

**M/S. INDIA CEMENTS LTD.**

**Sankarnagar**

**EXECUTIVE SUMMARY  
OF LIMESTONE MINING PROPOSAL  
TALAIYUTHU RESERVE FOREST AREA (48.33 ha.)  
OF TALAIYUTHU LIMESTONE MINE**

**Talaiyuthu village,  
Tirunelveli Taluk,  
Tirunelveli District.**

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Prepared by

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## **1.0 INTRODUCTION**

### **1.1 General information**

The India Cements Ltd (ICL), a market leader in cement manufacturing process and established in the year 1946. The company is having seven cements plants in Tamilnadu and Andhra Pradesh. In order to cater the need of limestone for cement manufacturing, ICL, Sankarnagar has developed its captive Limestone mines in Tirunelveli, Thoothukudi and Virudhunagar districts. Talaiyuthu limestone mine is one of the captive limestone mine having 5 mining leases. Government of Tamilnadu has granted 96.71.0 Ha. in Talaiyuthu village, Tirunelveli Taluk, Tirunelveli District, Vide G.O. 148 dated 18-06-1999.

Since the mining lease was expired on 03.05.2008, the company has submitted the renewal application as per the Forest (Conservation) Act, 1980. Further, in pursuance of the IBM circular insisted on usage of minimum forest area for dumping purpose in case of open cast mines. The company has decided to retain only an area of 48.33 Ha. which is essentially required for mining purpose and surrendered the remaining area of 48.38 Ha. to the Forest Department.

According to guidelines of the Ministry of Environment and Forest for the **mining projects**, the present scenario of all aspects of environment within 10km radius of the study area of Talaiyuthu limestone mine have been evaluated and incorporated in the Environmental Impact Assessment report.

### **1.2 The objectives of the study are:**

- To establish the present environmental scenario
- To prepare a detailed action plan for implementation of mitigative measures.
- To suggest preventive-and mitigative measures to minimize adverse impacts and to maximize beneficial impacts.
- To anticipate the impacts of existing project minimize adverse impacts and to maximize beneficial impacts.
- To suggest a monitoring programme to evaluate the effectiveness of mitigative measures
- To implement the environmental protective measures to eliminate the negative impacts.
- To suggest the formation of a core group responsible for implementation of environmental control and protective measures and monitoring of such implementation.
- To suggest a feedback mechanism enabling to make mid course corrections
- To prepare a capital cost for Environmental monitoring and Environmental Management Plan.

### **1.3 Location and accessibility**

The Talaiyuthu Limestone Mine is located at Talaiyuthu village, Tirunelveli Taluk and Tirunelveli District in the survey field no. 1 & 2 (part). The proposed area falls in the Topo sheet 58 H/9 with Latitude E 77° 40' 15" and Longitude N 78° 48' 40". Talaiyuthu Limestone Mine is situated 3.0 km and 10.0km away from Sankarnagar and Tirunelveli respectively. The nearest rail head is at Talaiyuthu and the nearest airport is at Tuticorin, which is 4.0 km and 65.0km away respectively from the proposed project site.

## **2.0 Project Description**

### **2.1 General Information**

The terrain of the RF lease is a low relief on the eastern side with small undulations which rise up on the western side to form a quartzite hillock. The area is rocky terrain with quartzite boulders & pebbles scattered all around. Though the area is categorized under Reserve Forest, this is an extremely degraded type of forest. No tree growth worth this name exists. The vegetation expresses mostly of Euphorbia varieties.

### **2.2 Geology**

The limestone band and other associated rock forms the foot wall side of the main quartzite band. The general trend of the limestone band is NS and NNW and the dip is generally towards west at 65° to 75°. The limestone deposit has been proved up to the depth of 70m by means of detailed core drilling study. The limestone of this mine is classified into limestone and magnesian limestone. It is estimated that the residual mineable limestone reserves in the mine is 59.37 Lakh Tons.

### **2.3 Mining**

Limestone production and the development works will be carried out by using Heavy Earth Moving Machineries. This opencast limestone mine will have the development benches of 10m height and 10m width. By drilling and blasting method limestone and development waste materials are removed. The sorted out limestone will be transported to the factory for cement manufacturing process. It is planned to take around 3.30 lakh tons of limestone per annum from this mine. The rated out put of limestone will be 1100 tpd. At the rate of around 3.30 lakh tons production per annum the life of the mine would be around 20 years. The development waste will be dumped far away from the stripping limit of the mine.

