

**EXECUTIVE SUMMARY
FOR
PANDAPULI LIMESTONE MINING LEASE OVER AN EXTENT OF 24.32.5 HA
AT
PANDAPULI VILLAGE, SANKARANKOVIL TALUK, TIRUNEIVELI DISTRICT
(Category-B1 PROJECT)**



APPLICANT

M/s Tamil Nadu Cements Corporation Ltd

(A Government of Tamil Nadu Undertaking)

LLA Building, 2nd Floor, 735, Anna Salai, Chennai 600 002



BASELINE STUDY PERIOD MARCH-MAY 2019

MCPL/EMD/MIN/2017-18/03/01/

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EXECUTIVE SUMMARY

1.1 GENERAL

The proposed mining lease area falls in India Toposheet No. 58G/11. The lease area located near village- Pandapuli, Taluk- Sankarankovil and district- Tiruneiveli, Tamilnadu.

Table 1: Detail of the project
Government Order No: 739 - Date: 19.07.1990

S no.	Particulars	Detail
A	Lease Area Detail	
	Lease Area	24.32.5 Ha.
	Type of Land	The mine lease area is in Govt. wasteland and own Patta Land.
	Topography	Undulated terrainas mining carried out from 4 decades
	Site elevation range	118-123 meters
B	Cost Detail	
	Cost of the Project	2.13 Crore
	Cost for EMP	4.26 Lakhs
	OH&S	2 Lakh
C	Detail of Environmental Setting	
	Ecological Sensitive Areas (National Park, Wild Life Sanctuary, Biosphere Reserve, Reserve/ Protected Forest etc.) within 10 km radius	No National Park, Wild Life Sanctuary falls within 10 km radius.
	Archaeological Important Place	None within 10 Km radius of the project
	Nearest Town	Sankarankovil, 15 Km in SSW.
	Nearest Railway Station	Rajapalayam railway station, 17 kms, N
	Nearest National Highway	State Highway 44 , 3 kms, S
	Nearest Airport	Tuticorin airport , 82.0 kms, SE
	Seismic Zone	Zone- II

1.1.1 Introduction

As per MoEF&CC, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project is categorized as category 'B'.

1.2 PROJECT DESCRIPTION

The project Pandapuli Limestone Mines is an existing captive mine for Alangulam Cement plants. The mine lease area is waste land of 24.32.5 Ha which is located at Village- Pandapauli village, Taluka- Sankarankovil, District-Tiruneiveli, State-Tamilnadu.

Water requirement for plantation and dust suppression will be 9.5 KLD, which shall be met from water tanker.

Total Geological reserve -1179325 tons

Mineable reserve- 1104950 tons

Production-120094 Ts

Life of Mine -9.20 years

1.3 DESCRIPTION OF ENVIRONMENT

Environmental data has been collected in relation to proposed mining for Air, Noise, Water, Soil, Socio-economic and Ecology & Biodiversity. The generation of primary data as well as collection of secondary data and information from the site and surroundings was carried out during pre monsoon season i.e. March 2019 to May, 2019. The EIA study is being done for the Mine Lease (core zone) and area within 10 Km distance from mine lease boundary (buffer zone), both of which together comprise the study area. The project site falls under seismic zone II.

1.3.1 Air Environment

Ambient Air quality monitoring reveals that the maximum and minimum concentration of PM₁₀ for all 5 monitoring stations location was found to be 80 µg/m³ at N. Pudur and 53 µg/m³ at project location. The minimum and maximum concentration of PM_{2.5} was 37 µg/m³ at N. Pudur and 48 µg/m³ at N.Pudur. The minimum and maximum concentrations for SO₂ were found 4 µg/m³ at Unjcham patti and 9.5 µg/m³ at Gomathimuthupuram. The minimum and maximum concentrations for NO₂ were found 9 µg/m³ at Gomathimuthupuram & Unjchampatti and 15 µg/m³ at N. Pudur. The minimum and maximum concentrations for CO were found 0.56 mg/m³ at at Project site and 0.88 mg/m³ at N.Pudur.

