

**EXECUTIVE SUMMARY
OF
*ENVIRONMENTAL IMPACT ASSESSMENT
AND
ENVIRONMENTAL MANAGEMENT PLAN***

For

**LUMSHNONG LIMESTONE MINES
LUMSHNONG, JAINTIA HILLS DISTRICT
MEGHALAYA
(OVER ML AREA OF 70.00 HA.)**

Prepared For

**M/S CEMENT MANUFACTURING COMPANY LIMITED
LUMSHNONG, JAINTIA HILLS DISTRICT
MEGHALAYA**

Prepared By



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EXECUTIVE SUMMARY

1. PROJECT DESCRIPTION

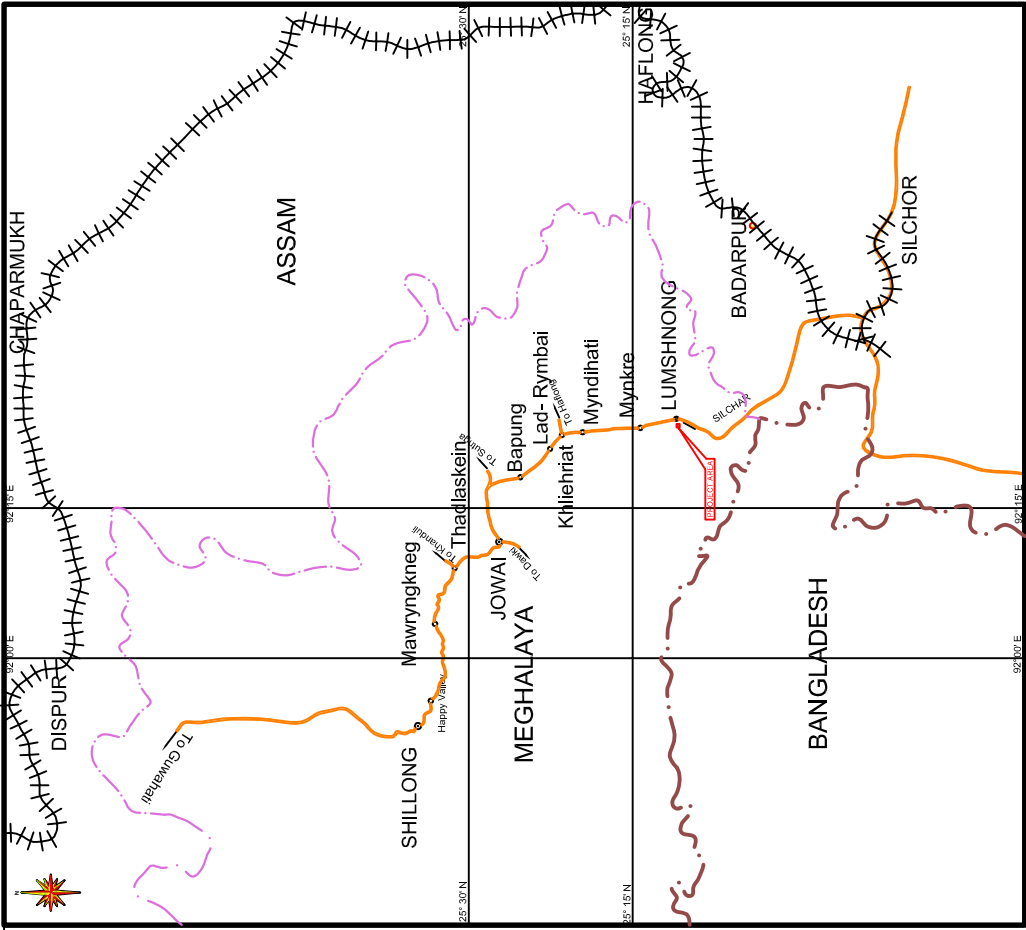
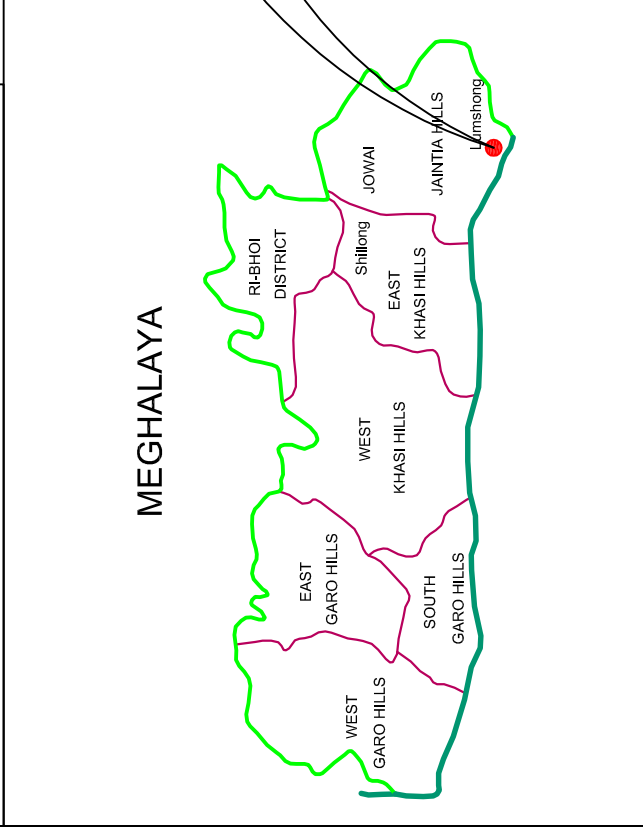
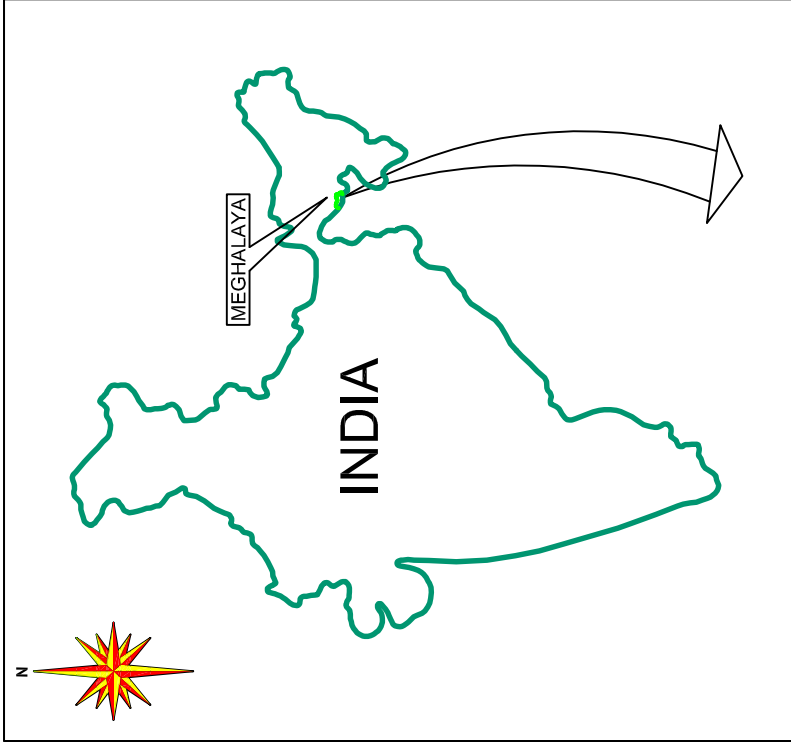
Mining Lease for the Lumshnong limestone project area over 70 ha. was granted by Meghalaya state Govt. vide letter number MG/54/2009/190 dated 22.12.2009 to M/s Cement Manufacturing Company Limited which is a public limited company. The project area is of private land category. No forest area involved. The mining operation will be carried out as per approved mining plan . Mining plan for the period 2010-11 to 2014-15 was submitted to IBM, Govt. of India. TOR has been granted by MOEF, Govt. of India for production capacity upto 9,00,450 MT as per the pre-feasibility report. This is a new mining proposal. The Limestone from the mines shall be utilised in the cement plant of the company. Cement Manufacturing Company Ltd (CMCL) an ISO9001:2000 certified company was incorporated as a Public Limited Company on 2nd November 2001 with Registered office and works at Lumshnong, Jaintia Hills district, Meghalaya. CMCL was granted licence for setting up a 900 TPD cement plant at Lumshnong village, Jaintia Hills district Meghalaya by the Govt. of Meghalaya in the year 2002 and subsequently was granted for expanding the capacity to 2400 TPD which was obtained the Environmental; clearance from SEIAA vide letter No. SEIAA/ Project-6/ 2008 / 23 Dated 16.03.2010 .