## 2.4 Mine drainage

The area is situated in the rain shadow belt of Western Ghats and the average rainfall for the last 10 year is only 600 to 700mm. Since the lease area is situated on the eastern slope of the Talaiyuthu Quartzite Hillock there will not be any serious drainage problem. During rainy season stagnated water if any will be pumped out by using two Nos. of 15 HP diesel pumps. The pumped out water will be utilized for plantation purpose.

## 2.5 Equipments & Manpower Potential

The major heavy earth moving equipments required for this mine is listed below:

<b>S.No</b>	<b>Equipment list</b>	<b>HP</b>	<b>Nos.</b>
1.	Wagon drill – Atlas Copo PVP – 25	90	1
2.	Jack hammer	90	2
3.	Front end loader	106	2
4.	Poclain 300 CK	324	1
5.	10 Ts tippers	106	5
6.	Dumper – 25 T	256	6

Manpower potential required for the mining operations is given below:

<b>S.No</b>	<b>Equipment list</b>	<b>Nos.</b>
1.	Mine Manager	1
2.	Mining Engineer	1
3.	Mine Mate	1
4.	Blaster	1
5.	Geologist	1
6.	Mine surveyor	1
7.	Office clerk	1
8.	Driller	2
9.	HEO / MVT	4
10.	Mechanics	1
11.	Helper	1
<b>Total</b>		<b>15</b>

## **2.6 Basic Amenities**

### **a) Water requirement**

The required water for drinking will be taken from the bore wells of the mine. The mine pit water will be used for watering the plants and for dust suppression mainly in the haul roads. The total water requirement for the mine is 19.25 KLD.

### **b) Electricity**

The power requirement of 52000 units per annum and will be drawn from the Tamilnadu Electricity Board.

### **c) Fuel Requirement**

The fuel requirement of 240 KL/year mainly required for heavy earth moving machinery will be met from storage facility provided at factory premises.

## **2.7 Infra Structure Facilities**

The infra structure facilities like provision of rest shed, toilet, office buildings etc are already available in the mine.

## **3.0 EXISTING ENVIRONMENTAL SCENARIO**

### **3.1 Topography, Drainage & Climate**

The limestone deposit of Talaiyuthu Limestone Mine is situated on the eastern slope of the Talaiyuthu Hillock. The terrain of the area has a low relief on the eastern side with small undulations which rises on the western side to form a quartzite hillock. The area is rocky terrain with quartzite boulders occurring all around and scattered. The area experiences very scanty rain even during monsoon period.

The area is neither a catchments area nor watershed and no river or nalla are emanating from here. The perennial river Thamirabarani is flowing 5 km SE of the lease area. There are some small water bodies occurring here and there around this area. They are of seasonal and almost dry through out the year.

The study area is situated in the warm climatic belt with moderate humidity. During the summer the temperature ranges from 32.8°C to 38.2°C while during winter it varies between 22.2°C to 25.5°C. The rainfall is mostly due to the SW and NE monsoon season with the average precipitation of 692.09 mm per year. The maximum rainfall is generally experienced in the months of August, September and October.

In the month of May to September the predominant wind direction is from SW during both morning and evening hours. During the month of January to March the predominant wind direction is generally from E while for the period from October to December it is from NE.

### **3.2 Flora & Fauna**

The study area falls under arid zone. The vegetation is characterized with open shrub type of vegetation and with trees comprising *Zizyphus jujube*, *Parkinsonia aculeate*, *Peltophorum ferrugenum*, *Prosopis juliflora*, *Azadiracta indica*, *Borassus flabellifer*, *Acacia* species etc.

The presence of herbaceous flora can also be noticed mostly during monsoon season. Various types of shrub species adapted to xerophytic condition are present all around the core zone and buffer zone of the study areas. The common reptiles found in the area are snakes like – Russel viper, Indian Cobra, Saw scale viper etc and other reptiles like Lizard, Chameleon are also found in the area. The common mammals in the area are squirrel, bat, mongoose, dog, cat, fox and wolf. Birds like Pigeon, house crow, sparrow, myna, parrot peacock, wood pecker, vulture, pariah kite etc are also seen in the area.