1.3.2 Water environment

Analysis result of Surface water:

pH varies from to 7.42 to 7.82 in which minimum at Vaippar river tributary and maximum at mine pit. Total Hardness varies from 310 mg/L at Mine Pit and 372 mg/L at Vaippar river tributary. Total Dissolved Solids varies from 484 mg/L at Vaippar River and 610 mg/L at Mine pit. Fluoride varies from 0.47 mg/L at mine pit and 0.75 mg/L at Vaippar River tributary near Thenkarai. Chloride varies from 123 mg/L at Vaippar River tributary and 255 mg/L at Mine pit. COD varies from 134 mg/L at mine pit and to 240 mg/L at Vaippar River tributary near Thenkarai. BOD varies from 46 mg/L at mine pit and 78 mg/L at Vaippar River tributary near Thenkarai.

Analysis results of Ground water;

pH varies from the minimum value of 7.22 at Sivalingapuram and maximum value 7.74 at bore well near project site. Total Hardness varies from 188 mg/L at Unjcham patti and 436 mg/L maximum at N. Pudur. Total Dissolved Solids varies from 346 mg/L at at Gomathimuthupuram to 717 mg/L at Project site. Fluoride varies from 0.42 mg/L at Sivalingapuram to 0.87 mg/L at N. Pudur. Chloride varies from 126 mg/L at N. Pudur to 163 mg/L at Gomathimuthupuram. An overview of the results obtained reveals that none of the chemicals Parameters were found above the permissible limits of IS: 10500 Drinking Water Standards.

1.3.3 Soil environment

The analysis results show that soil is basic in nature as pH value ranges from 6.72 at Killimangalanand 7.62 at Sivalingapuram. The organic matter found within the study area with minimum 0.86 % at Gomathimuthupuram and maximum 1.26 % at project site. The concentration of Nitrogen, Phosphorus and Potassium has been found to be in good amount in the soil samples.

1.3.4 Noise environment

The Noise level during day time minimum at N.Pudur 42.5 Ld and maximum at project site 64.2 Ld. Noise level during night time minimum at Unchampatti 36.2 Ln and maximum at project site 52.8 Ln. It was observed that the values obtained were within the prescribed Ambient Noise Quality Standards with respect to Noise indicated no industrial activity in the study area.

1.3.5 Socio-economic Environment

The demographic profile within the study area is given below.

Table 2: Demographic profile of the study area

S. No.	Description	Number	Percentage to Respective Total
1	Total Population	161368	100.0
	Male	80499	49.89
	Female	80869	50.11
	Sex Ratio	1005	
2	Population (0-6 age group)	16573	100.0
	Male	8465	51.08
	Female	8108	48.92
	Sex Ratio	958	
3	Population- Scheduled Caste	37826	100.0
	Male	18740	49.54
	Female	19086	50.46
	Sex Ratio	1018	
4	Population- Scheduled Tribe	286	100.0
	Male	146	51.05
	Female	140	48.95
	Sex Ratio	959	
5	Total No. of Households	45560	
	Average Household Size	4	
6	Total Literates	115180	100.0
	Male	63316	54.97
	Female	51864	45.03
	Overall Literacy Rate	79.55	
	Male	87.90	
	Female	71.28	
	Gender Gap in Literacy Rate	16.62	
7	Total Workers	84493	100.0
	Male	48572	57.49
	Female	35921	42.51
	Gender Gap in Work Participation Rate	14.98	
8	Main Workers	76720	100.0
	Male	44931	58.56
	Female	31789	41.44
	Gender Gap in Work Participation Rate	17.12	
9	Marginal Workers	7,773	100.0
	Male	3641	46.84
	Female	4132	53.16

