

**\*EXECUTIVE**  
**SUMMARY\***  
**for**  
**“Daba Saitthad**  
**Limestone**  
**Deposit”**

**At**

Villages-Daba Saitthad  
(wahlareng), Village-  
Lumshnong, District- East  
Jaintia Hills, Meghalaya.

**ToR letter no:**

IA-J-11015/39/2023-IA-II(NCM)

dated: 13.06.2024

Mining Lease Area- 25 ha.

Cost of Project - Rs 37.30 Crore

Item & Category - 1(a), B

Maximum Proposed  
Production of Limestone -  
2.51 million TPA & 0.322  
million TPA of waste/OB  
including topsoil.

Baseline Season: March, 2023  
to May 2023

Laboratory Assigned: M/s  
Perfact Researchers Pvt. Ltd.

**Project Proponent**

STAR CEMENT LIMITED

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**Environmental Consultant**

Perfact Enviro Solutions Pvt.  
Ltd. (PESPL)

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# EXECUTIVE SUMMARY

## **1.0 Introduction**

Star Cement Limited (SCL) (the applicant) is proposing a green field project named as "Daba Saitthad Limestone Deposit (25ha)" located at Daba Saitthad (wahlareng), village Lumshnong, East Jaintia Hills District Meghalaya. The proposal is for the mining of limestone to a maximum capacity of 2.51 million tons per annum (MTPA) which involve maximum excavation up to 2.832 MTPA (including 2.51 MTPA of limestone and 0.322 MTPA of waste/OB including topsoil) over an area of 25ha. Mining operations will be done by a fully mechanized opencast method utilizing heavy earth moving machinery (HEMM).

## **2.0 Project Description**

The project is located at Daba Saitthad (wahlareng), village Lumshnong, East Jaintia Hills District Meghalaya. The study area falls in the Survey of India Topo-sheet no. 83C/8 (Restricted) at Latitude: 25°09'24.78"N to 25°09'39.43"N and Longitude: 92°21'29.53"E to 92°21'56.03"E with maximum contour of 406 mRL and minimum contour of 336 mRL.

The LOI/authorization order for mining lease has been issued by Government of Meghalaya vide letter no: MG.6/2023/277 dated 28.08.2023. Mining lease deed was executed on 12.02.2024 for 50 years up to 11.02.2074.

Land Holding certificate issued by Jaintia Hills Autonomous District council, Jowai vide holding no. LHC No. 6 of 2021 dated 14.12.2021

Approval of the Mining Plan along with PMCP under Rule 16(1) Of MCR 2016 has been obtained from Indian Bureau of Mines, Guwahati vide letter no. MCDR-MPCP0CaFI/10/2023-GUH-IBM\_RO\_GUH dated 11.12.2023.

Non-Forest land certificate has been issued by Office of the PCCF (HoFF), vide letter No. MFG.39/NLFC/MINING/MMMCR /2016/JH/15,529 dated 01.02.2023

Distance certificate of Narpuh Wildlife Sanctuary (ESZ & Boundary) has been issued by Divisional Forest Officer (Jaintia Hills Wildlife Division, Jowai) vide letter No. MWL/JH/299/Mining/2022-23/1,184 dated 13<sup>th</sup> Feb 2023

### **Mining Method**

Mining of Limestone will be done by mechanized opencast method with drilling and blasting. All operations of mining will be done using heavy earth moving machineries for deep hole drilling, excavation, loading & transport. Other technical parameters like surface topography, continuation of limestone deposit, Quality variations, Geo- technical aspects, required rate of production etc., are also considered. The minimum width of the working benches in mineral will be 18 m for safe operation of mining machinery and the maximum height of the bench will be 9 metres.

