

DRAFT EIA/EMP REPORT
FOR OBTAINING ENVIRONMENTAL CLEARANCE

(Category - B1, under item 1 (a), as per EIA Notification 14th September' 2006 and its subsequent
amendments till date)

FOR

“Rusiar Limestone Mine”

Location	:	Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya	
Area	:	1.0 Hectare (Pvt. land)	
Lease Validity	:	10 years	
ToR Letter		Issued by SEIAA, Meghalaya, vide file No. ML/SEAC/ SEIAA/PP/EKH/102/2024 Dated 24.07.2025	
Proposed Production Capacity	:	48,900 TPA of ROM (Mineral Limestone- 44,025 TPA & Mineral Waste/Subgrade- 4,875 TPA).	
Baseline study Period	:	December, 2024 to February, 2025	
		Environmental Monitoring laboratory engaged	Noida Testing Laboratories {NABL Certificate Number- TC-6814, Validity period-03/12/2023– 02/12/2025}
Project Cost	:	11 Lakhs	

PROMOTER

Smt. Seisoh Syiemlieh
Sohbar Village, Sohbar Sirdarship
District- East Khasi hills
Meghalaya
Email:
seisohsyiemliehmining@gmail.com

ENVIRONMENTAL CONSULTANT

Gaurang Environmental Solutions Pvt. Ltd.
#102, SNG, Shree Ratna Apartment, Peetal Factory,
Jhotwara Road, Bani Park, Jaipur-302016
E-mail: gaurangenviro@gmail.com
NABET Accreditation: NABET/EIA/23-26/RA 0338
Valid up to Dec 07, 2026

Report Ref: GESPL_779/ 2024-25/ DEIA/109
July, 2025

INDEX

S. No.	CONTENTS	PAGE NO.
1.	INDEMNIFICATION	1-2
2.	DISCLOSURE OF CONSULTANT	3-7
3.	NABET CERTIFICATE OF ACO ALONG WITH STATUS OF ACCREDITATION	8-10
ANNEXURE-A	POINT WISE COMPLIANCE OF TOR	11-33
CHAPTER - I	INTRODUCTION	35-41
CHAPTER - II	PROJECT DESCRIPTION	42-58
CHAPTER- III	DESCRIPTION OF THE ENVIRONMENT	59-145
CHAPTER – IV	ANTICIPATED ENVIRONMENTAL IMPACT & MITIGATION MEASURES	146-172
CHAPTER - V	ANALYSIS OF ALTERNATIVES	173-174
CHAPTER - VI	ENVIRONMENTAL MONITORING PROGRAMME	175-183
CHAPTER - VII	ADDITIONAL STUDIES	184-190
CHAPTER-VIII	PROJECT BENEFITS	191-194
CHAPTER - IX	ENVIRONMENTAL COST BENEFIT ANALYSIS	195-196
CHAPTER - X	ENVIRONMENTAL MANAGEMENT PLAN	197-205
CHAPTER - XI	SUMMARY & CONCLUSION	206-226
CHAPTER - XII	DISCLOSURE OF CONSULTANTS ENGAGED	227-229
ANNEXURE NO.	LIST OF ANNEXURES	
I.	Copy of ToR Letter	231-237
II.	Copy of Sohbar Sirdarship NOC	238-239
III.	Copy of LOI & Lease documents	240-247
IV.	Copy of Non Forest Land Certificate	248-249
V.	Copy of Approved Mining Plan along with approval letter	250-314
VI.	Copy of Cluster Certificate	315-316
VII.	Copy of Mine Site Pillar Photographs	317-326
VIII.	10 Km Toposheet	327-328



Project: “Rusiar Limestone Mine”
Applicant: Smt Seisoh Syiemlieh

Indemnification, Disclosure of Consultant along with Status of EIA Consultant Organization, NABET Certificate




	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

Project: - “Rusiar Limestone Mine”	Indemnification
Promoter: - Smt. Seisoh Syiemlieh	

INDEMNIFICATION

Utmost care has been taken in preparation of this Report vis a vis Rusiar Limestone Mine coming up at Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya promoted by Smt. Seisoh Syiemlieh. The data incorporated in the report is generated through information received from project proponent in form of the details received through e-mails, telephonic discussions, meetings (in person/virtual mode) primary data collection and information derived from secondary sources. Due care has been taken to represent facts and figures and sources acknowledged. The purpose of this document is to facilitate environmental appraisal of the proposal and as such the exercise has been scientifically carried out. The quality assurance for the data received from the laboratory as well as from the experts/ data obtained from outsourcing has been done and then incorporated in this report. The Consultant stands indemnified against any consequences arising out of any inadvertent omissions.

Report No.	GESPL_779/ 2024-25/ DEIA/109			
Type of Report	Draft EIA/EMP report			
Revision details	Report ToR/ Draft EIA/ Final EIA	Rev. No.	Revision Date	Details of revision made
	Draft EIA	00	-	-
Issue to	Smt. Seisoh Syiemlieh			
Issue Date	18.07.2025			

	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

Project: - “Rusiar Limestone Mine”



Promoter: - Smt. Seisoh Syiemlieh

Disclosure of Consultant Engaged



DISCLOSURE OF CONSULTANTS ENGAGED

Part A: Declaration by ACO and Experts contributing to the EIA Report for project, “Rusiar Limestone Mine” promoted by Smt. Seisoh Syiemlieh. The mine lease is coming up at Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya.

I hereby, certify that I was a part of the draft EIA/EMP team in the following capacity that developed the above EIA.

EIA Coordinator (EC)	
Sector & category	1(a) Mining
Name	Abhishek Gautam (EIA- coordinator)
Signature and Date	
Period of Involvement	November, 2024 to till now
Contact Information	#102, SNG Shri Ratna Apartment, Near Tambi Petrol Pump, Peetal Factory, Jhotwara Road, Jaipur – 302016 Email id: - gaurangenviro@gmail.com
Team Member	Damini Kumari
Signature and Date	

Functional Area Experts: -

S. No.	Functional areas	Name of the expert/s	Involvement (period and task)	Signature and date	TM
1.	Air Pollution (AP)	Ms. Pooja Yadav	➤ Period: November, 2024 – till date ➤ Task:- <ul style="list-style-type: none">Verification of baseline data through secondary sourcesIdentifying and assessing the quantum of emissions	 	Damini Kumari



Gaurang Environmental Solutions Pvt. Ltd.




Report Ref: GESPL_779/ 2024-25/ DEIA/109

Rev. No. 00

Project: - “Rusiar Limestone Mine”

Promoter: - Smt. Seisoh Syiemlieh

Disclosure of Consultant Engaged

			<ul style="list-style-type: none">• Identification of probable impacts of the different air emissions from the project• Identification of suitable pollution control device		
2.	Water Pollution (WP)	Pooja Yadav	<p>➤ Period: November,2024–till date</p> <p>➤ Task: -</p> <ul style="list-style-type: none">• Designing of water balance and developing schemes for cascading use (recycle, reuse) of water.• Identification of probable impacts of effluent/ waste water discharges in to the receiving environment/ water bodies, if any.		
3.	Solid & Hazardous Waste Management (SHW)	Pooja Yadav	<p>➤ Period: November,2024 –till date</p> <p>➤ Task:-</p> <ul style="list-style-type: none">• Identification of type of waste generated & Suggesting Methodologies for segregation, collection, Transportation, Treatment & Disposal of Waste as per various rules & guidelines.		
4.	Socio-economics (SE)	Gajendra Singh Rathore	<p>➤ Period: November,2024 –till date</p> <p>➤ Task:-</p> <ul style="list-style-type: none">• Conducting baseline socio-economic survey• Conducting social needs assessment studies• Preparing need-based CER plan.		Puran Singh Gurjar
5.	Ecology & Biodiversity (EB)	Abhishek Gautam	<p>➤ Period: November,2024 –till date</p> <p>➤ Task:-</p> <ul style="list-style-type: none">• To survey flora – fauna in the study area.		Damini Kumari



Gaurang Environmental Solutions Pvt. Ltd.






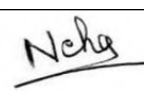
Report Ref: GESPL_779/ 2024-25/ DEIA/109

Rev. No. 00

Project: - “Rusiar Limestone Mine”

Promoter: - Smt. Seisoh Syiemlieh

Disclosure of Consultant Engaged

			<ul style="list-style-type: none">• To identify ecologically important areas around project location.• To identify threatened species in the project area.• To identify impact of proposed project on flora – fauna.• To recommend mitigation measures & greenbelt development plan.	 	
6.	Geology (Geo)	Mukesh Suroliya	➤ Period: November,2024 –till date ➤ Task:- <ul style="list-style-type: none">• Field Survey for assessing the regional and local geology of the area.		
7.	Hydrogeology (HG)	Mukesh Suroliya	➤ Period: November,2024 –till date ➤ Task:- <ul style="list-style-type: none">• Analysis of surface hydrological data• Computation of ground water recharge, flow rate and direction.		
8.	Soil Conservation (SC)	Mr. Pradyuman Deshpande	➤ Period: November,2024 –till date ➤ Task:- <ul style="list-style-type: none">• Assessment of fertility/productivity of soil, nutrient availability• Controlling degradation of soil/soil conservation• Effect of waste handling on soil		
9.	Air Quality (AQ)	Neha Bhargava	➤ Period: November,2024 –till date ➤ Task:- <ul style="list-style-type: none">• Analyzing micro meteorological data for use in air quality modeling• Collecting and using secondary data on meteorology like cloud		



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Rev. No. 00

Project: - “Rusiar Limestone Mine”

Promoter: - Smt. Seisoh Syiemlieh

Disclosure of Consultant Engaged

			cover, inversion related data, mixing heights etc., for air quality modeling <ul style="list-style-type: none">• Application of relevant air quality models in prediction of dispersion of pollutants• Plotting of isopleths of GLCs representing incremental pollution levels, on suitable maps showing both, the sources of pollution as well as the environmentally sensitive receptors.		
10.	Noise & Vibration (NV)	Mr. Mallikarjuna M. Guttula	➤ Period: November,2024 –till date ➤ Task:- <ul style="list-style-type: none">• Identifying probable impacts of noise• Assessing impact of noise from project activities on fauna in ecologically sensitive areas.• Suggesting Control measures for noise emanating from project activities.	Mallik	
11.	Land Use (LU)	Vinod Kumar Verma	➤ Period: November,2024 –till date ➤ Task:- <ul style="list-style-type: none">• Study of change in LULC with extent of impact.• Interpretation & preparation of LULC.	Vinod Verma	
12.	Risk & Hazards (RH)	Ms. Ginni Barotia	➤ Period: November,2024–till date ➤ Task:- <ul style="list-style-type: none">• Assessment and mitigation of probable impacts.• Suggesting PPE for workers.• Measures for risk assessment	Ginni Barotia	



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109


Rev. No. 00

Project: - “Rusiar Limestone Mine”	
Promoter: - Smt. Seisoh Syiemlieh	Disclosure of Consultant Engaged


Part B: Declaration by Head of the ACO/authorized person


Vipul Khandelwal, hereby, confirm that the above-mentioned experts prepared the EIA report for the project, “**Rusiar Limestone Mine**” promoted by Smt. Seisoh Syiemlieh. The mine lease is coming up at Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya and EIA Coordinator (EC) is fully aware of the content. The consultant organization shall be fully accountable for any mis-leading information. No unethical practices have been carried out and external data/text has not been used without proper acknowledgement, while preparing this EIA report.

Date and signature of EIA Co-Ordinator:

Name	Abhishek Gautam
Date	18.07.2025
Signature	

Date and signature of Head of ACO/Authorized person:

Signature	
Name	Vipul Khandelwal
Designation	Director
Name of the EIA Consultant Organization	Gaurang Environmental Solutions Pvt. Ltd. NABET Accreditation: NABET/EIA/23-26/RA 0338 Valid up to Dec 07, 2026

	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00



National Accreditation Board for Education and Training

Certificate of Accreditation

Gaurang Environmental Solutions Pvt. Ltd., Jaipur

102, SNG Shree Ratna Apartment, Peetal Factory, Jhotwara Road, Bani Park, Jaipur - 302016

The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA/EMP reports in the following Sectors

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including Opencast/ underground mining	1	1 (a)(i)	A
2.	Onshore and Offshore oil and gas exploration, development & productions	2	1 (b)	A
3.	Thermal power plants	4	1 (d)	A
4.	Mineral beneficiation	7	2 (b)	A
5.	Metallurgical industries	8	3 (a)	A
6.	Cement plants	9	3 (b)	A
7.	Asbestos milling and asbestos based products	12	4 (c)	A
8.	Leather/skin/hide processing industry	15	4 (f)	B
9.	Chemical Fertilizers	16	5 (a)	A
10.	Synthetic organic chemicals industry	21	5 (f)	A
11.	Distilleries	22	5 (g)	A
12.	Isolated storage & handling of hazardous chemicals	28	-	B
13.	Airports	29	7 (a)	A
14.	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)	A
15.	Common hazardous waste treatment, storage and disposal facilities	32	7 (d)	A
16.	Bio-medical waste treatment facilities	32A	7 (d a)	B
17.	Ports, harbours, break waters and dredging	33	7 (e)	A
18.	Common Effluent Treatment Plants (CETPs)	36	7 (h)	B
19.	Common municipal solid waste management facility (CMSWMF)	37	7 (i)	B
20.	Building and construction projects	38	8 (a)	B
21.	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated June 21, 2024 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/24/3314 dated July 16, 2024. The accreditation needs to be renewed before the expiry date by Gaurang Environmental Solutions Pvt. Ltd. following due process of assessment.

Issue Date
July 16, 2024

Valid up to
December 07, 2026

Mr. Ajay Kumar Jha
Sr. Director, NABET



Certificate No.
NABET/EIA/23-26/RA 0338

Prof (Dr) Varinder S Kanwar
CEO-NABET



**SCHEME FOR ACCREDITATION OF EIA
CONSULTANT ORGANIZATIONS**
NATIONAL ACCREDITATION BOARD FOR EDUCATION AND TRAINING




Online Portal for Scheme of Accreditation of EIA Consultant Organization || FAQ For Initial Accreditation (IA) Surveillance As

Accredited EIA Consultant Organisations (as on March 5, 2025)

search

Search

SL. No.	Name and Address EIA Consultant Organization	Scope of Accreditation				Downloads
		As per NABET Scheme			Project or Activity as per Schedule of MoEFCC Notification dated September 14, 2006 and subsequent Amendments	
		Sector Number	Name of Sector	Category		
1	A and N Technologies Address:#655, 3rd Floor, 6th Main Road, KSRTC Layout, 2nd Phase, J P Nagar, Bangalore Karnataka Head Name:SANJAY KUMAR M D Lead Designation:Chief	1	Mining of minerals - opencast mining only	A	1 (a) (i)	
		21	Synthetic organic chemicals industry (dyes & dye intermediates, bulk drugs and intermediates excluding drug formulations;	B	5 (f)	

org.in/EIA_LoginForm.aspx

Human Resource

98 Gaurang Environmental Solutions Pvt. Ltd.
Address: SNG Shree Ratna Apartments Near Tambi Petrol Pump, Bani Park, Jaipur, Rajasthan 302016
Head Name: VIPUL KHANDELWAL
Head Designation: Director
Mobile Number: 9782074776
Email: gaurangenviro@gmail.com; vipul.enviro@gmail.com
Tel: 01414029115
Remarks: Conditions apply

1	Mining of minerals including open cast/ underground mining	A	1 (a) (i)
2	Onshore and Off shore oil and gas exploration, development & productions	A	1 (b)
4	Thermal power plants	A	1 (d)
7	Mineral beneficiation	A	2 (b)
8	Metallurgical industries (ferrous & non-ferrous)	A	3 (a)
9	Cement plants	A	3 (b)
12	Asbestos milling and asbestos based products	A	4 (c)
15	Leather/skin/hide processing industry	B	4 (f)
16	Chemical Fertilizers	A	5 (a)
21	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals; other synthetic organic chemicals and chemical intermediates)	A	5 (f)
22	Distilleries	A	5 (g)
28	Isolated storage & handling of hazardous chemicals (for household purposes)	B	-



[Extension letter](#)

Certificate No.:
NABET/EIA/23-26/RA 0338
Validity: 07/12/2026

Validity Extension Letter No.:
QCI/NABET/ENV/ACO/24/3261
Extension Letter
Validity: 30/08/2024
UserName: ORG000958
Accreditation
Date: 25/01/2017
category: A

Human Resource

Project: “Rusiar Limestone Mine”
Applicant: Smt Seisoh Syiemlieh

Annexure-A

POINT WISE COMPLIANCE OF TOR



Gaurang Environmental Solutions Pvt. Ltd.	
Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

POINT WISE COMPLIANCE OF STANDARD TERMS OF REFERENCE

ToR Ref.	TOR Detail	Implementation/Plan																		
1. Specific Additional Conditions																				
1.1	No objection Certificate from Khasi Hills Autonomous District Council is to furnished while applying for Environmental Clearance.	No objection certificate Issued by Sirdar Sohbar Sirdarship vide letter No SSS/Adm//A-48/2022-24/40 dated 24.05.2025																		
1.2	Site photographs together with photographs and other related details of site visits by resource persons of NABET accredited consultant of project proponent, with their names and profession/designation, together with date(s) of visit, date(s) of data collection including names of instrument/machine actually used in the field, during preparation of EIA report, is to be clearly highlighted in the EIA/EMP report.	<p>A site visit was conducted by personnel from the NABET-accredited consultant and the NABL-certified laboratory during the baseline data collection period, from December 24 to Feb 25. During this period, monitoring and sample collection for air, water, noise, and soil parameters relevant to the study area were carried out. Additionally, photographs taken during the data collection for the biological study and the socioeconomic survey of the study area have been incorporated into the appropriate sections of Chapter III of the EIA/EMP report.</p> <p>Details of the site visit conducted by NABET-accredited consultant officials, including their names, designations, and dates, are provided below:</p> <table border="1"> <thead> <tr> <th>Particulars</th><th></th><th>Details</th></tr> </thead> <tbody> <tr> <td>Name</td><td>:</td><td>Gaurang Environmental Solutions Private Limited</td></tr> <tr> <td>Address</td><td>:</td><td>102, SNG Shri Ratna Apartment Peetal Factory, Jhotwara Road, Jaipur-302016</td></tr> <tr> <td>NABET Accreditation No.</td><td>:</td><td>NABET Accreditation: NABET/EIA/23-26/RA 0338 valid up to 07/12/2026</td></tr> <tr> <td>Abhishek Gautam</td><td>:</td><td>EIA Coordinator and Functional Area Expert</td></tr> <tr> <td>Vinod Kumar Verma</td><td>:</td><td>Functional Area Expert</td></tr> </tbody> </table>	Particulars		Details	Name	:	Gaurang Environmental Solutions Private Limited	Address	:	102, SNG Shri Ratna Apartment Peetal Factory, Jhotwara Road, Jaipur-302016	NABET Accreditation No.	:	NABET Accreditation: NABET/EIA/23-26/RA 0338 valid up to 07/12/2026	Abhishek Gautam	:	EIA Coordinator and Functional Area Expert	Vinod Kumar Verma	:	Functional Area Expert
Particulars		Details																		
Name	:	Gaurang Environmental Solutions Private Limited																		
Address	:	102, SNG Shri Ratna Apartment Peetal Factory, Jhotwara Road, Jaipur-302016																		
NABET Accreditation No.	:	NABET Accreditation: NABET/EIA/23-26/RA 0338 valid up to 07/12/2026																		
Abhishek Gautam	:	EIA Coordinator and Functional Area Expert																		
Vinod Kumar Verma	:	Functional Area Expert																		
1.3	Boundary pillars with the height not less than 2.5 feet above the ground level and 1.5	Boundary pillars with the height not less than 2.5 feet above the ground level and 1.5 feet below ground and minimum 8																		



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

	feet below ground and minimum 8 inches on all face of pillar should be erected.	inches on all face of pillars are provided. Photographs of the same is enclosed as Annexure -VII .
1.4	GPS coordinates of each pillar should be carved/painted clearly on the pillars with red colour.	Photographs showing boundary pillars and marked with GPS coordinates of each pillar is enclosed as Annexure -VII
1.5	Source of data taken from external source is to be mentioned clearly.	Source of data taken from external sources is mentioned in Chapter-III of the EIA/EMP Report

Standard Term of Reference (for Mining of Minerals)

1.1	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.	Not applicable, this is a Proposed Project.
1.2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	LOI for grant of mining lease has been issued by Office of Divisional Forest Officer: East Khasi Hills & Ribhoi Territorial Division in favour of Smt. Seisoh Syiemlieh vide order no. KH/8/ML/Limestone/2655 dated 30.08.2024. (Enclosed as Annexure-II) These documents confirm that the Project Proponent (PP) is the rightful lessee.
1.3	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 and mining technology and should be in the name of lessee.	The draft EIA/EMP report is being submitted to conduct public hearing. As desired all the documents including Approved Mining Scheme along with Progressive Mine Closure Plan, Draft EIA are compatible with one another in terms of the mine lease area, production levels, waste generation and its management.
1.4	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/toposheet; topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the	Corrigendum in respect of Geo-Coordinates of Non-Forest Land Certificate has been issued by office of divisional forest officer: East Khasi Hills & Ribhoi Territorial Division: Shillong vide order no NO. KH/8/NOC/Limestone/41/Pt.IV/2620 dated 26.08.2024



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

	proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	shows the coordinates of mining lease. (Enclosed as annexure-IV). The map showing geological and geomorphological formation of the study area is shown in Chapter III (Ref. Figure no. 3.7 & 3.8).
1.5	Information should be provided in Survey of India Toposheet 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 river and soil characteristics.	Topographical Map of 10 Km study area is enclosed as Annexure-VIII. The map showing geological and geomorphological formation of the study area is shown in Chapter III (Ref. Figure no. 3.7 & 3.8). The water bodies, streams and river has been given in Chapter – III, Sub-Section – 3.2 of EIA/ EMP Report. The soil characteristics has been given in the Section 3.5 of EIA/ EMP Report.
1.6	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.	Land proposed for the limestone mining was granted by Office of Divisional Forest Officer East Khasi Hills & Ribhoi Territorial Division in favour of Smt. Seisoh Syiemlieh vide order no. KH/8/ML/Limestone/68/2655 dated 30.08.2024. (Enclosed as annexure-II) Non-Forest Land Certificate issued by divisional forest officer: Khasi Hills (T) Division: Shillong vide order NO NO.KH/8/NOC/Limestone/41/Pt.IV/2620 dated 26.08.2024. stating that the proposed lease area is non-forest land and not part of any RF/PF. (Enclosed as annexure-IV) These approvals confirm that the proposed mining activities align with the state's land use policy. Therefore, the mining project complies with the state's land use regulations.
	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	Details is given below: -



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

of the environmental or forest norms/ conditions?

Environmental Policy

Smt Seisoh Syiemlieh, the operator of the “**Rusiar Limestone Mine**” situated at **Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya**, is committed to upholding a clean and sustainable environment. This commitment is reflected in the continuous improvement of environmental performance, which is an integral part of the business philosophy.

To achieve this goal, Project Proponent is committed to:

- Conducting operations in an environmentally responsible manner, ensuring compliance with all relevant legal and regulatory requirements related to environmental aspects.
- Adopting eco-friendly alternatives to minimize environmental impact.
- Actively participating in social welfare and environmental development initiatives for the local communities around the leased area.
- Promoting the efficient use of natural resources, energy, and equipment.
- Ensuring the dissemination of environmental information and providing training to our employees.
- Allocating the necessary resources to enable employees and associates to perform their work in compliance with environmental regulations.

STANDARD OPERATING PROCEDURE

A statement showing the responsibilities assignment for compliance of various statutory provisions applicable to the company are as under: -

S. No.	Relevant Acts/Rules	Functional Person Responsible
1.	Air (Prevention and Control of Pollution) Act,1981	Environmental Officer/ Mining Engineer
2.	Water (Prevention and Control of Pollution) Act,1974	Environmental Officer/ Mining Engineer
3.	Environmental Protection Act, 1986	Environmental Officer/ Mining Engineer
4.	Any other Rules, Regulations and Notifications Related Mining	Environmental Officer/ Mining Engineer
5.	Compliance of regulatory requirements	Environmental Officer/ Mining Engineer
6.	Overall Compliance Management	Environmental Officer/ Mining Engineer

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 hierarchical system or administrative order of the Company to deal with the environmental issues is as given below: -



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

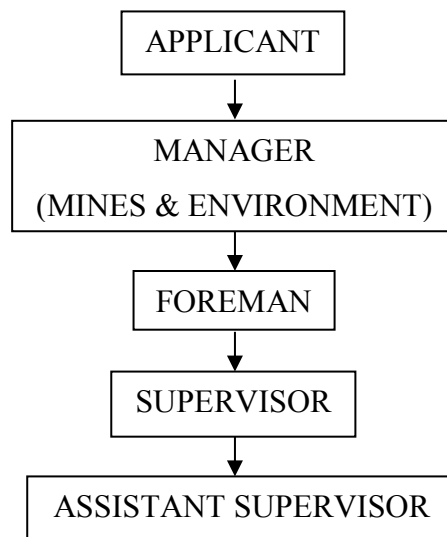
Page

Rev No. 00

Project:- “Rusiar Limestone Mine”

Applicant:- Smt. Seisoh Syiemlieh

Point Wise Compliance of Term of Reference



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.