	Gender Gap in Work Participation Rate	-6.32	
10	Household Industrial Workers	6,667	100.0
	Male	1619	24.28
	Female	5048	75.72
11	Total Agricultural Workers	33,292	100.0
	Male	17005	51.08
	Female	16287	48.92
11 (a)	Cultivators	6,257	100.0
	Male	4034	64.47
	Female	2223	35.53
11 (b)	Agricultural Labour	27,035	100.0
	Male	12971	47.98
	Female	14064	52.02
12	'Other Workers'	44,534	100.0
	Male	29948	67.25
	Female	14586	32.75

1.3.6 Biological Environment

This lease area lies under non-cultivable land mass. This area is recognized with a poor vegetation cover and its surrounding land use is agricultural fields. No Eco-Sensitive Zone exists within the 10 km radius of the project site.

From the point view of Forest classification, there are patches of the natural vegetation which is Southern Thorn Scrub forest (6A/C2/DS1) as per Champion & Seth 1968. These forests sustain very sparse vegetation with short stature trees and several kinds of shrubs and herbs. According to primary survey conducted in study area and consultation with the secondary resources, a total of 122 floral species belonging to 39 plant families were found including short stature trees like; *Acacia nilotica*, *Albizia amara*, *Leucaena leucocephala*, *Prosopis juliflora* and several kinds of shrubs like; *Argemone Mexicana*, *Lantana camara*, *Cassia occidentalis*, *Calotropis gigantea*, *Euphorbia antiquorum*, *Catunaregam spinosa*, *Opuntia sp.*, *Cassia auriculata* (mainly thorny bushes). The herbaceous flora comprises of *Croton bonplandianum*, *Capparis sepiaria*, *Cassia auriculata*, *Ageratum conyzoides*, *Anisomeles malabarica*, *Cynodon dactylon*, *Corchorus trilocularis*, *Impatiens balsamina*, *Oxalis corniculata*, *Mimosa pudica* and *Themeda triandra* etc. with several kind of grasses.

Cultivated crops includes; *Phaseolus sp.* (beans), *Phaseolus mungo* (greengram), *Phaseolus radiates* (Blackgram) are common pulses; *Oryza sativa* (rice), *Zea mays* (Maize) as cereals; *Carica papaya* (Pappali), *Hibiscus cannabinus* (Pulichakeerai), *Solanum melongena* (Brinjal), *Momordica charantia* (Bitter gourd), *Lycopersium esculentum* (tomato), *Hibiscus esculentus* (Ladies finger) as Vegetables. Whereas, *Anacardium occidentale* (Cashew), *Carica papaya* (Papaya), *Cucurbita*, *Cucumis melo* (Pumpkin), *Feronia elephantum* (Wood apple), *Psidium gujava* (Koyya), *Musa paradisiaca* spp. (Banana), *Cocos nucifera* (Coconut), *Citrus limon* (Lemon), *Mangifera indica* (Mango) and *Tamarindus indicus* (Tamarind) as fruits species.

From the faunal diversity perspectives, a total of 12 mammalian, 39 avian, 7 amphibian, 9 reptilian, 17 butterflies and 5 other insects are reported from the study area. Out of these, 2 mammals, 1 avian are listed in the Schedule-I of the WPA-1972. On account to aquatic life, few common/local fish species with general spectrum of the planktons are observed at some ponds at

villages. Common fishes are; Catla (*Catla catla*), Dwarf panchax (*Aplocheilus parvus*), Mrigal (*Cirrhinus mrigala*), Tank goby (*Glossogobius giuris*), Ticto barb (*Pethia ticto*), Greenstripe barb (*Puntius vittatus*) and Roho (Labeo rohita), Pool barb (*Puntius sophore*) etc.

