by the lessee below ground levels which cannot be removed without causing injury to any mines or works under the said lands (except such of the same as may with the sanction of the Government) have become disused and all buildings and structures of brick or stone executed by the lessee above ground level in good repair order and condition and fit in all respects for further working of the said minerals.
12. If after the determination of the lease there shall remain in or upon the said lands any engines, machinery, plant, buildings, structures, tramways, railways and other works, erections, and co-conveniences of minerals or mineral ores other property which the lessee is entitled to remove from the land the same shall, if not removed by the lessee within one calendar month after notice in writing requiring their removal is given to the lessee by the Collector be deemed to become the property of the Government of Tamil Nadu and may be sold in such manner as they shall deem fit without ability to pay and compensation or to account to the lessee in respect thereof.
13. In the event of existence of state of war or of grave national emergency (of which the President of India shall be the sole judge and a notification to this effect in the Gazette of India shall be conclusive proof) the Governor after notice in writing to the lessee under the hand of any Secretary to Government of his intention so to do may forthwith taken possession or assume control of the works, plant and machinery and premises

For Dalmia Cement (B) Ltd.

  
 R.A. Krishnakumar  
 Executive Director  
**LESSEE**

  
**DISTRICT COLLECTOR**  
**LESSOR**



of the lessee at or in connection with the said mines and may pre-empt at prices fixed by the Governor all the minerals and all products thereof extracted from or lying upon the said mines during such possession or control and the lessee shall confirm and obey all directions given by or on behalf of the Governor regarding the use of employment of such works, plants premises provided that a fair compensation which shall be determined by the Governor and shall be paid to the lessee for all losses or damage sustained by reasons or in consequences of the exercise of the powers shall not determine the said terms hereby granted or affect the terms and provisions of these presents further than may be necessary to give effect to the provisions of this clause.

- 14. (a) the lessee shall not enter upon or commence prospecting of mining operations in any reserve forest situated upon the said land without thirty days' previous notice in writing to the District Forest Officer nor without obtaining any written sanction of that officer not otherwise than in accordance with such conditions as that officer may in his absolute direction prescribed.
- (b) the area within the reserved forest limits must be demarcated by a declared fire line of 40 feet width which will be cut and kept cleared by the Forest Department at the expense of the lessee.
- (c) the lessee must at all times permit the Forest Department to enter upon the land for the purpose of maintaining or repairing existing boundary lines within the area, and must pay the cost of such maintenance of repair as determined by the District Forest Officer.
- (d) the lessee must take suitable precautions to prevent fire from spreading into the adjoining reserve forest from the land and if such fires accidentally occurs he must render all possible assistance in putting them out.
- (e) the lessee shall not cut any trees or growth on the area granted in excess of 20 percent of the number of trees on

For Dalmia Cement (B) Ltd.

*R.A.*  
 R.A. Krishnakumar  
 Executive Director  
**LESSEE**

*Sang* 2/11/19 101/179  
**DISTRICT COLLECTOR**  
**LESSOR.**



the whole area under the leases without the previous permission of the District Forest Officer and the value of such trees etc., shall be paid for the lessee at the rate to be fixed by the District Forest Officer, he must not deface or interfere with any boundary stone or marks, if any boundary mark is accidentally damaged, he must bring the matter immediately to the notice of the Range Officer.

15. The lessee shall keep the stock of beryl or any other prescribed substance under Section 3 of the Atomic Energy Act No. XXIX of 1948, if they occur in the property covered by the lease with a view to making them available to the Government of India.

16. The quarterly and annual returns should be submitted in the prescribed formats by the owner (lessee), agent or manager of the mines to the Directorate General of mines Safety, Chennai Region and to the respective officers.

For Dalmia Cement (B) Ltd.  
*R.A.*  
R.A. Krishnakumar  
Executive Director  
**LESSEE**

*[Signature]*  
DISTRICT COLLECTOR  
MUSOR.  
16/5/79



Email / Speed post

GOVERNMENT OF INDIA  
MINISTRY OF MINES  
INDIAN BUREAU OF MINES  
OFFICE OF THE REGIONAL CONTROLLER OF MINES

Telephone No.044-24914461/1570

Fax No.044-24911295

Email ID:

C-4-A, Rajaji Bhavan  
CGO comple, Besant Nagar  
Chennai - 600 090.

No. TN/TCR/LST/MMP-2088MDS

Dated : 19.08.2022

✓  
To |

M/s. Dalmia Cement (B) Ltd.  
Dalmiapuram  
Trichy District, PIN-621651.

Sub: Approval of Modifications to the Approved Mining Plan & PMCP for Kallakudi & Kovandakurichi Limestone Mine over 166.005 Ha in Kallakudi, Kovandakurichi & Venkatachalapuram Villages, Lalgudi Taluk, Trichy District, Tamilnadu, of M/s. Dalmia Cements (B) Ltd., submitted under Rule 17(3) of MCR, 2016.

Ref: (1) Your letter no. DCBL:/DPM:MPMP:KLK/KVK:IBM:7/2022 dated 09.07.2022  
(2) This office letter of even number dated 26.07.2022.  
(3) Your letter DCBL:DPM:MPMP:KLK/KVK:IBM:08/2022 dated 09.08.2022

Sir,

In exercise of the powers delegated to me under Rule 16 of Minerals (Other than Atomic & Hydro Carbon Energy Minerals) Concession Rules, 2016 vide Gazette Notification No. S.O. 1857(E) dated 18.5.2016, I hereby accord approval for the above said Modifications to the Approved Mining Plan for Limestone & Marl minerals only. This approval is subject to the following conditions.

- 1) That the Modifications to the Approved Mining Plan with Progressive Mine Closure Plan is approved without prejudice to any other law applicable to the mine/area from time to time whether made by the Central Government, State Government or any other authority.
- 2) That this approval of the Modifications to the Approved Mining Plan with Progressive Mine Closure Plan does not in any way imply the approval of the Government in terms of any other provision of the Mines & Mineral (Development & Regulation) Act, 2015 or the Mineral Concession Rules, 2016 or any other law including Forest (Conservation) Act, 1980, Environment Protection Act, 1986 and the rules made there under.
- 3) That these Modifications to the Approved Mining Plan with Progressive Mine Closure Plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- 4) Provisions of the Mines Act, 1952 and Rules & Regulations made thereunder including submission of notice of opening, appointment of manager and other statutory officials as required by the Mines Act, 1952 shall be complied with.
- 5) The Provisions made under MM(D&R) Act, 2015 (Amended) and Rules made thereunder shall be complied with.
- 6) The contents of circular No. 2/2010 issued by the Chief Controller of Mines, IBM, Nagpur vide his letter No. 11013/3/MP/90-CCOM Vol. VII dated 06.04.2010 shall be complied with.
- 7) The execution of Mining Plan / Modifications to the Approved Mining Plan shall be subjected to vacation of prohibitory orders / notices, if any.
- 8) This approval of Mining operations and associated activities is restricted to the Mining lease area only. The Mining lease area is as shown on the statutory plans under rule 32 of Mineral Conservation and Development Rules, 2017, by the lessee. Indian Bureau of Mines does not take any responsibility regarding correctness of the boundaries of the lease shown on the ground with reference to the lease map and other plans furnished by the lessee.

- 9) The Environmental Monitoring Cell of the Company shall continue monitoring ambient air quality, dust fall rate, water quality, soil sample analysis and noise level measurements on various stations established for the purpose both in the core zone and buffer zone, as per Department of Environment guidelines and keeping in view IBM's Circular No.3/92, season-wise every year or by engaging preferably the services of an Environmental laboratory approved by MOEF/CPCB. The data so generated shall be maintained in a bound paged register kept for the purpose and the same shall be made available to the inspecting officer on demand.
- 10) If anything is found to be concealed as required by the Mines Act in the contents of Modifications to the Approved Mining Plan and proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
- 11) Yearly report as required under Rule 26(2) of MCDR,2017 setting for the extent of protection and rehabilitation works carried out as envisaged in the approved progressive mine closure plan and if there is any deviations, reasons thereof shall be submitted before 1<sup>st</sup> July of every year to the regional office, IBM , Chennai.
- 12) The Modifications to the Approved Mining Plan is approved for the proposals contained therein and as applicable from the date of approval of the document for the mining activities to be carried out within the mining leasehold. The earlier instances of irregular mining/illegal mining, if any, shall not be regularized through the approval of this document.
- 13) The financial assurance submitted should be renewed before expiry of the same.
- 14) In case Mining lease falls within a radius of 10 kms. of National Park/Sanctuary, recommendations of NBWL have to be obtained as per the orders of the Hon'ble Supreme Court in L.A. No. 460/2004.
- 15) This approval is subject to the mining operations as per the proposals shall be carried out only after obtaining necessary clearances from MOEF, Pollution Control Board, Forest Department, etc.
- 16) This approval is subject to the conditions as per the directions given in WP(c) No. 114/2014 given by the Hon'ble Supreme Court of India should be taken care while implementing the proposals given in the PMCP part of the document.
- 17) This approval is subjected to the extension of the validity of the mining lease by the State government as per Section 8A(5) of MMDR Act, 2015 (Amended).
- 18) This approval is subject to submission of DGPS Plan duly authenticated by the State Government and submission of modifications in the approved Mining Plan if, consequent to the authentication of DGPS Survey Plan, any change in mining lease area is accepted by the State Government.
- 19) This approval is subject to the conditions as per the directions given in W.P.(c) No. 114/2014 given by the Hon'ble Supreme Court of India should be taken care while implementing the proposals given in the PMCP part of the documents.
- 20) It shall be mandatory for the project proponent, abstracting ground water, to obtain **No Objection Certificate** from Central Ground Water Authority or, the concerned State/Union Territory Ground Water Authority, as the case may be."

Yours faithfully,

Encl : Copy of Modifications to the Approved Mining Plan  
with Progressive Mine Closure Plan

(G.C. Sethi)

Regional Controller of Mines

Copy for information to:-

1. Shri Raja Ranjith Singh, QP & Mines Manager, M/s. Dalmia Cement (B) Ltd., Dalmiapuram, Trichy District, PIN - 621651.
2. The Commissioner of Geology & Mining, Government of Tamilnadu, Guindy, Chennai - 600 032 along with copy of the approved Modifications to the Approved Mining Plan.