The company follows a clear hierarchical structure to ensure effective management and compliance with environmental standards. The system, starting from the Applicant to the Manager (Mines & Environment), ensures that roles and responsibilities are well-defined. This structure enables efficient supervision, oversight, and adherence to both operational and environmental regulations, ensuring compliance at all levels.

1.7 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.

Mine Safety:

No underground workings exist in the lease area. Hence, subsidence study was not desirable.

Work in the applied lease area will be conducted with strict safety measures under the supervision of qualified staff. Workers will receive dust masks, safety boots, helmets, and other protective equipment, along with access to a well-equipped first aid box on-site.

To mitigate health risks, the following measures will be implemented: regular water sprinkling on haul roads, provision of dust masks, periodic medical examinations, maintenance of medical records, and availability of medical facilities. Workers showing early symptoms of illness will be reassigned to less dusty environments. Personal protective equipment will be provided, and vocational training will be offered. Employee safety will be prioritized according to Mine



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

		<p>Regulations, with a budget of ₹1.0 Lacs for capital costs and ₹2.0 Lacs for recurring costs allocated for labour welfare and occupational safety. Details of Occupational Health & Safety are given in chapter 4, section 4.8 of EIA/EMP report</p> <p><u>Slope Stability</u></p> <p>As per the Mineral Conservation Rules (MCR) 2016, and considering the stability of the rocks, an ultimate pit slope of 45° from the vertical has been proposed. This slope angle is deemed to be both safe and economical for these deposits. The overall bench slope will be maintained 85°. Bench height and width are being/will be maintained as 6 meters each considering semi-mechanization</p> <p><u>Blasting</u></p> <p>Controlled blasting is proposed for excavation of mineral and OB/ waste.</p> <p>AN-based slurry explosives such as Power Gel, Acquadyne, and Superdyne are proposed as primers, while the blasting agent will be an ammonium nitrate fuel oil (ANFO) mixture. This mixture, consisting of 94.50% ammonium nitrate and 5.5% diesel oil, will be produced on-site. If ANFO is not permitted, alternative slurry explosives may be used. Initiation will utilize half-second delay detonators. Details of blasting parameters are given in chapter 2, section 2.8.4 of EIA/EMP report.</p>
1.8	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.	<p>The study area, extending 10 km from the mine lease boundary, has been considered for the environmental impact assessment, covering aspects such as socio-economic, biological, hydrogeological, air, noise, soil, groundwater, surface water, land use, etc.</p> <p>According to the Mining Scheme, approximately 24475 tons of waste will be generated over five years. The mineral waste will be dumped on the southwest side of the lease area near pillar ‘1’ & ‘2,’ covering 0.02 ha and reaching a height of 6 meters in two terraces. The waste dump will be stabilized with rubble stone retaining walls, and a parapet wall and drain will</p>



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

		<p>be constructed on the lower side to prevent wash-off during the monsoon.</p> <p>Life of Mine ~6.28 or Say 7 Years (as per approved mining plan dated 13.12.2024).</p> <p>Lease period 10 Years From the date of Registration of mining lease.</p>
1.9	<p>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.</p> <p>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.</p>	<p>The details of the land use of the 10 km of the study area showing forest area, agriculture land, grazing land, water bodies, human settlement etc. has been given at Chapter- III, Section - 3.4 of EIA/ EMP Report.</p> <p>Land use map is interpreted/generated by the data obtained from LISS-IV sensor data of IRS ResourceSat-2 with resolution of 5.8 m. Land use map is given at figure 3.4. in EIA/EMP report.</p> <p>Land use plan of the mine lease area to encompass pre-operational, operational and post-operational phases is given in Chapter – II, Sub-Section –2.5.6 of EIA/EMP Report.</p> <p>Land use at preoperational, operational and post operational phases is given as below:</p>

S. No.	Land use Category	Present (Ha)	End of 5th year (Ha)	End of mine (Ha)
1.	Top Soil Dump	--	--	--
2.	Overburden Dump	--	0.02	0.02
3.	Excavation (voids Only)	--	0.64	0.64 (0.13 ha. -Plantation on Upper benches & 0.49 ha-Water reservoir)
4.	Roads	--	0.02	0.02
5.	Buildup Area	--	--	--
6.	Township Area	--	--	--
7.	Afforestation	--	0.10	0.20
8.	Reclamation (Backfilled)	--	--	--
9.	Mineral Storage	--	--	--
10.	Processing (Crushing)	--	--	--
11.	Undisturbed area	1.0	0.22	0.12
Total		1.0	1.0	1.0
<i>Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.</i>				



Gaurang Environmental Solutions Pvt. Ltd.	Page
Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

Anticipated Impact and Mitigation Measures of Land Use Change:

- The primary land use changes involve the conversion of undisturbed land into areas for excavation, waste dumping, and afforestation.
- The reclamation of waste dumps and afforestation efforts during the operational phase will mitigate environmental impacts. The creation of a water reservoir and plantation on excavation benches will aid in land rehabilitation post-mining activities. The overall impact of these changes will be managed through reclamation and sustainable land use practices.
- The land use plan has been designed to minimize adverse impacts while ensuring effective environmental management throughout all phases of the mining project.

1.10	Details of the land for any overburden 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.	There is no OB dump is proposed outside the mine lease area. Mineral waste will be dumped on the southwest side of the lease area near pillar ‘1’ & ‘2,’ covering 0.02 ha and reaching a height of 6 meters in two terraces of 3 meters each. The topsoil will be stored in a non-mineralized area for later use in plantation. No R & R issues are involved (as per RFCTLARR Act’ 2013).
1.11	A 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 to assist the Expert Appraisal Committees.	No forest land is involved within the lease area. This has been verified through the Non-Forest Land Certificate issued by divisional forest officer: Khasi Hills (T) Division: Shillong vide order NO. KH/8/NOC/Limestone/41/Pt.IV/2620 dated 26.08.2024. stating that the proposed lease area is non-forest land and not a part of any RF/PF. (Enclosed as annexure-XII)
1.12	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	The mining lease area is a Pvt. Owned land. Non-Forest Land Certificate issued by divisional forest officer: Khasi Hills (T) Division: Shillong vide order KH/8/NOC/Limestone/41/Pt.IV/2620 dated 26.08.2024.



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

	(CA) should be indicated. A copy of the forestry clearance should also be furnished	stating that the proposed lease area is non-forest land and not part of any RF/PF. (Enclosed as annexure-IV)
1.13	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.	The same is noted, but it is not applicable to this mining project.
1.14	The Vegetation in the RF/PF areas in the study area, with necessary details, should be given.	Details about the vegetation, flora, and fauna present within the 10 km study area are provided in Section 3.9 of the EIA/EMP report.
1.15	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.	<p>Details of Impact of the Mining Project on wildlife of the study area and corresponding mitigation measures are furnished in section 4.6 of EIA/EMP report. Mitigative measures adopted to minimize the impact on biodiversity and wildlife in the region are summarized below:</p> <p>Impact of the Mining Project on Wildlife includes:</p> <ul style="list-style-type: none"> • Habitat Disruption • Displacement of Species • Pollution • Altered Water Sources • Increased Human Activity <p>Mitigation Measures includes</p> <ul style="list-style-type: none"> • Greenbelt plantation over 0.25 ha (till conceptual stage) with 625 saplings, with a total allocated budget of 6.25 lakhs. • Habitat Restoration • Wildlife Corridors • Pollution Control measures • Monitoring Programs • Buffer Zones • Community Engagement • Environmental Education • Scheduled Operations
1.16	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	Land use map of 10 km study area showing forest area, agriculture land, grazing land, water bodies, human settlement etc. has been given at Chapter- III, Section - 3.4 of EIA/ EMP Report.



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

	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.	Non-Forest Land Certificate issued by divisional forest officer: Khasi Hills (T) Division: Shillong vide order NO.KH/8/NOC/Limestone/41/Pt.IV/2620 dated 26.08.2024. stating that the proposed lease area is non-forest land and not part of any RF/PF. (Enclosed as Annexure-XII)
1.17	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.	A detailed biological study of flora and fauna (core and buffer zone) has been carried out and the outcome has been given in Chapter – III, Sub-Section – 3.9 of EIA/ EMP Report.
1.18	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 Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered	Not applicable as the Mining project is located at Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya. having no declared Critically Polluted area and Aravali Range in proximity.



Gaurang Environmental Solutions Pvt. Ltd.	Page
Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

1.19	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 w.r.t 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)	Not applicable, as this is a mining project and does not fall under the Coastal Regulation Zone (CRZ).
1.20	R&R Plan/compensation details of 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.	There is no habitation present within the mine lease area. Hence, the R&R Plan is not required in this project.
1.21	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	One – season data i.e. Winter Season (of December 2024 to February 2025) was collected as per guidelines. AAQ data includes PM ₁₀ , PM _{2.5} , NO _x , SO ₂ and CO was carried out. The detailed report along with data generated for air pollutants and micro-meteorological parameters i.e. Wind speed, Direction, Temperature, Monitoring Period, Location etc. are



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

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.

given in **Chapter – III of EIA/EMP Report** in following sections:

S. No.	Particulars	Section
1.	Land Environment (Soil)	3.4
2.	Water Environment	3.6
3.	Ambient Air Quality	3.7
4.	Noise Level	3.8
5.	Biological Environment	3.9
6.	Socio-Economic Environment	3.10

The monitoring station selected represents the whole of study area is as described under: -

S. No.	Sampling Location	Distance (Km)	Direction	Components
1.	Mine Site (Smti. Seisoh Syiemlieh)	--	--	Air, Ground Water, Noise, Soil
2.	Bholaganj Bazar	0.9	E	Air, Ground Water, Noise, Soil
3.	Bholaganj	2.3	S	Air, Ground Water, Noise, Soil
4.	Chakalabasti	4.0	SW	Air, Ground Water, Noise, Soil
5.	Diengkain	3.85	WSW	Air, Ground Water, Noise, Soil
6.	Mawthang	3.65	NW	Air, Ground Water, Noise, Soil
7.	Sohbar	4.3	NNE	Air, Ground Water, Noise, Soil
8.	Mawpathaw	5.9	ENE	Air, Ground Water, Noise, Soil

Environmental Monitoring Reports by issued from the NABL Accredited laboratory: Noida Testing Laboratories {Certificate No.: TC-6814 valid upto 02.12.2025} is enclosed as **Annexure – XIX**.

1.22

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

The AERMOD Version 9.5 view dispersion model based on steady state Gaussian Plume Dispersion, was used for air quality account the impact of movement of vehicles for transportation of mineral, dispersion and transformation of emissions emitted into the air.

The isopleths showing air quality contours indicating the location of site, sensitive receptors, and pre-dominant wind direction has been given in **Chapter - IV, Sub-Section - 4.4.2 of EIA/ EMP Report**.



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

	receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	
1.23	The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.	Total Water Demand - 5.0 KLD (Drinking & Sanitation- 0.50 KLD, Dust Suppression- 2.5 KLD & Greenbelt Development- 2.0 KLD) Source: - Water demand will be met through tanker supply of nearby water stream. Detailed water balance has been given in Chapter- II, Sub-Section -2.5.3 of EIA/ EMP Report.
1.24	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the project should be provided.	no clearance from the Competent Authority is required as the water demand is being/will be met through tanker supply of nearby water stream.
1.25	Description of water conservation measures proposed to be adopted in the project should be given.	To conserve water during the mining project, the following measures will be implemented: <ul style="list-style-type: none"> • Water Recycling: Water accumulated in the excavation pits will be utilized for plantation and other project activities, reducing the overall water demand. • Groundwater Monitoring: Regular monitoring of pre-monsoon and post-monsoon groundwater levels will be conducted to ensure sustainable water use and prevent depletion. • Rainwater Harvesting: Measures for rainwater harvesting will be explored to supplement water requirements, especially during dry periods. These steps aim to minimize water usage, maximize recycling, and ensure long-term water sustainability in the project area.
	Details of rainwater harvesting proposed in the project, if any, should be provided.	Garland Drain and Desilting: The garland drain will be channelized to settling tanks of size 1.0m x 1.0m x 1.0m, which will be regularly desilted, especially after rainfall, to maintain their efficiency. Water Reservoir: At conceptual stage, 0.26 ha area will be excavated; out of which 0.12 ha will be developed as a water



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

		reservoir for community use which can accommodate approx. 15,21,500 Cu. m rainwater.						
1.26	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.	<p>Impact of the project on the water quality, both surface and groundwater has been assessed and detailed in Chapter – IV, Sub-Section- 4.3.2 along with necessary mitigation measures. The proposed safeguard measures to minimize the impact of mining on surface & ground water is as given below: -</p> <p><u>safeguard measures for Surface Water</u></p> <ul style="list-style-type: none"> ➤ Implement sedimentation ponds and treatment facilities for runoff control. ➤ Use re-vegetation, garland drains, and siltation ponds to prevent erosion. ➤ Quarry water will not be discharged; rainwater used for dust suppression and afforestation. ➤ Regular surface water quality monitoring. <p><u>safeguard measures for Ground Water</u></p> <ul style="list-style-type: none"> ➤ Mining will not intersect the groundwater table; water sourced from tanker supply. ➤ Sewage Management: Daily generation of 0.7 KLD, disposed in septic tank and soak pit, with stabilized sludge used for plantation. ➤ No chemicals or heavy metals used, preventing groundwater contamination. ➤ Regular groundwater quality monitoring to detect any changes. ➤ Post-mining efforts to restore natural groundwater recharge capabilities. <p>The budget allocated for water pollution measures has been incorporated in Action plan for Environmental Protection Measures mentioned in Chapter – IV, Section - 4.9 of EIA/EMP Report.</p>						
1.27	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be	<p>The detail of the elevation, ground water table and working level is given below: -</p> <table border="1"> <thead> <tr> <th>S. No.</th><th>Particulars</th><th>Levels (mRL)</th></tr> </thead> <tbody> <tr> <td>1.</td><td>Highest Elevation</td><td>183</td></tr> </tbody> </table>	S. No.	Particulars	Levels (mRL)	1.	Highest Elevation	183
S. No.	Particulars	Levels (mRL)						
1.	Highest Elevation	183						



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

	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.	<table> <tr> <td>2.</td><td>Lowest Elevation</td><td>141</td></tr> <tr> <td>3.</td><td>Fifth Year Working Level</td><td>156(45 m)</td></tr> <tr> <td>4.</td><td>General Ground Level</td><td>35</td></tr> <tr> <td>5.</td><td>Ultimate Pit Limit</td><td>138</td></tr> </table> <p>Ground water table will not be intersected as the mining activity will be above the ground level as per the approved mining plan.</p>	2.	Lowest Elevation	141	3.	Fifth Year Working Level	156(45 m)	4.	General Ground Level	35	5.	Ultimate Pit Limit	138			
2.	Lowest Elevation	141															
3.	Fifth Year Working Level	156(45 m)															
4.	General Ground Level	35															
5.	Ultimate Pit Limit	138															
1.28	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.	<p>No prominent stream or seasonal nallah is passing through the lease area. However, the rain water will follow the natural course of drainage.</p> <p>Therefore, no major impact on the hydrology is anticipated.</p>															
1.29	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.	<p>The detail of the elevation, ground water table and working level is given below: -</p> <table> <tr> <th>S. No.</th><th>Particulars</th><th>Levels (mRL)</th></tr> <tr> <td>1.</td><td>Highest Elevation</td><td>183</td></tr> <tr> <td>2.</td><td>Lowest Elevation</td><td>141</td></tr> <tr> <td>3.</td><td>Fifth Year Working Level</td><td>156(45m)</td></tr> <tr> <td>4.</td><td>Ultimate Pit Limit</td><td>138</td></tr> </table> <p>Ground water table will not be intersected as the mining activity will be above the ground level throughout the life.</p>	S. No.	Particulars	Levels (mRL)	1.	Highest Elevation	183	2.	Lowest Elevation	141	3.	Fifth Year Working Level	156(45m)	4.	Ultimate Pit Limit	138
S. No.	Particulars	Levels (mRL)															
1.	Highest Elevation	183															
2.	Lowest Elevation	141															
3.	Fifth Year Working Level	156(45m)															
4.	Ultimate Pit Limit	138															
1.30	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	<p>A time bound progressive greenbelt development plan in tabular form is given below: -</p>															



Gaurang Environmental Solutions Pvt. Ltd.	Page
Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

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.

Year	Safety Zone and Unworked Area (Inside the ML)		Waste Dump (Inside the ML)		*Reclaimed Area		Total		Amount (@ ₹ 1000 per sapling) (In lacs)
	Area (Ha)	No. of Trees	Area (Ha)	No. of Trees	Area (Ha)	No. of Trees	Area (Ha)	No. of Trees	
Existing	--	--	--	--	--	--	--	--	--
I	0.04	40	--	--	--	--	0.04	40	0.40
II	0.04	40	--	--	--	--	0.04	40	0.40
III	0.04	40	--	--	--	--	0.04	40	0.40
IV	0.04	40	--	--	--	--	0.04	40	0.40
V	0.04	40	--	--	--	--	0.04	40	0.40
End of life of mine	--	--	--	--	0.13	130	0.13	130	1.30
Total	0.20	200	-	-	0.13	130	0.33	330	2.94

***Reclaimed Area- Plantation on the upper benches of excavated pit (as shown in Conceptual Plan)**

Note:

- As per the MoEF&CC OM No. vide No. 22-34/2018-IA.III dated 16th Jan 2020 it will be ensured that after completion of mining operations re-grassing of the mining area and any other area which may have been disturbed due to the mining activities will be restored to a condition which is fit for growth of fodder, flora, fauna etc.
- All other costs like labor costs for plantation, soil filling dressing, irrigation etc. will also borne by client/proponent.

1.31	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	Traffic study has been carried out for SH-5 which will be used for the transportation of minerals from the mine site and traffic study has been covered in Chapter III Section 3.11 of EIA/EMP report. Due to the mine project the traffic density will increase slightly as the entire mineral will be transported through the SH-5 though the value of LOS would remain same i.e. A (Excellent).
-------------	--	--



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

	action to be taken by other agencies such as State Government) should be covered. Project proponent shall conduct impact of transportation study as Indian Road Congress Guidelines.	
1.32	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA report.	<p>As per the Mines Rules, 1955, the following temporary infrastructure facilities will be provided:</p> <ul style="list-style-type: none"> ➤ On-site Mine Office, including a vocational training center ➤ Rest Shelter ➤ Drinking Water and Sanitation Facilities ➤ Conservancy Facilities ➤ First-Aid Facilities
1.33	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.	The post-mining reclamation plan includes converting excavation areas into a water reservoir, afforesting 0.20 ha of total land of lease area, stabilizing waste dumps through plantation, and ensuring soil and water conservation. Erosion control measures and ongoing monitoring will restore ecological balance, enhance biodiversity, and provide sustainable land use for the community. Land use at the different stages of mine life is given at sub section 2.5.6 of EIA/EMP report.
1.34	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.	<p>Anticipated Occupational Health Impacts</p> <p>Physical Hazards: - It includes: -</p> <ul style="list-style-type: none"> ➤ Mechanical; ➤ Electrical; ➤ Noise and Vibration. <p>Chemical Hazards: - It includes: -</p> <ul style="list-style-type: none"> ➤ Fugitive Dust emissions; ➤ Particulate Matter; ➤ Silica; CO; Fumes (Sulphur Dioxide, Oxides of Nitrogen). <p>Proposed Preventive Measures</p> <ul style="list-style-type: none"> ➤ It's an open cast semi-mechanized method of mining, timing of exposure of workers due to high noisy and dusty zone will be restricted.



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

		<p>➤ Use of Personal Protective Equipment (PPE’s) to protect the worker from the residual risk;</p> <p>➤ Basic facilities such as adequate drinking water supply, rest shelters etc. will be provided.</p> <p>Medical Examination Schedule</p> <p>➤ All workers will be subjected to Initial Medical Examination at the time of appointment.</p> <p>➤ Periodical Medical Examination will be conducted at least once in five years.</p> <p>➤ All the examination stated in Form – O under Rule – 29 – B as per Mines Rule’ 1955 will be carried out.</p> <p>The schedule Pre-placement Medical Examination and Periodical Medical Examination along with the preventive measures have been detailed in the EMP of the Chapter – VII, Sub – Section – 7.3.3 of EIA/EMP Report.</p>
1.35	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.	<p>The public health implications of the project for the population in the impact zone will be systematically evaluated. Key health risks identified include potential air and water pollution, noise, and dust exposure due to mining activities. To mitigate these impacts, the following remedial measures will be implemented:</p> <p>Air Quality Management: Installation of dust suppression systems, regular monitoring of air quality, and plantation along peripheries to reduce dust levels.</p> <p>Water Quality Management: Proper wastewater treatment, garland drains, and sedimentation ponds to prevent contamination of local water sources.</p> <p>Noise Control: Use of silencers on machinery, regular noise level monitoring, and operational time restrictions to minimize noise pollution.</p> <p>Health Camps: Regular health check-ups and awareness programs for local communities, with a focus on respiratory diseases.</p> <p>• Emergency Medical Facilities: On-site first-aid and emergency response facilities, including training for</p>



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

		<p>employees and local residents. details about Occupational health and safety is given in section 4.8 of EIA/EMP report.</p> <ul style="list-style-type: none"> • Proper avenue plantation will be carried out along the kaccha road. • The speed of the vehicles will be maintained low (25 Kmph). It will minimize the fugitive dust generation. • However, due to low speed more vehicular exhausts will generate. To control the vehicular exhausts PUC certified vehicles will be used. • Vehicles will be fully covered with the Tarpaulin sheets before transportation.
1.36	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.	<p>Details of the socio-economic environment of the study area is included in Chapter III, Section – 3.10 of EIA/EMP Report.</p> <p>Impact and mitigation measures on socioeconomic environment of study area is covered in Chapter IV, Section – 4.7 of EIA/EMP Report</p> <p>The project will generate significant socio-economic benefits for the local community by creating direct and indirect employment opportunities. Infrastructure improvements, such as road development will enhance connectivity and living standards. Health camps and sanitation facilities will be provided to the community.</p> <p>CER initiatives will support local development, focusing on education, amenities, and entrepreneurship, ultimately contributing to the economic, health, and social welfare of the region.</p> <p>The action plan for Corporate Environmental Responsibility (CER) activities, along with budgetary provisions, will be included in the final EIA/EMP. This plan will also incorporate the points raised during the public hearing.</p>
1.37	Detailed Environmental Management Plan to mitigate the environmental impacts which, should inter-alia include the impacts	Based on the baseline study and impact prediction, the detailed Environmental Management Plan has been prepared.



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

	of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	All the possible environmental issues have been addressed properly. The detailed Environmental Management Plan is given in Chapter – X.			
1.38	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.	The draft EIA/EMP report is being submitted for the conduction of the Public Hearing and the points raised and commitment of the project proponent on the same along with time bound action plan with budgetary provisions to implement the same will be incorporated in the final EIA/ EMP Report of the Project.			
1.39	Details of litigation pending against the project, if any, with direction/ order passed by any Court of Law against the project should be given.	There are no pending litigations or court directions against the project.			
1.40	The cost of the project (capital cost and recurring cost) as well as the cost towards implementation of EMP should clearly be spelt out.	S. No.	Particulars	Capital Cost (In Lacs)	Recurring Cost (₹ In Lacs)
		1.	Project Cost	11.0	--
		2.	EMP Cost	5.84	4.25
1.41	A Disaster Management Plan shall be prepared and included in the EIA/EMP Report.	A Disaster Management Plan has been given in Chapter– VII, Sub-section – 7.2 of EIA/EMP Report.			
1.42	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.	The project will yield substantial benefits across environmental, social, and economic domains. Environmentally, it will implement sustainable mining practices with a focus on reclamation and habitat restoration. Socially, the project will contribute to local infrastructure development and enhance community welfare through its CER initiatives. Economically, it will bridge the existing demand-supply gap for limestone, supporting India's position as a key supplier in the global market. The mining and associated activities in the mineral bearing areas bring about gains in gross domestic product. India is considered a hub for limestone supplies and exports with low profit margins.			