1.4 ANTICIPATED ENVIRONMENT IMPACT AND MITIGATION MEASURES

1.4.1 Land Environment

Presently mining operations are carried out in the 5th bench and direction of development is in NW to SE of the mine pit. About 11.43.0 Ha area is existing quarry. The waste dump area is 1.79.7 Ha within the mine lease area. This is likely to go up to 11.65.0 Ha & 3.10.5 Ha under mining & Overburden/dumping respectively at the end of present Mine Scheme period.

In the ultimate stage about 11.65.0 Ha of land area will be covered under mining and 9.81.0 Ha will be under dumps. Area under mining will be 11.65 Ha; at conceptual stage, afforestation on the Ultimate benches within the area of 7.49 Ha and water reservoir will be formed within the area of 4.16 Ha. Besides this, 2.7634 Ha of land area will be covered under green belt / plantation.

Mitigation Measures

Top soil will be stored separately for future use in spreading afforestation areas.

A substantial plantation program was carried out undertaken along the public road and periphery of the mine lease area.

1.4.2 Water Environment

Anticipated Impact

No water is discharged to environment from Limestone mining at the project site.

The mining will not intersect ground water table (aquifer) thus avoiding a major impact on water regime.

Mitigation Measure

No waste water will be generated from the mine.

No toxic water will be generated.

Water monitoring will be done on time to time basis.

Garland drains shall be made around quarry and OB dumps to collect run off water and siltation points of sufficient size shall be provided for collection of silt.

1.4.3 Air Environment

Anticipated Impacts

Mining Operation carried out by opencast mechanized method generate dust particles due to loading & unloading of limestone and during transportation.

The dust liberated in mining and other related operations is injurious to health if inhaled in sufficient quantity.

Gases, such as, Sulphur Dioxide, Oxides of Nitrogen etc. from vehicular exhaust.

Blasting and drilling carried out and generate dust particles.

Mitigation Measures

Proper mitigation measures like water sprinkling will be adopted to control dust emissions.

Masks will be provided to workers.

To control the emissions regular preventive maintenance of equipment will be carried out on contractual basis

Blast site shall be wetted before and after blasting.

Wet drilling mechanism shall be adopted.

1.4.4 Soil Environment

Anticipated Impact

The land is a waste land. After mining this will become water reservoir which is useful for the plantation and other domestic purpose. No major impact on soil of the study area is envisaged due to mining activities as there is no waste water, heavy metal, and fugitive emission shall remain confined locally within working area and emission at haul roads will be controlled by water sprinkling and plantation.

Mitigation for Soil Environment

There is no waste water & toxic water will be generated.

Top soil shall be stacked at earmarked place and shall be used only in reclamation of OB dumps.

Reclamation of mined out areas including external OB dumps and back filled areas shall be taken up concurrent with progress of mining operations as per the EMP.

The voids left over after cessation of mining operations shall be converted in to water bodies.

1.4.5 Noise Environment

Anticipated Impact

Transportation vehicles used for the transportation of mineral are a source of noise pollution at the site.

Loading & unloading of minerals also source of noise pollution.

Blasting and drilling are also generating noise pollution.

Mitigation Measures

No other equipment except the transportation vehicles and excavator for excavation & loading will be allowed.

Noise generated by these equipments shall be intermittent and does not cause much adverse impact. Proper maintenance of all equipments/machines will be carried out which help in reducing noise during operations.

Plantation will be taken up along the approach roads and side. The plantation minimizes propagation of noise and also arrests dust.

Controlled blasting methods with proper spacing, burden and stemming shall be adopted to get optimum results.

Blast holes should be judiciously charged to control noise and blast vibrations.

1.4.6 Biological Environment

Anticipated Impact

There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly.

Mitigation Measures

Plantation will be done along the approach roads. These activities will help to improve the floral cover of the area, which helps counter soil erosion.

All the preventive measures will be taken for growth & development of flora.

Although, the project will not lead to any tree cutting, it is proposed to improve the greenery of the locality by plantation services. To avoid dust emissions, the mined materials will be covered with tarpaulin during transportation.