Geographical Location (Fig. 1)

State	Meghalaya
District	Jaintia hills
Village	Lumshnong
Lease Area	70 ha
Toposheet No.	83C/W
Latitude	25 ⁰ 10'05" to 25 ⁰ 10'32"N
Longitude	92 ⁰ 21'46.4" to 92 ⁰ 22'25.6"E
Altitude	498 m AMSL to 630m AMSL

There is no public road or railway line within the M.L area. The lease area is situated at distance 1.5 km west of NH-44 connecting Shillong to Silchar. The nearest railway station at a distance of 80km from Lumshnong is Badarpur on Guwahati-Lumding-Silchar meter gauge section of N.E.F. Railway. **Fig. 1.** The lease area map is given in **Fig. 2** Topography of the ML area and its surroundings are rugged and mountainous. Maximum and minimum contours passing through the area are 630m and 498m respectively. Northern part of the area is at a higher elevation with respect to southern and south-western part.

A seasonal nala flows from north to south in the southern part of the mining lease area. This nala joins a perennial nala running E-W at a distance of 700m towards south of the area.



LUMSHNONG LIMESTONE DEPOSIT

OVER AN AREA 70.00 HECTARES
IN JAINTIA HILLS DISTRICT, MEGHALAYA.

M/S C.M.C LTD.