Encl : As above.

sd-

(G.C. Sethi)

Regional Controller of Mines

G. O. 3

**J-11015/912/2007-1 A. II (M)**  
**Government of India**  
**Ministry of Environment & Forests**

Telefax: 011-24363973  
 Paryavaran Bhavan, C.G.O. Complex,  
 Lodi Road, New Delhi-110003.  
 Email: plahujarai@yahoo.com  
 Dated: May, 27<sup>th</sup> 2008

To  
 M/s Dalmia Cement (Bharat) Ltd.  
 Regd Office: Dalmiapuram  
 Tiruchirapalli  
 Tamil Nadu-621 651

**Sub: Expansion of Kallakudi & Kovandakurichi Limestone Mine (ML area 166.005 ha and enhancement of limestone production from 1.0 to 2.0 MTPA at villages Kallakudi, Kovandakurichi and Venkatchalapuram in Laigudi Taluk, in Tiruchirapalli Distt., in Tamil Nadu - reg. environmental clearance.**

Sir,

The undersigned is directed to refer to your letter dated 25.04.2008, on the above mentioned subject. The Ministry of Environment and Forests has considered the application.

2. It has been noted that the proposal is for expansion of limestone production from 1.0 MTPA to 2.0 MTPA. The lease is located at villages Kallakudi, Kovandakurichi and Venkatchalapuram, in Laigudi Taluk, in Tiruchirapalli Distt., in Tamil Nadu. The lease area is 166.005 ha, out of which 93.955 ha is patta land owned by the company and 72.05 ha is govt. revenue land. The mine is for captive consumption for its Cement plant located at Dalmiapuram in Tamil Nadu. The reserves of Iron Ore is 21.88 MT. Life of the mine at proposed rate of production will be 11 years. Method of mining will be mechanized open cast mining involving drilling and blasting. Out of total lease area of 166.005 ha, area for mining will be 75.058 ha; an area of 3.72 ha is kept for waste dump and is presently being used. For mineral storage 3.01 ha is earmarked; 3.56 ha for roads; 0.04 ha for green belt and 80.617 ha will be unutilised. There are no National Parks, Wildlife Sanctuaries, Biosphere Reserves, Heritage sites etc. within 10 km from the lease area. There are also no reserve forest within 10 km of lease. Water requirement at the mine will be 987 KLD, which will be met from mine pit water and ground water. Nandiyar Upper nallah (non perennial) flows at a distance of about 2-4 km from the lease area. This river confluence with river Coleroon flowing at a distance of 8.5 -10 km from the lease. Ultimate depth of mining will be at 50 m (bgl). Ground water table is at 45 m (bgl). Mining will intersect ground water table. Hydro geological study conducted indicates that the stage of ground water development is 67 % which is well within the permissible limits as per CGWB norms. The net annual ground water availability is estimated at 7.2184 million m<sup>3</sup>/year. The underlying layer of soil in the lease area has poor transmissibility and permeability. The radius of influence will be within the mine pit and does not spread appreciably. Water requirement will be 987 KLD, which will be met from mine pit water and ground water source. Sewage generation of 4.0 KLD is being treated in a soak pit followed by dispersion trench. Workshop effluent is treated in an upflow filter for oil and grease removal and treated water is sent to a septic tank. No solid waste is generated in this mine. Mining plan has been approved by Indian Bureau of Mines on 30.05.207. Public hearing was held on 07.03.2008. Cost of the project will be Rs 5.0 Crores.

3. The project has been considered in accordance with the provisions of the EIA notification issued by the Ministry of Environment & Forests vide S.O. 1533 (E), dated September 14, 2006.

Cont'd....

-2-

4. Based on the information submitted by you, as at para 2 above and others, the Ministry of Environment and Forests hereby accords environmental clearance to the above project under the provisions of EIA Notification dated September 14, 2006, subject to the compliance of the following Specific and General conditions:

**A. Specific conditions**

- i) Reclamation of mined pit shall be done and demonstrated on the ground before the next pit is worked. No two pits shall be simultaneously worked i.e before the first is exhausted and reclamation work completed, no more mineral bearing area shall be worked.
- ii) Adequate buffer zone shall be maintained between two consecutive mineral bearing deposits.
- iii) Hydro-geological study of the area shall be reviewed annually. In case adverse effect on ground water quality and quantity is observed mining shall be stopped and resumed only after mitigating steps to contain any adverse impact on ground water is implemented.
- iv) The company shall adopt non-conventional mining without involving drilling and blasting near the temple.
- v) Zero waste mining concept shall be implemented either by putting up pelletisation plant or dispose of 100% of low grade ores/fines to prospective buyers.
- vi) Maintenance of village roads through which transportation of ores are undertaken shall be carried out by the company regularly at its own expenses. The roads shall be black topped.
- vii) Land-use pattern of the nearby villages shall be studied, including common property resources available for conversion into productive land. Action plan for abatement and compensation for damage to agricultural land/ common property land (if any) in the nearby villages, due to mining activity shall be submitted to the Regional office of the Ministry within six months. Annual status of implementation of the plan and expenditure thereon shall be reported to the Regional Office of the Ministry.
- viii) Need based assessment of the near by villages shall be conducted to study economic measures which can help in upliftment of poor section of society. Income generating projects/tools such as development of fodder farm, fruit bearing orchards, vocational training etc. can form a part of such programme. Company shall provide separate budget for community development activities and income generating programmes. This will be in addition to vocational training for individuals imparted to take up self employment and jobs.
- ix) Water to be supplied for drinking purposes shall be treated to meet the prescribed standards. Monitoring of water quality for drinking shall be undertaken on daily basis especially for fluoride & arsenic and records maintained.
- x) Rain water harvesting scheme shall be undertaken in consultation with the Regional Director, Central Ground Water Board and action plan for implementation of the scheme shall be submitted to the Regional Office of the Ministry, the Central Ground Water Board and the concerned state Govt. Dept. within six months.



- xi) Water quality both for surface as well as ground water in the core zone shall be regularly monitored and records maintained. Water supplied for drinking shall be monitored on daily basis and records maintained. In case contamination is observed, measures for control and action taken shall be reported to the state government as well as the Regional Office of the Ministry.
- xii) Adequate measures for prevention and control of soil erosion and management of silt shall be undertaken. Dumps shall be protected by geo textile matting or other suitable material, and thick plantations of native trees and shrubs shall be carried out at the dump site. Dumps shall be protected by retaining walls. Total silt load of the mines (including that of adjacent mine) shall be assessed and measures for prevention and control of silt shall be submitted to the Regional Office of the Ministry within six months.
- xiii) Trenches / garland drains shall be constructed at foot of dumps and coco filters installed at regular intervals to arrest silt from being carried to water bodies. Adequate number of Check Dams and Gully Plugs shall be constructed across seasonal/perennial nullahs flowing through the ML area and silts arrested. De-silting at regular intervals shall be carried out.  
  
Garland drain of appropriate size, gradient and length shall be constructed for both mine pit and for waste dump and sump capacity shall be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and de-silted at regular intervals.
- xiv) Occupational health and safety measures for the workers including identification of work related health hazards, training on malaria eradication, HIV, and health effects on exposure to mineral dust etc. shall be carried out. The company shall engage a full time qualified doctor who is trained in occupational health. Periodic monitoring for exposure to respirable mineral dust on the workers shall be conducted and records maintained including health records of the workers. Awareness programme for workers on impact of mining on their health and precautionary measures like use of personal equipments etc. shall be carried out periodically. Review of impact of various health measures undertaken (at interval of five years or less) shall be conducted followed by follow up action wherever required.
- xv) Action plan for implementation with respect to suggestions/improvements and recommendations made during public consultation/hearing shall be submitted to the Ministry and the State Govt within six months.
- xvi) Dust fall measurement shall be periodically carried out including particle size analysis in work zone area. Results shall be submitted to the Regional Office of the Ministry and the State Govt.
- xvii) Top soil/ solid waste shall be stacked properly with proper slope and with adequate safeguards for prevention of erosion and shall be used for backfilling for reclamation and rehabilitation of mined out area.
- xviii) The waste water from the mine shall be treated to conform to the prescribe standards before discharging in to the natural stream. The discharged water from the Tailing Dam (if any) shall be regularly monitored and report submitted to the Ministry of

Environment & Forests, Central Pollution Control Board and the State Pollution Control Board.

- xix) Over burden shall be stacked at earmarked dump site(s) only and shall not be kept active for long period. The maximum height of the dump shall not exceed 30 m, each stage shall preferably be of 10 m and overall slope of the dump shall not exceed 28°. The OB dumps shall be scientifically vegetated with suitable native species to prevent erosion and surface run off. Monitoring and management of rehabilitated areas shall continue until the vegetation becomes self-sustaining.
- xx) Slope of the mining bench and ultimate pit limit shall be as per the mining scheme as approved by the Indian Bureau of Mines.
- xxi) Drilling and blasting (if any) shall not be conducted.
- xxii) Green belt development shall be carried out considering CPCB guidelines including selection of plant species and in consultation with the local DFO / Agriculture Department. Herbs and shrubs shall also form a part of afforestation programme besides tree plantation. Plantation shall be raised in 84.377 ha around the ML area, haul roads, OB dump sites etc. The density of the trees shall be not less than 2500 plants per ha. The company shall involve local people with the help of self help group for plantation programme. Further the company shall practice poly culture plantation instead of monoculture of plant species. Details of year wise afforestation programme including rehabilitation of mined out area shall be submitted to the Ministry within six months.
- xxiii) Prior permission from the competent authority shall be obtained for extraction of ground water, if any.
- xxiv) Regular monitoring of ground water level and quality shall be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring shall be carried out four times in a year - pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected shall be regularly sent to the RO of the Ministry, Central Ground Water Authority and RO of Central Ground Water Board.
- xxv) Vehicles used for transportation of ores and other mining operations shall have valid permissions as prescribed under Central Motor Vehicle Rules, 1989 and its amendments. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of ores. Transporting of ores shall be done covered with a tarpaulin or other suitable enclosures so that no dust particles / fine matters escape during the course of transportation. No overloading of ores for transportation shall be undertaken.
- xxvi) A final mine closure plan, along with details of Corpus Fund, shall be submitted to the Regional Office of the Ministry of Environment & Forests, 5 years in advance of final mine closure for approval.