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

		The project will also generate employment opportunities, stimulate local businesses, and contribute to GDP growth, ensuring long-term economic stability and the responsible use of natural resources.
--	--	--

1.44 Besides the above, the below mentioned general points are also to be followed: -

a)	All documents to be properly referenced with index and continuous page numbering.	All documents have been properly referenced with index, page numbers and continuous page numbering.
b)	Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.	The data presented in the report especially in table, along with the period in which the data was collected and the source has been incorporated.
c)	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.	All the analysis/testing reports of water, air, soil and noise has been enclosed as Annexure – V .
d)	Where the documents provided are in a language other than English, an English translation should be provided.	All documents enclosed with this EIA/EMP report is provided in English.
e)	The Questionnaire for Environmental Appraisal of industrial projects as devised by the Ministry shall also be filled and submitted.	Noted.
f)	While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4 th August, 2009, which are available on the website of this Ministry should also be followed.	All instruction mentioned in O.M. No. J-11013/41/2006-IA.II (I) dated 4 th August, 2009 are being complied with.
g)	Changes, if any made in the basic scope and project parameters (as submitted in Form-1 and the F.R. for securing the TOR) should be brought to the attention of MoEF 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	There have been no changes made to the basic scope and project parameters as submitted in Form-1 and the F.R. for securing the TOR. Any modifications, if required, will be promptly communicated to the MoEF with justifications, and necessary permissions will be sought for such changes.



Gaurang Environmental Solutions Pvt. Ltd.


Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Point Wise Compliance of Term of Reference

	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.											
h)	As per the circular no. J-11011 16L8/201.0-1A.11fl) 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.	Not applicable, this is fresh project.										
i)	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.	<table> <tr> <th>S. No.</th><th>Plans</th><th>Details</th></tr> <tr> <td>1.</td><td>Surface Plan</td><td rowspan="3">All the details regarding these is given in mining plan plates attached with approved mining plan</td></tr> <tr> <td>2.</td><td>Geological Maps and Sections</td></tr> <tr> <td>3.</td><td>Sections of the mine pit and external dumps</td></tr> </table>	S. No.	Plans	Details	1.	Surface Plan	All the details regarding these is given in mining plan plates attached with approved mining plan	2.	Geological Maps and Sections	3.	Sections of the mine pit and external dumps
S. No.	Plans	Details										
1.	Surface Plan	All the details regarding these is given in mining plan plates attached with approved mining plan										
2.	Geological Maps and Sections											
3.	Sections of the mine pit and external dumps											

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project: “Rusiar Limestone Mine”
Applicant: Smt Seisoh Syiemlieh

EIA/EMP REPORT



	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

CHAPTER–I

INTRODUCTON



CHAPTER I INTRODUCTION**1.1 PURPOSE OF THE REPORT**

Gaurang Environmental Solutions Pvt. Ltd. has been assigned the job by Smt. Seisoh Syiemlieh to carry out Environmental Impact Assessment (EIA) studies and preparation of EIA report with suitable EMP for the “Rusiar Limestone Mine” coming up at Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya. The project activity is listed at item 1(a) Mining of Minerals in Schedule of EIA Notification, 2006 and subsequent amendments thereafter as category “B1” project and hence require prior Environmental Clearance.

However, as per the EIA Notification No. S. O. 3977 (E) dated 14th August 2018 for Sand Mining and other Minor mineral Mining projects in Cluster situation having Cluster area of Mine leases > 5 ha and < 25 ha with no individual lease > 5 ha comes under category “B2” and public hearing is not required for appraisal of EC.

As per the Ministry of Environment, Forest & Climate Change Office Memorandum dated 12th December, 2018 “If the cluster or an individual lease size exceeds 5 ha the EIA/EMP be made applicable in the process of grant of prior Environmental Clearance”. The total cluster area is 5.23 Ha. Details of the cluster are as below: -

S.N	Approved Mining Plan	Area (Hectares)	Mineral	Distance from the approved mining plan of Shri Arbis Tangdhara (metres)
1	Smt. Seisoh Syiemlich	1.0	Limestone	-
2	Shri Arbis Tangdhara	0.47	Limestone	5
3	Shri Idalis Ryngnga	1.36	Limestone	74
4	Smt. Ailadmon Japang	2.40	Limestone	128
Total Area		5.23	-	-

Hence, the project is treated as “B1” category project

The objective of the Environmental Impact Assessment (EIA) report is:-

- To identify, predict and evaluate the environmental, economic and social impact due to project activities;
- To provide information on the environmental consequences for decision making and;
- To promote environmentally sound and sustainable development through the identification of appropriate alternatives and mitigation measures.



Baseline studies for one season i.e. Winter Season (December,2024 to February, 2025) along with field surveys were conducted by NABL Accredited laboratory: Noida Testing Laboratories {Certificate No.: TC-6814 valid upto 02.12.2025} and potential environmental impacts of the project activities are identified, assessed and their mitigation measures are documented in this EIA/EMP report.

1.2 REGULATORY COMPLIANCES

Legal Provision	Letter Nos.	Date	Annexure No.
No Objection Certificate issued by Sirdar Sohbar Sirdarship	SSS/Adm/A-48/2022-24/40	24.05.2024	II
LOI issued by Office of Divisional Forest Officer East Khasi Hills & Ri Bhoi (T) Division, Shillong	KH/8/ML/Limestone/68/2655	30.08.2024	III
Non-Forest Land Certificate issued by Divisional forest officer: Khasi Hills (T) Division:: Shillong	NO.KH/8/NOC/Limestone/41/Pt.IV/2620	26.08.2024	IV
Approval of Mining Plan by the Mining Engineer, Directorate of Mineral Resources, Meghalaya:: Shillong	No.DMR/MM/203/2024/04-A	27.11.2024	V
Cluster Certificate issued by Directorate of Mineral Resources Shillong.	NO.DMR/MM//203/2024/08	17.12.2024	VI
No litigation is pending against the project in the court of law as the information provided by Project Proponent.			

1.3 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

1.3.1 IDENTIFICATION OF THE PROJECT

The “Rusiar Limestone Mine” is coming up at Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya. The total lease area of the project is 1.0 Ha. The mining activity is will be carried out by open cast semi-mechanized method.

1.3.2 INTRODUCTION OF PROJECT PROPONENT

Smt Seisoh Syiemlieh, the applicant for a mining lease for limestone over an area of 1.0 hectares, is interested in undertaking mining activities.



Details of the Project Proponent are as given below:-

Name & Address of the Applicant	Applicant: - Smti Seisoh Syiemlieh R/o.- Sohbar Village, Sohbar Sirdarship, East Khasi Hills District, Meghalaya.
--	--

1.4 BRIEF DESCRIPTION OF NATURE, SIZE, LOCATION OF THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY, REGION.

1.4.1 BRIEF DESCRIPTION AND NATURE OF PROJECT

The Letter of Intent (LOI) for mineral Limestone, Area: 1.0 hectare was sanctioned in favour of Smt. Seisoh Syiemlieh by Office of Divisional Forest Officer Khasi Hills Division & Ri Bhoi (T)Division, Shillong vide letter no. KH/8/ML/Limestone/2655 dated 30.08.2024.

The Mining Plan with PMCP has been approved by the Mining Engineer, Directorate of Mineral Resources Meghalaya: Shillong vide letter NO/DMR/MM/203/2024/04-A dated 27.11.2024.

The mineable reserves are about 2,76,345 MT to produce limestone at the rate of 48,900 TPA of ROM (Mineral Limestone- 44,025 TPA & Mineral Waste/Subgrade- 4,875 TPA). The mining operations will be carried out by open cast semi - mechanized method.

1.4.2 SIZE

The size and magnitude of the lease area is as given below:-

Table 1.1: Size or Magnitude

S. No.	Particulars	Details
1.	Lease Area (Ha.)	1.0
2.	Cluster Area (Ha.)	5.23
3.	Total Mineable Reserves	2,76,345 Tonnes
4.	Proved Reserves	2,76,345 Tonnes
5.	Probable Reserves	-
6.	Proposed Production Capacity	48,900 TPA of ROM (Mineral Limestone- 44,025 TPA & Mineral Waste/Subgrade- 4,875 TPA)
7.	Lease Validity	10 Years
8.	Total Man Power (Nos.)	19
<i>Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.</i>		



1.4.3 LOCATION OF THE PROJECT

The “Rusiar Limestone Mine” is coming up at Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya.

The geographical location with respect to boundary pillars of the mining lease are:-

Table 1.1: Geographical Position of the Boundary Pillars

Pillar No.	Latitude(N)	Longitude(E)
1.	25°10'48.41"N	91°44'26.92"E
2.	25°10'48.28"N	91°44'25.56"E
3.	25°10'48.54"N	91°44'25.08"E
4.	25°10'47.97"N	91°44'23.31"E
5.	25°10'49.27"N	91°44'23.26"E
6.	25°10'52.38"N	91°44'25.91"E
7.	25°10'52.62"N	91°44'27.56"E
8.	25°10'51.64"N	91°44'28.43"E
9.	25°10'50.29"N	91°44'26.45"E
<i>Source: As per the Approved Mining Plan along with PMCP dated 27.11.2024.</i>		

1.4.4 IMPORTANCE TO THE COUNTRY, REGION

Limestone/Building stone is a popular building material from ancient times. It is relatively soft, making it easy to carve. It has been widely used around the world in constructing of temples, homes and other buildings.

Mining activities are expected to create more employment opportunities, leading to an anticipated rise in average household income levels, which serve as indicators of socio-economic status, potentially improving overall standards of living within affected communities.

1.5 EIA PROCESS

As per EIA Notification dated 14th September 2006, as amended from time to time; this project falls in Category “B” under project or activity 1(a) (Mining of Minerals).

The prior Environmental Clearance process for the project will comprise of three stages. These stages in sequential order are:-

1. Screening



2. Scoping
3. Public Consultation
4. Appraisal

The flow-chart depicting these stages to obtain the prior Environmental Clearance for Category B1 project from SEIAA, Meghalaya is as given below in Figure 1.1:-

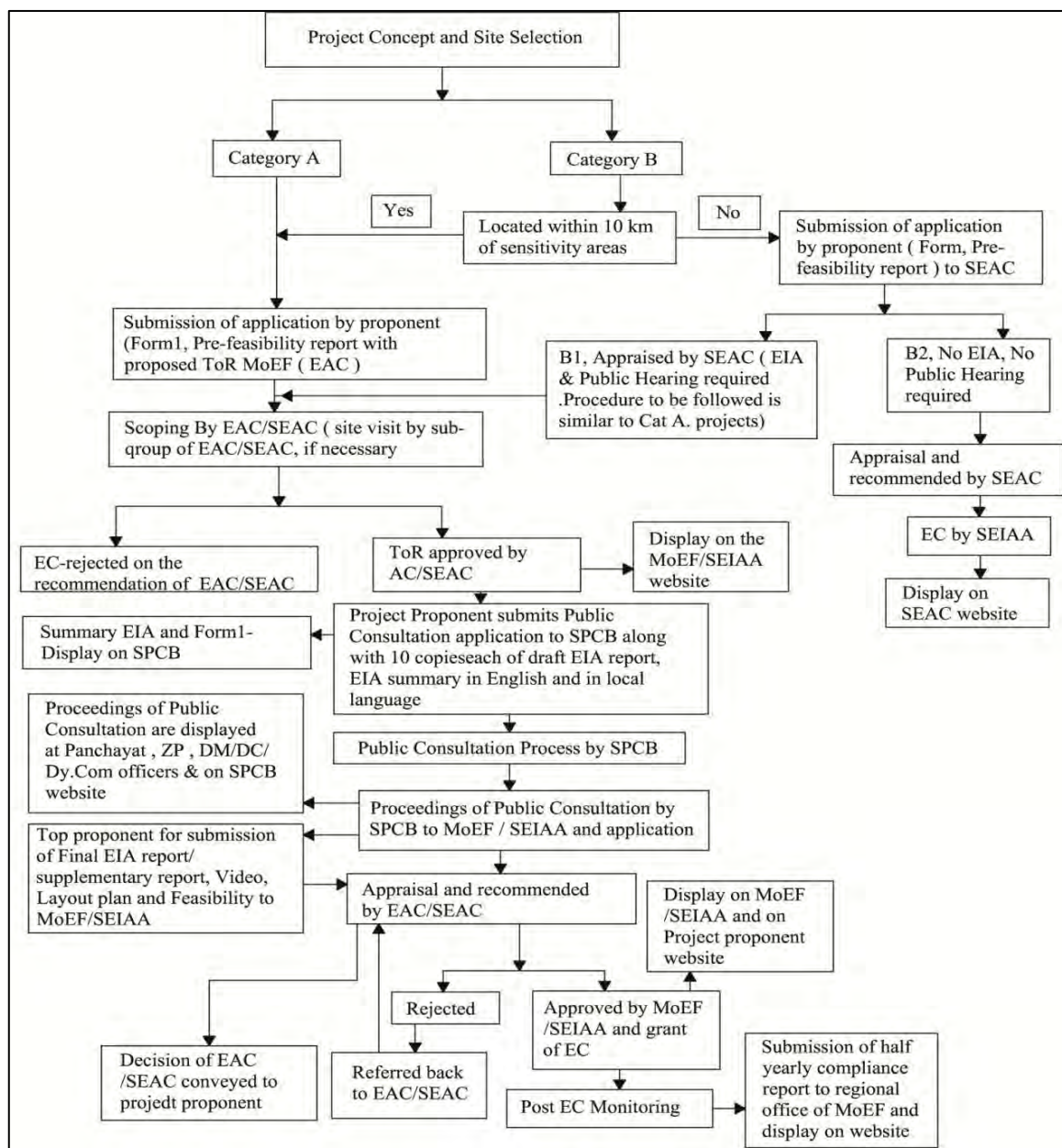


Figure 1.1: Stages for obtaining prior Environmental Clearance

1.6 SCOPE OF THE STUDY/ COMPLIANCE OF THE TOR



Terms of Reference for the “Rusiar Limestone Mine” was granted by SEIAA, Meghalaya. The point wise compliance of the TOR is attached as **Annexure-IA** with this EIA/EMP report.

1.7 POST – ENVIRONMENTAL CLEARANCE MONITORING

The Company will submit a half yearly compliance report in respect of stipulated prior Environmental Clearance terms and conditions on 1st June and 1st December of each calendar year. The latest such compliance report will be displayed on the website of the concerned regulatory authority.

1.8 GENERIC STRUCTURE OF ENVIRONMENTAL IMPACT ASSESSMENT

In terms of EIA Notification of the MoEF & CC, New Delhi dated 14th September 2006 and its subsequent amendments, the generic structure of the EIA document is as under:-

Table 1.2: Generic structure of EIA document

S. NO.	CHAPTERS	PAGE NOS.
1.	INTRODUCTION	35-41
2.	PROJECT DESCRIPTION	42-58
3.	DESCRIPTION OF THE ENVIRONMENT	59-145
4.	ANTICIPATED ENVIRONMENTAL IMPACT & MITIGATION MEASURES	146-172
5.	ANALYSIS OF ALTERNATIVES	173-174
6.	ENVIRONMENTAL MONITORING PROGRAMME	175-183
7.	ADDITIONAL STUDIES	184-190
8.	PROJECT BENEFITS	191-194
9.	ENVIRONMENTAL COST BENEFIT ANALYSIS	195-196
10.	ENVIRONMENTAL MANAGEMENT PLAN	197-205
11.	SUMMARY & CONCLUSION	206-226
12.	DISCLOSURE OF CONSULTANT ENGAGED	227-229



CHAPTER – II

PROJECT DESCRIPTION



CHAPTER II PROJECT DESCRIPTION

2.1 TYPE OF PROJECT

This is proposed Rusiar Limestone Mine promoted by Smt. Seisoh Syiemlieh. The proposed method of mining is open cast semi-mechanized. The mining lease is coming up at Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya over an area of 1.0 ha. with proposed production capacity of 48,900 TPA of ROM (Mineral Limestone- 44,025 TPA & Mineral Waste/Subgrade- 4,875 TPA).

2.2 NEED FOR THE PROJECT

Limestone mining projects are undertaken for several reasons, each serving different needs and purposes:

Construction Materials: Limestone is a fundamental component in the construction industry, used in the production of cement, concrete, and mortar. Mining limestone ensures a steady supply of this crucial material for infrastructure projects such as buildings, roads, bridges, and dams.

Industrial Uses: Limestone is utilized in various industrial processes beyond construction, including manufacturing of glass, steel, and chemicals. Its chemical properties make it valuable for neutralizing acidic soils and waters, treating flue gases from industrial processes, and purifying metals.

Global Demand: Limestone is a globally traded commodity, with demand driven by economic growth and construction activities worldwide. Mining projects help meet this demand and can contribute to a country's export earnings.

Economic Development: Limestone mining projects contribute significantly to local and national economies. They create jobs directly in mining and processing operations, as well as in ancillary industries such as transportation and equipment manufacturing. Moreover, revenue generated from limestone mining supports local communities through taxes and royalties.



2.3 LOCATION OF THE PROJECT (MAPS SHOWING GENERAL LOCATION, SPECIFIC LOCATION, PROJECT BOUNDARY & PROJECT SITE LAYOUT)

The mining lease is coming up at Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya. The geographical position of the Mining Lease Boundary Pillars is given in Table 2.1.

Table 2.1: Geographical Position of the Boundary Pillars

Pillar No.	Latitude(N)	Longitude(E)
1.	25°10'48.41"N	91°44'26.38"E
2.	25°10'48.28"N	91°44'25.33"E
3.	25°10'48.54"N	91°44'25.08"E
4.	25°10'47.97"N	91°44'23.31"E
5.	25°10'49.27"N	91°44'23.26"E
6.	25°10'52.38"N	91°44'25.91"E
7.	25°10'52.62"N	91°44'27.56"E
8.	25°10'51.64"N	91°44'28.43"E
9.	25°10'50.29"N	91°44'26.45"E
<i>Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.</i>		

The map showing the general location of the Proposed mine is given in figure 2.1 and specific location along with project boundary is given in Figure 2.2.



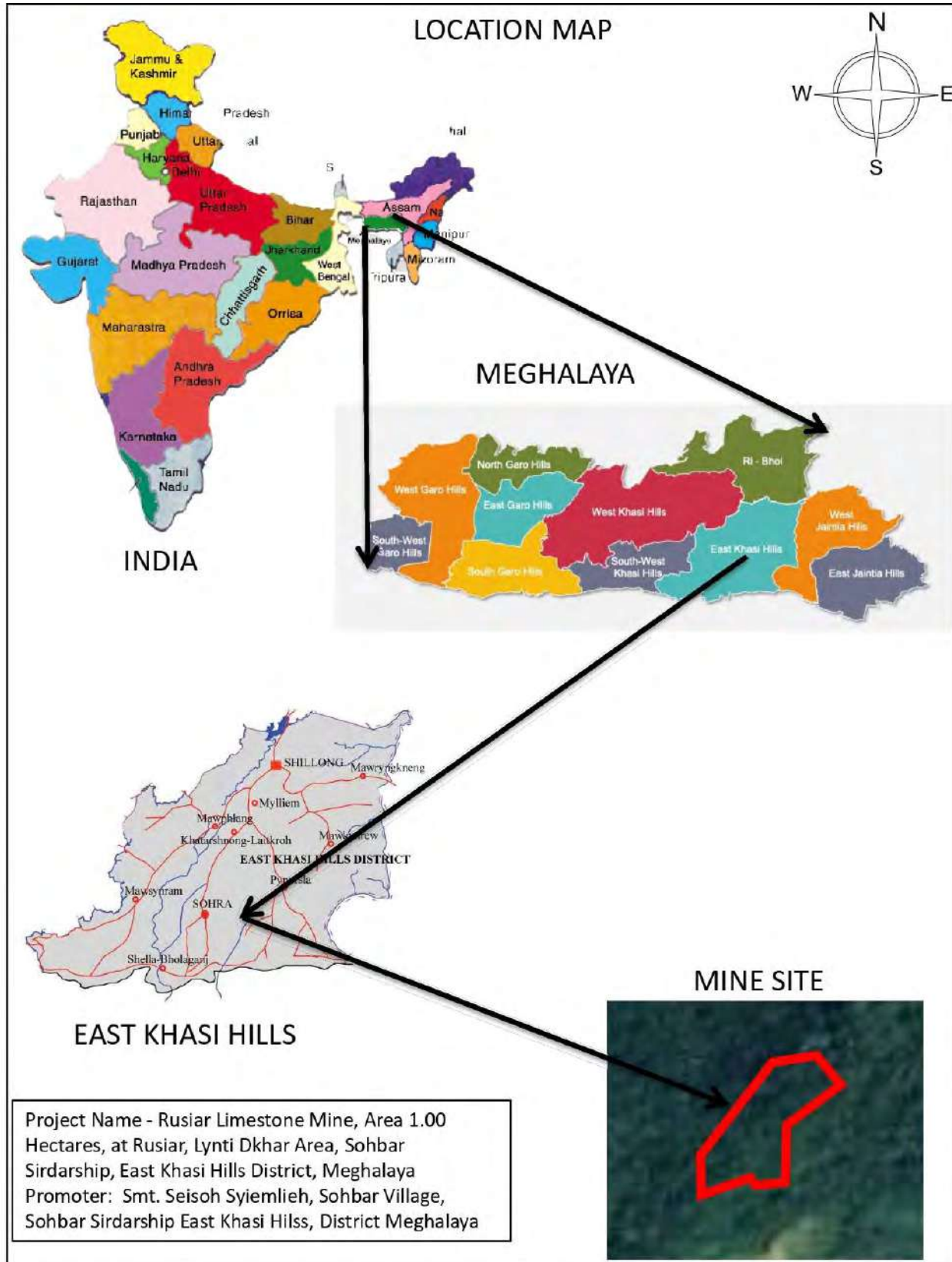


Figure 2.1: Map showing General Location of the Lease Area



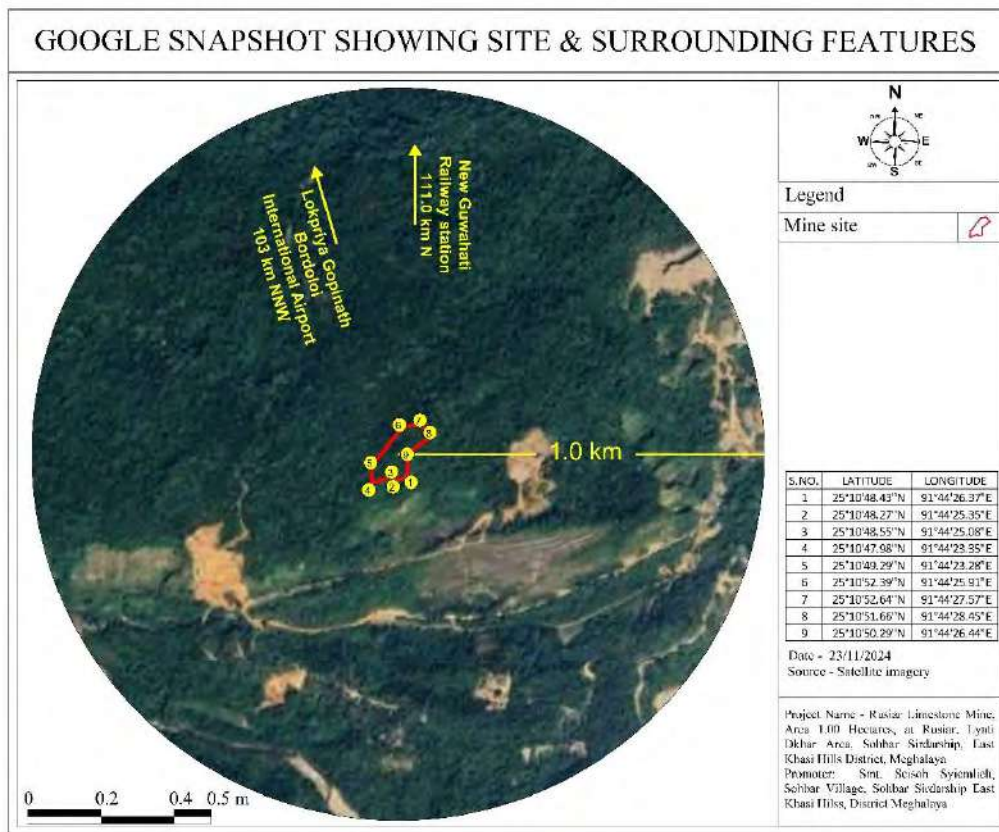


Figure 2.2: Map Showing Specific Location of the Lease Area

2.4 SIZE OR MAGNITUDE OF OPERATION

The size and magnitude of the project is as given below:-

Table 2.2: Size or Magnitude

S. No.	Particulars	Details
1.	Lease Area (Ha.)	1.0
2.	Mineable Reserves (MT)	2,76,345
3.	Proposed Production	48,900 TPA of ROM (Mineral Limestone- 44,025 TPA & Mineral Waste/Subgrade- 4,875 TPA).
4.	Lease Validity	10 Years
5.	Total Man Power (Nos.)	19
6.	Elevation	Highest-183 mRL, Lowest-141 mRL
7.	Working limit at the end of 5 th year mining plan	156 mRL(45 meter)
8.	Ultimate Pit Limit (at Conceptual stage)	138 mRL
9.	General Ground level near the lease area	35 mRL

Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.