### **3.3 Hydrological Condition**

#### **a. Surface water**

Thamirabarani River and Cittaar are flowing 5 km and 8 km away from the project site in the South East and northern side of the study area respectively.

#### **b. Ground Water**

Ground water is drawn from the hand pumps, open wells and water supply systems at selected towns. They are the main sources for domestic use. To estimate the quality of water, water samples have been drawn from River Thamirabarani, Cittaar and 7 bore wells. Total hardness of the water in the study area is under desirable limits. The ground water at Talaiyuthu was found to contain about 331 - 372 mg/l of total dissolved solids which is well within the prescribed limits as per IS 10500: 1991 of drinking water specification. In places like Gangaigondan and Pallikkottai well water samples total dissolved solids were found to be 1031 and 823 mg/l respectively. In Tenkulam (well) water was found to be of good quality with the lower dissolved solids of 495 mg/l. Other than this, oil and grease is not found anywhere in the samples collected.

### 3.4 Air & Noise Environment

To assess the existing air quality and noise level, sampling stations were established at seven points. In the core zone area the air quality is found to be 157.7microgram /m<sup>3</sup> and in the buffer zone the air quality is found to be 55.5 microgram / m<sup>3</sup>. Comparatively the present air quality is much lower then the prescribed standard of 500 microgram / m<sup>3</sup>and 200 microgram / m<sup>3</sup> respectively.

Noise level of the existing environment is found to be well within the prescribed limits in the core zone and as well as in the buffer zone.

### 3.5 Land use pattern

Land use pattern of the entire Talaiyuthu Limestone Mine and area under reserved forest mining lease are given below:

Sl.No.	Land use	Total Lease Area		Forest Area	
		Area (Ha.)	% of Total	Area(ha.)	Area (%)
1	Under Mining	53.76	49.02	36.30	75.10
2	Waste Dumps and Bunds	5.39	4.92	9.20	19.00
3	Infrastructure Facilities	1.33	1.21	0.00	0.00
4	Roads, Safety Zone etc.	16.64	15.17	2.83	5.90
5	Afforestation / Green belt area	32.54	29.68	0.00	0.00
<b>Total</b>		<b>109.66</b>	<b>100</b>	<b>48.33</b>	<b>100.00</b>

Detailed break up of land use pattern in buffer zone based on 2001 Census data is given below.

### Land use pattern of 10km radius study area (Buffer Zone)

LAND USE	AREA (Ha.)	% OF TOTAL AREA
Irrigated land	3036.76	18.77
Unirrigated land	1934.86	11.96
Culturable waste land	3080.64	19.05
Area not available for cultivation	2766.70	17.10
Forest land	2854.31	17.65
R.F. Forest land	2501.67	15.47
<b>TOTAL</b>	<b>16174.94</b>	<b>100.00</b>

### 3.6 Socio economic status

In the study area 33 villages have been studied. As per the census data, the total population is 52573 over an area of 78.5 sq.km, having a population density of 669 per sq.km. The main workers constitute 38.0%, marginal workers 6.8% and non workers 55.2% of the total population. Out of the main workers cultivators and agricultural labor constitute 41.58%, while only 9.88% are in house hold industry. This shows that the major source of income of local population is agriculture.

District	Taluk	Total Population	Male	%	Female	%
<b>Tirunelveli</b>	Tirunelveli	74596	36847	49.4	37749	50.6
	Palayamkottai	7977	3922	49.1	4055	50.9
	<b>Total</b>	<b>82573</b>	<b>40769</b>		<b>41804</b>	<b>100</b>

OCCUPATION	POPULATION	%
Marginal workers	5659	6.8
Non workers	45522	55.2
Main workers	31392	38.0
<b>Total</b>	<b>82573</b>	<b>100.0</b>

<b>Break-up of main workers</b>		
Cultivators	3840	12.23
Agriculture labour	9212	29.35
Household industry	3103	9.88
Others	15237	48.54
<b>Total</b>	<b>31392</b>	<b>100.0</b>
<b>Others Details</b>		
Literate	53462	64.7
SC	25628	31.0
ST	86	0.10
<b>Total SC &amp; ST</b>	<b>79179</b>	<b>31.14</b>

Within the buffer zone study area, most of the villages have basic amenities such as educational, medical, electricity, communication facilities etc.