LOCATION PLAN


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
50510Km


FIG. NO- 1

I N D E X

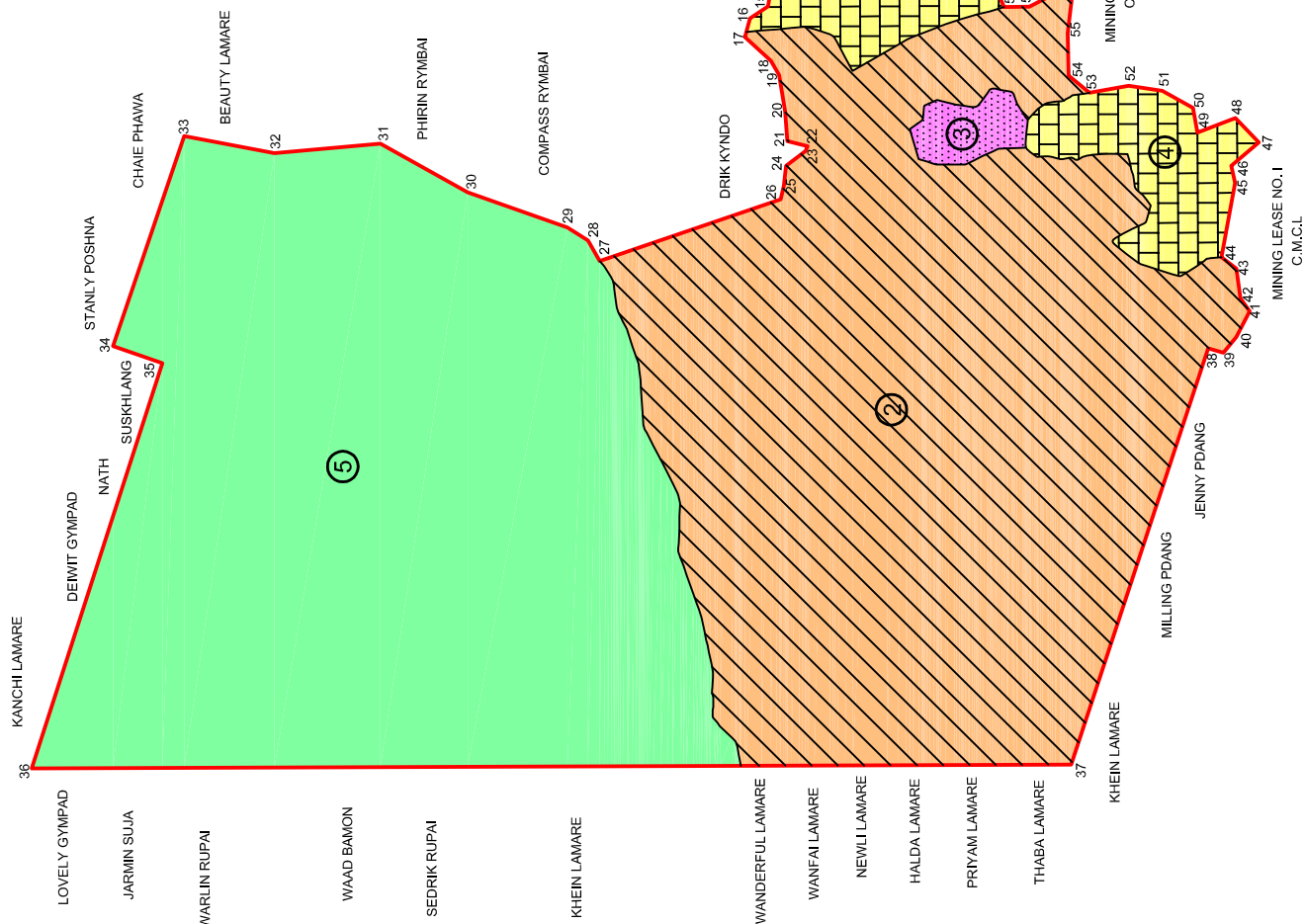
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PROJECT AREA
- 

ROAD
- 






RAILWAY
- 

STATE BOUNDARY



RIGHTS BENCH MARK
RL-550M
(BEARING - 195° 36')

LAND DETAILS

SL. NO.	LAND HOLDER	AREA (Ha)	SYMBOL
1.	C.M.C.L	4.241	
2.	EMLANG LAMARE	32.821	
3.	COMPASS RYMBAI	0.630	
4.	C.M.C.L	2.308	
5.	SIMON SIANGSHA	30.000	
	TOTAL	70.000	

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M.L. BOUNDARY

**LUMSHNONG LIMESTONE DEPOSIT
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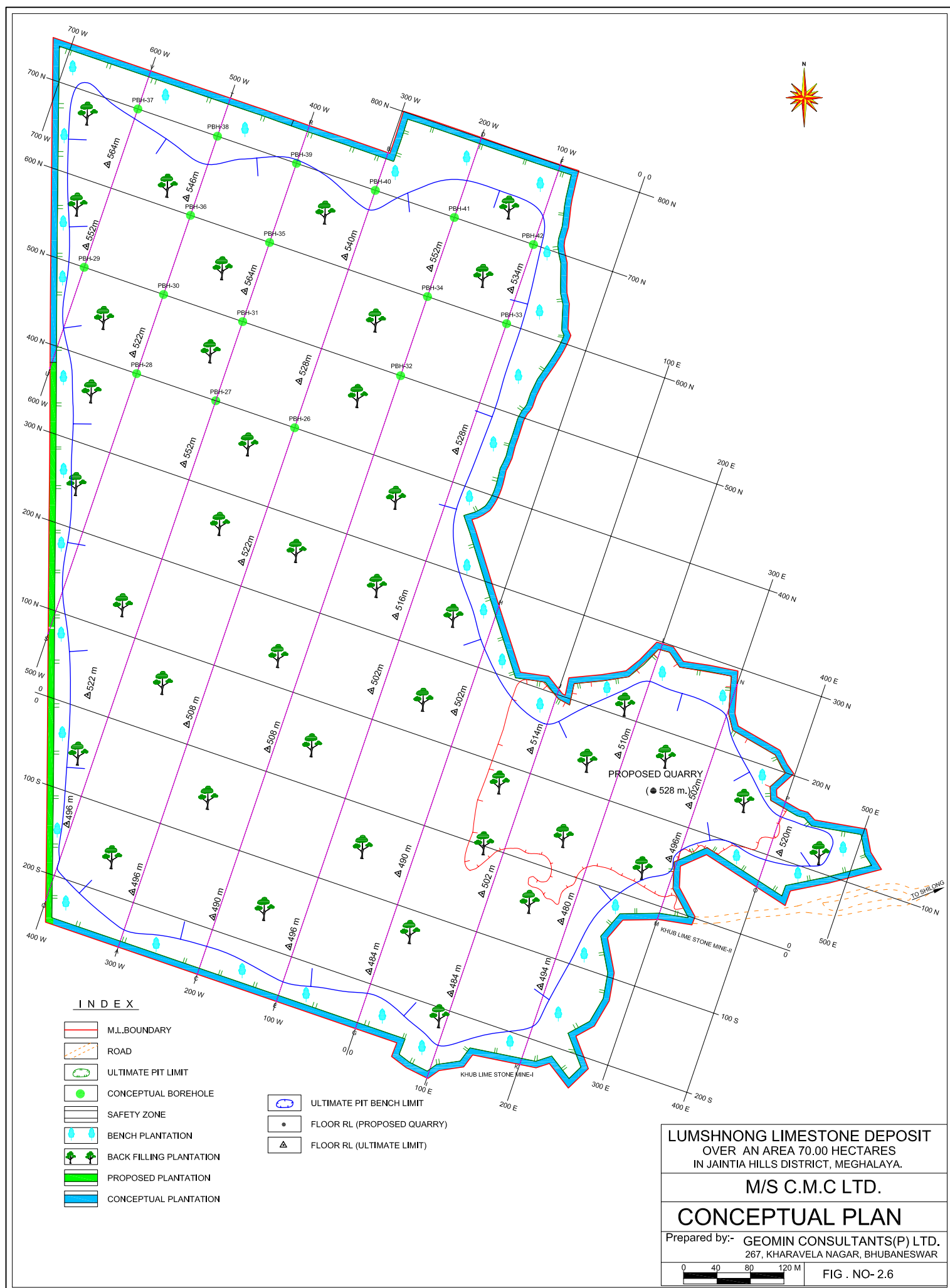
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LEASE PLAN