2.5 INFRASTRUCTURE (PROJECT REQUIREMENTS)

2.5.1 AMENITIES/ FACILITIES

The site services like rest room shelter, first-aid facility, mines office, stores, drinking water facilities, toilets etc. will be provided for the workers.

However, the nearest basic amenities/ facilities available within 10 Km study area and is given Table 2.3.

Table 2.3: Basic Amenities/ Facilities within the Study Area

S. No.	Nearest Amenities	Distance & Direction (From Lease Boundary)		
1.	Police Station	Sohra Police Station, Sohra -Laitkynsew Rd, Cherrapunji, Meghalaya- 9.90 Km, North		
2.	Post Office	Cherrapunji Post Office, 10.12 Km, North		
3.	Power supply	Nill		
4.	Educational Facilities	Educational Facilities	Distance (Km)	Direction
			(From Lease Boundary)	
		RKM LP/UP/Secondary School Bholaganj Majai, Meghalaya	0.65	East
		Anderson L.P School, Bholaganj, Umdud, Umsaw, Meghalaya	1.33	SSW
		Ramakrishna Mission English High School, Umsaw, Meghalaya	1.65	SSW
		Byrong Govt. L.P School - Elementary School, Meghalaya	3.0	WNW
5.	Medical Facilities	Medical Facilities	Distance (Km)	Direction
			(From Lease Boundary)	
		Wahsherkhmut PHC- Hospital	11.6	ENE
		Mawlong P.H.C – Hospital,	6.7	WNW
		Laitkynsew PHC -Medical Center	10.2	WNW
		Sohbar PHC -Hospital	2.7	NNW
*Source: - Google Earth				



2.5.2 POWER

The mining will be carried out during the day time hence, no electricity is required at mine site.

2.5.3 NEAREST SOURCE OF WATER SUPPLY AND DEMAND

The daily water demand for the project is 5.0 KLD, out of which 0.9 KLD is used for domestic purposes, 2.0 KLD for plantation and 2.1 KLD for dust suppression. Water demand will be met through tanker supply from nearby water stream or other water sources.

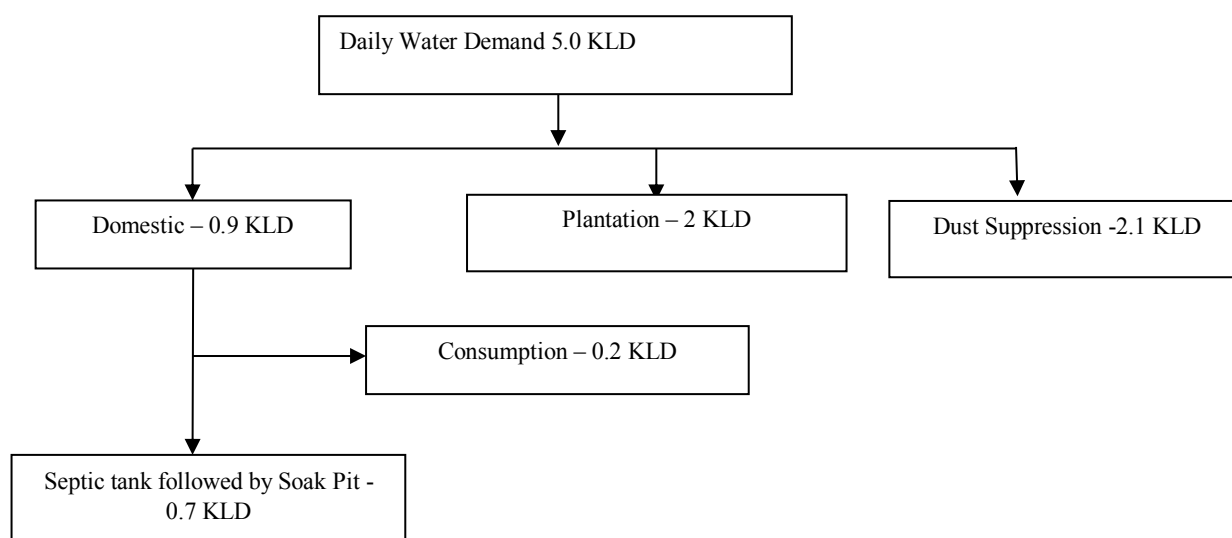


Figure 2.3: Water Balance

2.5.4 MANPOWER REQUIREMENTS

The project will provide employment to 19 people. Preference will be given to eligible local people for employment. In spite of direct employment, there will also be many indirect employment opportunities. The list of technical and non-technical staff requirement is presented in Table 2.4.

Table 2.4: Manpower (Technical and Non-Technical) Requirement

Sr. No.	Particulars	No. of Persons
1.	Highly Skilled	1
2.	2Skilled	6
3.	Semi-Skilled	6



Project:- “Rusiar Limestone Mine”

Applicant:- Smt. Seisoh Syiemlieh

Chapter – II–Project Description

4.	Un-Skilled	6
TOTAL		19
<i>Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.</i>		

2.5.5 LAND OWNERSHIP/OCCUPANCY

Table 2.5: Land Ownership

S. No.	Type of Land	Area (Ha.)	Ownership
1.	Private land	1.0	Own Land (Private land) occupied by lessee
Total		1.0	-

2.5.6 LAND USE PATTERN

The land use for mining and allied purposes is given in Table 2.6.

Table 2.6: Land use Pattern

S. No.	Land use Category	Present (Ha)	End of 5th year (Ha)	End of mine (Ha)
1.	Top Soil Dump	--	--	--
2.	Overburden Dump	--	0.02	0.02
3.	Excavation (voids Only)	--	0.64	0.64 (0.13 ha. -Plantation on Upper benches & 0.49 ha-Water reservoir)
4.	Roads	--	0.02	0.02
5.	Buildup Area	--	--	--
6.	Township Area	--	--	--
7.	Afforestation	--	0.10	0.20
8.	Reclamation (Backfilled)	--	--	--
9.	Mineral Storage	--	--	--
10.	Processing (Crushing)	--	--	--
11.	Undisturbed area	1.0	0.22	0.12
Total		1.0	1.0	1.0
<i>Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.</i>				

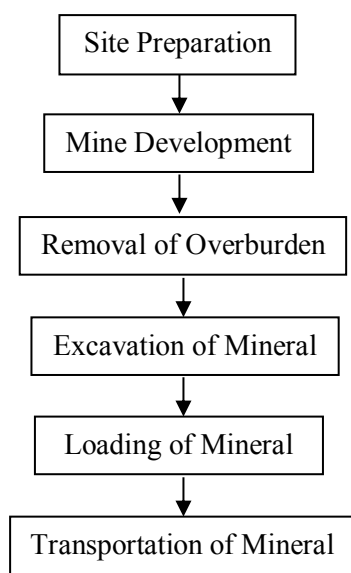


2.6 PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION

The proponent proposes to implement the production capacity immediately after obtaining all the statutory approvals such as EC, CTE, CTO, etc. The proponent will comply with the environmental clearance conditions during mining operations. Mining activities will be commencing as per the five-year Mining Plan.

2.7 TECHNOLOGY AND PROCESS DESCRIPTION

The mining operations will be carried out by open cast semi-mechanized method. Various mining activities such as drilling, blasting, loading and transportation will be carried out to ensure maximum mineral conservation and minimum environmental degradation. The process flow diagram given below depicts the mining process:-



2.8 PROJECT DESCRIPTION

2.8.1 GEOLOGY

2.8.1.1 Regional Geology

The generalized stratigraphic sequence of the region is given below:-

Table 2.7: Regional Geology

Geological Age	Group Name	Formation Name	Rock Type
Recent	Newer Alluvium	Unclassified	Sand, Silt and Clay
-----UNCONFIRMITY-----			
Pleistocene	Older Alluvium	Unclassified	Sand, Clay, Pebble, Gravel and boulder deposits



Project:- “Rusiar Limestone Mine”**Applicant:- Smt. Seisoh Syiemlieh****Chapter – II–Project Description**

-----UNCONFIRMITY-----			
Mio- Pliocene	Dupitula Group	Unclassified	Mottled Clays, Feldspathic sandstone and conglomerate.
-----UNCONFIRMITY-----			
Oligo- Miocene	Garro Group	Chengopara Formation Baghmara Formation Simsang Formation	Sand, Siltstone, Clay, Mart Feldspathic Sandstone, Pebble, Conglomerate, Clay, Silty Clay. Shale, Sandstone, Mart
Eocene	Jaintia Group	Kopili Formation Shella Formation Langpar Formation	Siltstone-sandstone alternations, sand Alternation of sandstone- lime stone Calcareous Shale, Sandstone, Limestone
Upper Cretaceous	Khasi Group	Mahadek Formation Bottom Conglomerate Formation Jadukata Formation	Arkose (glauconitic) Conglomerate, Arkose Sandstone- Conglomerate alternation
-----UNCONFIRMITY-----			
Jurassic	Sylhet Trap	-	Basalt, alkali Basalt, Rhyolite acid tuff.
-----UNCONFIRMITY-----			
Pre- Cambrian	-	Intrusives (Acid and Basic) Shillong Group	Ponphyritic and coarse granites, aplite, quartz vein, epidiorite, dolerite, basalt Quartzite, Phyllite, Conglomerate
-----UNCONFIRMITY-----			
Archaean	-	Gneissic Complex	Biotite- gneiss, Biotite- Hornblend gneiss, granitic gneiss, Migmatite, mica-schist, sillimanite- quartz schist, biotite- granulite- amphibolites, pynoxene-granulite etc.

Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.

2.8.1.2 Local Geology

The succession of rocks in the lease area is as given below:-


	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Table 2.8: Local Geology

Geological Age	Group Name	Formation Name	Rock Type
Recent	Newer Alluvium	Unclassified	Sand, Silt and Clay
-----UNCONFIRMITY-----			
Eocene	Jaintia Group	Shella Formation	Lime Stone

Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.

2.8.1.3 Geological and Mineable Reserves as per UNFC Classification

The mineral reserves as per UNFC are as follows:-

Table 2.9: Geological Reserves

A) Total Mineral Reserves	Limestone (Tonnes)
Proved Mineral Reserves	2,76,345
Probable Mineral Reserves	0
Total Mineable Reserves	2,76,345
B) Total Remaining Resources	
Feasibility Mineral Resources	5,35,005
Pre-Feasible Mineral Resources	0
Inferred Mineral Resources	0
Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.	

2.8.1.4 Proposed Rate of Production when Mine is fully Developed and expected Life of the Mine

The life of mine is calculated on the basis of present mineable reserve i.e. 2,76,345 MT with proposed production of Limestone: 44,000 TPA.

Mineable reserve	2,76,345 MT
Production in the period of the approved mining plan	Around 2,20,025 MT
Balance reserve	=2,76,345-2,20,025 =-56320 MT
Proposed rate of targeted production	44,000 Tonnes per Annum
Balance reserve will be sufficient for	=56320/44,000



	=1.28 years
Total Life of mine	=5+1.28 =6.28 or Say 7 years

2.8.2 MINING

2.8.2.1 Method for Developing and Working the Deposits

Opencast method of mining with semi mechanization will be adopted to excavate the mineral.

The salient features of mode of working as per approved Mining Plan with PMCP are:-

- Bench height and width are proposed to be kept 6 m each.
- Blasting will be done by short or long holes with permission of DGMS.
- The pneumatic breaker and hydraulic breakers will be used for the excavation of mineral.
- Fencing around the pit/excavation will be provided to check the inadvertent entry of human and livestock in the working zone.
- Garland drains with parapet walls be provided around the pit to avoid the surface runoff during the monsoon.
- Waste is proposed to be dumped in southwestern side of the lease area between the pillar ‘1’ & ‘2’ in 0.02 ha. area for 6 m in height in two terraces of 3m height each.
- Proposed bench slope is 85°.
- In the period of mining plan the lessee will develop six benches i.e. From Bench levels 171 mRL (Top Bench), 165 mRL, 159 mRL, 153 mRL, 147 mRL and 141 mRL (Lowest Bench).
- The approach roads will be provided time to time up to faces from nearest tar road.
- Drinking water will be brought from public water supply available at village and stored in water pitchers at site office and near the working sites for drinking purpose and in cement tanks near the site office for other purpose.
- The soil which may come across during mining will be scraped and stacked separately to be used for plantation during each monsoon.

2.8.2.2 Extent of Mechanization

The details of equipment is being used as well as proposed in mining operation are listed below:-

Table 2.10: Extent of Mechanization

S. No.	Type	No.	Size/Capacity	Mode of Operation
1.	Jack hammer Drill	03	34 mm Dia	Pneumatic



2.	Hydraulic excavator with rock breaker	01	0.6 mm dia.	Diesel
3.	Compressor	01	100L/S	Diesel
4.	Tractor Water Tank	01	3000 Liters	Diesel
5.	Water Pump	01	5/10 HP	Diesel
<i>Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.</i>				

2.8.3 YEAR-WISE DEVELOPMENT PROPOSED DURING PLAN PERIOD

The year wise development of mines for the plan period is as given below:-

Table 2.11: Proposed Year Wise Production during Plan Period

Year	Tentative Excavation in Tons (ROM)	Waste/Sub Grade of Limestone in Tons	Mineral Limestone in Tons
First Year	48,900	4,900	44,000
Second Year	48,900	4875	44025
Third Year	48,900	4,900	44,000
Forth Year	48,900	4,900	44,000
Fifth Year	48,900	4,900	44,000
Total	2,44,500	24,500	2,20,000
<i>Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.</i>			

2.8.4 BLASTING PARAMETERS

The blasting is needed to excavate the limestone. The safe blasting is being conducted as well as proposed by adopting all the safety measures as per Mines Act and with the permission of DGMS.

2.8.4.1 Broad Blasting Parameters

Table 2.12: Broad Blasting Parameters

Deep Hole Blasting	
Deep Hole Drill rod	6 meters effective length
Deep Hole Drill Machine	Down the hole drill
Burden	3 meter
Spacing	4 meter
Hole Diameter	4 inch (100mm)
Short Hole Blasting	
Drill rod	1.5 meters effective length
Drill machine	Jack Hammer



Burden	0.8 meter
Spacing	1.0 meter
Hole Diameter	32 mm

2.8.4.2 Explosive to be used

Blasting is will be done by various types of explosives. Generally, the following conventional types of explosives are used in the mine.

Slurry explosive (AN based) viz. power gel, Acquadyne, Superdyne etc. are proposed as primer. Blasting agent is proposed as ammonium nitrate fuel oil (ANFO) mixture.

The ANFO mixture will be readily produced at site by mixing ammonium nitrate (94.50%) with diesel oil (5.5%). If ANFO is not allowed the other slurry explosive may be used.

Initiation is proposed by half second delay detonators.

2.8.4.3 Powder Factor

Deep Hole: Charges per hole is 0.125 kg of primer, 5.5 kg per meters of blasting agent and one detonator (as required by Mines Manager).

Powder Factor	:	$\frac{\text{Effective Depth of hole} \times \text{Burden} \times \text{Spacing} \times \text{Bulk Density}}{\text{Total charge in Kg}}$
	:	$\frac{6 \times 3 \times 4 \times 2.5}{0.125 + 33}$
	:	180/33.125 = 5.43 Tonnes of rock/ kg of explosive

Short Hole: Charges per hole are 0.125 kg of primer, 0.45 kg of blasting agent, and One detonator.

Powder Factor	:	$\frac{\text{Effective Depth of hole} \times \text{Burden} \times \text{Spacing} \times \text{Bulk Density}}{\text{Total charge in Kg}}$
	:	$\frac{1.5 \times 0.8 \times 1 \times 2.5}{0.125 + 0.45}$
	:	3.00/0.575 = 5.21 tons of rock/kg of explosive

2.8.4.4 Storage of Explosive

Annual excavation of Rock	48,900 Tons
Explosive for excavation of per ton of rock	5.21 kg
Explosive for excavation of 48,900 tons of rock	48,900/5.21 = 9,385.80 Kg



Quarterly Requirement of Explosive	9,385.80 kg /4= 2,346.45 Kg
Requirement @ 20%, use of Primer (Booster)	2,346.45 *0.20 = 469.28 Kg
Requirement @ 80%, use of ANFO	2,346.45 *0.80 = 1877.16 Kg
Advised capacity of Explosive Magazine	5200 Kg
Advised capacity of ANFO Storage	2000 Kg

About 2000 Kg portable explosive magazine will be proposed for storing the explosive.

ANFO storage facility is proposed for the manufacture of ANFO. A room will be provided for storage of Ammonium Nitrate.

The lessee should apply for the explosive magazine for 2000 Kg capacity to the competent authority and for the ANFO storage facility to the competent authority.

2.9 CONCEPTUAL MINING PLAN

Conceptual Mining Plan is considered to know the ultimate limit of the workings at the end of mining, when mineable mineral deposit exhaust. The maximum limit of upper crust and depth of the workings at the end of lease period is considered for preparation of Conceptual Mining Plan. The site of waste dump, site service, plantation etc. in such a place that these sites should not get any disturbance by mining during the life of mine. The aforesaid aspects of the conceptual mining plan proposed are as follows:-

THE FINAL SLOPE ANGLE ADOPTED

Considering the stability of rocks the final slope angle or says ultimate pit slope will be 45° from vertical. This slope angle will remain quite safe for these deposits.

ULTIMATE PIT LIMIT

The ultimate Pit limit at the end of mine life will be - 138 mRL.

RECLAMATION

The mining is from top to bottom side. No reclamation is proposed during the period of this mining plan, as reserves will remain alive in the lease at the end of mining plan period. However, if reserve will be exhausted during the lease period, the exhausted benches will be reclaimed by mine rejects, spreading of topsoil and plantation will be done. It is also proposed to convert the pit into a water reservoir.

Reclamation	By water reservoir (Ha)	0.49
	By Plantation on Upper Benches (Ha)	0.13
Total reclaimed area (Ha)		0.62



2.9.1 MINERAL RESERVES

The Mineable reserves of the mine are 2,76,345 MT.

2.9.2 FINAL SLOPE ANGLE TO BE ADOPTED

Considering the stability of rocks the ultimate pit slope will be is 45° from vertical.

2.9.3 ULTIMATE EXTENT & SIZE OF PIT

The ultimate extent and size of the pit will be as follows at the conceptual stage:-

Length	70 meter (Average)
Width	50 meter
Depth	45 m

2.9.4 ULTIMATE CAPACITY OF DUMPS**Waste dump and stabilization:**

As per the approved Mining plan around 24,475 tons of waste will be generated during the period of 5 year of Mining plan. Maximum waste will be used in construction and maintenance of approach roads, construction of site services and rest. The waste will also lifted by local habitants for constructing the walls along the agriculture field.

The mineral waste is proposed to be dumped in southwestern side of the lease area between the pillar ‘1’ & ‘2’ in 0.02 ha. area for 6 m in height in two terraces of 3m height each. The waste dump will be stabilized by retaining walls of rubble stone. Parapet wall and drain will also be constructed towards lower altitude side to check the wash-off during monsoon.

Top soil

No separate soil is observed in the applied lease area. The soil that may come across during mining in patches or in cavities will be scraped and stacked separately and to be used for plantation in monsoon. Thus, there will be no permanent stack of soil.

2.10 DESCRIPTION OF MITIGATION MEASURES INCORPORATED INTO THE PROJECT TO MEET ENVIRONMENTAL STANDARDS, ENVIRONMENTAL OPERATING CONDITIONS, OR OTHER EIA REQUIREMENTS

- Safety barrier of 7.5m will be left for growing plantation around the lease boundary as per statutory requirement.



- To mitigate the negative impact of mining, a phase wise green belt will be developed in 7.5m statutory barrier, near rest shelter, site office & unworked area within the mining lease area during the initial five years of plan period.
- At the conceptual stage, 33% of lease area (i.e. 0.33 ha.) will be covered under plantation which includes 0.20 ha. Undisturbed area and 0.13 ha area of upper benches of excavated pit.
- All environmental mitigation measures are being adopted/proposed for the project is detailed in **Chapter-IV**.

2.11 ASSESSMENT OF NEW & UNTESTED TECHNOLOGY FOR THE RISK OF TECHNOLOGICAL FAILURE

Not applicable. Opencast semi-mechanized mining method is being/will be adopted for mining operations.



CHAPTER - III

DESCRIPTION OF ENVIRONMENT



CHAPTER III DESCRIPTION OF ENVIRONMENT

3.1 INTRODUCTION

EIA process requires the primary baseline data collection to know the information on the biophysical, social and economic settings of the mine site. The criteria of the baseline data collection were based on the impact zone which was expected to be around 2-3 Km. The stations were considered based on their sensitivity by considering the close proximity with the sensitive zones like reserve forests, expected high pollutant concentration zones and transportation route etc. The baseline data have been collected as per CPCB guidelines in the month of December 2024 to February 2025.

The criteria based on wind profile adopted while selecting the monitoring locations representing the whole study area as described under:-


- One location on the upwind depending upon the wind profile/pattern.
- Two locations on the downwind side depending upon wind pattern (predominant directions).
- One location covering the sensitive areas within the vicinity.
- One location covering the transportation convergences route.
- One location covering the major habitation.
- One location on the downwind direction where the max GLC's are falling.

The monitoring station selected is as described under:-

Table 3.1: List of Monitoring Stations

S. No.	Sampling Location	Distance (Km)	Direction	Components
1.	Mine Site (Smti. Seisoh Syiemlieh)	--	--	Air, Ground Water, Noise, Soil
2.	Bholaganj Bazar	0.9	E	Air, Ground Water, Noise, Soil
3.	Bholaganj	2.3	S	Air, Ground Water, Noise, Soil
4.	Chakalabasti	4.0	SW	Air, Ground Water, Noise, Soil
5.	Diengkain	3.85	WSW	Air, Ground Water, Noise, Soil
6.	Mawthang	3.65	NW	Air, Ground Water, Noise, Soil
7.	Sohbar	4.3	NNE	Air, Ground Water, Noise, Soil
8.	Mawpathaw	5.9	ENE	Air, Ground Water, Noise, Soil

Baseline data generation was carried out by M/s Noida Testing Laboratories, NABL Accredited laboratory {Certificate No.: TC-6814 valid upto 02.12.2025}. Environmental Monitoring Report is enclosed as **Annexure VIII**.

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

3.2 ENVIRONMENTAL SETTING

S. No.	Particulars	Details		
1.	Name of the Project	Rusiar Limestone Mine		
2.	Location	Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya		
3.	Lease Area	1.0 Hectare		
4.	Land Type	Private Land		
5.	Latitude & Longitude	Pillar No.	Latitude(N)	Longitude(E)
		1.	25°10'48.41"N	91°44'26.38"E
		2.	25°10'48.28"N	91°44'25.33"E
		3.	25°10'48.54"N	91°44'25.08"E
		4.	25°10'47.97"N	91°44'23.31"E
		5.	25°10'49.27"N	91°44'23.26"E
		6.	25°10'52.38"N	91°44'25.91"E
		7.	25°10'52.62"N	91°44'27.56"E
		8.	25°10'51.64"N	91°44'28.43"E
		9.	25°10'50.29"N	91°44'26.45"E
Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.				
6.	Elevation	Highest-183 mRL, Lowest-141mRL		
7.	Nearest Habitation	Bholaganj Majai, 0.60 Km, S		
8.	Nearest Major Town	Shillong –46.64 Km, NE		
9.	Nearest Highway	Highway	Distance (Km)	Direction
		(From Lease Boundary)		
		SH 5	2.88	N
		MDR 27	0.73	ESE
11.	Nearest Railway Station	Guwahati Railway Station, Assam - 110 km, N		
12.	Nearest Airport	Shillong Airport – 61 Km, NNE		
13.	Nearest Tourist Places	None within 10 Km radius		
14.	Defense Installations	None within 10 Km radius		
15.	Archaeological Sites	None within the 10 km radius		
16.	State/Interstate/	Bangladesh International Boundary – 0.93 km, SE		



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlich	Chapter – III–Description of Environment

	International Boundary			
17.	Eco-sensitive Zones	None within 10 km periphery of the mine lease area.		
18.	Protected Area	None within 10 km periphery of the mine lease area.		
19.	Reserved/ Protected Forest	None within 10 km periphery of the mine lease area.		
20.	Nearest Streams/ Rivers/ Water Bodies	River-750 m, SSE		
20.	Public Building Places	Educational Facilities	Distance (Km)	Direction
			(From Lease Boundary)	
		RKM LP/UP/Secondary School Bholaganj Majai, Meghalaya	0.65	East
		Anderson L.P School, Bholaganj, Umdud, Umsaw, Meghalaya	1.33	SSW
		Ramakrishna Mission English High School, Umsaw, Meghalaya	1.65	SSW
		Byrong Govt. L.P School - Elementary School, Meghalaya	3.0	WNW
		Medical Facilities	Distance(Km)	Direction
			(From Lease Boundary)	
		Wahsherkhmut PHC- Hospital	11.6	ENE
		Mawlong P.H.C – Hospital,	6.7	WNW
		Laitkynsew PHC -Medical Center	10.2	WNW
		Sohbar PHC -Hospital	2.7	NNW
21.	Other Industries/ Mines (Within 500 m radius)	Name of the Mine	Distance from Lease (Shri Arbis Tangdhara) (in Meters)	
		Smti. Seisoh Syiemlich	5	
		Smti Idalis Ryngnga	28	
		Smt. Ailadmon Japang	71	
22.	Seismic Zone	As per 2002 Bureau of Indian Standards (BIS) map, Meghalaya state falls in zone V very high damage risk zone (MSK IX or more) category		
23.	Toposheet No.	--		

Source: - Distances measured from Google Earth and are indicative pertinent to the project.