The salient points of mining are as ahead -

- Mining operation will be carried out by opencast mechanized method using HEMM with deep hole drilling & blasting.
- A minimum width of the working benches in mineral will be 18 m for safe operation of mining machinery. The height of the bench will be 9 m.
- Since limestone is hard rock, the individual benches will be sloped at 85° from horizontal.
- Overall pit slope will be less than 45°.
- There will be two shifts of 08 hours duration each for the mine to operate. Every shift will consist of 7 hours of productive work.
- Hydraulic drill with 115 mm diameter (dia) will be used for drilling of blast holes.
- The blast holes in mineral will be drilled by keeping 4.5 m spacing and 3.5 m burden.
- Ammonium Nitrate Fuel Oil Mixture & Slurry Explosives (large diameter) will be used for blasting.
- Explosives along with non-electric detonators (NONEL) will be used for blasting.
- Ultimate level of excavation will be 269 mRL in part area at conceptual stage.
- The material after blasting will be loaded by hydraulic excavators of about 2.6 m<sup>3</sup> bucket capacity into tippers of 25 tons carrying capacity for its transportation to crusher and waste dump yards.
- The main haul road will be proposed to be constructed with 1:16 gradient which will be connected to the transport road that leads to the crusher located in the plant premises.

### 3.0 Description of the Environment

The baseline data has been collected from March 2023 to May 2023. The details are given below:

#### Micro-meteorological data:

- Temperature:** Temperature of the area varies from 14.13<sup>o</sup>C to 35.37<sup>o</sup> C.
- Relative Humidity:** The relative humidity varies from 21.0 to 99.44 %.
- Wind Speed:** Wind speed normally is in the range of 0.10 m/s to 6.43 m/s.

The longest spoke shows the predominant wind direction i.e. the wind blew from the SW.

The different colours of each spoke provide details of the speed of the wind in m/s from each direction.

Thus, most of the time, the wind is blowing at a speed between 0.50- 5.70 m/s.

**Ambient Air Quality Results:** Samples were collected from 06 sampling locations which are Onsite SW, Onsite NE, Umlaper, Tongseeng, Lumshnong, Umlong.

#### Core zone

The mean value of PM<sub>10</sub> ranges from (64.55 - 66.49 µg/m<sup>3</sup>) & PM<sub>2.5</sub> ranges from (29.20 - 30.08 µg/m<sup>3</sup>), SO<sub>2</sub> ranges from (6.15 - 6.33 µg/m<sup>3</sup>), NO<sub>2</sub> ranges from (16.45 - 16.94 µg/m<sup>3</sup>) & CO ranges from (0.29 - 0.30 mg/m<sup>3</sup>) which are within the limits of NAAQS. As per the Air Quality Index by CPCB, the air quality of the core zone is found to be Satisfactory in the Summer season.

#### Buffer zone:

The mean value of PM<sub>10</sub> ranges from (69.07 - 75.53 µg/m<sup>3</sup>), PM<sub>2.5</sub> ranges from (31.25 - 34.17 µg/m<sup>3</sup>), SO<sub>2</sub> ranges from (6.57 - 7.19 µg/m<sup>3</sup>), NO<sub>2</sub> ranges from (17.60 - 19.24 µg/m<sup>3</sup>) & CO ranges from (0.31 -

0.34 mg/m<sup>3</sup>) which are within the limits of NAAQS. As per the Air Quality Index by CPCB the air quality of the buffer zone is found to be Satisfactory during the sampling campaign.

**Noise Quality results:** Samples were collected from 08 locations which are Onsite SW, Onsite NE, Approach road, NH 6, Umlaper, Tongseng, Lumshnong, Umlong

**Core Zone (Industrial Area): N1 & N2:** The ambient noise level during day time at the proposed project site varies from 57.4 dB (A) to 57.6 dB (A) which are within the standard limit of Industrial area ~ 75 dB (A). During night the noise level at the project site ranges from 44.7 dB (A) to 44.8 dB (A) which are within the standard limit of Industrial area 70.0 dB (A).

**Buffer Zone:**

**Residential Area: N5 to N8-**The ambient noise level in residential areas ranges from 53.1 dB (A) - 56.6 dB (A) during day time and from 43.9 dB (A) to 47.2 dB (A) during night time. The slightly higher noise level compared to standard limit may be regarded to the residential and other local activities occurring within the village.

**Commercial Area: N3- Approach Road, N4- NH - 6** The ambient noise level in commercial area i.e. Approach Road & NH-6 is 57.4 dB (A) to 62.8 dB (A) during day time which is within the standard limit of commercial area of ~ 65 dB (A) and 46.7 dB (A) to 57.9 dB (A) during night time which is within the standard limit of commercial area ~ 55 dB (A). The increased noise level is due to vehicular movement.

**Water Quality Results** The samples were collected from 12 stations, consisting of 8 groundwater and 4 surface water sites.