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FIG. NO - 2.3



The reserves of the area are as follows.

	Geological Reserve (Tonne)			Mineable reserve (Tonne)		
	Proved	Probable	Total	Proved	Probable	Total
Lime Stone	26,998,200	36,588,375	63,586,575	24,618,150	3,31,98,075	57,816,225

Based on the bore hole drilled in the limestone ore zone the grade wise resources have been computed below by taking log analysis data into account.

Opencast fully mechanised method of mining will be adopted on two shift basis. Machineries/vehicles like crawler drill, air compressor, hydraulic excavators, dumpers, etc. will be used. The limestone and sandstone OB shall be dislodged by crawler drill and blasting. Limestone and Sandstone will be handled by dumpers/ tipper trucks and Excavators. Height and width of the mine benches would be 6 meters and 15 meters respectively. Slope of the benches will be 22° where as overall slope of the pit will be 45°. Production will be upto 9,00,450 TPA of limestone. Keeping the above production, the life of the mine will be 66 years, including 5 years of plan and 61 years of beyond plan period. The capital cost of the project is 6.65 crores. The total amount of Sandstone OB generated will be 3.645 Million Cum during life of the mine including 3,21,453 cum of OB during first 5 years of plan period. 70% of the waste material shall be used for backfilling and 30 % shall be utilised as an additive to make up the deficiency of Silica in the rawmix and road maintenance. There would be a temporary dump over 2.25 ha. of land for storage of sandstone OB and it's subsequent use for back filling and the area will be utilized for mining .The capacity of the dumps will be 2.25 lakh cum. .The height & width of the terraces will be 2m and 5m respectively and maximum height of the dump will be 10m.The sandstone would be stacked in dump yard and will be utilized for backfilling of mined out area. Employment will be provided for 137 people in two shift basis. Ultimate working depth of the mine will be 480m AMSL where as ground water table is at 420m AMSL (in summer) and 425m AMSL (in rainy season). Hence mining will not touch ground water table. About 75 Cum of water will be required daily and 65 Cum shall be met from surface water source and balance 10 Cum treated water will be supplied from CMCL Plant site

2. DESCRIPTION OF THE ENVIRONMENT

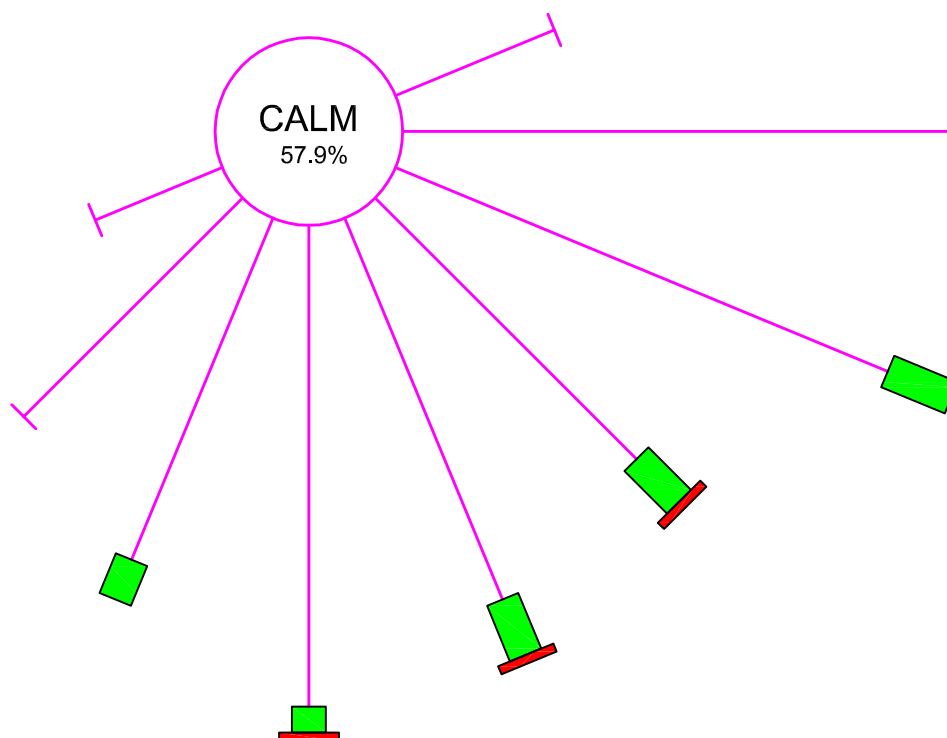
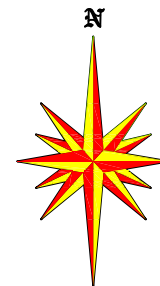
Different environmental parameters required to evaluate the prevailing scenario have been generated / collected and compiled for the period from March 2011 to May 2011. The annual normal rainfall of Shillong area is 2415.3 mm. The temperature ranged from 14.6°C to 29.0°C while the relative humidity varied from 65.0% to 95.0% during the season. The predominant wind direction is from Southern side. The wind rose diagram is shown in **Fig. 4**. The sample location map is indicated in **Fig. 5**.