3.3 COLLECTION OF BASELINE DATA

Environmental data has been collected in relation to propose mine for:-

1. Land Environment
2. Water Environment
3. Air Environment
4. Noise Environment
5. Biological Environment
6. Socio-Economic Environment

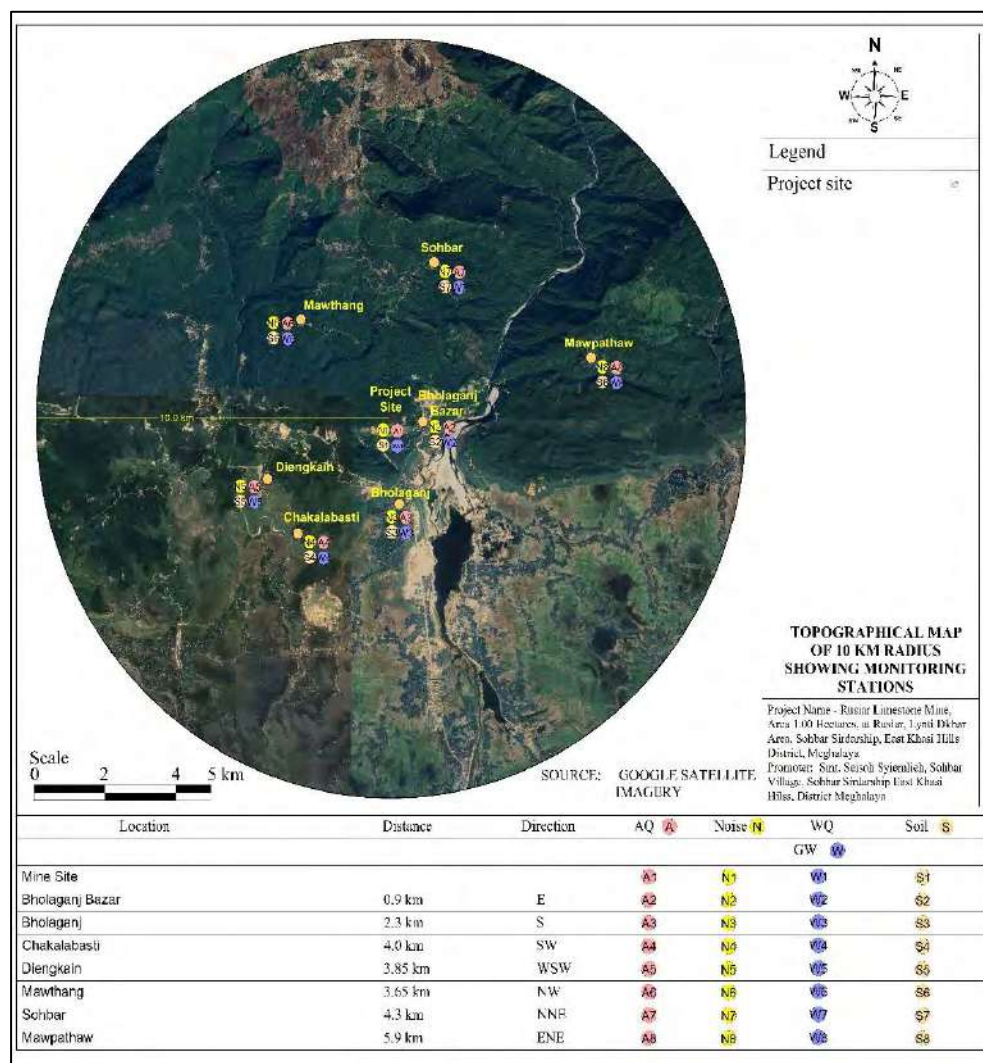


Figure 3.1: Map Showing Study area with Monitoring Stations (10 Km)



3.4 LAND ENVIRONMENT

3.4.1 Introduction of Materials and Methods

With a total geographical area of 2784 sq. km., the East Khasi Hills District is situated in the central region of Meghalaya extending from 25°07' N to 25°41' North Latitude 91°21" E & 92°09" Eastern longitude with its headquarters situated in Shillong. The district is bounded by the Jaintia Hills District to the east and the West Khasi Hills District to the west.

The district is predominantly characterized by hills, deep gorges, and ravines. A key physiographic feature is the Shillong Plateau, which is interspersed with river valleys and descends sharply in the southern part, forming deep gorges and ravines in areas like Mawsynram and Shella-Bholaganj, near the Bangladesh border. The climate varies from temperate on the plateau to warmer tropical and subtropical conditions in the northern and southern regions, with well-distributed rainfall during the southwest monsoon. The region is also rich in mineral resources, including china clay, limestone, copper, lead-zinc, silver, titanium, fire clay, granite, and sillimanite.

Objective

The study of land-use of the project area is an integral part of the EIA. The objective of the present work is to study land use landcover pattern, terrain analysis etc, of the study area as per EIA norms. The land use-land cover map will depict the state of land features and land use of the core and the buffer Zone (10 Km Radius). In addition, land use-land cover thematic map will be used in studying the spatial distribution of impacts due to the project and their mitigation.

3.4.2 LAND USE / LAND COVER STUDIES BASED ON REMOTE SENSING SATELLITE IMAGERY

Satellite data offers reliable and accurate insights into natural resources such as water, soil and forests, providing essential baseline information for the systematic assessment of environmental impacts. Remotely sensed data allows detailed analysis of lithological, geomorphological, pedological, hydrological, and land use/land cover characteristics through its synoptic and multi-spectral coverage of the terrain. In this study, an effort has been made to create a land use/land cover map of the study area using topographical sheets from the Survey



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

of India, remotely sensed images, and field survey data. This information has been integrated into a GIS for further analysis.

3.4.2.1 Satellite Data and Tools:

In this study, the multispectral satellite imageries of IRS ResourceSat-2 LISS IV sensor and digital elevation data from SRTM were used. In order to analyze the data, Visual Interpretation technique along with unsupervised classification scheme was implemented. Software like QGIS 3.34.6 'Prizren' and Google Earth Pro were used for this analysis.

3.4.2.2 Topographical maps of the study area: -

The study area shares a border with Bangladesh, and as a result, toposheets are not available on the Survey of India website. Therefore, toposheets were not used in the present study.

Ancillary data

Information derived from the remotely sensed data can only be verified using field data. Field data is used to improve the information extraction, to calibrate either data or the information, and to assess the accuracy of the derived information. Sources of field data used in the study were of different types such as maps of Survey of India, data collected from the field sampling, and information derived from statistical data of concerned Revenue Department.

3.4.2.3 COMPUTER HARDWARE AND SOFTWARE


DESKTOP-MACT83B Intel(R) Core (TM) i5-8250U with Google Earth Pro and QGIS 3.34.6 'Prizren' image analysis software were used for performing spatial analyses and creating land use land cover maps.

3.4.2.4 SPATIAL OBSERVATIONS

The high-resolution data acquired from multispectral satellite ResourceSAT-2A for evaluating land use patterns and SRTM DEM for elevation, terrain analysis, drainage and contour provide handsome amount of information about the earth features due to their high spatial and spectral resolution. Some of their important specifications are listed below:

Table 3.2: DEM Data Specifications

Name of Satellite	Sensors	Spatial Resolution	Spectral Bands	Acquisition date	Source	Altitude
Shuttle Radar	Imaging Radar	30 to 90 meter	C-band & X-band	02-11-2000	https://earthexplorer.usgs.gov/	233 km

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

Topographic Mission (SRTM)					(Entity id: SRTM1N25E091V3)	
----------------------------	--	--	--	--	------------------------------	--

Data and Methodology

Modern geospatial technologies such as satellite Remote Sensing (RS) and Geographical Information System (GIS) were employed in this project. For the current study area, the latest high-resolution multispectral sensor data from Resource SAT 2A were used to analyze the land use and land cover for the baseline time frame of December 2024 to February 2025.


Table 3.2 (a): Satellite Data Specifications

Name of Satellite	Sensors	Spatial Resolution	Spectral Bands	Date of Acquisition	Source
Resourcesat-2a	LISS- IV	5.8 meter	Total: 3 bands B2 - Green: 520-590 nm B3 - Red: 620- 680 nm B4 - NIR: 770-860 nm	01.12.2024	Bhoonidhi: ISRO/NRSC

(Source: <https://bhoonidhi.nrsc.gov.in/bhoonidhi/index.html>).

LISS IV data (5.8-meter resolution) were used to cover the whole 10 km of buffer around the project site for Level-III classification. Ministry of Environment, Forests and Climate Change (MoEF&CC), New Delhi classification scheme was implemented for current land use study. Firstly, the required satellite data were acquired from Bhoonidhi website of National Remote Sensing Center in GeoTIFF format, which were then imported to QGIS 3.34.6 'Prizren' and processed for further data analysis and map creation. The images were geometrically rectified to the common local UTM coordinate system which is **WGS 1984 UTM zone 46N** and the area of interest was masked out of the respective images.

Pre-processing (DIP) techniques such as Geometric correction, Image Enhancement, were employed to enhance the quality of the image. Process flow chart for preparing land use maps is given as figure 1. Visual Interpretation technique was used for the identification of LULC classes in the project area and surroundings within 10 km radius followed by supervised Classification method.

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

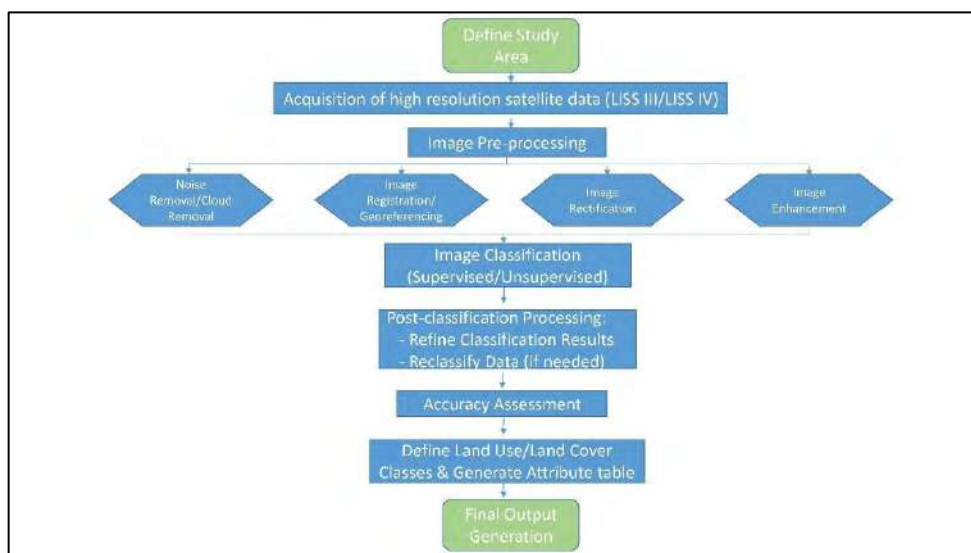


Figure 3.2: Process flow chart for preparing land use maps

3.4.3 FALSE COLOUR COMPOSITE MAP

A False Colour Composite (FCC) is a method of visualizing satellite or aerial imagery in a way that highlights specific features or land cover types by using different color combinations of the image bands. In this process, the typical red, green, and blue (RGB) colors used in standard photographs are replaced with other bands of the electromagnetic spectrum, often from the near-infrared (NIR), red, and green parts of the spectrum. This results in a "false" color representation, which is particularly useful in land use and land cover studies to emphasize certain land types like vegetation, water bodies, or urban areas. Figure 3.3 shows the false colour composite map of the study area.



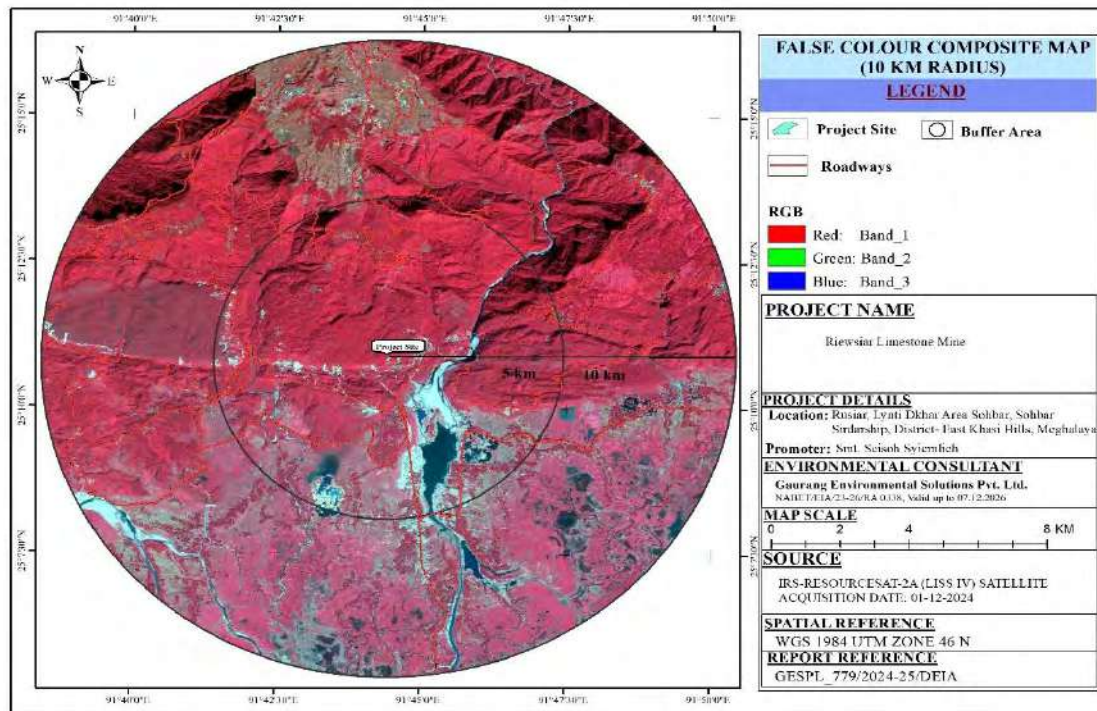


Figure 3.3: False Colour Composite (FCC) Map

3.4.4 LULC ANALYSIS / CLASSES FOR BUFFER ZONE

Digital image processing was carried out to analyze various LULC categories in the buffer zone area. Post visual interpretation, the LULC classification was performed by the supervised classification technique. The satellite imageries were classified into six categories namely: **built-up, irrigated crop land, dense forest/tree cover, land with or without scrub, gullied/ravinous land, waterbodies and mining dumps**. The total area covered within a 10 km radius was calculated to be 31851.79 ha. The LULC map of the study area is given in fig 3.4.

3.4.4.1 LULC ANALYSIS DESCRIPTION

- **Rural Area** with 1414.69 ha. (4.46%) includes sparsely distributed rural and urban settlements, major roadways and other utilities. There is no significant industry in the buffer area.
- **Irrigated crop land:** The analysis reveals that the irrigated land covers 9068.71 ha. (28.62%) of the total study area. The land is highly fertile with good soil moisture. The presence of perennial streams and flood plains along riverbanks further enhances the soil fertility, making it ideal for cultivation.



- **Dense forest/tree cover:** The analysis reveals that the 17992.45 ha. (56.49%) of the total study area comes under Forest and Tree cover. The 10 km buffer area which consist of deciduous type of vegetation on hilly region.
- **Wasteland:** A total of 1300.82 hectares (4.11%) of land in the study area is classified as wasteland. This is further divided into land with or without scrub, covering 1119.23 hectares (3.53%), and gullied/ravinous land, covering 181.59 hectares (0.57%).
- **Waterbodies** include perennial streams, natural & manmade ponds and tanks which are the main source of irrigation in this region. This class covers 1657.76 ha. (5.23%) area. The major river flowing through the study area is *Lyngngam River*, which flows towards south.
- **Others:** This class consists of mining area and mining dumps with 40.73 ha. (0.13%) of total area.

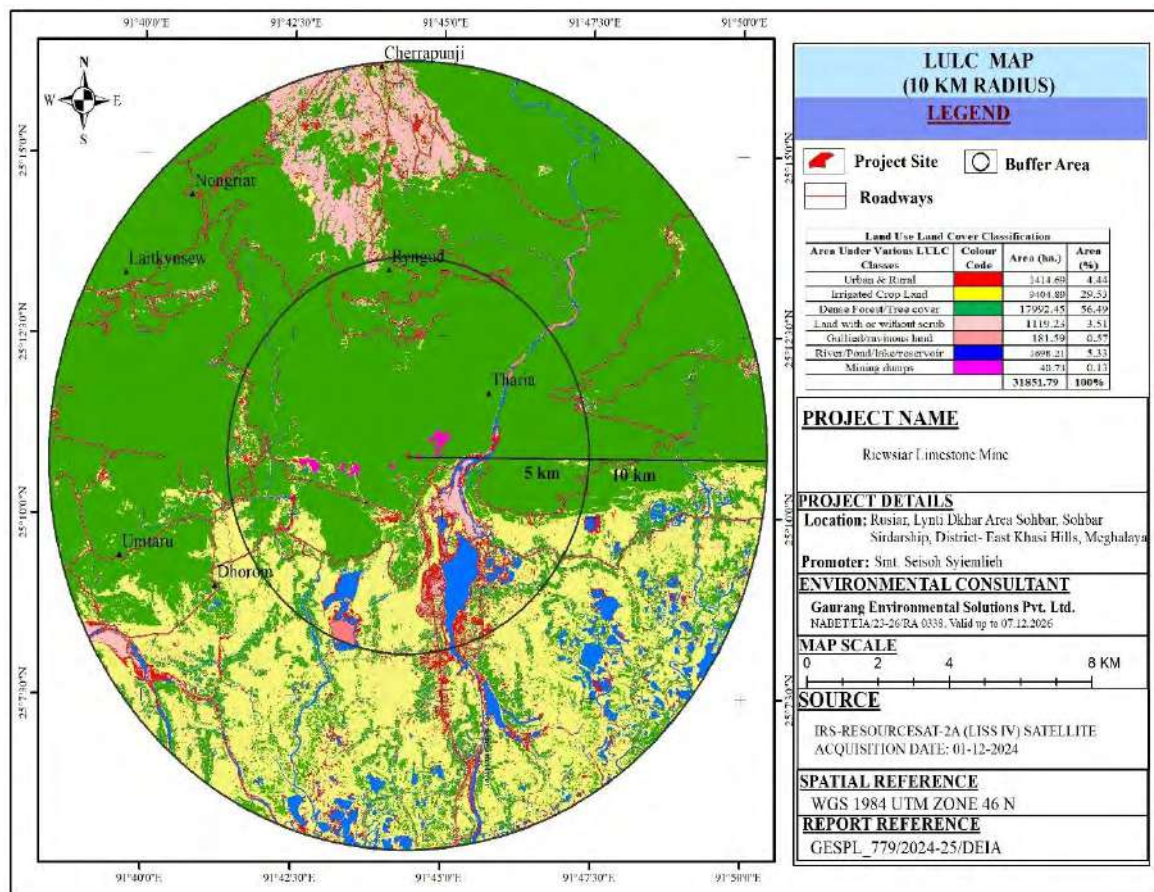


Figure 3.4: Land use of the study area (10 km)

Table 3.3: Area under various LULC classes

Land Use Land Cover Classification			
Area Under Various LULC Classes	Colour Code	Area (ha.)	Area (%)
Rural Area		1414.69	4.46



Irrigated Crop Land		9404.89	29.53
Dense Forest/Tree cover		17992.45	56.49
Land with or without scrub		1119.23	3.53
Gullied/Ravinous land		181.59	0.57
River/Pond/lake/reservoir		1698.21	5.33
Mining dumps		40.73	0.13
		31685.16	100%

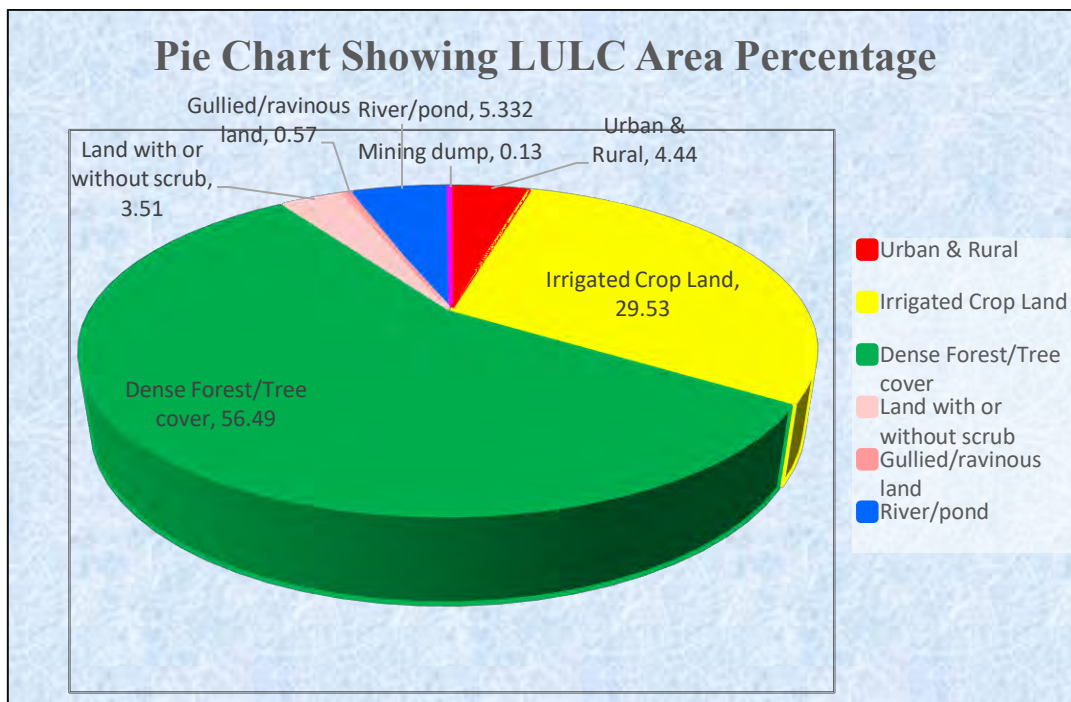


Figure 3.5: Pie Chart showing LULC Classes percentage

3.4.5 Delineation of elevation, slope and aspect

The Digital Elevation Model (DEM) generated from the stereo pair of the Shuttle Radar Topography Mission (SRTM) was used for delineating physiographic parameters, viz. elevation, terrain, contour and drainage, by using QGIS 3.34.6 'Prizren' software. Specifications of SRTM were mentioned in Table 1 above. For surface analysis, maps like DEM, terrain, drainage, and contour were generated. The highest and the lowest points observed in the study area are 1392 meter and -2 meter respectively. The study area's terrain has varying elevations. As seen in the following map the northern parts are relatively higher in elevation than to the southern parts of the study region. The southern region of the study area, are part of plains formed by *Lyngngam river*.