**Ground water quality-**

Water samples from 08 sites were collected from drinking water supplies including Onsite, Umlaper, Tongseng, Lumshnong, Umlong, Sailkan, Umbadoh and Brishyrnot

**Ground water quality- Core zone & Buffer Zone -**

- ❖ The Total Dissolved Solids (TDS) of the sampling locations W1, W2, W3, W4, W5, W6, W7, W8 range from 68 mg/l to 182 mg/l which are within the drinking water standard (IS:10500) i.e. 500 mg/l.
- ❖ The Total Hardness of the sampling locations ranges from 18 mg/l to 70 mg/l which are within the drinking water standard (IS:10500) i.e. 200 mg/l.
- ❖ The Alkalinity of the sampling locations ranges from 13.80 mg/l to 61.60 mg/l which are within the drinking water standard (IS:10500) i.e. 200 mg/l.
- ❖ The Fluoride content in the sampling locations ranges from <0.1 mg/l to 0.64 mg/l which are within the drinking water standard (IS:10500) i.e. 1.0 mg/l.
- ❖ The Calcium Concentration of sampling locations ranges from 5.4 mg/l to 26 mg/l. Calcium levels of sampling locations are within the drinking water standards (IS:10500) i.e. 75 mg/l.
- ❖ The Magnesium Concentration of sampling locations ranges from 0.48 mg/l to 7.20 mg/l. Magnesium levels of sampling locations are within the drinking water standards (IS:10500) i.e. 30 mg/l.

- ❖ The Chloride Concentration of all the sampling locations ranges from 6.80 mg/l to 31 mg/l. Chloride levels of all the sampling locations are within the drinking water standards (IS:10500) i.e 250 mg/l.

**Surface water quality-** 04 locations namely Near Onsite, Umso Nala Upstream, Lubha River, Umso nala Downstream.

**Surface water quality- Buffer Zone -**

- Surface water samples were derived from 4 locations in different surface water bodies within study area, analysis results of the same revealed that pH values amongst all samples varied in the range of 7.40 - 7.78, Total Hardness concentration varied in the range of 118 mg/l to 172 mg/l &, TDS concentration varied in the range of 201 to 252 mg/l. Electrical Conductivity was found to be ranging in between 352 to 432 mS/cm.
- The surface water samples falls under class D (i.e. Water is suitable for Propagation of Wildlife and Fisheries) & E (i.e. Irrigation, Industrial Cooling, Controlled Waste disposal) as per CPCB surface water criteria.

**Soil Quality Results-** Samples collected from 08 sampling locations which are Onsite, Umlaper, Tongheng, Lumshnong, Umlong, Sailkan, Umbadoh, Brishyrnot

**Soil quality- Core zone & Buffer Zone -**

Soil samples at location S1 - S8 shows that the soil texture class is Clay, Clay Loam, Colour is 5/3 Dull reddish brown, Brown (3/4), 5/3 Dull brown, pH range is (6.90 - 7.70). Amount of primary nutrients like Organic matter range is (0.35 - 2.31)%, the available nitrogen range is (62.40 - 106.40) mg/kg is Low and available Potassium range is (12.20 - 43.70) mg/kg is Low while the available Phosphorus range is (7.20 - 14.10) mg/kg is medium to high. Thus it can be concluded that soil is average fertile.

**Ecology and Biodiversity Results:**

Mining can affect vegetation in the core zone. The mining activity will generate dust which may impact the nearby biological environment.

**Flora of Core zone**

In the core zone of the proposed greenfield project, the initial survey revealed minimal presence of flora and fauna due to the presence of numerous existing industries. Consequently, the variety of tree species was limited, with only a few observed, such as Duabanga grandiflora, Bauhinia species, grasses, shrubs, Broomstick, Banana leaves, Bamboo, etc.

**Flora of Buffer Zone:** On the basis of primary survey and secondary data collected from the forest office a large variety of trees, herbs, shrubs, ornamental plants, weed and grasses found suited to climatic conditions.