### **3.7 PLACES OF TOURISM/RELIGIOUS/HISTORICAL INTEREST**

There is no place which is of interest for tourism, religious or historical importance in the near by area. However, the district head quarters, Tirunelveli and Palayamkottai have a number of ancient temples and historical monuments.

## **4.0 Environment Impact Assessment**

### **4.1 Air Environment**

In the study area, the air pollutants levels of SPM, SO<sub>2</sub>, NO<sub>x</sub> gases are well within the permissible limits. The mining operations like drilling, blasting, loading and transportation may increase the pollution load marginally. However it will be controlled by means water sprinkling at all the source of dust generation and in the haul roads.

### **4.2 Water resource**

Water is mainly required for domestic purpose and also for water sprinkling haul roads and working benches. The required water will be met from the mine sump pumping arrangements. ICL requires about 19.25 m<sup>3</sup>/day of water for all operations including green belt development within the mine area.

Water sprinkling:	18.00 m <sup>3</sup> /day
Green belt development:	0.75 m <sup>3</sup> /day
Domestic purpose:	0.50 m <sup>3</sup> /day
Total:	19.25 m <sup>3</sup> /day

### **4.3 Water Quality**

Lime stone excavated from the mines are directly used for cement manufacturing. Mineral beneficiation process is not envisaged due to direct usage in the process. Hence there is no tailing or process wastes generated from this mine.

There is no trade effluent generation from this mine. Only domestic sewage to the tune of 0.25 m<sup>3</sup>/day will be generated which will be treated in a suitable septic tank of size 1.5 x 1.0 x 1.0 m followed by dispersion trench of size 5.0 x 2.0 x 2.5 m.

### **4.4 Land degradation**

Out of 48.33 Ha. mining operations will be limited to an extent of 36.30 Ha., 9.20 Ha will be designated for waste dumping and the remaining area of 2.83 ha will be utilized for mine road. The mined out pit will be used for storing rain water and it will further used for plantation.

### **4.5 Noise level and ground vibration**

Since the application of drilling, blasting, haulage / transportation are used for limited extent and marginal increase in ambient noise level is expected. Certain amount of ground vibration is also anticipated due to blasting operations.

However, it is found that the noise and vibration levels are well with in the limits prescribed limit of Directorate of Mines Safety. The Directorate of Mines Safety has also given permission to carryout deep hole drilling and blasting in the mine. The noise and ground vibrations are monitored using Blast Vibrometer.

### **4.6 Socio – economic impact**

Since there is no human settlement in the mining area and hence there will not be any displacement of households and the question of rehabilitation also does not arise. Mining will result in loss of aesthetic environment only. However, the mining operations will generate direct and indirect employment to the villagers

## **5.0 ENVIRONMENTAL MANAGEMENT PLAN**

In order to mitigate the environmental impact due to mining and its allied activities, a comprehensive environmental management plan (EMP) has been formulated.

### **5.1 Land degradation control measures**

The limestone deposit is narrow in the lease area and extended depth wise, the mineable depth is being 70 m. The pit remains in operation over almost entire area during the life of the mine. This does not allow the normal practice of phase wise reclamation by refilling of mined out area with the waste generated during later periods. Totally 32.54 Ha. of area will be covered under tree plantation in all the five mining leases including 11.61 ha. under Talaiyuthu RF area.

### **5.2 Air Pollution control measures**

As we discussed earlier, the ground level concentration of SPM, SO<sub>2</sub>, CO and NO<sub>x</sub> are well within limits. However, efforts are necessary to contain the dust generation at source for improvement of environmental conditions, as given below.

- Dust extraction system to be provided in drill machines.
- The cuttings will be wetted by wet drilling wherever possible.
- Using sharpened drill bits with efficient flushing system.
- Dust suppression on mine working areas, haul roads and the road leading to the factory for limestone transport by periodical water sprinkling. This is of highest importance.
- Proper maintenance of all earthmoving and transport equipments / vehicles for control of gaseous emissions.