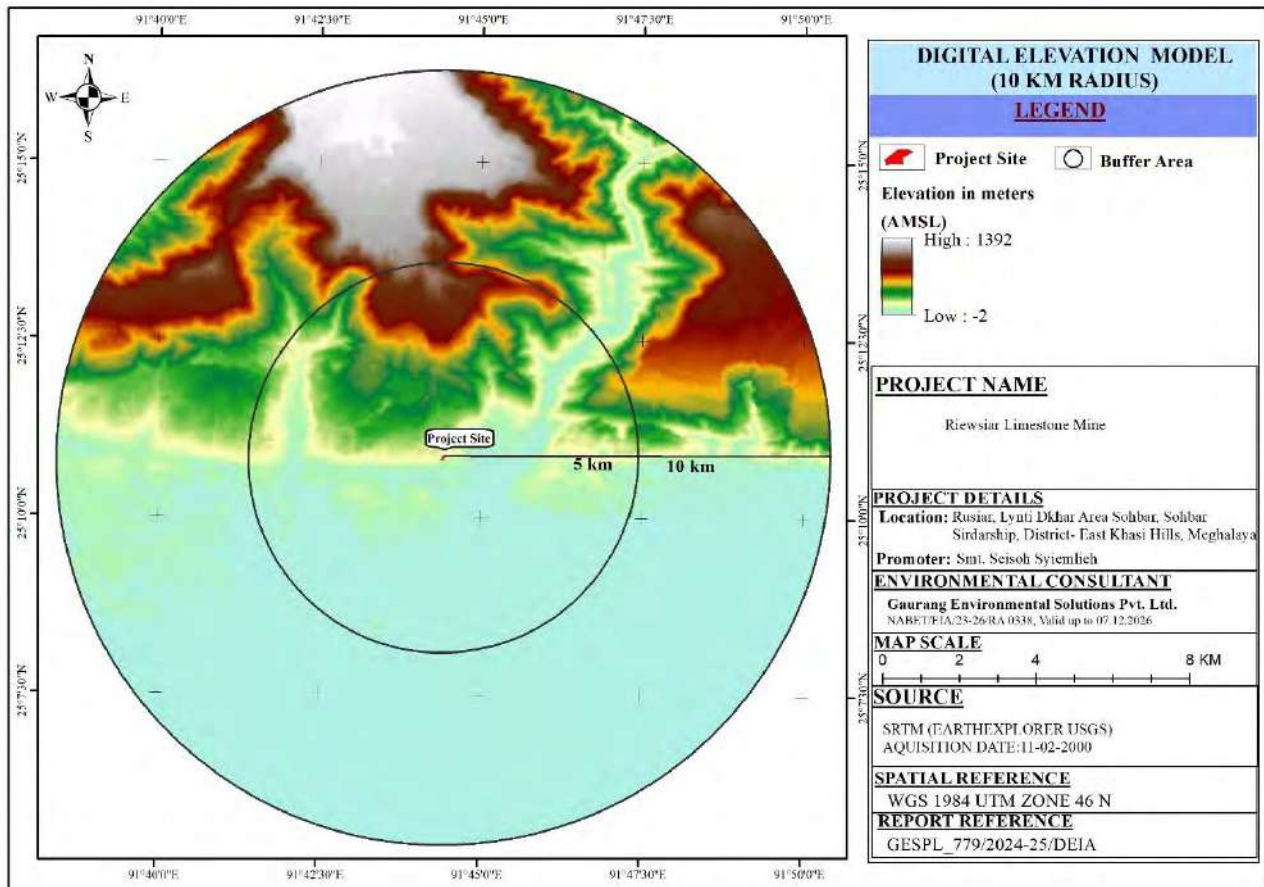


Figure 3.6 (a): Digital Elevation Map (DEM)

3.4.6 Terrain Analysis:

The terrain map is created by composing hillshade, aspect and slope together. Its main purpose is the better visualization of relief features. Hill-shading depicts how the three-dimensional surface would be illuminated by a point light source with shadows that follow the convention of top-left lighting. Aspect is the orientation of hills with respect to the sun angle. Percent rise of slope is determined by the ratio of rise (vertical distance) and run (horizontal distance) multiplied by 100. As seen below, the terrain is highly elevated in the North visualizing the presence of mountain range. The Southern parts are relatively flat, as shown in figure 3.6(b)



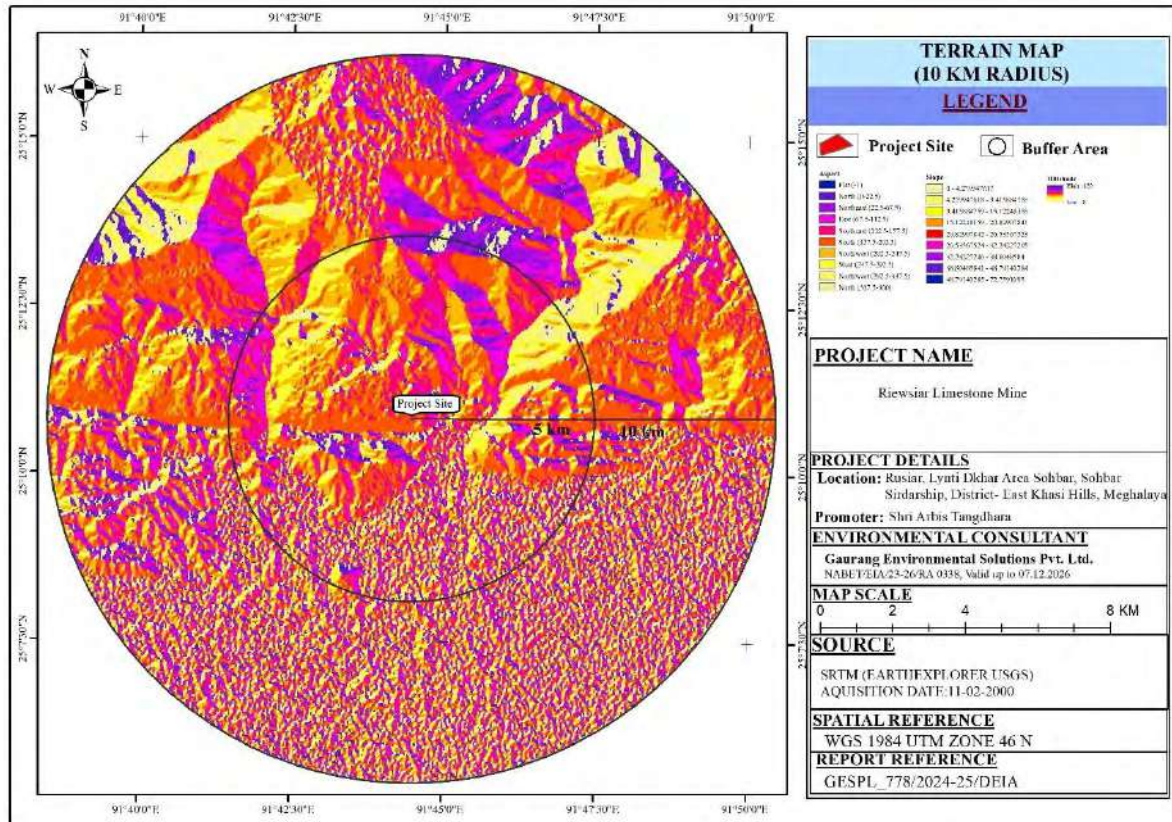


Figure 3.6 (b): Terrain Map

3.4.7 DRAINAGE:

The following drainage map (fig 3.6C) indicates the stream order ranking from 1 to 4, which shows their hierarchy within the drainage system. The relief features highly influence the drainage pattern of the region, as the drainage direction can be directly correlated to the elevation pattern in the study area. In the present study, a drainage map for the study area was developed in a GIS environment using SRTM DEM. The Strahler method of stream ordering, also known as the "top-down" system, was used to reflect the morphology of the catchment based on its watershed line. The accuracy of the map was then verified using Google Earth Pro. Major waterbody in the study region is Lyngngam River, which flows towards south. The drainage pattern in the area is dendritic in nature.



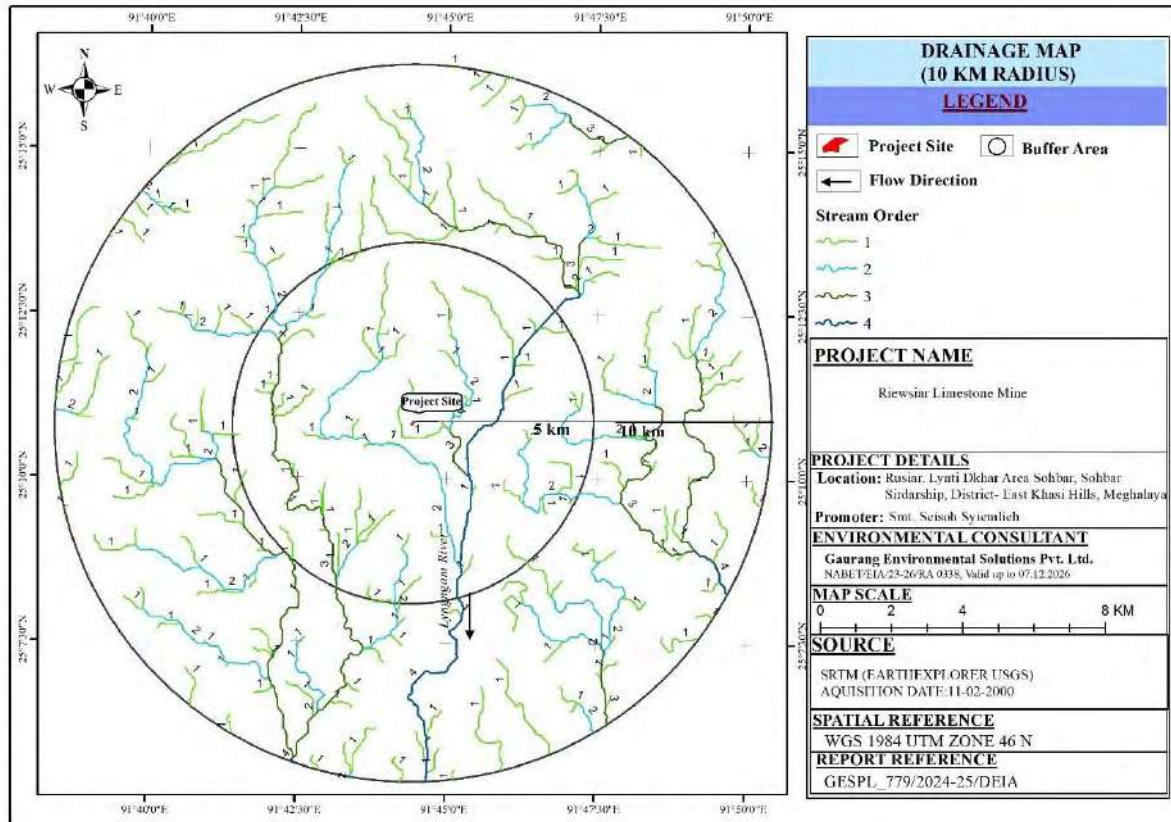


Figure 3.6 (c): Drainage Map with Stream Order

3.4.7 CONTOUR:

The contour map displays the undulation of the surface. A contour line connects a series of equal elevation points. In this study, a contour interval of 5 meter is used. In the 10 km buffer area, highest contour observed is 590-meter and lowest contour is 365-meter. The contour and digital elevation map (DEM) show that the relief features are unevenly distributed throughout the study area. The closely placed contour lines show the presence of plateau region in the NW of the project site. The contour lines are not distributed in the southern region of the study area indicating area is relatively plainer. The Northern region of the study area is hilly region. The project site is situated at a plain surface with elevation of about **158 meter**.



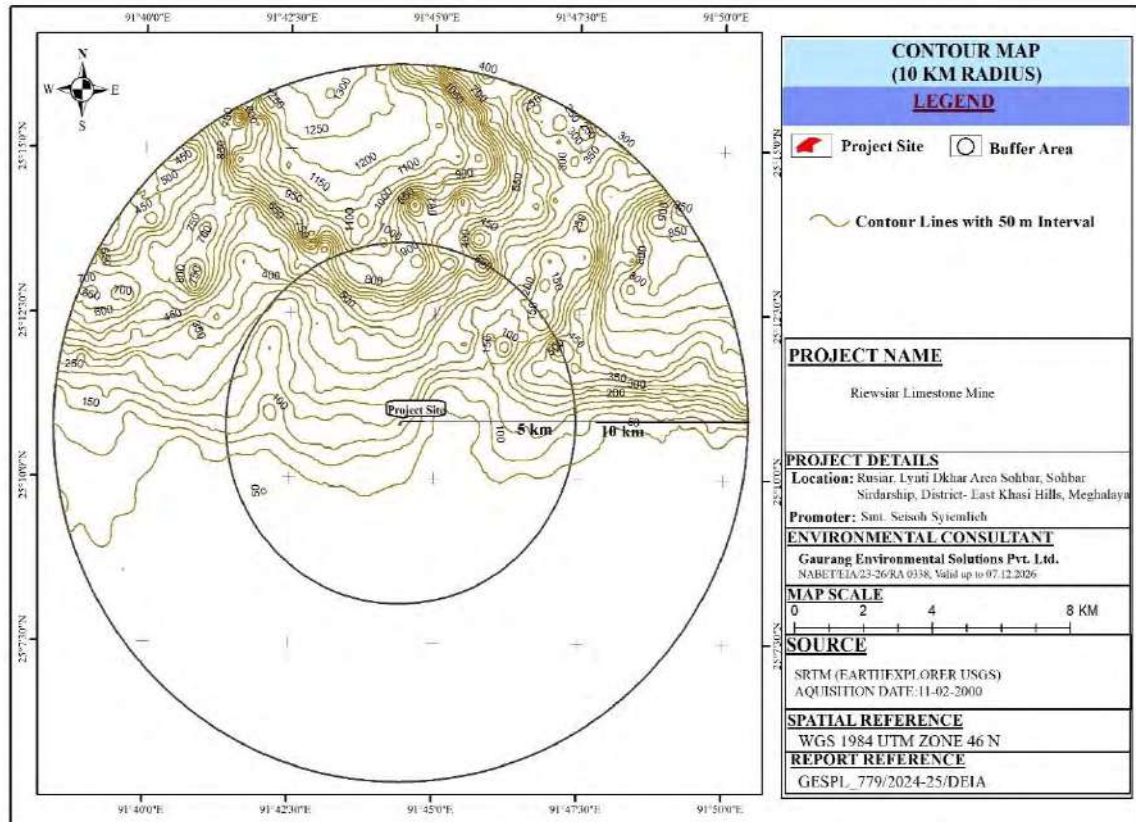


Figure 3.6 (d): Counter Map

3.4.4 Geology and Geomorphology

Regional Geology: -

Regional Stratigraphic Succession

General Stratigraphic Sequence of the formation of Meghalaya Plate

Geological Age	Group Name	Formation Name	Rock Type
Recent	Newer Alluvium	Unclassified	Sand, Silt and Clay
UNCONFIRMITY			
Pleistocene	Older Alluvium	Unclassified	Sand, Clay, pebble, Gravel and boulder deposits
UNCONFIRMITY			
Mio-pliocene	Dupitula Group	Unclassified	Mottled Clays, Feldspathic Sandstone and conglomerate
UNCONFIRMITY			



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

Oligo-miocene	Garo Group	Chengopara formation Baghmara formation Simsang formation	Sand, Silstone, Clay Mart, Feldspathic Sandstone, Pebble, Conglomerate, Clay Silty Clay, Shale Sandstone Mart
Eocene	Jaintia Group	Kopili Formation Shella Formation Langpar Formation	Siltstone-sandstone alternations, sand Alternation of sandstone–limestone Calcareous Shale, Sandstone, Limestone
Upper Cretaceous	Khasi Group	Mahadek Formation Bottom Conglomerate Formation Jadukata Formation	Arkose (glaucconitic) Conglomerate, Arkose Sandstone Conglomerate alternation
UNCONFIRMITY			
Jurassic	Sylhet Trap	-	Basalt, Alkali Basalt Rhyolite acid tuff.
UNCONFIRMITY			
Pre-Cambrian	-	Intrusives (acid and Basic)	Ponphyritic and coars granites,aplite, Quartz vein,epidiorite, dolerite, Basalt Quartzite, Phyllite, Conglomerate
UNCONFIRMITY			
Archaen	-	Gneissic Complex	Biotite gneiss, Biotite-Hornblend gneiss, Granitic gneiss, Migmatite Mica-schist, Sillimanite-quartz schist, Biotite-granulite Amphibolites, Pyroxene-granulite



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”

Applicant:- Smt Seisoh Syiemlieh

Chapter – III–Description of Environment

etc.

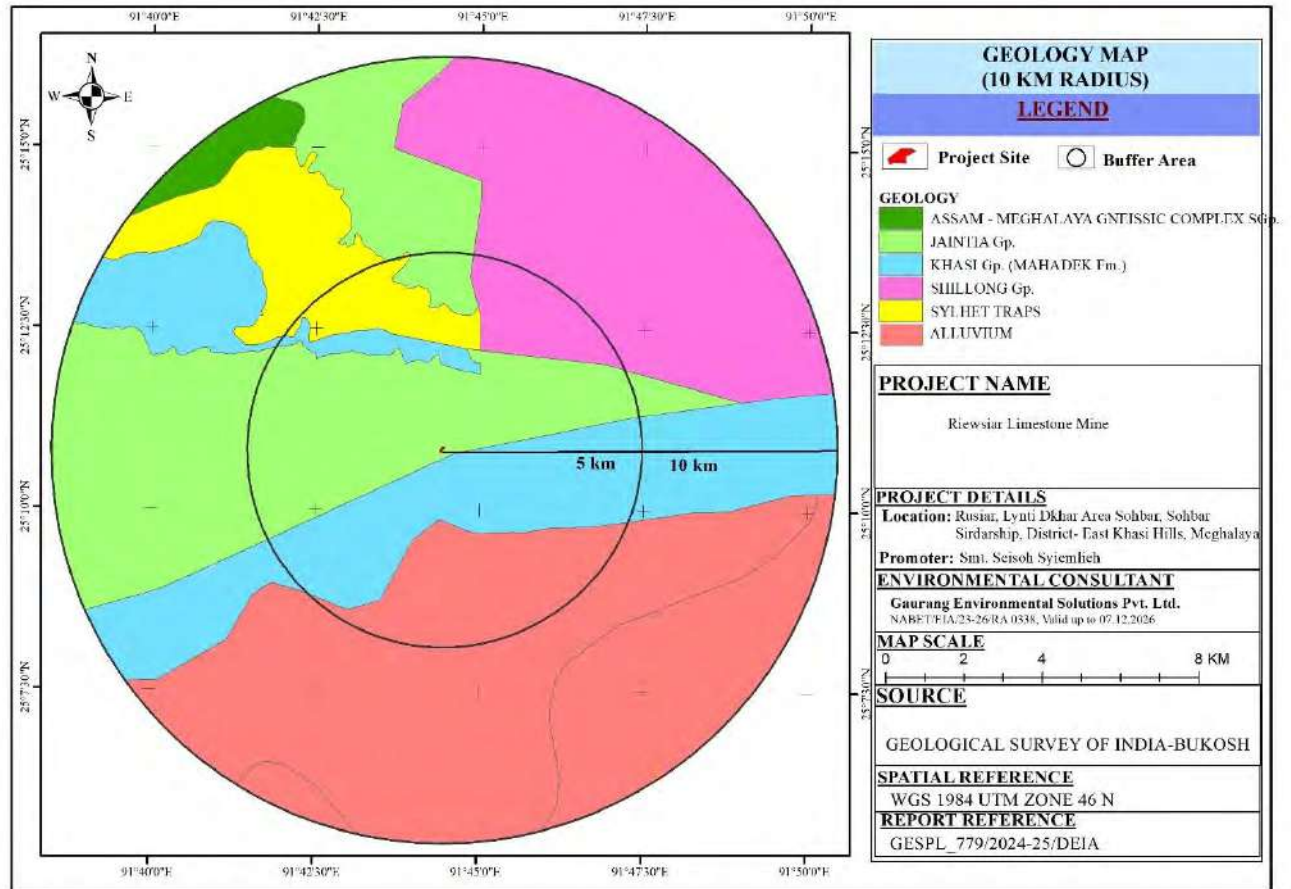


Figure 3.7: Geological map of 10 km study area

Local Geology:

Succession of rocks in the lease area (Local Geology)

Geological Age	Group Name	Formation Name	Rock Type
Recent	Newer Alluvium	Unclassified	Sand, Silt and Clay
Unconformity			
Eocene	Jaintia Group	Shella formation	Lime Stone

Geomorphology

Geomorphologically, the East Khasi hills is an undulatory one. It comprises of denudational high and low hills with deep gorges. The district represents a remnant of ancient plateau of Indian Peninsular Shield which is deeply dissected suggesting several geotectonic and structural deformities that the plateau has undergone. The northern portion of the district is a



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

dissected Shillong plateau gradually rising southwards to the rolling grasslands with gentle river valleys, then falls sharply in the Southern portion forming deep gorges and ravines in Mawsynram and Shella-Bholaganj, bordering Bangladesh. In the southern border areas, there are fringes of alluvial plains that are localized in nature.

Figure 3.8 shows the geomorphological formation of the 10 km study area. The project site falls under dissected hills & Valley.

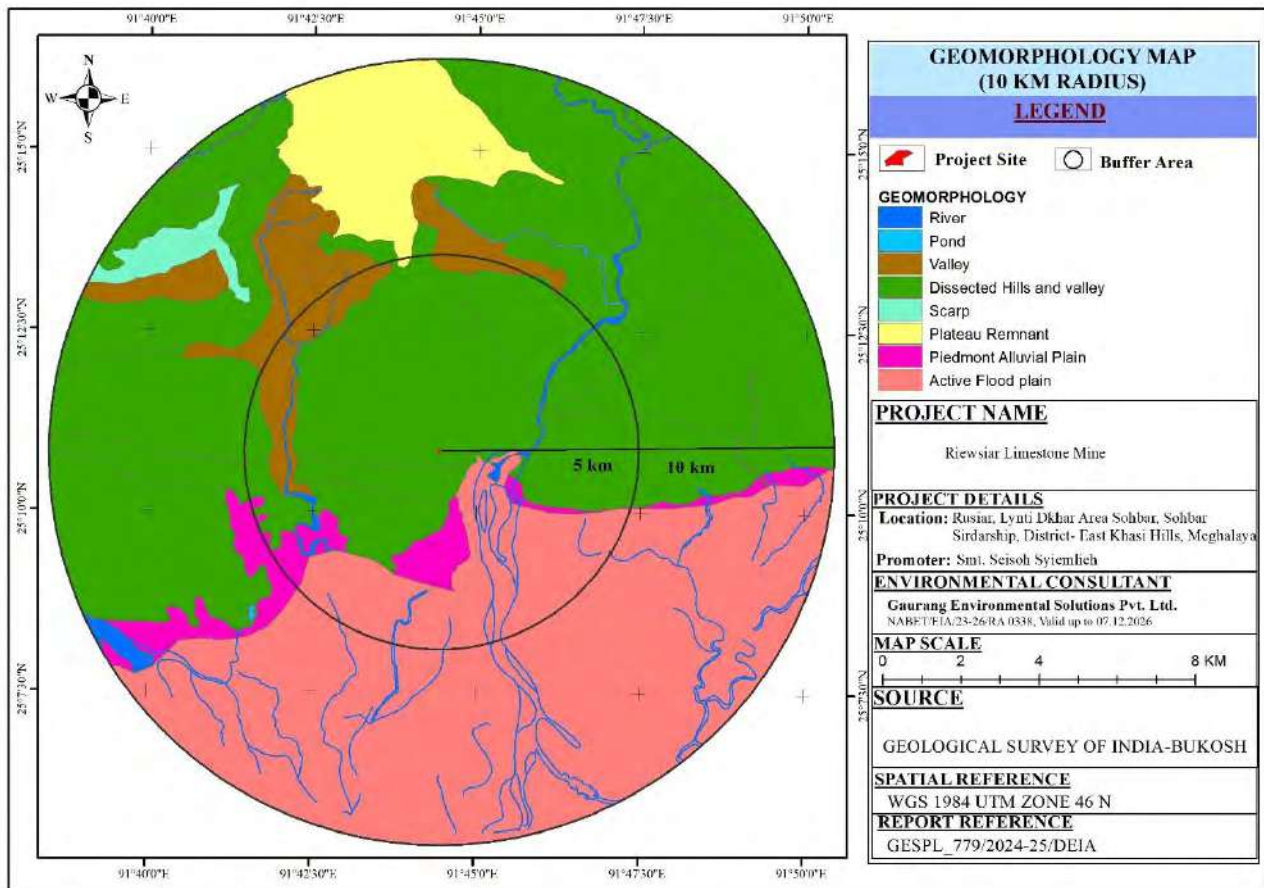


Figure 3.8: Geomorphology map of 10 km study area



3.5 SOIL ENVIRONMENT

Soil type of an area is Alluvial soils are found exposed in the southern part of the district that are rich in potash but poor in phosphate content. They are acidic in nature. The soil in the study area is mostly deep brown, silty clay to clay loam, permeable and acidic in nature. The acidic character is due to leaching of bases caused by high rainfall. The gneisses, quartzite and basic intrusive gave rise to very deep fine texture soils whereas soil developed over granites are coarse loamy and permeable.

The objectives of the soil sampling are:-

- To determine the baseline soil characteristics of the study area;
- To determine the impact of proposed activity on soil characteristics and;
- To determine the impact on soil more importantly with agriculture production point of view.