**Fauna of Study area:** The total number of **15 schedule I species** listed under the Wildlife Protection Act indicates their endangered status and necessitates conservation efforts. These species are Hog Badger

(*Arctonyx collaris*), Golden Jackal (*Canis aureus*), Himalayan Serow (*Capricornis sumatrenis*), Leopard Cat (*Felis bengalensis*), Domestic Cat (*Felis catus*), Indian Grey Mongoose (*Herpestes edwardsii*), Hoolock Gibbon (*Hoolock hoolock*), Indian Crested Porcupine (*Hystrix indica*), Pangolin (*Manis pentadactyla*), Slow Loris (*Nycticebus bengalensis*), Indian Python (*Python molurus*), Indian Cobra (*Naja naja*), Indian Peafowl (*Pavo cristatus*), Great Pied Hornbill (*Buceros bicornis*), White-rumped Vulture (*Gyps bengalensis*).

### **Socio Economic Study Results:**

#### **Administrative structure of the study area:**

About 37 villages were selected for the secondary study. The total population of the study area is 15558 constituting 2896 households. Average sex ratio is 942 females to 1000 males.

#### **Social Structure**

The proportion of Scheduled Caste (SC) population within the study area is 0.11 % and Scheduled Tribes (ST) population is 97.45 % and others are 2.44% .

#### **Literacy**

Total literates in the study area are 61.67 % and total illiterates are 38.33%. Out of total literates' males are 61.21% and females are 62.17 %.

#### **Occupation and Livelihoods**

Out of the total population, Total Working Population is 37.57% of which the main working population is 81.85 % whereas the marginal population is 18.15 %.

#### **Primary Study**

Out of 37 villages in the study area total 05 villages are selected for the primary data collection. As per primary survey, the population of the surveyed villages is 2290 (Male 50.66%, Female-49.34%) as compared to PCA Census 2011 was 1743. Total number of households in the surveyed villages are 442 as compared to PCA Census 2011 were 310. The average occupancy is 5.18 persons per household as compared to PCA Census 2011 was 5.62. Sex ratio (number of females to per 1000 males) in the surveyed area is 983. As compared to PCA 2011 Census was 987. Total SC population in the surveyed area 0.60% as compared to PCA Census 2011 was 0.51%. Total ST population in the Surveyed area is (99.4%) as compared to PCA Census 2011 was 99.40%. Overall Literacy in the surveyed villages are 71% as compared to PCA Census 2011 were 62%.

#### **Traffic Study Results:**

Traffic survey was carried out on both sides (up & down) of the NH-6 . Vehicles were observed and the count was recorded for 24 hours.

**I. NH-6 (2 Lane):** As per the traffic survey done for NH-6, the existing traffic is 451 (PCU/hr) and the carrying capacity of the road is 2550 PCU/hr.

The carrying capacity of the NH-6 is much higher than the proposed traffic volume. The traffic (to & fro) from the Proposed Daba Saitthad Limestone Deposit will not create any traffic congestion.

The volume/capacity ratio is likely to be changed 0.18 to 0.20 with LOS being "A" to "A" only

## 4.0 Anticipated environmental impact and mitigation measures

**Air Environment:** To mitigate the adverse impact of mining requisite measures will be done such as water sprinkling, maintenance of machineries, Personal Protective equipment, regular health checkup of workers, Green belt development, wet drilling etc. Accordingly, Air quality reports have been prepared considering all the activities associated with mining. The development of green belt will be done in an area of 1.46 ha in a safety zone of 7.5 m boundary in the first five years of mining. Besides, at the end of the conceptual period, the total 23.14 Ha mined-out area will be afforested.

**Noise Environment:** The mining operation will be done by open cast mechanized mining method with drilling and blasting. Excavators will be used in excavation. To mitigate noise pollution at the mine mining site machinery will be maintained in good condition, mine workers will be given protective gears such as goggles, dust masks, gloves, helmets and earmuffs for protection. Blasting parameters will be optimized to have proper fragmentation with least noise and vibration.

**Water Environment:** The water requirement for mine will be approx. 40 KLD which will be mainly consumed for drinking & domestic purposes, sprinkling, and plantation. The requirement of water will be sourced through water tankers from the company's cement plant.

**Land Environment:** Mining lease encompasses a total area of 25 Ha. Mining will be opencast mechanized with drilling and blasting. The maximum production of limestone will be 2.51 MTPA. The maximum excavation will be 2.832 million TPA (including 2.51 MTPA of limestone and 0.322 MTPA of waste/OB including topsoil) from this mine. At the end of the conceptual period, quarry will be created in the area of 23.54 ha. Out of total mined-out area 23.54 ha, 23.14 ha will be reclaimed by bench plantation/grassification, & 0.40 ha will be covered under road. In addition to above, 1.46 ha of area will also be afforested under 7.5 m statutory boundary.