Suitable plan for conservation of Schedule-I Species have prepared and necessary fund for implement for the same will be made.

1.4.7 Impacts on Socio-Economic Environment

Anticipated Impact

From the primary Socio-economic survey & through secondary data available from established literature and census data 2001 & 2011, it is found that there would be positive impact on Socio-economic condition of the nearby area. There is no habitation in the mining lease area. Therefore, neither villages nor any part of villages will be disturbed during the entire life of the mine. Mining in this lease will give Direct & indirect 43 job opportunities to the local people.

Mitigation measures

Limestone mining will create beneficial effect on local people. With the operation of mining lease, various indirect employment opportunities will also be generated. Several persons of the neighboring villages have been benefited with contract works, employment through contractors, running jeeps, trucks, tractors and buses on hire, running canteens, different kinds of shops and transport related business avenues.

1.4.8 Solid Waste

Topsoil, and waste rock sandstone is being stored at the designated places separately. The top soil dump will be used for afforestation purpose in the reclaimed area. For biological reclamation, local grasses and shrubs will be planted followed by plantation of saplings of appropriate species. The top soil from the dump shall be re handled and spread over the afforestation area.

Anticipated Impact

Impact of runoff from overburden, top soil, low-grade ore on water bodies (siltation, contamination etc) shall be negligible.

No loss of vegetation and wildlife habitat is anticipated.

Impact on surrounding agricultural land shall be negligible.

Impact on groundwater quality due to leachate shall be negligible.

Impact of hazardous wastes and liquids is not anticipated so that the mine waste is negligible.

Mitigation measures

Overburden is backfilled into the worked out pits.

Plantation program was carried out.

Precaution will be taken for landslide control and slope also maintained.

1.4.9 Traffic Density

Anticipated Impact

Not much impact on local transport as only 12×2 trips/day $\times 2$ (up/down) = 48 tipper/day will be required for transport of mineral from mine. The LOS value from the proposed mine may be

“Excellent” for state highway. So the additional load on the carrying capacity of the concern roads is not likely to have any significant adverse effect.

Mitigation measures

It is being ensured that all transportation vehicles will carry a valid PUC certificate.

Speed limit of the vehicles will be followed. To avoid accidents the speed of vehicles will be low near habitation areas.

Un- necessary blowing of horn will be avoided.

1.5 ANALYSIS OF ALTERNATIVES

No alternative site had been considered since this is an existing captive limestone mine and hence it is site specific.

1.6 ENVIRONMENTAL MONITORING PROGRAMME

TANCEM has formulated well laid-out Environmental Policy, wherein preservation of environment has been accorded a most strategic and prime position. The various protocol procedures in connection with communication channels upwards and downwards, for dealing with violations or departures in environmental standards involvement of Board of Directors as well as shareholders about such incidences, etc.

Regular monitoring of implementation of various control measures in respect of air quality, meteorology, water quality, noise levels, biological status, land environment, socioeconomic factors, occupational health, etc. is most important to ensure that the project operations do not deteriorate the environmental status of the area at any point of time and environmental quality in respect of above parameters are kept well within the statutorily sustainable levels, as prescribed by CPCB, MOEF&CC and State Pollution Control Board.

A full-fledged environment cell is operating in the Pandapuli Limestone mine. This cell will undertake effective monitoring and implementation of various environmental control measures promptly and effectively and to oversee various environmental management schemes for air quality control, water quality status, noise level control, plantation programmes, social development schemes, construction of garland drains, etc. in the cement plant and all the working mines in the area.

The total recurring costs per annum for environmental control, excluding man power cost, work out to Rs.11.25 lakhs. In case of any further necessity for funds for implementation of control measures.

1.7 ADDITIONAL STUDIES

M/s Tamilnadu Cement Corporation Limited has formulated a disaster management plan for Emergency Preparedness & Responses.