**B. General conditions**

- (i) No change in mining technology and scope of working shall be made without prior approval of the Regional Office of the Ministry of Environment & Forests.
- (ii) No change in the calendar plan including excavation, quantum of mineral ore and waste shall be made.

- (iii) Conservation measures for protection of flora and fauna in the core & buffer zone shall be drawn up in consultation with the local forest and wildlife department.
- (iv) Four ambient air quality-monitoring stations shall be established in the core zone as well as in the buffer zone for RPM, SPM, SO<sub>2</sub>, NO<sub>x</sub> monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board.
- (v) Data on ambient air quality (RSPM, SPM, SO<sub>2</sub>, NO<sub>x</sub>) should be regularly submitted to the Ministry including its Regional office located at Bangalore and the State Pollution Control Board / Central Pollution Control Board once in six months.
- (vi) Fugitive dust emissions from all the sources shall be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points shall be provided and properly maintained.
- (vii) Measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. shall be provided with ear plugs / muffs.
- (viii) Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19<sup>th</sup> May, 1993 and 31<sup>st</sup> December, 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of workshop effluents.
- (ix) Personnel working in dusty areas shall be provided with protective respiratory devices and they shall also be imparted adequate training and information on safety and health aspects.
- (x) A separate Environmental Management Cell with suitable qualified personnel shall be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.
- (xi) The project authorities shall inform to the Regional Office of the Ministry located at Bangalore regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.
- (xii) The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year wise expenditure shall be reported to the Ministry and its Regional Office located at Bangalore.
- (xiii) The project authorities shall inform the Regional Office of the Ministry located at Bangalore regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.
- (xiv) The Regional Office of the Ministry, Bangalore shall monitor compliance of the stipulated conditions. The project authorities shall extend full cooperation to the officer(s) of the Regional Office by furnishing the requisite data / information / monitoring reports.
- (xv) A copy of clearance letter will be marked to concerned Panchayat / local NGO, if any, from whom suggestion / representation has been received while processing the proposal.

- (xvi) State Pollution Control Board shall display a copy of the clearance letter at the Regional office, District Industry Centre and Collector's office / Tehsildar's Office for 30 days.
- (xvii) The project authorities shall advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forests at <http://envfor.nic.in> and a copy of the same shall be forwarded to the Regional Office of the Ministry located Bangalore.
5. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.
6. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.
7. Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred, within a period of 30 days as prescribed under Section 11 of the National Environment Appellate Authority Act, 1997.
8. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules.

Yours faithfully,

  
(Dr. P. L. Ahujara)  
Director

Copy to:

1. Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
2. Secretary, Department of Environment, Government of Tamil Nadu, Chennai.
3. Secretary, Department of Mines and Geology, Government of Tamil Nadu, Chennai.
4. Secretary, Department of Forests, Government of Tamil Nadu, Chennai.
5. Chief Wildlife Warden, Government of Tamil Nadu, Chennai.
6. Chief Conservator of Forests, Regional Office (SZ), Kendriya Sadan, 4<sup>th</sup> Floor E&F, Wings 17<sup>th</sup> Main Road, 1 Block, Koramangala, Bangalore-560 034.
7. Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-Cum-Office Complex, East Arjun Nagar, New Delhi-110 032.
8. Chairman, Tamil Nadu State Pollution Control Board, No. 76, Mount Salai, Guindy, Chennai-600 032.
9. Member Secretary, Central Ground Water Authority, A2, W-3 Curzon Road Barracks, K.G. Marg, New Delhi-110001.
10. Controller General, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.
11. District Collector, Tiruchirapalli, Government of Tamil Nadu.



सत्यमेव जयते

भारत सरकार  
GOVERNMENT OF INDIA  
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय  
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE  
Integrated Regional Office, Chennai,  
1<sup>st</sup> floor, Additional Office Block for GPOA, Shastri Bhawan, Haddows Road,  
Nungambakkam, Chennai - 600006, Tel.No.044-2822 2325, Fax 28252536  
E.Mail: [roefccc@gmail.com](mailto:roefccc@gmail.com) / [roefccc1@gmail.com](mailto:roefccc1@gmail.com)



F.No. EP/12.1/724/TN/ 966

Dated: 9<sup>th</sup> September, 2022

To  
✓ Shri. S.Makesh,  
Mines Agent & Asst. Executive Director (Mines),  
M/s Dalmia Cement (Bharat) Ltd.,  
Dalmiapuram, Trichy - 621 651.

**Subject: MoEF&CC - Environmental Clearance - Expansion of Kallakudi & Kovandakurichi Limestone Mine (ML Area - 166.005 ha) and enhancement of limestone production from 1.0 to 2.0 MTPA at villages Kallakudi, Kovandakurichi and Venkatachalapuram in Lalgudi Taluk, in Tiruchirapalli District, in Tamil Nadu by M/s Dalmia Cement (Bharat) Ltd - regarding.**

Ref: (1). EC.No.J-11015/912/2007-IA.II(M), dated 27.05.2008.  
(2). Letter No. DCB:DPM:KLK/KVK-GO 76 (Expansion)/MoEF/EC:1/2022, dated 18.04.2022 of M/s Dalmia Cement (Bharat) Ltd  
(3) Letter No. DCB:DPM:KLK/KVK-GO 76 (Expansion)/MoEF/EC:2/2022, dated 12.05.2022 of M/s Dalmia Cement (Bharat) Ltd  
(4) Letter No. DCB:DPM:KLK/KVK-GO 76 (Expansion)/MoEF/EC:3/2022, dated 18.07.2022 of M/s Dalmia Cement (Bharat) Ltd

Sir,

This has reference to your letters dated 18.04.2022 and 12.05.2022 on the above mentioned subject. In this regard, the project site was monitored on 21.04.2022 and subsequent clarifications submitted on 18.07.2022; a copy of compliance report is enclosed herewith for kind reference.

This has the approval of the Competent Authority vide diary No.600 dated 09.09.2022

Yours faithfully,

(Dr. Saranya. P)  
Scientist 'D'

Email: [saranya.p@gov.in](mailto:saranya.p@gov.in)

Copy to:

1. Dr. Shruti Rai Bhardwaj, Scientist 'E' Monitoring Cell, IA Division, Indira Paryavaran Bhawan, Ministry of Environment, Forest and Climate Change, Jorbagh road, Adiganj, New Delhi - 110003

**Dr. P. Saranya**  
Scientist 'D'  
Min. of Environment Forest and Climate Change,  
Integrated Regional Office,  
1<sup>st</sup> Floor, Addl. Office Block for GPOA,  
Shastri Bhawan, Haddows Road,  
Nungambakkam, Chennai - 600 006.

- 2. The Member Secretary, State Environmental Impact Assessment Authority, 3<sup>rd</sup> Floor, No 1, Panagal Maligai Building jeenis Road Saidapet, Chennai 600015
- 3. The Member Secretary, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032
- 4. Office copy/ Guard file

  
(Dr. Saranya. P)  
Scientist 'D'

*[Faint, illegible text, possibly a stamp or footer]*

**GOVERNMENT OF INDIA**  
**Ministry of Environment, Forest & Climate Change**  
**(Integrated Regional Office, Chennai)**

**MONITORING REPORT**

**PART I**

**DATA SHEET**

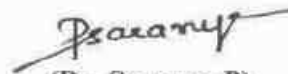
1	Project Type : River valley/Mining/Industry/Thermal/ Nuclear/Other Specify	Mining Project (Limestone)
2	Name of the project	MoEF&CC- Environmental clearance- Expansion of Kallakudi & Kovandakurichi Limestone Mine (ML Area - 166.005 ha) and enhancement of limestone production from 1.0 to 2.0 MTPA by M/s Dalmia Cement (Bharat) Ltd at villages Kallakudi, Kovandakurichi and Venkatachalapuram, Lalgudi Taluk, Tiruchirapalli District, Tamil Nadu
3	Clearance letter(s)/OM No. and dated	EC. No. J-11015/912/2007-IA.II(M), dated 27.05.2008.
4	Locations	
	a District (s)	Tiruchirapalli District
	b State (s)	Tamil Nadu
	c Latitudes	---
	d Longitudes	---
5	Address of correspondence	
	a Address of concerned project Head (with Pin Code & telephone/telex/fax numbers)	Shri. S.Makesh Mines Agent & Asst. Executive Director (Mines) M/s Dalmia Cement (Bharat) Ltd Dalmiapuram, Trichy - 621 651 Mob: 9865165326 Email: <a href="mailto:s.makesh@dalmiacement.com">s.makesh@dalmiacement.com</a>
6	Salient features	
	a of the project	Mining of Limestone mine of 2 MTPA in a lease area of 166.005 Ha
	b of the environmental management plans	(i) Green belt development (ii) Monitoring of environmental parameters (AAQ/Noise/Water quality) (iii) Water sprinkling for dust suppression (iv) Monitoring of ground vibration levels on regular basis, amongst others
7	Breakup of the project area	
	a Submergence area (forest & non-forests)	Nil No Forest land