### **5.3 Control measures for water pollution**

Since the major cause of surface water pollution in the opencast mining activities is the wash off from the freshly excavated areas and fresh outside/inside dumps. Since the annual rainfall is low in these areas, wash off from this proposed mine is very much limited. Further the analysis of water from various points like nalas, wells and rivers, reveals that all the parameters are well below the limits prescribed by CPCB.

Still in order to prevent degradation and to maintain the quality as prescribed by MOEF, adequate control measures are required to check the wash off from the freshly excavated areas and soil erosion from dumps. Control measures to be adopted are:

- The peripheral bunds will help in such a way that the soil is not carried away by storm water.

- A water gradient of about 1 in 100 shall be kept at every bench towards inside of the bench to prevent formation of gullies in the bench slopes which cause serious erosion.
- Stabilization of bund slope to prevent erosion.
- To prevent surface and ground water contamination by oil/grease, leak proof containers shall be used for storage and transportation of oil/grease.
- The floors of the areas wherever oil/grease is handled shall be kept effectively impervious. Any wash off from the oil/grease handling area or workshop shall be drained through impervious drains, collected in specially constructed pit and treated appropriately before releasing it into the natural drains.

As the area receives very poor rainfall the water table is very low. However, during the rainy season, the rain water collected in the mine will be dewatered and it will be used for plantation and other works. There is no natural spring and stream course in the core zone.

#### **5.4 Control measures for noise level and ground vibration**

The noise level monitoring carried out in and around the mine has revealed that the ambient noise levels are well within the prescribed limits. The following measures will be undertaken for noise control:

- Tree plantation around the working areas will act as noise barrier.
- Preventive maintenance of mining machinery and transport vehicles to eliminate noise as far as possible.
- Ear muffs have been given to those persons operating or working close to any machine generating noise levels more than 85 dB(A) on continuous.

The levels of ground vibration controlled by adopting controlled blasting practice by minimizing explosive charges per delay during blasting. The following safety precautions adopted during blasting :

- Blasting only at specific notified time selecting bright sunny weather avoiding cloudy weather, thunderstorms, early morning and evening times
- All persons kept at least 500 m (safety zone) away from the place of blasting as per statutory requirements.
- Posting of security guard at all entry points.
- Blowing siren three times before blasting.

- Supervision of entire blasting operation under a competent official approved by Director General Mine Safety.
- Using millisecond delay detonators and Sequential Timer Blasting Machine and maintaining appropriate spacing and burden.
- Selecting appropriate type of explosives to suit strata conditions and Judicious decking of explosive charges to ensure effective usage of explosives energy for rock breakage to prevent air blast, high noise level and fly rocks
- The National Highway (NH-7) 3 Km away from mines is not affected by fly rocks.
- The forest fauna is also adequately protected by above controlled methods of blasting.

### **5.5 Socio-economic condition**

As no habitation is going to be effected by the project, no rehabilitation package is necessary for resettlement of people. The amenities created for project employees will also be available for the inhabitants of adjoining villages. Job opportunities will be much limited with in the project but avenues for marketing of day-to-day material for the project employees, service industries, and various other activities around the project will tend to raise the standards of living of local population.

### **5.6 Places of religious/historical/architectural importance**

Since there are no important historical or religious structures in the study area, hence, there will be no impact and therefore, no control measures are required.

### **6.0 ENVIRONMENTAL CONTROL AND MONITORING ORGANIZATION**

An appropriate team is existing and is proposed to be continued to take care of pollution monitoring aspects and implementation of control measures. A schedule has been spelt out for periodical monitoring. The total investment on environmental improvement works is envisaged as Rs.33.0 lakhs and recurring expenditure during the stage of production is Rs.9.0 lakh per year.

## **7.0 DISASTER MANAGEMENT PLAN**

Appropriate disaster management plan has been spelt out in the EIA/EMP to take care of the following:

- Risk of inundation
- Disaster due to failure of pit slope
- Disaster due to failure of dump slopes
- Danger due to storage of explosives

Hence, no danger of any kinds is anticipated.

**For the India Cements Ltd,**

**SENIOR VICE PRESIDENT(MANUFACTURING)**