The CPCB value for rural and residential areas for PM 10, SO₂, NO_x and CO (24 hourly) are 100, 80, 80 and 2000µg/cum respectively. We had taken various ambient air quality datas from eight stations for minimum one season. The analysis results are presented as follows.

WIND ROSE DIAGRAM

STATION - LUMSHONG

SEASON -



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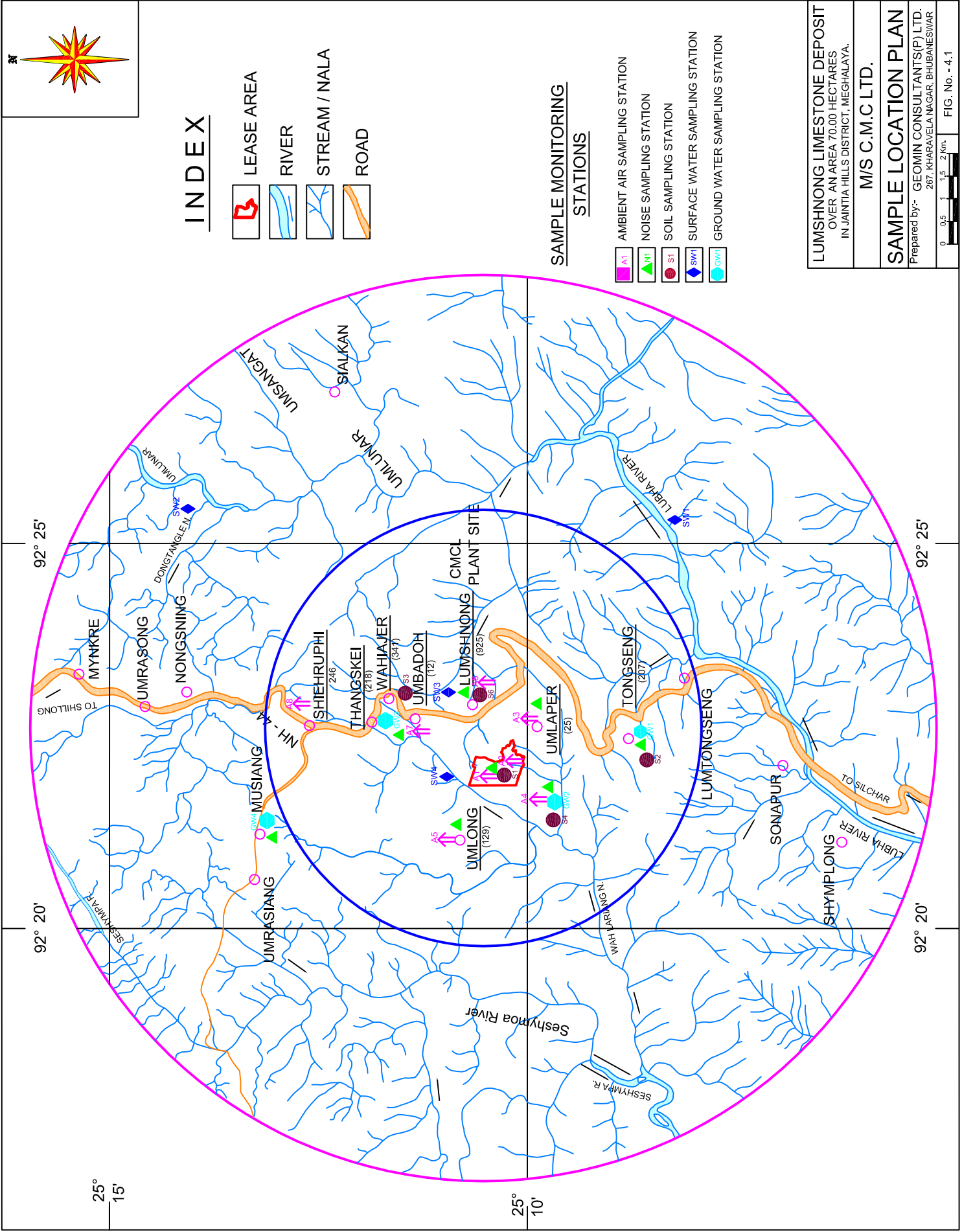
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WIND ROSE DIAGRAM

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SCALE - 1CM=1%

FIG . NO- 3.2



INDEX

- LEASE AREA
- RIVER
- STREAM / NALA
- ROAD

SAMPLE MONITORING STATIONS

- AMBIENT AIR SAMPLING STATION
- NOISE SAMPLING STATION
- SOIL SAMPLING STATION
- SURFACE WATER SAMPLING STATION
- GROUND WATER SAMPLING STATION

LUMSHNONG LIMESTONE DEPOSIT
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M/S C.M.C LTD.

SAMPLE LOCATION PLAN

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0 0.5 1 1.5 2 Km

FIG. No. - 4.1

We had tested all the parameters as prescribed by CPCB but the all the parameters found below the permissible limit in the study area, so we had not given them in them in tabular form.