	b	Others	NA																			
8	Break up of project affected population with enumeration of those losing houses/dwelling units only, agricultural land only, both dwelling units and agricultural land and landless labourers/artisans		NA																			
	a	SC,ST/Adivasis	No displacement of population																			
	b	Others	Not applicable																			
9	Financial Details																					
	a	Project cost as originally planned and subsequent revised estimates and the years of price reference	Rs.5.00 Crores.																			
	b	Allocations made for environmental management plans, with item wise and year wise breakup	<table border="1"> <thead> <tr> <th>S.No</th> <th>Year</th> <th>Budget allocated (lakhs)</th> <th>Actual expenditure (lakhs)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2019-20</td> <td>35</td> <td>38.7</td> </tr> <tr> <td>2</td> <td>2020-21</td> <td>45</td> <td>44.41</td> </tr> <tr> <td>3</td> <td>2021-22</td> <td>50</td> <td>50.18</td> </tr> </tbody> </table>				S.No	Year	Budget allocated (lakhs)	Actual expenditure (lakhs)	1	2019-20	35	38.7	2	2020-21	45	44.41	3	2021-22	50	50.18
			S.No	Year	Budget allocated (lakhs)	Actual expenditure (lakhs)																
			1	2019-20	35	38.7																
			2	2020-21	45	44.41																
	3	2021-22	50	50.18																		
c	Benefit cost ratio/internal rate of return and the years of assessment	NA																				
d	Whether (c) includes the cost of environmental management as shown in (b) above	NA																				
e	Total expenditure on the Project so far	Rs.4.9 Crores.																				
f	Actual expenditure incurred on the environmental management plans so far	<table border="1"> <thead> <tr> <th>S.No</th> <th>Year</th> <th>Budget allocated (lakhs)</th> <th>Actual expenditure (lakhs)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2019-20</td> <td>35</td> <td>38.7</td> </tr> <tr> <td>2</td> <td>2020-21</td> <td>45</td> <td>44.41</td> </tr> <tr> <td>3</td> <td>2021-22</td> <td>50</td> <td>50.18</td> </tr> </tbody> </table>				S.No	Year	Budget allocated (lakhs)	Actual expenditure (lakhs)	1	2019-20	35	38.7	2	2020-21	45	44.41	3	2021-22	50	50.18	
		S.No	Year	Budget allocated (lakhs)	Actual expenditure (lakhs)																	
		1	2019-20	35	38.7																	
		2	2020-21	45	44.41																	
3	2021-22	50	50.18																			
10	Forest land requirement																					
a	The status of approval for a diversion of forest land for non-forestry use		NA																			
b	The status of compensatory afforestation, if any		NA																			
c	The status of clear felling		---																			
d	Comments on the viability and sustainability of compensatory afforestation programme in the light of actual field experience so far		---																			
11	The status of clear felling in non-forest area (such as submergence area of reservoir, approach road), if any, with quantitative information		NA																			
12	Status of construction																					
	a	Date of commencement	The mine is in operation since 1939, as informed.																			
	b	Date of completion (actual and/or planned)	Mining is operational as on date.																			
13	Reasons for the delay if the project is yet to start.																					



14	Date of site visit	
a	The dates on which the project was monitored by the Regional Office on previous occasions, if any	10.01.2018
b	Date of site visit for this monitoring report	21.04.2022

This has the approval of the competent authority vide diary No.600 dated 09.09.2022



(Dr. Saranya.P)  
Scientist 'D'

Email: [saranya.p@gov.in](mailto:saranya.p@gov.in)

**Dr. P. Saranya**  
Scientist 'D'

Government of India

Min. of Environment Forest and Climate Change,

Integrated Regional Office,

1<sup>st</sup> Floor, Addl. Office Block for GPOA,

Shastri Bhawan, Haddows Road,

Nungambaldam, Chennai - 600 006.

## CERTIFIED COPY OF THE COMPLIANCE REPORT

**Subject:** MoEF&CC - Environment Clearance - Expansion of Kallakudi & Kovandakurichi Limestone Mine (ML Area 166.005 ha) and enhancement of limestone production from 1.0 to 2.0 MTPA at villages Kallakudi, Kovandakurichi and Venkatachalapuram, Lalgudi Taluk, Tiruchirapalli District, Tamil Nadu - reg.

**Reference:** EC. No. J-11015/912/2007-I A. II (M) dated: 27.05.2008.

### Present Status of the project



The Ministry of Environment, Forest and Climate Change had accorded environmental clearance for expansion of Kallakudi (KLK) and Kovandakuruchi (KVK) Limestone mines (166 Ha) from 0.50 MTPA to 1.0 MTPA vide letter dated 24.10.2005 under EIA Notification, 1994. Further, the Ministry had accorded environmental clearance for expansion of Kallakudi (KLK) and Kovandakuruchi (KVK) Limestone mines (166 Ha) from 1.0 MTPA to 2.0 MTPA vide letter dated 27.05.2008 under EIA Notification, 2006.

The mining operations started in 1939 at Kallakudi and in 1952 at Kovandakuruchi and **are currently operational**. For the operations of the mines, M/s Dalmia Cement (Bharat) Limited has obtained the latest Consent to Operate (CTO) from TNPCB under Air (Prevention and control of pollution) Act, 1981 and Water (Prevention and control of pollution) Act, 1974, vide proceedings No. T2/TNPCB/F.0672TRY/RL/TRY/A/2019, and T2/TNPCB/F.0672TRY/RL/TRY/W/2019, dated 13.09.2019 respectively, valid upto 31<sup>st</sup> March, 2024.

**Table: Details of the mine pits as provided by the Project Authority**

<b>Mining Lease</b>	<b>GO 76</b>
<b>Extent in Ha</b>	166.005
No of pits	5
No of working pits	2

Depth of each pit( In Mts)	Pit-1-31.86m
	Pit 2-38.7m
	Pit 3(East)-43.9 m
	Pit 3(West)-62.9 m
	Pit 4 - 1.5m
Quantity of top soil stacked (m <sup>3</sup> )	Pit 2-50578 Pit 3-8654 Total- 59232
Green belt developed Area (Ha)	33
No of Saplings	37974

The mining plan was approved by the Indian Bureau of Mines vide letter No.TN/TCR/LST/MMP-2057.MDS, dated 29.05.2019. Mining operation is being carried out by Opencast Non-Conventional Method of Mining using Rock Breakers and by working the deposit by systematic formation of benches as per Metalliferous Mines Regulations 1961. At present, the mining activity has not intersected the ground water table.

The PA has now proposed to enhance the limestone production quantity of this mine from existing 2.0 MTPA to 6.97 MTPA (say 7.0 MTPA) over the extent of existing 166.05 Ha to meet the immediate Limestone requirements of both Dalmiapuram and Ariyalur cement plants. Therefore, the PA has requested Integrated Regional Office of MoEF&CC, Chennai to provide Certified Copy of the Compliance Report.

*As per specific condition A(i), “.....No two pits shall be simultaneously worked i.e., before the first is exhausted and reclamation work completed, no more mineral bearing area shall be worked”. However, two pits in the instant ML, which are at a distant of 4 kms are being operated simultaneously. However, as per EC condition, no two pits shall be simultaneously worked. Hence, two pits under operation in the instant ML, is in violation of stipulated condition.* In this regard, the Project Authority has submitted a representation vide letter dated 18.07.2022 which is enclosed as *Annexure- 1*, for kind perusal and necessary action of SEIAA, Tamil Nadu.

The above project was monitored on 21.04.2022 along with the representative of the Project authorities. The report is submitted on the basis of the field visit and as per the information provided by the PA. The status of compliance on the stipulated conditions contained in the EC cited above is given below.

**Date of Monitoring:** 21.04.2022

## PART - III

S.No.	CONDITIONS	COMPLIANCE STATUS
<b>A. SPECIFIC CONDITIONS</b>		
i.	Reclamation of mined pit shall be done and demonstrated on the ground before the next pit is worked. No two pits shall be simultaneously worked i.e., before the first is exhausted and reclamation work completed, no more mineral bearing area shall be worked.	<p><b>Not complied</b></p> <p>This is an existing Mine operating since 1939 and is currently in operation. There are 5 mine pits, <b>out of which two mine pits which are at a distant of 4 kms are being operated simultaneously.</b> The present depth of working mine pits varies from 31 m to 63 m.</p> <p>The PA informed that the reclamation work will be carried out after excavating the limestone. At the end of mine life, the excavated pit will be converted into a water storage reservoir as per approved mining plan.</p> <p>Further, PA also informed that due to variation in the quality of limestone, different pits are worked simultaneously to blend the limestone to arrive at the required raw mix parameters. This also results in conservation of mineral.</p> <p><i>However, as per EC condition, no two pits shall be simultaneously worked. Hence, two pits under operation in the instant ML, is in violation of stipulated condition.</i></p>
ii.	Adequate buffer zone shall be maintained between two consecutive mineral bearing deposits.	<p><b>Complied.</b></p> <p>The PA informed that the Buffer zone is</p>

		maintained between the deposits as per approved Mining Plans/Schemes.
iii.	Hydro-geological study of the area shall be reviewed annually. In case adverse effect on ground water quality and quantity is observed mining shall be stopped and resumed only after mitigating steps to contain any adverse impact on ground water is implemented.	<p><b>Complied</b></p> <p>At present, the mining activities have not intersected the ground water table.</p> <p>M/s Dalmia Cement (Bharat) Limited has studied geotechnical and hydrogeological for KLK and KVK mines by engaging M/s SRK Mining services (India) Pvt. Ltd during May 2019. The report has recommended geotechnical pit design parameters and ground water &amp; surface water management, which was meticulously followed by the PA, as informed.</p> <p>Further, periodical monitoring of surface water &amp; ground water are being carried out through NABL recognized third party laboratory viz. M/s Interstellar Testing Centre Private Limited. The monitored data, as per report, shows that the values are within the limits. The copy of the same is enclosed at <i>Annexure -2</i></p>
iv.	The company shall adopt non-conventional mining without involving drilling and blasting near the temple.	<p><b>Complied</b></p> <p>Mining is carried out using Rock Breakers, thus eliminating the need for drilling &amp; blasting operations.</p>

v.	Zero waste mining concept shall be implemented either by putting up pelletisation plant or dispose of 100% of low grade ores/fines to prospective buyers.	<p><b>Complied</b></p> <p>As such there is no overburden or mineral waste intrusion. Ore: OB ratio is 1:0. The low grade minerals are blended with high grade minerals. As entire mineral (low &amp; high grade) from this captive mine is being fully utilized for cement manufacturing and no need of any sale to third party or prospective buyer.</p>
vi.	Maintenance of village roads through which transportation of ores are undertaken shall be carried out by the company regularly at its own expenses. The roads shall be black topped.	<p><b>Refer below</b></p> <p>The limestone mined is being sent to Dalmiapuram plant which is 2-4 Kms away. These roads are being maintained periodically at their own expenses, as informed by PA.</p>
vii.	Land use pattern of the nearby villages shall be studied including common property resources available for conversion into productive land. Action plan for abatement and compensation for damage to agricultural land / common property land (if any) in the nearby villages, due to mining activity shall be submitted to the Regional office of the ministry within six months. Annual status of the implementation of the plan and expenditure thereon shall be reported to the Regional office of the Ministry.	<p><b>Complied</b></p> <p>Land use pattern of 10 km radius area was studied while carrying out the EIA studies.</p> <p>The Mines occupies about 0.66% of the study area. These existing mines are in operation since 1939 and there is no damage to any agriculture land or common property so far due to mining activities as informed.</p>
viii.	Need based assessment of the nearby villages shall be conducted to study economic measures which can help in upliftment of poor section of society. Income generating projects/ tools such as development of fodder farm, fruit bearing orchards, vocational training etc. can form a	<p><b>Complied.</b></p> <p>Need based assessment of the nearby villages was conducted by their CSR Team to study economic measures. Company has provided separate budget for community development</p>