The soil analysis results are given below:-



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

Table 3.4: Soil Analysis

Sr. No.	Parameters	Location	Mine Site	Bholaganj Bazar	Bholaganj	Chakalabasti	Diengkain	Mawthang	Sohbar	Mawpathaw
		Units	Date of Sampling – 21.02.2025							
1	pH	-	7.64	7.33	7.84	7.56	7.57	7.36	7.50	7.32
2	Conductivity	µmhos/cm	398.0	416.15	402.2	428.02	351.20	451.0	402.0	298.0
3	Sodium (as Na)	mg/kg	88.21	121.52	75.16	84.4	96.53	85.40	82.10	98.51
4	Water holding capacity	%	28.4	26.0	25.0	28.8	26.0	32.10	34.50	26.4
5	Potassium (as K)	mg/kg	241.03	248.0	248.0	250.8	248.0	271.50	267.40	216.0
6	Sand	%	66.00	56.00	64.00	60.00	65.00	65.00	66.00	60.00
7	Clay	%	15.00	26.00	22.0	26.00	17.00	18.00	18.00	26.00
8	Silt	%	19.00	18.00	14.0	14.00	18.00	17.00	16.00	14.00
9	Calcium (as Ca)	mg/kg	798.0	734.0	618.0	812.3	755.65	957.00	886.00	885.0
10	Magnesium (as Mg)	mg/kg	316.0	308.5	256.0	350.0	249.97	514.10	468.50	316.0
11	SAR	-	0.97	0.63	1.55	0.63	0.63	1.08	0.98	1.40
12	CEC	meq/100gm	2.15	1.89	2.34	1.99	1.84	2.26	2.20	2.20
13	Phosphorus (as P)	mg/kg	10.84	18.52	12.76	18.67	18.54	12.80	12.40	12.44
14	Organic carbon	%	0.46	0.38	0.35	0.26	0.36	0.49	0.46	0.42
15	Porosity	%	40.98	36.8	45.6	34.83	34.64	45.20	40.10	35.6
16	Permeability	cm/hr	1.95	1.78	1.88	1.64	1.45	1.96	1.84	1.76
17	Bulk Density	kg/cm3	1.38	1.57	1.34	1.56	1.38	1.28	1.18	1.45
18	Available Nitrogen (N)	Kg/ Hectare	287.0	0.041	0.056	0.042	320.0	298.0	276.0	312.0

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

3.5.1 OBSERVATION

- The pH of the soil samples ranged from 7.32 to 7.84.
- Soil Conductivity varied from 298 to 451 $\mu\text{mhos/cm}$.
- The phosphorous concentrations are in the range of 10.84 to 18.67 mg/kg.
- The Nitrogen concentrations are in the range of 0.041 to 320 Kg/ Hectare.

3.6 WATER ENVIRONMENT


3.6.1 Hydrology and Ground Water Study:

3.6.1.1 Regional Geology: -

The area is underlain by Shillong group of rocks consisting of quartzite & phyllites. The base of Shillong Group is marked by conglomerate bed containing cobbles and boulders of earlier rocks, i.e. Archaean crystalline rocks, which formed the basement rocks over which the Shillong Group of rocks were laid down as sedimentary deposits during Pre-Cambrian times and metamorphosed over time. The rocks were intruded by Epi-diorite rocks known as Khasi greenstone. These meta-Basic rocks occur mostly as sills being concordant with the formations they intruded. The surface area is covered by red soil to mixed soil type having thickness ranging from few centimetres to 2 m. This weathered zone is underlain by jointed and fractured quartzite. This is followed by hard massive quartzite, which are generally devoid of prominent structural features. However fracture/jointed rocks are found to occur at greater depths in certain exploratory wells drilled in similar formations in the area. Broadly, there are three sets of lineaments in the area, mainly along ENE–WSW, NW–SE and E–W directions. Lineaments along NE–SW, NNW–SSE and N–S directions are also developed.

Table 3.5(a) - stratigraphic succession of geological formation

Age	Group	Formation
Quaternary	Quaternary	Undifferentiated Quaternary
Miocene	Surma	Bhuban
Miocene-Pliocene	Garo	Changapara
Palaeocene-Eocene	Jaintia	Kopili
		Shella
		Langpar
Cretaceous	Khasi	Mahadek
		Jadukata

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

	Sung Ultramafic-Alkaline	
	Carbonatite Complex	
	Sylhet Traps	
Neo-Proterozoic-Early Palaeozoic	Granite Plutons (Mylliem/Kyrדם/South Khasi Batholith)	
Palaeo- Meso-Proterozoic	Khasi Mafic-felsic Intrusives Shillong	
Palaeo-Neo-Proterozoic	Assam Meghalaya Gneissic Complex	


Source: - GSI

3.6.1.2 Geomorphology:

Geomorphological, the East Khasi hill is an undulated one. It comprises of denudation high and low hills with deep gorges. The district represents a remnant of ancient plateau of Indian Peninsular Shield which is deeply dissected suggesting several Geo-tectonic and structural deformities that the plateau has undergone. The northern portion of the district is a dissected Shillong plateau gradually rising southwards to the rolling grasslands with gentle river valleys, and then falls sharply in the Southern portion forming deep gorges and ravines in Mawsynram and Shella Bholaganj, bordering Bangladesh. In the southern border areas, there are fringes of alluvial plains that are localized in nature.

3.6.1.3 Drainage pattern of the study area:

The topography controls the drainage system as it divides the state of Meghalaya into two watersheds namely the Brahmaputra system in the North and Meghna /Surma system in the South. Drainage of the East Khasi Hills district in the north flows toward the Brahmaputra River and in the south, the rivers flow towards the Bangladesh plains into Surma River. The important rivers in the northern part are Umtrew, Umiam and Umkhen. The Umtrew (or Digaru) River originates from the west of the Sohpetbneng range in East Khasi Hills District. In the southern part, rivers Umiew (or Shella, also known as Bagra), Umngot, Umngi (Balat) etc. all tributaries of the Surma, originating from southern slopes of Khasi Hills, drain one of the world's heaviest rainfall areas and flow southwards into Bangladesh, have violent flows. The drainage pattern is structurally controlled and parallel to sub-parallel in nature

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

3.6.1.4 Factors Affecting Ground Water Occurrence

Climate

The high-altitude areas of the district experience temperate humid climate and low altitude areas experience tropical to sub-tropical humid climate. Generally, the central hilly area experiences an ambient annual temperature of 20°C; elsewhere, the temperature is greater than that. The summer temperature is as high as 25°C, and mean winter temperature ranges from 2°C to 9°C with periodic deviation to below the freezing point, marked by the appearance of ground frost in the early morning.

Rainfall

Rainfall plays a major role in groundwater availability of East Khasi hills. The mean annual rainfall of last 10 years (2014 to 2023) for East Khasi hills station is about **6718 mm**. Based on Indian Meteorological Department.


Table 3.5(b): Rainfall data of East Khasi District

LOCATION- EAST KHASI HILLS DISTRICT	
Year	Average annual Rainfall
2015	7898.7
2016	6526.2
2017	7679.8
2018	5065.8
2019	3086
2020	10381.8
2021	5160.8
2022	8084.7
2023	6171
2024	7120.68
Average	6718

Source: IMD CRIS

Soil

Soil type of an area is Alluvial soils are found exposed in the southern part of the district that are rich in potash but poor in phosphate content. They are acidic in nature. The soil in the study area is mostly deep brown, silty clay to clay loam, permeable and acidic in nature. The acidic character is due to leaching of bases caused by high rainfall. The gneisses, quartzite and basic intrusive gave rise to very deep fine texture soils whereas soil developed over granites are coarse loamy and permeable.\

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

3.6.1.5 Seismic zone

Zone V, Very High damage risk Zone as per BMTPC, Vulnerability atlas Seismic Zone of India IS: 1893-2002.

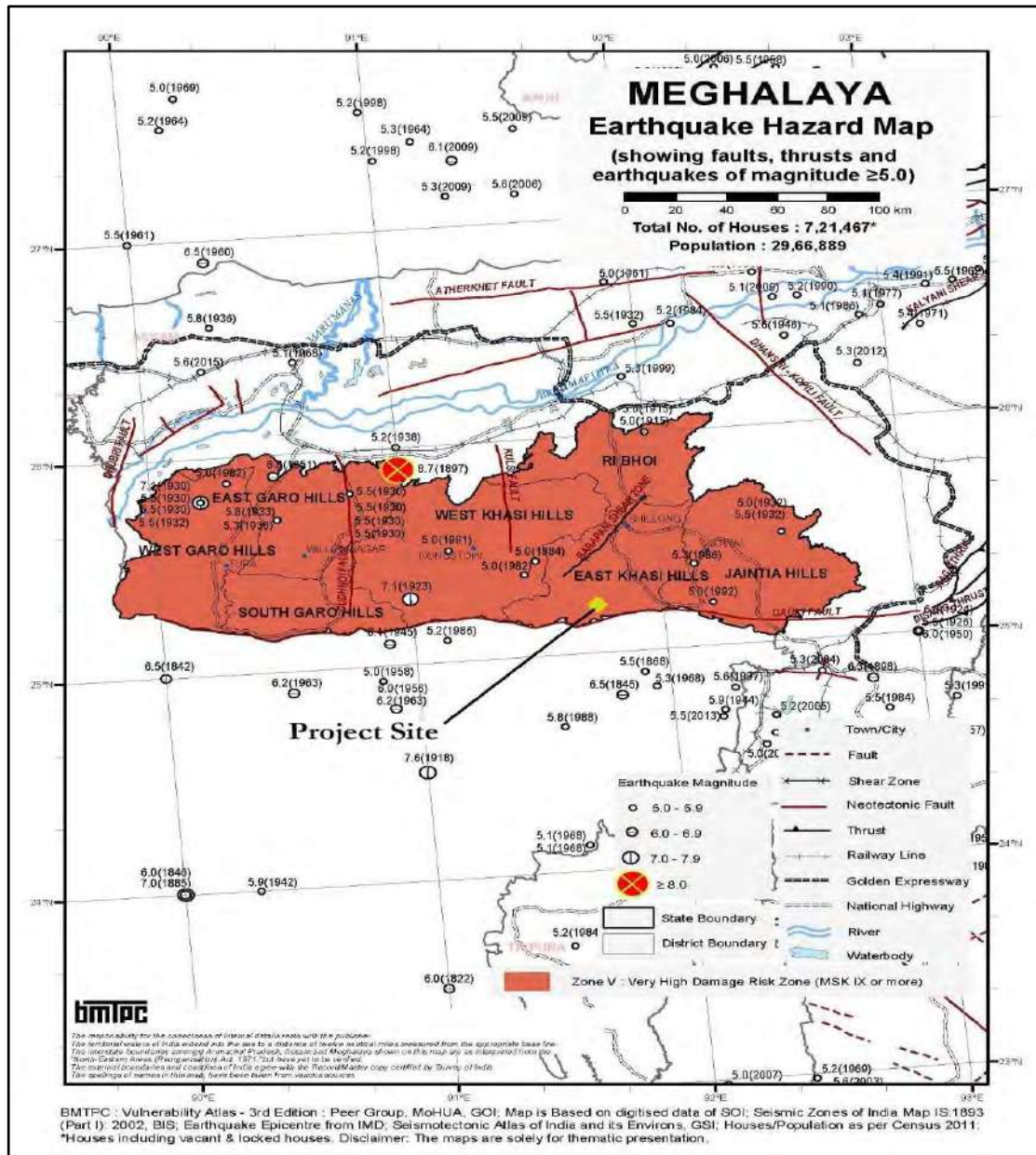


Fig 3.9: Earth quick Hazard Map of East Khasi Hill District

3.6.1.6 Landslide: -



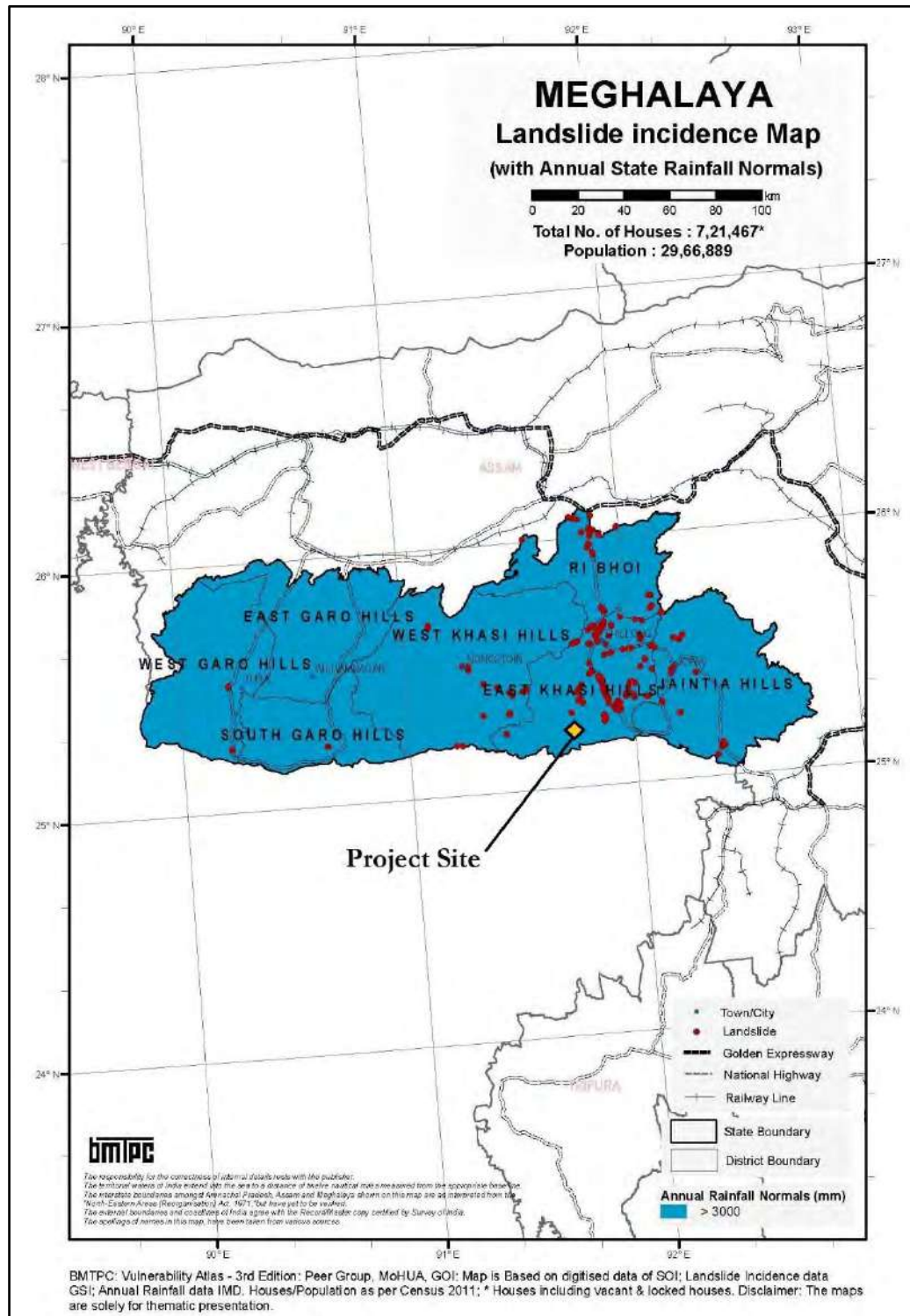


Fig 3.10: Landslide map of East Khasi Hill district

3.6.1.7 Hydrogeology

The hydrogeological formation of the study area comprised of Gneissic complex of Arcaean to Proterozoic, Quartzite of Palaeo-Meso-Proterozoic, Khasi Basic- Ultra basic intrusive of



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

Proterozoic, Granite plutons (myllem granite) of Neo Proterozoic to Early Proterozoic formation. The presence of weak planes like fractures and joints in these hard rock formation forms the principal aquifer in the area. The ground water in the district occurs under unconfined, semi confined to confined conditions. Study of dug wells and exploration data reveals the presence of phreatic, shallow and deep fractured aquifers in the district.

Occurrence of ground water in shallow aquifers:

The depth of shallow aquifer in the district ranges from 1.5 to 10.74 meters. This shallow aquifer occurs under unconfined to semi confined condition. Ground water from shallow aquifer is extracted through different types of ground water extraction structures such as dug wells.


Occurrence of ground water in deeper aquifers:

The deeper aquifer occurs as semi-confined to confined condition where ground water is found in the fractured zone of consolidated Quartzite, Gneiss Granite, Kahsi greenstones and limestone. The drilled depth of exploratory wells tapping this aquifer ranges from 64.0 to 247.60 m bgl. The number of fractures and its zones encountered varies in all the places which show the complexity of the hydrogeology of consolidated hard rock formation. Two artesian wells were found in the study area, one was at Lawsohtun campus, Shillong (drilled by CGWB earlier) where the discharge is 10.8 m³/ hr and the other one is at Power Grid campus, Shillong.

Aquifer System: -

Aquifer system: The entire study area is underlain by consolidated rocks like Archaean Gneissic complex, Granite pluton Quartzite, Intrusive and with small patches of weathered/fractured sandstone/shale (Jaintia group) in the southern part of the district. North western part of the district has conglomerate and sandstone of upper cretaceous Khasi Group of rocks which is still unexplored. The aquifer system exists mainly in Granitic plutons, quartzite, Archaean Gneissic complex and the intrusive. It also exists in both weathered Formation as well as fractured system down to the maximum explored depth of 247.6 m bgl. The depth of weathered zone varies from 1.5 to 10.74 m below ground level. Thus, hydrogeological, the study area can be categorized into three group's i.e.

I. Granitic gneissic complex aquifer of Archaean

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

II. Quartzite aquifer of Shillong Group

III. Khasi Greenstone of Proterozoic age.

The aquifer system in these hard rock terrains is a complex one. Number, depth and thickness of fractures were observed not only in different geological formations but also in same geological formation.

3.6.1.8 Status of Ground Water Development & Ground Water Resources: -

As per the Dynamic Ground Water Resources of India, 2024, the total annual ground water recharge of East Khasi hills district is 22693.99 Ham, total annual ground water extraction from irrigation, industry, and domestic sectors 651.38 Ham. The stage of ground water extraction is 3.19 %. Shella Bholaganj Block come under “Safe category”.

3.6.1.9 Observation and interpretation:

FAE	Aspects	Impacts	Mitigation measures
GEO	i. Topography The project area comprises flat terrain, Geomorphology Plateau in the study area. ii. Soil cover:- the area is covered with Deep brown to silty clay to loam iii. Earthquake	✓ Minor and short term impact in the construction phase ✓ No Change in geomorphology. ✓ Fertile Soil will be moved in construction phase – fertile soil loss. ✓ Zone V High Damage risk Zone	Structure with ductile detailing is considered as per IS: 13920-1993.
HG	i. Aquifer – porous media, confined and unconfined ii. Ground water used used iii. Stage Of Water Development May be changed iv. STP/ETP Discharge possible v. GW Problem vi. Storm Water Not possible vii. Safe category area	✓ GW Contamination easily possible ✓ No impacts ✓ Minor impacts ✓ Zero discharge- no impacts ✓ GW contamination, hence diseases occurred, who used it.	Piezometer well proposed for identify the contamination products and GW quality study Proper channelized drainage system suggest to collect the rain/storm water collection



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109


Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

3.6.2 Water Sample Analysis

Eight ground water samples were collected as grab samples and were analyzed for various parameter as per the procedures specified in “Standard Methods for the Examination of Water and Wastewater” published by American Public Health Association (APHA). Different physico-chemical parameters of ground water during study period were compared with standard at each monitoring stations and shown in the Table 3.9.

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

Table 3.9 (a): Ground Water Analysis

S. No	Parameter	Unit	Mine Site	Bholagan j Bazar	Bholaganj	Chakalabasti	Diengkein	Mawthang	Sohbar	Mawpat haw	Limit (as per IS: 10500:2012)	
											Requirement (Acceptable Limit)	Permissible Limit in absence of alternate source
1	Colour	Hazen	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5	15
2	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	-
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	-
4	Turbidity	NTU	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1	5
5	pH	-	7.38	7.55	7.42	7.26	7.65	7.42	7.37	7.28	6.5-8.5	No Relaxation
6	Total Hardness (as CaCO ₃)	mg/l	184	162	176	180	195	176	145	152	200	600
7	Iron (as Fe)	mg/l	0.115	0.135	0.146	0.128	0.108	0.123	0.135	0.116	1.0	No Relaxation
8	Chlorides (as Cl)	mg/l	14.2	16.5	18.0	12.6	16.6	15.2	18.5	14.5	250	1000
9	Fluoride (as F)	mg/l	0.23	0.27	0.20	0.18	0.18	0.23	0.26	0.32	1	1.5
10	TDS	mg/l	448.0	356.0	410.0	395.0	435.0	340.0	326.0	285.0	500	2000
11	Calcium(as Ca ²⁺)	mg/l	65.4	60.6	68.8	61.4	62.8	64.5	61.6	72.5	75	200
12	Magnesium (as Mg ²⁺)	mg/l	18.6	16.2	15.4	18.0	10.4	12.6	9.87	14.7	30	100
13	Copper (as Cu)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	1.5
14	Manganese(as Mn)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	0.3
15	Sulphate (as SO ₄)	mg/l	32.0	28.8	27.6	24.3	28.0	26.4	32.0	34.6	200	400



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

16	Nitrate(as NO3)	mg/l	3.02	2.90	3.15	3.40	4.12	3.98	3.35	3.25	45	No Relaxation
18	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	No Relaxation
19	Cadmium (as Cd)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	No Relaxation
20	Selenium (as Se)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	No Relaxation
21	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	No Relaxation
22	Cyanide (as CN)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	No Relaxation
23	Lead (as Pb)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	No Relaxation
24	Zinc (as Zn)	mg/l	0.146	0.138	0.152	0.178	0.132	0.126	0.149	0.155	5	15
25	Anionic Detergent (as MBAS)	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.2	1
26	Chromium (as Cr6+)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	No Relaxation
27	Mineral oil	mg/l	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.5	No Relaxation
28	Alkalinity as CaCO3	mg/l	194.0	178.0	180.0	162.0	197.0	185.0	172.0	168.0	200	600
29	Aluminium (as Al)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.2
30	Boron (as B)	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.5	2.4
31	Free Residual Chlorine	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.2	1.0
32	Phenolic Compound as (C6H5OH)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.002
33	Ammonia	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	No Relaxation
34	Sulphide (as H2S)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	No Relaxation



Gaurang Environmental Solutions Pvt. Ltd.


Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

35	Barium (as Ba)	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.7	No Relaxation
36	Total Coliform	MPN /100ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent/100ml	
37	<i>E. coli</i>	E.coli /100ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent/100ml	

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

3.6.3 RESULT

Ground Water

The analysis results indicate that pH of the groundwater was found to be in range of 7.26-7.65. The TDS were found to be in the range of 285-448.0 mg/l. Other parameters like Calcium, Magnesium, Chlorides, Sulphates and Nitrates were found within the prescribed limits. The physico – chemical analysis for the other parameters were also within the permissible limits as per the standards as per IS: 10500. The water quality is non- potable in nature.

3.7 AIR ENVIRONMENT

The prime objective of the baseline air monitoring was to evaluate the existing air quality of the area. This will also be useful for assessing the conformity to standards of the ambient air quality during the operation of the mine.

The baseline status of the air quality has been assessed though a scientifically designed ambient air quality monitoring network based on the following considerations:-

- Meteorological conditions on synoptic scale;
- Topography of the study area;
- Representatives of regional background air quality for obtaining baseline status; and
- Representatives of likely impact areas.

3.7.1 MICRO-METEOROLOGICAL DATA

An auto weather monitoring station was installed at mine Site during the study period to record various meteorological parameters on hourly basis to understand the wind pattern, temperature variation and relative humidity variation.



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment


Table 3.10 Meteorological Data

Month	Temperature (°C)			Relative Humidity (%)			Wind Speed (m/sec)			Solar Radiation (W/m ²)			Rainfall		
	Max	Min	Avg.	Max	Min	Avg.	Max	Min	Avg.	Max	Min	Avg.	Total rainfall (mm)	No. of days	Avg. Annual rainfall (mm)
Dec., 2024	31.61	18.98	25.295	94.81	73.12	83.965	7.95	0.18	4.065	103.2	26.6	64.9	497.76	22	1882.68
Jan., 2025	31.53	16.4	23.965	88.56	66.31	77.435	11.62	0.45	6.035	103.2	26.6	64.9	17.76	15	
Feb., 2025	28.4	12.26	20.33	90.81	62.94	76.875	8.41	0.2	4.305	103.2	26.6	64.9	33.54	15	

Source: <https://power.larc.nasa.gov/data-access-viewer/>

3.7.2 WIND ROSE DIAGRAM

Wind rose is the diagrammatic representation of wind speed in a specified direction with its arms representing sixteen directions. Each arm gives a clear frequency distribution of wind speed in a particular direction for a given period of time. The wind rose diagram for the study period was developed & presented in Figure 3.13.