**Biological Environment:** Mining can affect vegetation in the core zone. The mining activity will generate dust which may impact the nearby biological environment. It is a non forest land. The Chief Wildlife warden had a meeting with Industries and Government departments for preparation of Regional Conservation plan for the East Jaintia Hills district under the supervision and guidance of CWLW, Meghalaya and the cost for preparation and implementation of the Regional Conservation Plan may be shared by various project proponents on a proportionate basis keeping in view the likely impacts of each project on the wild life and their habitat. We also confirmed that we shall be part of the regional conservation plan and will pay the fee as determined for our project.

At the end of the conceptual period, quarry will be created in the area of 23.54 ha. Out of total mined-out area 23.54 ha, 23.14 ha will be reclaimed by bench plantation/grassification & 0.40 ha will

be covered under road. In addition to above, 1.46 ha of area will also be afforested under 7.5 m statutory boundary.

- **Socio- Economic environment:** The project will enhance indirect employment in the area. Therefore overall economic development is much likely after the commencement of the project.
- **Impacts due to transportation:** Impact of transportation will be minimal as ROM will be transported by tipper to the proposed crusher at the cement plant, which is outside the mining lease area.

## 5.0 Environmental Monitoring Programme

Environmental monitoring at various locations, within the mining lease area and in the study area of 10 km radius will be carried out on a periodic basis. A comprehensive network for monitoring has been prepared. Sampling locations have been identified by considering the source of pollution due to mining operations, drainage pattern, topography of the area and biological environment.

## 6.0 Additional Studies

**Risk Assessment & Disaster Management Plan-** Mining will be carried out by mechanized opencast mining by using HEMM with deep hole drilling and blasting. Mining will be done under strict supervision of statutory qualified persons.

**Rehabilitation and Resettlement-** The mining lease area 25ha land has now been granted under mining lease to Star Cement limited. The land is granted to Star Cement Ltd by the land owner for mining lease. There is no habitation on the said land, therefore, R&R is not applicable

### **Occupational Health & Safety:**

The company will concern and will take responsibility for the protection of the workers and will adapt occupational health services by establishing and maintaining a safe and healthy working environment. The following control measures will be adapted in the proposed mine to maintain the Occupational health and safety:

- Use of safety/protective gears like rubber gloves, safety shoes, helmet, dust mask etc. will be a must. Routine check-ups to develop habits will be made by an environmental cell.
- Regular training and refresher follow-ups in this regard will be given continuously to build the capacities of the mine workers.
- Monitoring of quality of water, air, noise, and occupational health status of project personnel and surrounding habitations.
- Planned monitoring program to evaluate the effectiveness of various /specific aspects of technological / mitigation measures.
- Plantation monitoring program to ensure survival and growth rate of plantations.
- A plan for monitoring the health of workers and the community in vicinity will be drawn and submitted along with financial allocation



## **7.0 Project Benefits**

The proposed mining project has a significant positive impact on the socio-economic environment and it will help sustain the overall development of the area. The proposed project significantly contributes to economic development by providing total direct employment to 99 and indirect employment to many more people in the area. By organising health check-up camps, awareness programs about rural development of the locals in the field of education, personal health care and skill development campaigns to improve standards of living in the area.

About Rs 20 Crores of Royalty, Rs 2 crore of DMF, Rs 40 Lakh of NMET and Rs 15 crores of Cess will be paid to the State Government.

## **8.0 Environment Management Plan**

Environmental Management plans giving the environmental protection measures for mine to meet the stipulated norms of IBM/MoEF&CC.

The effective management system involves proper and regular monitoring of the environment components for continual improvement. Based on the project descriptions and the activities associated, the Environment Management plan has been prepared for all the valued Components for which the Budget proposes Rs. 376.54 lakhs as capital cost & Rs. 23.28 lakhs as recurring cost has been proposed by the Star Cement Limited. Environment Monitoring shall be carried out as per EC/CTE/CTO conditions.

## **9.0 Conclusion**

Thus, it can be concluded on a positive note that after the implementation of the mitigation measures and Environmental Management Plan, the normal operation of the project will have minimal impact on the environment.

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