	part of such programme. Company shall provide separate budget for community development activities and income generating programmes. This will be in addition to vocational training for individuals imparted to take up self employment and jobs.	activities every year and implemented.  The PA informed that skill development programmes and livelihood initiatives are being done in the nearby villages. A skill training centre is established and local youths are trained, enabling them to get employment in various sectors.
ix.	Water to be supplied for drinking purposes shall be treated to meet the prescribed standards. Monitoring of water quality for drinking shall be undertaken on daily basis especially for fluoride & arsenic and records maintained.	<b>Complied.</b>  Drinking water is being sourced from nearby river and which is treated in the RO plant within the premises.  The drinking water quality is being monitored through NABL recognized third party laboratory viz. M/s Interstellar Testing Centre Private Limited and fluoride is well within the prescribed drinking water standards of IS 10500 (2012).
x.	Rain water harvesting scheme shall be undertaken in consultation with the Regional Director, Central Ground Water Board and action plan for implementation of the scheme shall be submitted to the Regional office of the Ministry, the Central Ground Water Board and the concerned state Govt. Dept. within six months.	<b>Complied</b>  The PA informed that rainwater is being collected in rainwater harvesting pit near the Magazine area at Kovandakurichi.  At the end of mine life, all the pits will be used for rain water collection which will recharge the water table in and around the ML area.
xi.	Water quality both for surface as well as ground water in the core zone shall be regularly monitored and records maintained. Water supplied for drinking shall be monitored on daily basis and records	<b>Complied.</b>  Periodical monitoring of surface water & ground water are being carried out through

	<p>maintained. In case contamination is observed, measures for control and action taken shall be reported to the state government as well as the Regional office of the Ministry.</p>	<p>NABL recognized third party laboratory viz. M/s Interstellar Testing Centre Private Limited. The monitored data, as per report, shows that the values are within the limits. The copy of the same is enclosed at <i>Annexure -2</i></p> <p>The status reports are also being submitted on half yearly basis to MoEF&amp;CC, RO, Chennai</p>
xii.	<p>Adequate measures for prevention and control of soil erosion and management of silt shall be undertaken. Dumps shall be protected by geo textile matting or other suitable material, and thick plantations of native trees and shrubs shall be carried out at the dump site. Dumps shall be protected by retaining walls. Total silt load of the mines (including that of adjacent mine) shall be assessed and measures for prevention control of silt shall be submitted to the Regional office of the Ministry within six months.</p>	<p><b>Complied</b></p> <p>These mines are in operations since 1939. It is to be noted that top soil obtained from this ML is about 59232 m<sup>3</sup>. Below top soil, the entire belt is reportedly limestone rich area and there is no overburden dumps in the mines. Hence this condition is not applicable.</p>
xiii.	<p>Trenches/ garland drains shall be constructed at foot of dumps and coco filters installed at regular intervals to arrest silt from being carried to water bodies. Adequate number of check dams and gully plugs shall be constructed across seasonal/perennial nallahs flowing through the ML area and silts arrested. De-silting at regular intervals shall be carried out. Garland drain of approximate size, gradient and length shall be constructed for both mine pit and for waste dump and sump capacity shall be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at</p>	<p><b>Complied</b></p> <p>These mines are in operations since 1939 and there is no overburden dumps in the mines.</p> <p>Garland drains are formed in the periphery of the mine pits and maintained. Regular desilting is carried out. The rain water collected in the garland drains, after Suspended Solids Settlement in a sump, joins the natural drains of the area. Sump capacity provides adequate retention period enabling proper settling of silt material.</p>



	the corners of the garland drains and de-silted at regular intervals.	
xiv.	Occupational health and safety measures for the workers including identification of work related health hazards, training on malaria eradication, HIV and health effects on exposure to mineral dust etc. shall be carried out. The company shall engage a full time qualified doctor who is trained in occupational health. Periodic monitoring for exposure to respirable mineral dust on the workers shall be conducted and records maintained including health records of the workers. Awareness programme for workers on impact of mining on their health and precautionary measures like use of personal equipments etc. shall be carried out periodically. Review of impact of various health measures undertaken (at interval of five years or less) shall be conducted followed by follow up action where wherever required.	<p><b>Complied.</b></p> <p>All the employees are subjected to periodical medical examination as per the provisions of Mines Rules, 1955. A fully fledged Dispensary / occupational health centre with qualified doctor &amp; required infrastructures are available at Dalmiapuram plant.</p> <p>All mine workers are provided with required personnel protective equipments for working in the mines.</p> <p>Mines workers are periodically undergoing medical surveillance once in 3 years for occupational health related diseases &amp; periodically reviewed. As per the medical records there is no evidence of any occupational health related diseases among the mine workers.</p> <p>Awareness programme for workers on impact of mining on their health and precautionary measures like use of personal equipments etc. is carried out in Mines periodically.</p>
xv.	Action plan for implementation with respect to suggestions/ improvements and recommendations made during public consultation/ hearing shall be submitted to the Ministry and the State Govt within six months.	<p><b>Refer below</b></p> <p>The PA informed that the action plan for implementation of suggestions/ improvements and recommendations made</p>

		<p>during public consultation/ hearing was submitted to the Ministry. However copy of the same was not made available.</p> <p>Further, the PA informed that the activities proposed are being carried out and improved periodically.</p>
xvi.	Dust fall measurement shall be periodically carried out including particle size analysis in work zone area. Results shall be submitted to the Regional office of the Ministry and the State Govt.	<p><b>Complied.</b></p> <p>Fugitive emissions data are being analyzed regularly and submitted to Ministry on a half yearly basis.</p>
xvii.	Top soil/ solid waste shall be stacked properly with proper slope and with adequate safeguards for prevention of erosion and shall be used for backfilling for reclamation and rehabilitation of mined out area.	<p><b>Refer below</b></p> <p>These mines are in operations since 1939 and there is no solid waste generated in mines.</p> <p>The Top soil of quantity 59232 m<sup>3</sup> (obtained from pit 2 and pit 3) was stacked in the earmarked area and used for afforestation purpose.</p>
xviii.	The waste water from the mine shall be treated to conform to the prescribed standards before discharging into the natural stream. The discharged water from the Tailing Dam (if any) shall be regularly monitored and report submitted to the Ministry of Environment & Forests, Central Pollution Control Board and the State Pollution Control Board.	<p><b>Complied.</b></p> <p>There is no trade effluent generated from the mine pit. The workshop effluent is being treated in Up flow Filter to trap oil and grease present and then the treated effluent is reused for green belt development.</p> <p>Periodical monitoring reports of mine discharges are being carried out through NABL recognized third party laboratory viz. M/s Interstellar Testing Centre Pvt. Ltd. and reported to this Ministry on half yearly basis.</p>

xix.	Overburden shall be stacked at earmarked dump site(s) only and shall not be kept active for long period. The maximum height of the dump shall not exceed 30m, each stage shall preferably be of 10m and overall slope of the dump shall not exceed 28°. The OB dumps shall be scientifically vegetated with suitable native species to prevent erosion and surface runoff. Monitoring and management of rehabilitated areas shall continue until the vegetation becomes self-sustaining.	<p><b>Refer below</b></p> <p>These mines are in operations since 1939 and there are no overburden dumps in the mines.</p> <p>However, the PA informed that sub-grade mineral is dumped in the area earmarked for that purposes only.</p>
xx.	Slope of the mining bench and ultimate pit limit shall be as per the mining scheme as approved by the Indian Bureau of Mines.	<p><b>Complied.</b></p> <p>A slope of mine bench is maintained 45-60 degree at the pits as per the Approved Mining Schemes by IBM. They have agreed to maintain the ultimate pit limit also as per the approved mining scheme by IBM after completion of the mining activity.</p>
xxi.	Drilling and blasting (if any) shall not be conducted.	<p><b>Complied</b></p> <p>Drilling &amp; blasting is not being carried out. Mining is done deploying Rock breakers.</p>
xxii.	Green belt development shall be carried out considering CPCB guidelines including selection of plant species and in consultation with the local DFO/ Agriculture Department. Herbs and shrubs shall also form a part of afforestation programme besides tree plantation. Plantation shall be raised in 84.377 ha around the ML area, haul roads, OB dump sites etc. The density of the trees shall not be less than 2500 plants per ha. The company shall involve local people with the help of self help group for plantation	<p><b>Complied.</b></p> <p>Green Belt has been developed and maintained around the lease areas covering 33 Ha area. Species of different varieties are planted in afforestation area. As informed by PA, around 37974 saplings were planted in the ML area.</p> <p>The green belt development around the ML</p>

	<p>programme. Further, the company shall practice poly culture plantation instead of monoculture of plant species. Details of year wise afforestation programme including rehabilitation of mined out area shall be submitted to the Ministry within six months.</p>	<p>area seems satisfactory. Further, during the visit, it was observed that the new plantations were carried out in the recent times to enhance the density of the plantation, involving local people with the help of self help group for plantation programme.</p>
xxiii.	<p>Prior permission from the competent authority shall be obtained for extraction of ground water, if any.</p>	<p><b>Refer below.</b></p> <p>There are no bore wells/open wells within the ML area. Further, there is no extraction of ground water during the visit. At present, the mining activity has not intersected the ground water table.</p> <p>However, the PA informed that an application has been submitted to State Ground water Authority, Taramani, Chennai.</p>
xxiv.	<p>Regular monitoring of ground water level and quality shall be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring shall be carried out four times in a year – pre-monsoon (April – May), monsoon (August), post monsoon (November) and winter (January) and the data thus collected shall be regularly sent to the RO of the Ministry, Central Ground Water Authority and RO of Central Ground Water Board.</p>	<p><b>Complied</b></p> <p>Periodical monitoring of surface water &amp; ground water are being carried out through NABL recognized third party laboratory viz. M/s Interstellar Testing Centre Private Limited. The monitored data, as per report, shows that the values are within the limits. The copy of the same is enclosed at <i>Annexure -2</i></p> <p>The status reports are also being submitted on half yearly basis to MoEF&amp;CC, RO, Chennai</p>
xxv.	<p>Vehicles used for transportation of ores and other mining operations shall have valid permissions as prescribed under Central Motor Vehicle Rules, 1989 and its</p>	<p><b>Complied</b></p> <p>Vehicles with valid permissions are only</p>