The salient features are elaborated as below.

- Emergency response Organization
- Communication System
- Action on the site
- Facilities available at site.

Emergency Response organization

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

Person	Name	Contact No.	Responsibility
Head of the department	Mr. V.Karthikeyan	6384817919	Site Controller
Section in charge	Mr. A.Bose	9486028541	Accident Controller/ Communication officer
Employee who gives the first information about the accident/ Shift in charge	Mr. S.Vairavan	8344121006	Primary Controller
P & A Dept. (HOD)	Mr. Baskar	04562171836	Liaison officer

1.8 PROJECT BENEFITS

Project has positive impact to the local people as direct and indirect employment opportunity have been generated. M/s TANCEM had incur approx. Rs. 233.68 Lakh invested towards Corporate Social Responsibility.

1.9 ENVIRONMENTAL MANAGEMENT PLAN

1.9.1 Air Quality Management

Proper mitigation measures like water sprinkling on haul roads will be adopted to control dust emissions.

To control the emissions regular preventive maintenance of equipments will be carried out on contractual basis.

Plantation will be carried out along approach roads & mine premises.

It shall be ensured that all transportation vehicles carry a valid PUC certificate.

1.9.2 Water Management

No waste water will be generated from the mining activity of minor minerals as the project only involves lifting of over burden from mine site.

1.9.3 Noise Management

Periodical monitoring of noise will be done.

No other equipments except the Transportation vehicles and Excavator (as & when required) for loading will be allowed at site.

Noise generated by these equipments shall be intermittent and does not cause much adverse impact.

Plantation will be carried out along approach roads. The plantation minimizes propagation of noise and also arrest dust.

1.9.4 Solid Waste Management

No solid waste will be generated from the said mining operations.

1.9.5 Occupational Health & Safety

Dust masks will be provided as additional personal protection equipment to the workers working in the dust prone area.

No, occupational health hazards is reported till date from this activity.

Workers are informed, kept aware and trained about occupational health hazards, due to such activities and preventive measures.

Workers health related problem if any, will be properly addressed.

1.9.6 Plantation Development and Program

The green belt plantation programme will be continued till the end of the mining operation in the area. In framing out this programme on a sustainable and scientific base, due consultation and coordination with the forest department will be sought. The plantation will be developed in 33% of the project area. The overall plantation will be developed at the rate of 1500 saplings/Ha. Plants are chosen to provide aesthetic, ecological and economical value. Trees will help to arrest propagation of noise and help to lessen dust pollution due to dust arresting action

Total cost for green belt development will be Rs. **721800/-** as capital cost and **Rs 72180/-** as recurring cost.

1.10 ECOLOGICAL DAMAGE ASSESSMENT, REMEDIATION PLAN AND NATURAL & COMMUNITY AUGMENTATION PLAN

As discussed, it is safe to say that the project is not likely to cause any significant impact on the ecology of the area, as adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Green belt development around the area will also be taken up as an effective pollution control technique, as well as to control the pollutants released from the premises of the proposed mine. The project will throw opportunities to local people for both direct and indirect employment. The proposed mining operation in the state will not only fetch income to the state exchequer but also ensure healthy development. Illegal mining and un-organized mining poses a much bigger health hazard where as organized mining under ML facilities to undergo periodic health check-ups. At present agriculture is the main occupation of the people living in the study area. Due to mining project the occupational pattern of the people in the area will change making more people engaged in industrial and business activities there by leading to urbanization. It is expected that education, health, housing, water and electricity etc facility will improve to due to this mining project and associated industrial and business activities.

1.11 CONCLUSION

The project has positive impact to the local people as direct and indirect employment opportunity have been generated. There will be no significant pollution of air, water, soil and noise. Regular monitoring of all the components of environment will be done. Increased social welfare measures taken by the company. All possible environment aspects have been adequately assessed and necessary control measures have been formulated to meet statutory requirement.