Zone	Station Code	Station	Value of	PM10	SO ₂	NO _x
Core Zone	A1	Lease area	MAX	53.3	14.7	16.4
			MIN	38.3	8.5	10.2
			AVERAGE	45.92	11.77	13.07
			95 PERCENTILE	51.2	14.125	15.45
Buffer zone	A2	Lease area	MAX	49.7	16.8	15.8
			MIN	38.3	9.7	10.5
			AVERAGE	44.67	13.22	13.29
			95 PERCENTILE	49.275	16.175	15.2
	A3	Umlaper Village	MAX	47.7	12.5	12.5
			MIN	40.4	7	8.5
			AVERAGE	44.25	9.35	10.59
			95 PERCENTILE	47.175	11.75	12.375
	A4	Khub	MAX	45.8	11.7	15.7
			MIN	40.2	7.5	10.3
			AVERAGE	42.64	9.67	12.45
			95 PERCENTILE	45.35	11.275	14.175
	A5	Umlong	MAX	48.6	14.7	15.5
			MIN	38.5	8.5	10.1
			AVERAGE	42.18	11.03	12.71
			95 PERCENTILE	45.85	12.8	14.75
	A6	CMCL Plant Site	MAX	48.9	15.7	18.7
			MIN	37.2	10.5	12
			AVERAGE	41.96	13.25	15.65
			95 PERCENTILE	45.42	15.47	18.37
	A7	Umbadoh	MAX	47	12.5	13.7
			MIN	41.5	8	10
			AVERAGE	44.46	10.03	11.46
			95 PERCENTILE	46.37	11.65	13.10
	A8	Shieruphi	MAX	48.8	13.5	15
			MIN	39.5	8.8	10.3
			AVERAGE	42.38	11.15	12.58
			95 PERCENTILE	44.6	13.25	14

The vehicular movement are the main noise source during the study period. The noise level data are varying from 42.5 to 61.5dBA in the day time and in the night it varies from 37.3 to 42.6 dBA. The noise level of the area is within the prescribed limit.

The annual ground water recharge is 16.8 Ham. The depth to water level in summer ranges from 198 to 200m below ground level. The quality of surface and ground water is within the prescribed limit of Inland Surface Water, class-A, IS 3025 and IS 10500 respectively.

Analysis Result of Surface Water Samples

Parameter	Unit	Standard	Surface Water Samples			
			SW ₁	SW ₂	SW ₃	SW ₄
pH	---	6.5 - 8.5	6.5	6.8	6.9	6.7
Colour	---	Colourless	Colourless	Colourless	Colourless	Colourless
Odour	----	Odourless	Odourless	Odourless	Odourless	Odourless
Total solid	mg/l	----	265	212	225	235
Total suspended solid	mg/l	----	10	12	15	10
TDS	mg/l	1500	255	200	210	225
Oil and Grease	µg/l	----	BDL	BDL	BDL	BDL
Total residual chlorine	mg/l	0.2	BDL	BDL	BDL	BDL
Total kjeldahl nitrogen as N	mg/l	----	3.5	3.0	3.8	2.7
Ammoniacal nitrogen as N	mg/l	50	0.60	0.65	0.60	0.65
Free ammonia as NH ₃	mg/l	----	BDL	BDL	BDL	BDL
BOD	mg/l	3	0.6	0.7	0.2	0.5
Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL
Mercury as Hg	mg/l	----	BDL	BDL	BDL	BDL
Lead as Pb	mg/l	0.1	BDL	BDL	BDL	BDL
Total chromium as Cr	mg/l	2.0	BDL	BDL	BDL	BDL
Hexavalent Chromium as Cr	mg/l	0.05	BDL	BDL	BDL	BDL
Copper as Cu	mg/l	3.0	BDL	BDL	BDL	BDL
Cadmium as Cd	mg/l	0.01	BDL	BDL	BDL	BDL
Zinc as Zn	mg/l	15	BDL	BDL	BDL	BDL
Selenium as Se	mg/l	0.05	BDL	BDL	BDL	BDL
Nickel as Ni	mg/l	----	BDL	BDL	BDL	BDL
Boron as B	mg/l	2.0	BDL	BDL	BDL	BDL
Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL
Chloride as Cl	mg/l	600	25	20	20	15
Nitrate as NO ₃	mg/l	50	0.7	0.6	0.7	0.8
Flouride as F	mg/l	1.5	BDL	BDL	BDL	BDL
Dissolved PO ₄	mg/l	5.0	0.3	0.1	0.2	0.1
Sulphate as SO ₄	mg/l	400	10	15	12	15
Sulphide as S	mg/l	2.0	0.5	0.5	0.8	0.9
Iron as Fe	mg/l	5.0	0.6	0.5	0.3	0.6
Silica as SiO ₂	mg/l	----	BDL	BDL	BDL	BDL
Phenolic compound	mg/l	0.005	BDL	BDL	BDL	BDL
Residual pesticide	mg/l	Absent	BDL	BDL	BDL	BDL
Sodium Percentage	mg/l	60	BDL	BDL	BDL	BDL
Calcium as Ca	mg/l	75	25	30	30	20
Magnesium as Mg	mg/l	30	3	3	3.5	2
Total hardness	mg/l	300	74	86.5	88.4	57.7
Coliform cells/100ml		BDL	BDL	BDL	BDL	BDL
Standard : IS 3025, Class - A, Inland Surface Water Surface water sampling stations:- SW ₁ : Lubha river SW ₂ -Dongtanglen river SW ₃ -Umlunar nala SW ₄ -Seshymor						