	amendments. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of ores. Transporting of ores shall be done covered with a tarpaulin or other suitable enclosures so that no dust particles/ fine matters escape during the course of transportation. No overloading of ores for transportation shall be undertaken.	used. Vehicles transporting limestone from mines to the factory are covered with tarpaulin properly so as to arrest the dust particles / fine matters escaping during the course of transportation. No overloading is done as informed.
xxvi.	A final mine closure plan along with details of Corpus Fund shall be submitted to the Regional office of the Ministry of Environment & Forests, 5 years in advance of final mine closure for approval.	<b>Agreed to comply.</b>  The PA informed that final mine closure plan along with details of Corpus Fund will be submitted to the Regional office of the Ministry of Environment & Forests, 5 years in advance of final mine closure for approval.
<b>B. GENERAL CONDITIONS:</b>		
<b>S.No.</b>	<b>Conditions</b>	<b>Compliance</b>
i.	No change in mining technology and scope of working shall be made without prior approval of the Regional office of the Ministry of Environment & Forests.	<b>Complied</b>  Mechanized method of Mining is followed as per approved Mining plan/ schemes and there is no change in mining technology.
ii.	No change in the calendar plan including excavation, quantum of mineral ore and waste shall be made.	<b>Complied.</b>  There is no change in the calendar plan including excavation, quantum of mineral (minor mineral) made, as per records made available during the visit.  However, the PA has now proposed to enhance the limestone production quantity of this mine from existing 2.0 MTPA to 6.97 MTPA (say 7.0 MTPA) over the extent of existing 166.05 Ha to meet the immediate

		Limestone requirements of both Dalmiapuram and Ariyalur cement plants.
iii.	Conservation measures for protection of flora and fauna in the core & buffer zone shall be drawn up in consultation with the local forest and wildlife department.	<p><b>Refer below</b></p> <p>The mine site does not fall within 10 km radius of any protected area or wildlife sanctuaries.</p> <p>However, the PA had conducted Flora and Fauna Study for the proposed expansion activities around Dalmia Cement Factory and mines through Bishop Heber College, Trichy in November, 2003.</p>
iv.	Four ambient air quality-monitoring stations shall be established in the core zone as well as in the buffer zone for RPM, SPM, SO <sub>2</sub> , NO <sub>x</sub> monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and the frequency of monitoring should be undertaken in consultation with the State Pollution Control Board.	<p><b>Complied.</b></p> <p>Four ambient air quality-monitoring stations are established in the core zone as well as in the buffer zone for RPM, SPM, SO<sub>2</sub>, NO<sub>x</sub> monitoring.</p> <p>Monitoring of ambient air quality is being carried out through NABL recognized third party laboratory viz. M/s Interstellar Testing Centre Private Limited. The monitored data, as per report, shows that the values are within the limits. The copy of the same is enclosed at <i>Annexure -3</i></p> <p>TNPCB vide letter No.104/AAQS/2021-2022, dated 11.04.2022 has furnished report of analysis of Ambient air quality level in the vicinity of the KLK and KVK mines and monitored data shows that the values are within the limits.</p>

v.	Data on ambient air quality (RPM, SPM, SO <sub>2</sub> , NO <sub>x</sub> ) should be regularly submitted to the Ministry including its Regional Office at Chennai and the State Pollution Control Board / Central Pollution Control Board once in six months.	<p><b>Complied.</b></p> <p>Data on ambient air quality (RPM, SPM, SO<sub>2</sub>, NO<sub>x</sub>) are submitted to the Ministry's Regional Office, Chennai as a part of six monthly compliance report.</p> <p>The PA further informed that the same is also submitted to Central Pollution Control Board once in six months and to the State Pollution Control Board once in a month.</p>
vi.	Fugitive dust emissions from all the sources shall be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points shall be provided and properly maintained.	<p><b>Complied.</b></p> <p>Water sprinkling is being done on haul roads, loading areas, etc. at frequent intervals to control fugitive dust emission.</p>
vii.	Measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM etc., shall be provided with ear plugs/muffs.	<p><b>Complied.</b></p> <p>Monitoring of ambient noise levels is being carried out through NABL recognized third party laboratory viz. M/s Interstellar Testing Centre Private Limited. The monitored data, as per report, shows that the values are within the limits. The copy of the same is enclosed at <i>Annexure -3</i></p> <p>TNPCB vide letter No.104/AAQS/2021-2022, dated 11.04.2022 has furnished report of analysis of Ambient Noise level in the vicinity of the KLK and KVK mines and monitored data shows that the values are within the limits.</p>

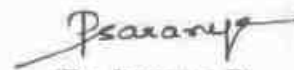
		Workers engaged in operations of HEMM etc., are provided with ear plugs/muffs. The heavy mining equipments were provided with sound proof cabin for operators.
viii.	Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422(E) dated 19 <sup>th</sup> May 1993 and 31 <sup>st</sup> December 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of workshop effluents.	<p><b>Complied.</b></p> <p>There is no process effluent generated from the mine pit. The workshop effluent is being treated in Up flow Filter to trap oil and grease present and then the treated effluent is reused for green belt development.</p>
ix.	Personnel working in dusty areas shall be provided with protective respiratory devices and they shall also be imparted adequate training and information on safety and health aspects.	<p><b>Complied.</b></p> <p>During the visit, it was observed that the mine employees were provided with protective equipment like dust mask, shoes, helmets etc.</p> <p>The PA further informed that periodical medical examination is done for all mine employees. Adequate training on health and safety aspects is carried out as per Mines Vocational Training Rules, 1966.</p>
x.	A separate Environmental Management Cell with suitable qualified personnel shall be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.	<p><b>Complied.</b></p> <p>A separate Environmental Management Cell is constituted vide their office order dated 06.04.2021 with qualified environmental engineer for monitoring the environmental parameters.</p> <p>Further, all the environmental parameters at the site are also being monitored by</p>



		recognized third party laboratory.																
xi.	The project authorities shall inform to the Regional Office of the Ministry located at Bangalore regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.	<p><b>Complied.</b></p> <p>These existing mines are in operation since 1939. The CTE for expansion of this mine was obtained reportedly during June, 2009.</p> <p>The PA informed that the fund required for the project was managed from the resources internally from the company. Hence the date of financial closure is not applicable.</p>																
xii.	The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year wise expenditure shall be reported to the Ministry and its Regional Office located at Chennai.	<p><b>Complied.</b></p> <p>EMP Budget for each Financial Year is being allotted and spent as under:</p> <table border="1"> <thead> <tr> <th>S.No</th> <th>Year</th> <th>Budget allocated (lakhs)</th> <th>Actual expenditure (lakhs)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2019-20</td> <td>35</td> <td>38.7</td> </tr> <tr> <td>2</td> <td>2020-21</td> <td>45</td> <td>44.41</td> </tr> <tr> <td>3</td> <td>2021-22</td> <td>50</td> <td>50.18</td> </tr> </tbody> </table>	S.No	Year	Budget allocated (lakhs)	Actual expenditure (lakhs)	1	2019-20	35	38.7	2	2020-21	45	44.41	3	2021-22	50	50.18
S.No	Year	Budget allocated (lakhs)	Actual expenditure (lakhs)															
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xiv.	The Regional Office of the Ministry, Bangalore shall monitor compliance of the stipulated environmental conditions. The project authorities shall extend full co-operation to the officer(s) of the Regional Office by furnishing the requisite data/information/ monitoring reports.	<p><b>Complied</b></p> <p>The PA has extended full co-operation during the visit and also provided the required information.</p>																

xv.	A copy of the clearance letter will be marked to concerned Panchayat/local NGO, if any, from whom any suggestion/representation has been received while processing the proposal.	<b>Reportedly Complied.</b>  A copy of the clearance letter was provided to Kallakudi & Kovandakurichi Panchayat as informed.
xvi.	State Pollution Control Board shall display a copy of the clearance letter at the Regional office, District Industry Centre and the Collector's office/ Tahsildar's office for 30 days.	<b>Reportedly complied.</b>
xvii.	The Project authorities shall advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment & Forests at <a href="http://envfor.nic.in">http://envfor.nic.in</a> and a copy of the same shall be forwarded to the Regional Office of the Ministry located in Chennai.	<b>Complied.</b>  The PA had advertised in two local newspapers viz. Trinity Mirror and local vernacular Tamil daily- Makkal Kural on 18.06.2008 and the copy of the same was submitted to Regional office on 18.07.2008. The copy of the same is enclosed at <i>Annexure -4</i>

This has the approval of the competent authority vide diary No.600 dated 09.09.2022

  
(Dr. Saranya.P)

Scientist 'D'

Email: [saranya.p@gov.in](mailto:saranya.p@gov.in)

Dr. P. Saranya  
Scientist 'D'

Government of India  
Min. of Environment Forest and Climate Change,  
Integrated Regional Office,  
1<sup>st</sup> Floor, Addl. Office Block for GPOA,  
Shastri Bhawan, Haddows Road,  
Nungambalam, Chennai - 600 006.

# Dalmia cement

**FUTURE TODAY**

*cement! sugar! refractories! power!*

DCB: DPM: KLK/KVK - GO 76 (Expansion)/MOEF/EC: 3/2022

July 18, 2022

**The Deputy Director General of Forest (C)**

Integrated Regional Office,  
Ministry of Environment, Forest and Climate Change,  
First Floor, Additional Office Block for GPOA,  
Shastri Bhavan, Haddows Road,  
Nungambakkam,  
Chennai-600006.

Dear Sir,

Sub: Kallakudi and Kovandakurichi Limestone Mines of M/s Dalmia Cement (Bharat) Limited -Mining **Lease** in GO No 76 (Existing Mine for captive use) over an **Extent** of 166.005 Ha existing **production** 2.0 MTPA at Kallakudi, Kovandakurichi & Venkatachalapuram Villages, Lalgudi Taluk, Tiruchirapalli District, Tamil Nadu –Certified EC Compliance Report – MoEF&CC Observation on violation of EC condition – **Submission for Observation made** – reg.

Ref: 1. EC. NO. J.11015/912/2017 – IA (M) dated 27.5.2008  
2. Our letter No. DCB:DPM:KLK/KVK-G.O.76 (Expansion) / MoEF / EC:1/2022 dated 18.4.2022.  
3. Our letter No. DCB:DPM:KLK/KVK-G.O.76 (Expansion) / MoEF / EC:2/2022 dated 12.5.2022.  
4. Lr. No. F.No. EP/12.1/724/TN/612 dated 14.6.2022 of MoEF & CC, Chennai.

We are in receipt of the Ministry's Letter cited as Ref. 4 above and are pleased to submit herewith our Submissions for the **Observation made "no two pits shall be simultaneously worked. However, two pits under operation in the instant ML is Violation of stipulated condition"**:

1. We are operating our Kallakudi & Kovandakurichi Limestone Mines since 1939 under 5 Leases granted in 4 Nos. Pits.
2. These two mines are working independently since beginning and the distance between the mines is about 4 Kms.
  - a. Kallakudi (DGMS Mine Code 360295) – National High Passing adjoining to Kallakudi Limestone is separating the two pits Pit No. 1 and Pit No. 2.
  - b. Kovandakurichi (DGMS Mine Code 360296) – with two pits Pit 3 West & East **Blocks** and Pit No.4 separated by National High (NH 81).
3. These two Limestone Mines comprises of totally 5 Mining Leases which are interspersed with each other and lying compact and **contiguous mineral bearing areas**. The Lease details are furnished below:



**Dalmia Cement (Bharat) Limited**

Fagan Mansion, 4th Floor, 26, Ethiraj Salai, Egmore, Chennai - 600 008, Tamil Nadu, India.  
T 91 044 4090 2112 / 2827 9933, W www.dalmiacement.com CIN : U65191TN1996PLC035963  
Registered Office : Dalmiapuram, Dist. Tiruchirapalli - 621 651, Tamil Nadu, India.  
A Dalmia Bharat Group company, www.dalmiabharat.com

Current GO No. & Date	Village	Extent, Ha	Covered Pits
76 dt. 26.07.2018	Kallakudi, Kovandakurichi and Venkatachalapuram	166.005	All 4 Pits (1 to 4)
71 dt. 20.7.2018	Kallakudi and Kovandakurichi	13.295	Pit No. 2 & Pit No. 3 West Block
143 dt. 19.11.2018	Kallakudi	10.545	Pit No. 1
262 dt. 15.11.1996	Kallakudi	1.135	Pit No. 1
263 dt. 15.11.1996	Kallakudi	0.285	Pit No. 1
<b>Total</b>		<b>191.265</b>	

The Lease extents covered in the Pits are as detailed

Current GO No. & Date	Village(s)	Extent granted in Hec.	Name of Pits and break up of extent covered by respective ML				
			Pit No.1	Pit No.2	Pit No.3 (East Block)	Pit No.3 (West Block)	Pit No.4
76 dt. 26.7.18	Kallakudi, Kovandakurichi and Venkatachalapuram	166.005	6.530	91.425	33.230	27.795	7.025
71 dt. 20.7.18	Kallakudi and Kovandakurichi	13.295		2.065		11.230	
143 dt. 19.11.18	Kallakudi	10.545	10.545				
262 dt. 15.11.96	Kallakudi	1.135	1.135				
263 dt. 15.11.96	Kallakudi	0.285	0.285				
<b>Total</b>		<b>191.265</b>	<b>18.495</b>	<b>93.490</b>	<b>33.230</b>	<b>39.025</b>	<b>7.025</b>

We are submitting herewith a combined plan showing the 5 MLs spread in the above mines for ready reference.

- Presently, **3 Leases** are in operation with individual Environmental Clearances and other **two leases** (<5 Ha) are not in operation for want of ECs (Final EIA Reports are submitted and SEAC-TN Meeting is due).
- From the above table it is clear that GO 76 over an extent of 166.005 Ha falls in all four Pits of these two Mines for which EC has been granted for 2.0 MTPA production over an extent of 166.005 Ha.
- However, the mining operations are being carried out in only one pit of each mine at a time, in ML granted over an extent of 166.005 Ha as instructed by MoEF in Environmental Clearance issued to us vide the reference cited under Ref. No.1.

7. Enclosed herewith relevant pages of Mining Plan documents approved by Indian Bureau of Mines, indicating the quantum of production planned from each pit of this respective ML.
8. As these two mines comprises of other 4 MLs, operation of those MLs as per the respective Environmental Clearances are carried out to meet quantity requirement of plants.
9. Reclamation of mined out pits will be carried out at the end of mine life after exhaustion of mineral & it is planned to convert the mined out areas of these mines into a Water Storage Reservoir which is approved by Indian Bureau of Mines.

Thus, there is no Violation of the Specific Condition No. A (i) of the Environmental Clearance issued to us.

Considering the above given facts, we request your good self to issue us with Certified EC Compliance Report from your good office, which would support us to file our Expansion Application for enhancement of production at the earliest.

Thanking you,

Yours faithfully,  
For Dalmia Cement (Bharat) Limited,

  
S. Makesh  
Asst. Executive Director (Mines)

Encl: As above.

Copy to: Dr. Shruti Rai Bhardwaj, Scientist-E, Monitoring Cell, MoEF&CC, Indira Paryavaran Bhavan, Jor Bagh, Aliganj, New Delhi-110 003 – Submitted for kind information and Perusal.



**TAMILNADU POLLUTION CONTROL BOARD**

Category of the Industry :

**RED****CONSENT ORDER NO. 1908121917156 DATED: 13/09/2019.****PROCEEDINGS NO.T2/TNPCB/F.0672TRY/RL/TRY/W/2019 DATED: 13/09/2019**

**SUB:** Tamil Nadu Pollution Control Board - RENEWAL OF CONSENT – M/s. DALMIA CEMENT (BHARAT) LIMITED KALLAKUDI KOVANDAKURICHI LIMESTONE MINES (ML-1), S.F.No. 39/8,40,41/1,47/1,3,4,11,49,50,51,52,53/1,55/1(P),15,101,102/20,104/1A,15,24,110/2,3,4,15,111/1,2,112/1,8,11B,12,14A,15,113/1,3,114/ 1,6,7,11,12,13,14,15,17A,17B,18,19,115/1,3,4,6,7,9,10,116/1,2,3, 117/1,2,3,4,5,6,7,8,118/1,3A,3C,5,10,119/1,19B,120,121/1,7A,18,19,122, 135/1,2,136/1,3,7,10,11,12,13,14,137/1,2,3,6,7, 138/1,2,139/1,2,3,4,5,6,7,140/1,2,3,4,6B,252, 254/4,7,8,9,10,11,12,13,258/1,259/6,260/3,7,9,13,16,18,268/1(P), 403 of Kallakudi Village 54/1,2,55,56,57,58(P),59/1B(P),60,61/8,72/1,3(P),73/1,3,5,74/1,75,77/4(P),78/5(P),7(P),8A,79/1A(P),1B,2,6,80/1, 81/1B,3,4,82,83,85/2,86/1,87,88/1,89/1,92(P),93/1D,94/7(P),95/8(P),140A/1,147/1 of Kovandakurichi Village 32 of Venkatachalapuram Village, KALLAKUDI village, Lalgudi Taluk and Thiruchirapalli District - Renewal of Consent for the operation of the plant and discharge of sewage and/or trade effluent under Section 25 of the Water (Prevention and Control of Pollution) Act, 1974 as amended in 1988 (Central Act 6 of 1974) – Issued- Reg.

**REF:** 1) Board Proceedings No. T2/TNPCB/F.0672TRY/RL/TRY/W&A/2018 DATED: 11/12/2018  
2) Unit's application for CTO-Renew submitted through OCMMS on 20/03/2019 and resubmitted in full shape on 01/09/2019.  
3) DEE's IR.No : F.0672TRY/RL/DEE/TRY/2019 dated 20/05/2019.

RENEWAL OF CONSENT is hereby granted under Section 25 of the Water (Prevention and Control of Pollution) Act, 1974 as amended in 1988 (Central Act, 6 of 1974) (hereinafter referred to as "The Act") and the rules and orders made there under to

**DY.MANAGING DIRECTOR****M/s.DALMIA CEMENT (BHARAT) LIMITED KALLAKUDI KOVANDAKURICHI LIMESTONE MINES (ML-1),**

S.F.No. 39/8,40,41/1,47/1,3,4,11,49,50,51,52,53/1,55/1(P),15,101,102/20,104/1A,15,24,110/2,3,4,15,111/1,2,112/1,8,11B,12,14A,15,113/1,3,114/ 1,6,7,11,12,13,14,15,17A,17B,18,19,115/1,3,4,6,7,9,10,116/1,2,3, 117/1,2,3,4,5,6,7,8,118/1,3A,3C,5,10,119/1,19B,120,121/1,7A,18,19,122,135/1,2,136/1,3,7,10,11,12,13,14,137/1,2,3,6,7, 138/1,2,139/1,2,3,4,5,6,7,140/1,2,3,4,6B,252,254/4,7,8,9,10,11,12,13,258/1,259/6,260/3,7,9,13,16,18,268/1(P), 403 of Kallakudi Village 54/1,2,55,56,57,58(P),59/1B(P),60,61/8,72/1,3(P),73/1,3,5,74/1,75,77/4(P),78/5(P),7(P),8A,79/1A(P),1B,2,6,80/1, 81/1B,3,4,82,83,85/2,86/1,87,88/1,89/1,92(P),93/1D,94/7(P),95/8(P),140A/1,147/1 of Kovandakurichi Village 32 of Venkatachalapuram Village,  
KALLAKUDI Village,  
Lalgudi Taluk,  
Thiruchirapalli District.

Authorising the occupier to make discharge of sewage and /or trade effluent.

**POLLUTION PREVENTION PAYS**



## TAMILNADU POLLUTION CONTROL BOARD

This is subject to the provisions of the Act, the rules and the orders made there under and the terms and conditions incorporated under the Special and General conditions stipulated in the Consent Order issued earlier and subject to the special conditions annexed.

**This RENEWAL OF CONSENT is valid for the period ending March 31, 2024**

K. Gokuladas  
Digitally signed by K. Gokuladas  
Date: 2019.09.13 17:34:54 +05'30'  
**For Member Secretary,  
Tamil Nadu Pollution Control Board,  
Chennai**



## TAMILNADU POLLUTION CONTROL BOARD

### SPECIAL CONDITIONS

1. This renewal of consent is valid for operating the facility for the manufacture of products/byproducts (Col. 2) at the rate (Col 3) mentioned below. Any change in the product/byproduct and its quantity has to be brought to the notice of the Board and fresh consent has to be obtained.