Analysis Result of Ground Water Samples

Sl. No.	Parameters	Units	Standards	Ground Water Samples			
				GW ₁	GW ₂	GW ₃	GW ₄
1	Colour	Hazen	Colourless	Colourless	Colourless	Colourless	Colourless
2	Odour	----	Odourless	Odourless	Odourless	Odourless	Odourless
3	pH	----	6.5-8.5	6.4	6.7	6.9	6.8
4	Dissolved oxygen	mg/l	3.0 (min)	6.0	5.2	5.5	5.4
5	T.D.S	mg/l	500	135	125	85	125
6	Suspended solid	mg/l	----	8	10	4	9
7	Chloride as Cl	mg/l	250	8	12	10	10
8	Sulphate as SO ₄	mg/l	200	12	7	8	4
9	Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL
10	Fluoride as F	mg/l	1.0	0.1	0.05	0.05	BDL
11	Phosphate as PO ₄	mg/l	----	0.2	0.1	0.1	0.1
12	Amonia as NH ₃	mg/l	----	BDL	BDL	BDL	BDL
13	Boron as B	mg/l	1.0	BDL	BDL	BDL	BDL
14	Calcium as Ca	mg/l	75	18	14	15	16
15	Magnesium as Mg	mg/l	30	6	3	7	5
16	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL
17	Barium as Ba	mg/l	----	BDL	BDL	BDL	BDL
18	Cadmium as Cd	mg/l	----	BDL	BDL	BDL	BDL
19	Total Chromium	mg/l	----	BDL	BDL	BDL	BDL
20	Hexavalent Chromium	mg/l	----	BDL	BDL	BDL	BDL
21	Copper as Cu	mg/l	0.05	BDL	BDL	BDL	BDL
22	Iron as Fe	mg/l	0.3	0.01	0.01	0.01	0.01
23	Selenium as Se	mg/l	0.01	BDL	BDL	BDL	BDL
24	Silver as Ag	mg/l	----	BDL	BDL	BDL	BDL
25	Zinc as Zn	mg/l	5.0	BDL	BDL	BDL	BDL
26	Phenol	mg/l	0.001	BDL	BDL	BDL	BDL
27	Pesticides	mg/l	Absent	BDL	BDL	BDL	BDL
28	Radioactive substance	mg/l	----	BDL	BDL	BDL	BDL
Standard : IS 10500							
Ground water sampling stations:-							
GW1- Tongseng well ,GW2-Khub well,GW3- Thangskei, GW4- Musiang well							

The area exposes hilly ever green and dry deciduous forests. The commonly seen flora species are pine. The recorded fauna species are common reptiles, birds, amphibians, insects and few mammals such as Bamboo Rat, Squirrel, Otter, House rat, .Monkey. No rare or endangered flora and fauna species are found.

3. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Mining activities and related operations can cause several beneficial and adverse impacts on the environment. The adverse impacts are proposed to mitigate. Using ‘Matrix method’ the impact on the environment has assessed.

The expected beneficial impacts on the society are Health, Population/Migration, Employment, Literacy, Services and Aesthetic sense. The proposed mining operation will

generate direct employment for 137 nos. of employees and indirectly for 200 people. Communication, education, medical, power and employment facilities will be improved.

Various mining operations will generate dust and gaseous pollutants. In a view to the scale of mining and existing environmental back ground condition it is anticipated that increment impact due to the mining operation will be within the prescribed limit. Further mitigation measures like water sprinkling and plantation will reduce the pollution level in the area.

Contamination/siltation of surface water might occur due to mixing of runoff during rainy season with high-suspended particles, likely to be caused due to wash out of overburden. As it is proposed to construct settling tank and garland drain around the mining area the level of concentration of suspended particles in the surface water shall be well within the prescribed limit.

The contamination of surface water may cause diseases in the area. Treatment of water will be done. Medical treatment will be provided as per the requirement. The impact on ground water will be marginal since proposed mining activities will be much above the ground water table.

Due to the opencast mining project, the noise level of the area due to drilling, blasting, transportation and running of heavy machineries will increase. Controlled blasting, proper maintenance of machineries and soundproof cabins, noise level can be minimized.

Compensatory afforestation will neutralize this impact on flora. The present and so also proposed land use pattern of the mine will be as follows. (Fig. 3)

Existing Core Zone Land use Pattern

Classification of land	Village/District	Total area in Hects.
Total Private Land (non-forest)	Lumshnong/Jaintia hills	70.00 • Agricultural land – 46.809 • Waste land – 23.191

Proposed Land Pattern (Area in Ha.)				
Sl. No.	Features	Planned period	Beyond planned period	Total
1	Mining	8.64	47.13	55.77
2	Over Burden Dump to be used for mining	2.25	----	2.25
3	Infrastructure (workshop, admn. Building etc.)	0.02	---	0.02
4	Roads	0.2	---	0.2
5	Magazine	---	---	---
6	Green Belt	10.0	1.56	11.76
	Total	21.11	48.69	70.00

Post-operational Land use

Area in Ha.					
Land use	Plantation	Water Body	Public Use	Undisturbed	Total
Mining	58.02	--	--	--	58.02
Road and Infrastructure	0.22	--	--	--	0.22
Green Belt	11.76	--	--	--	11.76
Total	70.00	--	--	--	70.00

Environmental Impact and Management Stage-wise Cumulative Plantation

REQUIREMENT OF PLANTS FOR AFFORESTATION / RECLAMATION										
Year	Un-worked Area		Out Side Dump		Dump Area		Top Soil Dump		Total	
	Area (Ha)	Trees	Area (Ha)	Trees	Area (Ha)	Trees	Area (Ha)	Trees	Area (Ha)	Tree
1st	2.0	3200	--	--	--	--	--	--	2.0	3200
2nd	4.0	6400	--	--	--	--	--	--	4.0	6400
3rd	6.0	9600	--	--	--	--	--	--	6.0	9600
4th	8.0	12800	--	--	--	--	--	--	8.0	12800
5th	10.0	16000	--	--	--	--	--	--	10.0	16000
Ultimate	11.76	18816	58.24	93184	--	--	--	--	70.00	112000

The post mining land use is represented in **Fig. 6**.