Sl. No.	Description	Quantity	Unit
<b>Product Details</b>			
1.	MINING OF LIMESTONE OVER AN EXTENT OF 166.005 HECTARES	2.0	MTPA

2. This renewal of consent is valid for operating the facility with the below mentioned outlets for the discharge of sewage/trade effluent. Any change in the outlets and the quantity has to be brought to the notice of the Board and fresh consent has to be obtained.

Outlet No.	Description of Outlet	Maximum daily discharge in KLD	Point of disposal
<b>Effluent Type : Sewage</b>			
1.	Sewage	1.2	On Industrys own land
<b>Effluent Type : Trade Effluent</b>			
1.	Trade effluent	0.95	For green belt development

POLLUTION PREVENTION PAYS





## TAMILNADU POLLUTION CONTROL BOARD

### Additional Conditions:

1. The unit shall treat and dispose the sewage generated from the unit through septic tank and soak pit arrangements.
2. The unit shall operate and the water sprinklers effectively to suppress the dust generated during mining, crushing and vehicle movements.
3. The haul roads in the mines shall be adequately water sprayed.
4. The unit shall not use 'use and throwaway plastics' such as plastic sheets used for food wrapping, spreading on dining table etc., plastic plates, plastic coated tea cups, plastic tumbler, water pouches and packets, plastic straw, plastic carry bag and plastic flags irrespective of thickness, within the industry premises. Instead it shall encourage use of eco friendly alternative such as banana leaf, areca nut palm plate, stainless steel, glass, porcelain plates/cups, cloth bag, Jute bag etc.,

K. Gokuladas Digitally signed by K. Gokuladas  
Date: 2018.09.11 11:25:32  
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**For Member Secretary,  
Tamil Nadu Pollution Control Board,  
Chennai**

To  
DY.MANAGING DIRECTOR,  
M/s.DALMIA CEMENT (BHARAT) LIMITED KALLAKUDI KOVANDAKURICHI LIMESTONE MINES  
(ML-1),  
KALLAKUDI ,KOVANDAKURICHI VILLAGE, LALGUDI TALUK, THIRUCHIRAPALLI DISTRICT.,  
Pin: 621651

### Copy to:

1. The Executive Officer, KALLAKKUDI-Town Panchayat, Lalgudi Taluk, Thiruchirapalli District .
  2. The District Environmental Engineer, Tamil Nadu Pollution Control Board, THIRUCHIRAPALLI.
  3. The JCEE-Monitoring, Tamil Nadu Pollution Control Board, Tiruchirappalli.
  4. File
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**TAMILNADU POLLUTION CONTROL BOARD**

Category of the Industry :

**RED****CONSENT ORDER NO. 1908221917156 DATED: 13/09/2019.****PROCEEDINGS NO.T2/TNPCB/F.0672TRY/RL/TRY/A/2019 DATED: 13/09/2019**

**SUB:** Tamil Nadu Pollution Control Board - RENEWAL OF CONSENT -M/s. DALMIA CEMENT (BHARAT) LIMITED KALLAKUDI KOVANDAKURICHI LIMESTONE MINES (ML-1), S.F.No. 39/8,40,41/1,47/1,3,4,11,49,50,51,52,53/1,55/1(P),15,101,102/20,104/1A,15,24,110/2,3,4,15,111/1,2,112/1,8,11B,12,14A,15,113/1,3,114/1,6,7,11,12,13,14,15,17A,17B,18,19,115/1,3,4,6,7,9,10,116/1,2,3,117/1,2,3,4,5,6,7,8,118/1,3A,3C,5,10,119/1,19B,120,121/1,7A,18,19,122,135/1,2,136/1,3,7,10,11,12,13,14,137/1,2,3,6,7,138/1,2,139/1,2,3,4,5,6,7,140/1,2,3,4,6B,252,254/4,7,8,9,10,11,12,13,258/1,259/6,260/3,7,9,13,16,18,268/1(P),403 of Kallakudi Village 54/1,2,55,56,57,58(P),59/1B(P),60,61/8,72/1,3(P),73/1,3,5,74/1,75,77/4(P),78/5(P),7(P),8A,79/1A(P),1B,2,6,80/1,81/1B,3,4,82,83,85/2,86/1,87,88/1,89/1,92(P),93/1D,94/7(P),95/8(P),140A/1,147/1 of Kovandakurichi Village 32 of Venkatachalapuram Village, KALLAKUDI village, Lalgudi Taluk and Thiruchirapalli District - Renewal of Consent for the operation of the plant and discharge of emissions under Section 21 of the Air (Prevention and Control of Pollution) Act, 1981 as amended in 1987 (Central Act 14 of 1981) -Issued- Reg.

**REF:** 1) Board Proceedings No. T2/TNPCB/F.0672TRY/RL/TRY/W&A/2018 DATED: 11/12/2018  
2) Unit's application for CTO-Renew submitted through OCMMS on 20/03/2019 and resubmitted in full shape on 01/09/2019.  
3) DEE's IR.No : F.0672TRY/RL/DEE/TRY/2019 dated 20/05/2019.

RENEWAL OF CONSENT is hereby granted under Section 21 of the Air (Prevention and Control of Pollution) Act, 1981 as amended in 1987 (Central Act 14 of 1981) (hereinafter referred to as "The Act") and the rules and orders made there under to

**DY.MANAGING DIRECTOR****M/s.DALMIA CEMENT (BHARAT) LIMITED KALLAKUDI KOVANDAKURICHI LIMESTONE MINES (ML-1),**

S.F.No. 39/8,40,41/1,47/1,3,4,11,49,50,51,52,53/1,55/1(P),15,101,102/20,104/1A,15,24,110/2,3,4,15,111/1,2,112/1,8,11B,12,14A,15,113/1,3,114/1,6,7,11,12,13,14,15,17A,17B,18,19,115/1,3,4,6,7,9,10,116/1,2,3,117/1,2,3,4,5,6,7,8,118/1,3A,3C,5,10,119/1,19B,120,121/1,7A,18,19,122,135/1,2,136/1,3,7,10,11,12,13,14,137/1,2,3,6,7,138/1,2,139/1,2,3,4,5,6,7,140/1,2,3,4,6B,252,254/4,7,8,9,10,11,12,13,258/1,259/6,260/3,7,9,13,16,18,268/1(P),403 of Kallakudi Village 54/1,2,55,56,57,58(P),59/1B(P),60,61/8,72/1,3(P),73/1,3,5,74/1,75,77/4(P),78/5(P),7(P),8A,79/1A(P),1B,2,6,80/1,81/1B,3,4,82,83,85/2,86/1,87,88/1,89/1,92(P),93/1D,94/7(P),95/8(P),140A/1,147/1 of Kovandakurichi Village 32 of Venkatachalapuram Village,  
KALLAKUDI village,  
Lalgudi Taluk,  
Thiruchirapalli District.

Authorizing the occupier to operate the industrial plant in the Air Pollution Control Area as notified by the Government and to make discharge of emission from the stacks/chimneys.

**POLLUTION PREVENTION PAYS**

**TAMILNADU POLLUTION CONTROL BOARD**

This is subject to the provisions of the Act, the rules and the orders made there under and the terms and conditions incorporated under the Special and General conditions stipulated in the Consent Order issued earlier and subject to the special conditions annexed.

**This RENEWAL OF CONSENT is valid for the period ending March 31, 2024**

K. Gokuladas  
Digitally signed by K. Gokuladas  
Date: 2019.09.13 17:36:42 +05'30'  
**For Member Secretary,  
Tamil Nadu Pollution Control Board,  
Chennai**



## TAMILNADU POLLUTION CONTROL BOARD

### SPECIAL CONDITIONS

1. This renewal of consent is valid for operating the facility for the manufacture of products (Col. 2) at the rate (Col. 3) mentioned below. Any change in the products and its quantity has to be brought to the notice of the Board and fresh consent has to be obtained.

Sl. No.	Description	Quantity	Unit
<b>Product Details</b>			
1.	MINING OF LIMESTONE OVER AN EXTENT OF 166.005 HECTARES	2.0	MTPA

2. This renewal of consent is valid for operating the facility with the below mentioned emission/noise sources along with the control measures and/or stack. Any change in the emission source/control measures/change in stack height has to be brought to the notice of the Board and fresh consent/Amendment has to be obtained.

<b>I Point source emission with stack :</b>				
Stack No.	Point Emission Source	Air pollution Control measures	Stack height from Ground Level in m	Gaseous Discharge in Nm <sup>3</sup> /hr
<b>II Fugitive/Noise emission :</b>				
Sl. No.	Fugitive or Noise Emission sources	Type of emission	Control measures	
1.	Mining area and Haulage Road	Fugitive	Water sprinkler system	

POLLUTION PREVENTION PAYS



## TAMILNADU POLLUTION CONTROL BOARD

### Additional Conditions:

1. The unit shall operate and maintain the Air Pollution Control measures efficiently and continuously to achieve the Ambient Air quality/ Emission standards prescribed by the Board.
2. The unit shall operate and the water sprinklers effectively to suppress the dust generated during mining, crushing and vehicle movements.
3. The haul roads in the mines shall be adequately water sprayed.
4. The unit shall continue to develop green belt in and around the plant premises
5. The unit shall furnish exact greenbelt area earmarked/developed as per norms in the unit premises and furnish photographs along with Latitude and Longitude co-ordinates.

K.

Gokuladas

Digitally signed by K.  
Gokuladas  
Date: 2019.09.13  
17:37:14 +05'30'

For Member Secretary,  
Tamil Nadu Pollution Control Board,  
Chennai

To

DY.MANAGING DIRECTOR,

M/s.DALMIA CEMENT (BHARAT) LIMITED KALLAKUDI KOVANDAKURICHI LIMESTONE MINES (ML-1),

KALLAKUDI ,KOVANDAKURICHI VILLAGE, LALGUDI TALUK, THIRUCHIRAPALLI DISTRICT.,

Pin: 621651

### Copy to:

1. The Executive Officer, KALLAKKUDI-Town Panchayat, Lalgudi Taluk, Thiruchirapalli District .
2. The District Environmental Engineer, Tamil Nadu Pollution Control Board, THIRUCHIRAPALLI.
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4. File