There will be less chance of improvement in agriculture. By using these land in mining there will generation of employment and revenue.

4. ENVIRONMENT MONITORING PROGRAMME

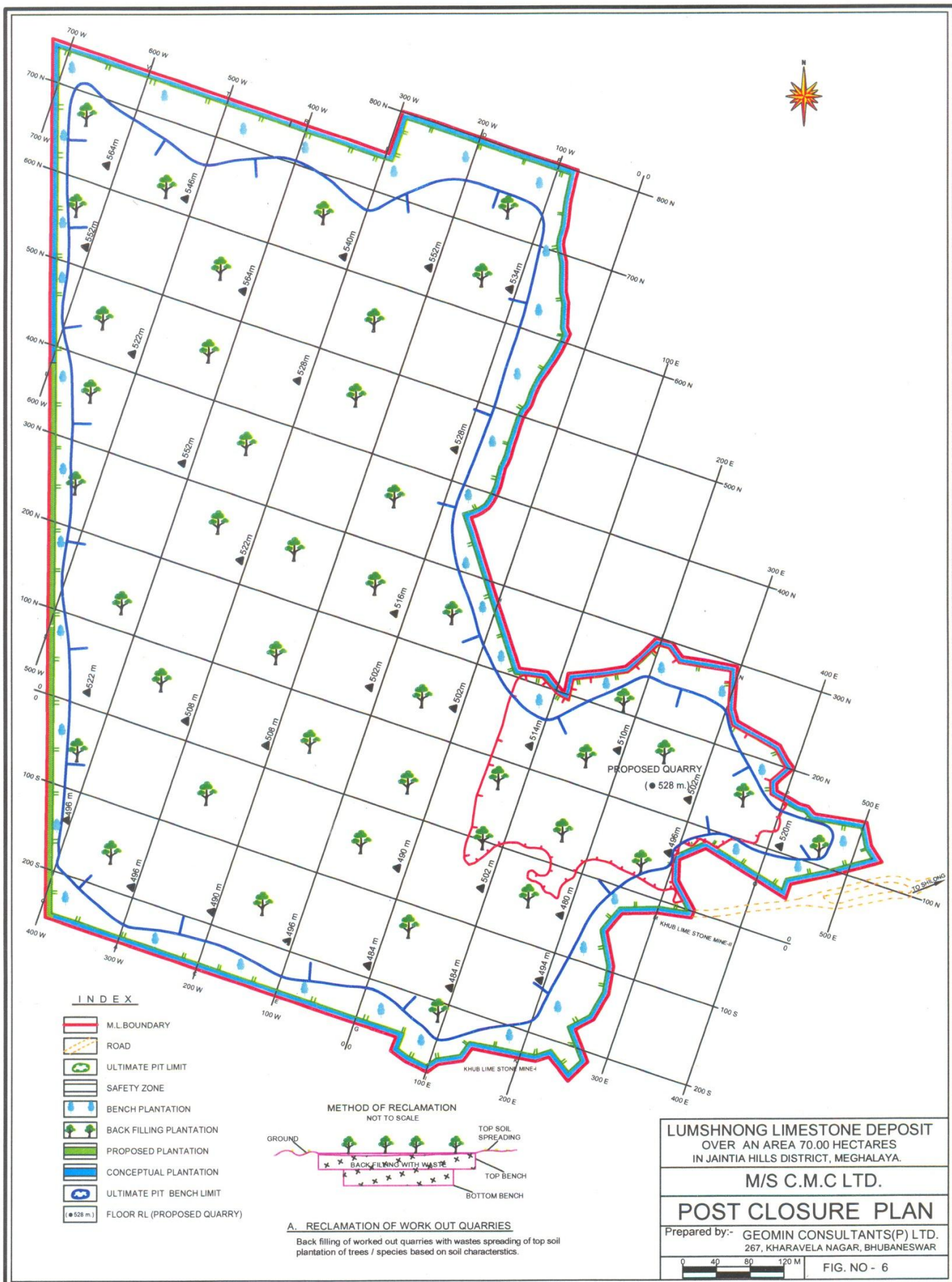
An environmental monitoring cell will be formed for regular environmental assessment on air, water, noise and soil qualities at nearby habitational area. Four permanent Air quality stations will be fixed as per the SPCB guidance to monitor the AAQ in quarterly basis. Quarterly water samples of ground water and surface water shall be collected and analysed. Noise level monitoring at Noise generating points and AAQ locations shall be done in quarterly basis.

5. ADDITIONAL STUDIES

Additional studies like soil erosion and nutrient quality at river bed soil will be taken up.

6. PROJECT BENEFITS

The limestone to be produce from the mine shall be utilised in the plant of the Lessee. In the mining project along with the cement plant shall uplift the socio-economic, educational and cultural status of the local inhabitants.



7. ENVIRONMENT MANAGEMENT PLAN

The mining activities will have certain adverse effects on the existing environment like air, water land and noise. The following protection measures will be adopted to minimize pollution.

- Provision of planting emission, noise absorbing species (with dense/thick type canopy), soil erosion control and nutrient enhancing species
- To suppress fugitive dust, provision of water sprinkler, dust extractor etc at the dust generation source
- Adoption of control blasting techniques (using advance non-electric detonator)
- Construction of garland drains around the quarry area and dumps with proper gradients
- The settling tank will have adequate dimension
- Drain and channel on Overburden dump in to sedimentation pond before discharging into natural drainage
- Proper maintenance of plant and machinery
- Providing sound proof cabins with proper ventilation
- Provision of personal protective equipments according to the pollution.
- Dump yard stabilization through grading, compacting and suitable plantation
- Stone pitched walls in garland drains will be prepared to arrest flow of loose sediments.
- Provision of speed breaker (stone pitching) at regular intervals in garland drains
- Phased wise reclamation through backfill

---X---