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

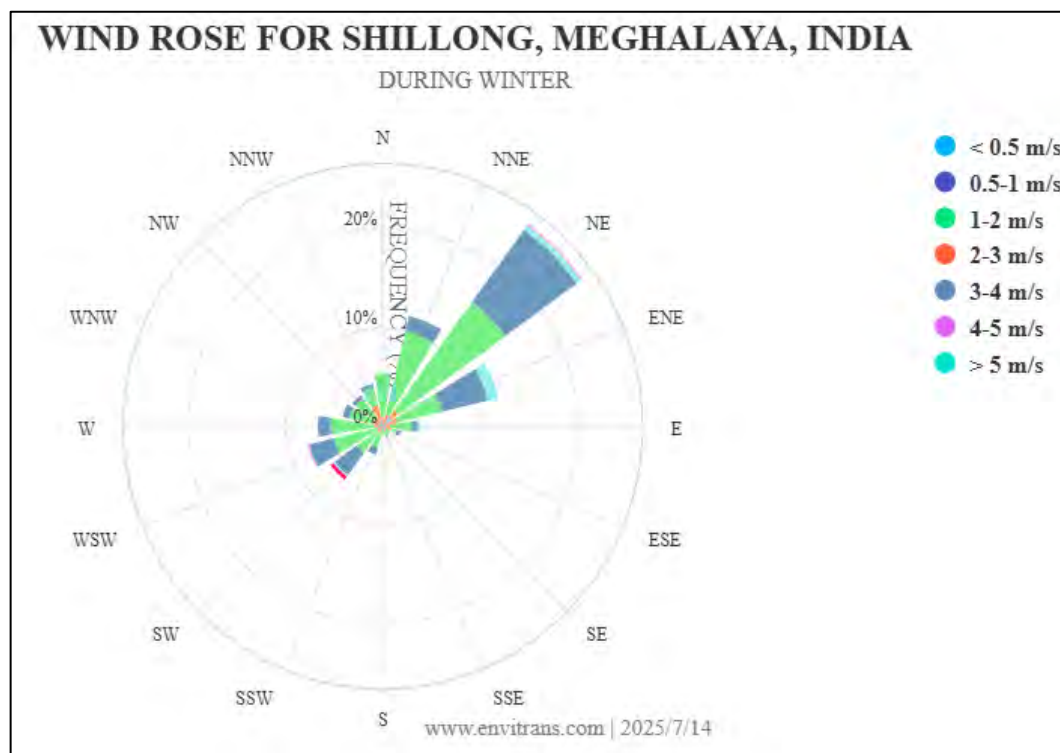


Figure 3.13: Wind Rose Diagram

The Wind rose show that the most predominant wind direction blows from the North-East, with the secondary wind direction being from the East North East of West South West. This means that the emissions plume will be dispersed mainly in the SW direction, and secondarily in the East of South East direction. Calm wind during this period 16.90%.

3.7.3 AMBIENT AIR QUALITY DATA

Ambient air quality monitoring stations were selected on the basis of surface influence, demographic influence and meteorological influence. The sites were chosen at eight locations. The ambient air monitoring has been carried out with a frequency of two days in a week at eight locations covering one complete season.

Table 3.11: Sampling Frequency

Parameters	Sampling Frequency
PM ₁₀	24 hourly sample twice a week
PM _{2.5}	24 hourly sample twice a week
Sulphur Dioxide (SO ₂)	8 hourly for 24 hrs sample twice a week
Oxides of Nitrogen (NO _x)	8 hourly for 24 hrs sample twice a week



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

Carbon Monoxide	8 hourly for 24 hrs sample twice a week
-----------------	---


Table 3.12: Instruments used for Sampling & Analysis

Pollutants	Instrument	Make	Model No.	Range and Sensitivity
PM ₁₀	Respirable Dust Sampler (RDS)	M/s ECO TECH Instruments Pvt. Ltd	COMBO-AAS-271	2.3 m ³ /hr ± 0.03 m ³ /min
PM _{2.5}			--	1.0 m ³ /hr ± 0.03 m ³ /min
SO ₂	RDS with thermoelectrically cooled gaseous sampling attachment		--	0 – 3 LPM ± 0.2 LPM
NO _x				
CO	CO Analyzer	Testo Analyzer	--	1-1999 PPM
		GC – Bruker (Gas Chromatography)	--	< 1.0 PPM
Trace Elements	AAS	Thermo Fisheries	--	--

Table 3.13: Sampling and Analytical Techniques

S. No.	Parameter	Method
1	PM ₁₀	IS-5182 (Part – 23) 2006
2	PM _{2.5}	RTI (Research Triangle Institute) (Gravimetric Ana Revision-07 Aug14-2003)
3	Sulphur Dioxide	IS 5182 (Part – II) 2001, with Improved West & Gaeke Method
4	Nitrogen Oxide	Modified Jacob – Hochheiser/ Arsenite Method(IS 5182 Part 6) 2011
5	Carbon Monoxide	NDIR Spectroscopy method
6	Trace Elements	APHA-401 and ASTM D 4185-90

Table 3.14: Statistical Summary of Concentration Levels of Criteria Pollutants

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

S. No.	Sampling Location		Parameters				
			PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (mg/m ³)
1.	Mine Site (Smti. Seisoh Syiemlieh)	Min	60.53	30.69	11.76	16.85	0.48
		Max	79.82	39.27	14.75	19.5	0.92
		Avg.	66.29	34.20	12.85	17.50	0.70
		98 th % ile	79.08	39.10	14.53	19.21	0.89
2.	Bholaganj Bazar	Min	63.12	24.46	5.84	9.45	0.25
		Max	73.32	32.81	9.78	13.61	0.48
		Avg.	68.92	28.87	7.70	11.39	0.37
		98 th % ile	73.12	32.69	9.63	13.32	0.48
3.	Bholaganj	Min	55.41	22.65	9.58	12.45	0.32
		Max	70.61	27.58	11.3	16.39	0.92
		Avg.	62.14	24.00	10.26	14.01	0.57
		98 th % ile	70.09	27.24	11.27	16.15	0.90
4.	Chakalabasti	Min	59.25	29.73	11.55	15.67	0.47
		Max	78.45	38.14	13.88	18.36	0.59
		Avg.	62.95	31.74	12.55	16.78	0.53
		98 th % ile	77.21	37.11	13.83	18.31	0.59
5.	Diengkain	Min	59.28	31.56	9.23	15.62	0.39
		Max	74.65	45.12	18.56	20.31	0.58
		Avg.	66.36	38.65	13.87	18.74	0.47
		98 th % ile	73.18	44.52	17.74	20.17	0.58
6.	Mawthang	Min	53.40	19.21	9.74	10.96	0.35
		Max	65.80	24.77	10.65	15.4	0.54
		Avg.	57.17	21.14	10.14	11.82	0.45
		98 th % ile	65.38	24.61	10.65	14.81	0.54
7.	Sohbar	Min	66.21	25.02	6.28	9.62	0.46
		Max	75.28	32.04	9.31	14.75	0.79
		Avg.	69.94	28.31	8.06	11.99	0.62
		98 th % ile	74.87	31.69	9.28	14.67	0.78
8.	Mawpathaw	Min	63.42	36.41	6.33	15.55	0.51
		Max	72.16	45.22	11.11	19.6	0.79
		Avg.	67.37	40.17	7.73	17.55	0.64
		98 th % ile	71.65	44.93	10.72	19.53	0.78
NAAQ STANDARDS			100	60	80	80	02



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

3.7.4 RESULTS

The analysis results for the study period are presented in above monitoring tables. Various statistical parameters like 98th percentile, average, maximum and minimum values have been computed from the observed raw data for all the AAQ monitoring stations. These are compared with the standards prescribed by Central Pollution Control Board (CPCB) for rural and residential zone.

The observation based on the perusal of the results is summarized below:-

PM₁₀:-The maximum value for PM₁₀ observed at Mine Site 79.82 µg/m³ and minimum value for PM₁₀ observed at Mawthang 53.4 µg/m³. The 24 hours applicable limit for Industrial, Residential Rural and Other Areas is 100 µg/m³.


PM_{2.5}:-The maximum value for PM_{2.5} observed at Mawpathaw 45.22 µg/m³ and minimum value for PM_{2.5} observed at Mawthang 19.21 µg/m³. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 60 µg/m³.

SO₂:- The maximum value for SO₂ observed at Diengkain 18.56 µg/m³ and minimum value for SO₂ observed at Bholaganj Bazar 5.84 µg/m³. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 80 µg/m³.

NO_x:-The maximum value for NO₂ observed at Diengkain 20.31 µg/m³ and minimum value for NO₂ observed at Bholaganj Bazar 9.45 µg/m³. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 80 µg/m³.

CO:-The maximum value for CO observed at Mine Site-0.92 mg/m³ and minimum value for CO observed at Bholaganj Bazar 0.25 mg/m³. The 8 hours applicable limit for Industrial, Residential Rural and other areas is 2.0 mg/m³.

Conclusion: The results of the monitored data indicate that the ambient air quality of the region in general conforms to the norms of National Ambient Air Quality standards of CPCB, at all locations monitored.

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

3.8 NOISE ENVIRONMENT

The main objective of noise monitoring in the study area is to establish the baseline noise level and assess the impact of the total noise expected to be generated during the project operations around the project site.

Table 3.15: Noise (Sound) Measuring Instrument

Instrument	Make	Model No.	Instrument Identification	Detection Limit
Integrated Sound Level Measurement Instrument Standard Accessories.	HTC	SL-1352	SAL/NOISE/INT/0 5	Lo 35-80 dB Hi 80-130 dB

Table 3.16: Testing Method to be followed

Particular		Testing Method to be Followed
Noise Level Measurement		
A	Noise Level in dB (A) for continuous 24 hours at 1 hour interval.	Operational Manual of Noise Level Meter, Model No. DT - 805 issued by Mextech.

3.8.1 AMBIENT NOISE LEVEL DATA

The statistical analysis is done for measured noise level at eight locations. The parameters are analyzed for L_{eq} (day), L_{eq} (night) and L_{eq} (day-night). The statistical analysis results are given in below:-

Table 3.17: Ambient Noise Level Data

Location	Date of Sampling	Day Time in dB(A) (6.0 AM to 10.0 PM)	Night Time in dB(A) (10.0 PM to 6.0AM)
Mine Site	08.12.2024	58.7	42.8
Bholaganj Bazar	24.12.2024	53.4	40.5
Bholaganj	05.12.2024	54.2	43.1
Chakalabasti	04.01.2025	52.7	42.9
Diengkain	18.01.2025	51.6	38.5
Mawthang	05.02.2025	53.3	41.6
Sohbar	08.02.2025	54.8	43.2
Mawpathaw	12.02.2025	51.7	42.9
Standards			



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

Category of Area/ Zone	Day Time in dB(A)	Night Time in dB(A)
Industrial Area	75	70
Residential Area	55	45
Commercial Area	65	55
Silence Zone	50	40
Busy Airports	70	65
All other Airports Excluding proposed Airports	65	60

3.8.2 RESULT

A) Day time Noise Levels L_{eq} (day)

The day time L_{eq} (day) noise levels at all locations were observed to be in the range of 51.6-58.7 dB (A). The maximum noise level of 58.7 dB (A) was observed at Mine site and the minimum noise level of 51.6 dB (A) was observed at Mawpathaw during the study period. It is observed that the day time noise levels are in accordance to the prescribed limit of 75dB (A) in the study area.


B) Night time Noise Levels L_{eq} (night)

The night time L_{eq} (night) noise levels at all the residential locations was observed to be in range of 38.5- 43.2 dB (A). The maximum noise level of 43.2 dB (A) was observed at Sohbar and the minimum noise level of 38.5 dB (A) at Diengkain during the study period. It has been found that the night time noise levels at Mine Site were found to little very high due to vehicular movement, within the prescribed standard of 70 dB(A).

3.9 BIOLOGICAL ENVIRONMENT

3.9.1 INTRODUCTION

The biological environment includes both terrestrial and aquatic ecosystems. A change in the composition and structure of biotic communities are reflected by a change in the distribution pattern, density, diversity, frequency, dominance and abundance of natural species of flora and fauna existing in the ecosystem. Studies on biological aspect of ecosystems are significant under Environmental Impact Assessment for protection of natural flora and fauna from impacted and influenced zones of project. Assessment on the impact of environmental pressure on the biological community structure serves as an inexpensive and efficient early warning system to check the damage to a particular ecosystem. This document reports the Baseline Environmental Data on the Flora and Fauna of the study area of 10 km radial distance

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

around the Project site including submergence and influence zones. Field survey was conducted for baseline study of existing biological resources in three different seasons and all the data has been gathered by direct inventory as well as through reviewing secondary information. Thus, both participatory and consultative approaches were followed under this study.

Forest and Forest types in Meghalaya: - Meghalaya is a treasure trove of Nature, with its richly varied and dense endemic, exotic and cultivated flora. Nature, in its generous abundance, had bestowed on Meghalaya a unique array of vegetation, ranging from tropical and sub-tropical to temperate or near temperate. This is due to the diverse topography, varied and abundant rainfall and differential climatic and edaphic conditions of the State, within small regions. Biotic factors have also played an important role, at places decisive. The State is basically an agricultural State. It has a total geographical area of 22,429 km². The total estimated forest area of the State is 8,514 km² of which only 722.36 km² are directly under the control of the State Forest Department. The remaining areas are managed by the respective District Councils of Khasi Hills, Jaintia Hills and Garo Hills as per provisions of the Sixth Schedule to the Constitution of India. Except the reserved forest areas and protected forests in and around Shillong (being managed by the department in arrangement with the District Councils), the rest of the forest areas are subjected to the primitive agricultural practice of shifting cultivation or slash and burn method especially in Garo Hills. However, there are few pockets of undisturbed natural forests still in existence, comprising about 1000 km² being protected by the tribal as 'Sacred Groves'. Essentially, they are located in strategic watersheds and still play an important role.

The forests of Meghalaya can be broadly grouped into tropical, subtropical and temperate types. The Indian Institute of Remote Sensing have classified the vegetation of Meghalaya into tropical evergreen, tropical semi-evergreen, tropical moist deciduous, subtropical broad leaved, subtropical pine and temperate forest types, grasslands and savannas. Detailed description of forest is described in following sections:

Tropical forests: These forests occur up to an elevation of 120 m where average annual rainfall ranges between 100 and 250 Cm. They may be evergreen, semi evergreen, and moist deciduous depending on the annual rainfall. Such type of forests occurs along the banks of the River Umngot.



Tropical evergreen forests: These forests usually occur in high rainfall areas as well as near catchment areas. They seldom form continuous belts due to various exogenous factors. But still, they harbour very rich species diversity, where nature is at its extravaganza forming a closed evergreen canopy. The trees exhibit clear zonation with dense and impenetrable herbaceous undergrowth. Small strips and patches of such type of communities could be seen along the banks of the river and the streams that discharge into the river in the form of narrow strips.

Tropical semi-evergreen forests: This category of forests occupies the north-eastern and northern slopes of the State, typically up to elevations of 600m, where annual rainfall is 150 to 200 Cm with a comparatively cooler winter. The numbers of species here are fewer than the evergreen zone. There are also a few species in these forests which are deciduous in nature, such as *Careya arborea*, *Dillenia pentagyna* and *Callicarpa arborea*. Again, there is a clear stratification of the trees in these forests.

Tropical moist and dry deciduous forests: This type of forest occurs where annual rainfall is below 150 Cm and at comparatively low elevations. Deciduous forests are much more extensive in their distribution in the State and include a host of economically important trees like *Shorea robusta*, *Tectona grandis*, *Terminalia myriocarpa*, *Sterculia villosa*, *Logerstroemia flos-reginae*, *Logerstroemia parviflora*, *Morus laevigatus*, *Artocarpus chaplasha*, and *Gmelina arborea*.

Grass and Savannas: Grasslands of Meghalaya are also not a climax type but are only the result of removal of original forest cover. The rolling grasslands covering large areas can be seen throughout the Shillong plateau, around Riango, Ranikor, Weiloi, Mawphlang, Mawsynram, Cherrapunji, Shillong, Jowai, Jarain, and Sutnga in Khasi Hills and Jaintia Hills districts and major parts of West Garo Hills district.

Temperate Forests: 5.10 The temperate forests occupy the higher elevations of about 1000 m, mostly along the southern slope of Khasi Hills and Jaintia Hills. The rainfall here is very high (200-500 Cm) with severe winter during November to March. Ground frost is also common during December to January.

According to the State of Forest Report (FSI 2001), the actual forest cover of the state is 15,584 sq. km. This accounts for around 69.5% of the state’s geographic area. Per capita forest area in the state is 0.64 hectares compared to the national average of 0.11 hectares. However, the total recorded forest area is 9,496 sq. km. The area of reserved and protected forests under the control of the state government is only 1,124 sq. km. The Unclassed Forests, managed by



Autonomous District Councils, village durbars and other traditional institutions, and private owners cover an area of 8,372 sq. km. During 1985-87, 73.41% (16,466 sq. km) of the total geographical area of the state was under forest cover. It decreased to 69.75% (15,645 sq. km) by the year 1987-89 and then increased to 69.48% (15584 sq. km) in 1999-2001.

3.9.2 OBJECTIVES OF THE STUDY

The objectives of the present study were as follows:-

- To assess the flora and fauna present in the core site of the project and in around area buffer region (10 Km radius range),
- To document cultivated, planted and naturally occurring species in the core site,
- To document Rare, Endangered, Threatened species in the core area and in the buffer zone,
- Assessment of species protected by specific legislation (Rare, endangered, critically endangered, endemic and vulnerable)
- To identify designated locates, habitats and features of ecological significance

3.9.2.1 Activities undertaken during the study

a) Flora survey

- Fauna survey Tree, shrub, herb, climber and grass species identification and enumeration
- Diversity of species under plantations
- Analysis of Rare-Endangered-Threatened flora

b) Fauna survey

- Documentation of Avian, Reptilian, Insect, Amphibian, Mammal and other faunal diversity
- Observation by direct and indirect evidences (Direct evidence-Sighting and hearing, indirect evidence-Pug marks, nests and other sings)
- Analysis of Scheduled species
- Study Habit/microhabitat for the faunal elements in the project site and surrounding areas within 10 km range from the site.
- Records of the forest department and discussion with forest officials.
- The presence of wildlife was also confirmed from the local inhabitants depending on the animal's sightings and the frequency of their visits in the project area.



- In addition review of secondary data was another source of information for studying the fauna of the area.

c) Habitat/microhabitat diversity in the core sites and Buffer area

This survey records the flora and fauna evident on the day of the site visit and field survey. It does record any flora and fauna that may appear at other times of the year, and such, were not evident at the time of visit. The report represents ecological status of the area evident during the particular period of the study.

3.9.3 STUDY AREA

The state of Meghalaya is known for its diverse, extensive and luxuriant forests. The rich natural vegetation of the state ranges from Sub-tropical to Tropical owing to its diverse topography and varied climatic and edaphic conditions. Availability of fertile soil and its spatial variability in structure and texture provide rich substratum for growth and development of a wide range of vegetation. Further, luxuriant growth of wide range of flora is also attributed to differences in altitude and climatic conditions.

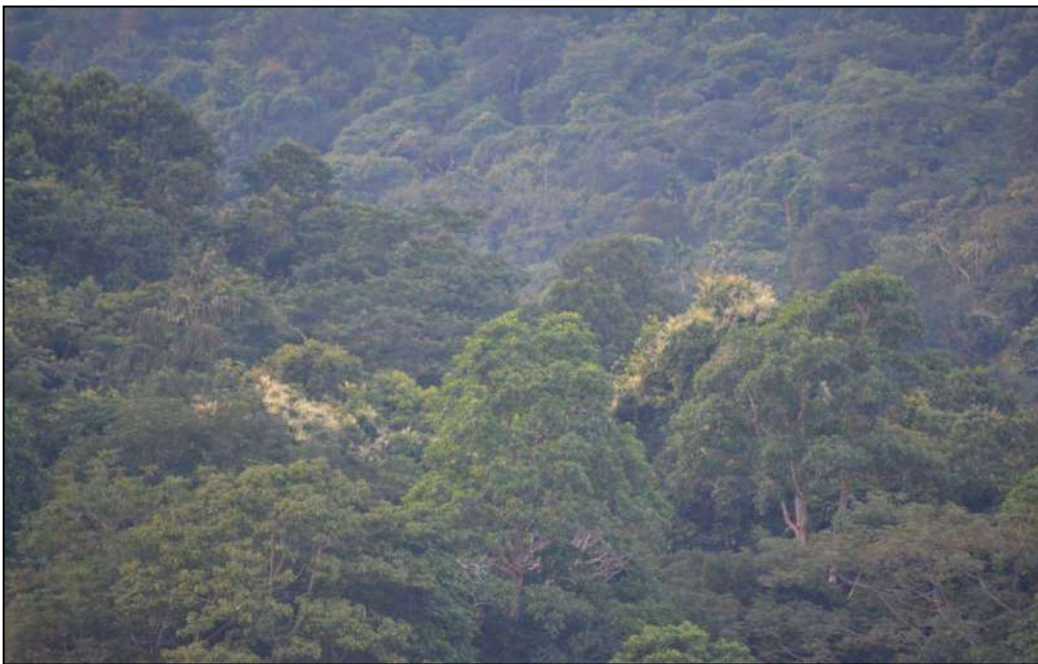



Figure: 3.14 View of the study area

3.9.4 OBSERVATION

Forest type in Submergence Area:

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00


Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

The forests that occur in the area of submergence are typical tropical riverside forests dominated by different species of *Ficus*, *Shorea robusta*, *Tectona grandis*, *Terminalia myriocarpa*, *Sterculia villosa*, *Logerstroemia flos-reginae*, *Logerstroemia parviflora*, *Morus laevigatus*, *Artocarpus chaplasha*, *Gmelina arborea*, *Schima wallichii*, *Artocarpus gameziana*, *Tetrameles nudiflora*, *Lannea coromandelica*, *Salmalia malabarica*, *Erythrina stricta*, *Premna milliflora*, *Vitex peduncularis*, *Albizia lebbek*, *Terminalia bellirica*, *Anthocephalus cadamba* and others.

The catchment area towards the Jaintia Hills was represented mainly by private or community croplands. Potato, Cabbage, Cauliflower, Carrot, Radish, Tomato, Chilies, Paddy, Millets, Pulses, Jute, Mesta, Ginger, Turmeric, Black Pepper, Sugarcane are the main crops grown during the rainy season. Areca nut, Pineapple and Betel wines are also grown in a limited area. The Eastern slopes of the East Khasi Hills beyond the level of submergence have been denuded and reclaimed for cultivation of Potato, Cabbage, Cauliflower, Carrot, Radish, Tomato, Chilies, Paddy, Millets, Pulses, Jute, Mesta and Ginger. Black Pepper, Areca nuts and Pineapple are grown in a few localities. In upper part of the hills large areas are also under the cultivation of broom grass (*Thysanolaena maxima*) on the plateau regions. The catchment area of the Umngot River supports all the different types of vegetation types described earlier. There are different types of forests, grasslands and croplands. Based on the ownership of the land, the forests are classified as the reserve forests, unclassified community forests and sacred grooves. The sacred groves of Meghalaya are the best protected pieces of natural vegetation and have been preserved since time immemorial. Therefore, these are treasure trove of unique flora. However, there no sacred groove in the submergence area. A protective hedge of *Castanopsis kurzii* trees, which do not allow the growth of the Khasi pine within the enclosed area, surrounds these groves. Inside the groves however, the soil is richly laden with humus, accumulated over the centuries and which supports a variety of plant life found nowhere else. As indicated, there are unclassified dense (private forests) and open forests in the catchment and reservoir areas. Land use and Land cover of the catchment and submergence area. Out of the total forest area, only 4% is a reserve forest and the rest are treated as unclassified community forests.

Economically Important Species

(Viz. Medicinal, Timber, Fuel Wood etc. Sacred groves): Forest-Groves are known by various names as "Ki Law Kyntang" (sacred forest); "Ki Law Adong" (prohibited forest); "Ki Law Shnong" (village forest) and "Ki Law Kynti" (private forest). These sacred groves

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

are basically nature's own museum, as they have been preserved since time immemorial, and are hence a treasure trove of unique flora. A protective hedge of *Castanopsis kurzii* trees, which do not allow the growth of the Khasi pine within the enclosed area, surrounds these groves. Inside the groves however, the soil is richly laden with humus, accumulated over the centuries and which supports a variety of plant life found nowhere else. The trees in every grove are loaded with epiphytic growth of pipers, ferns, orchids etc. The size of the sacred groves varies from as small as an acre to hundreds of acres. There is at least one sacred grove for every two villages on an average. Some of the important tree species, which yield valuable timber for trade, are Khasi Pine, Sal, Teak, Bamboos. In Meghalaya forests the rubber-yielding plant of *Ficus elastica* belonging to the family of Moraceae is common. Lac and Gum are obtained from forests in the area. Forests offer tremendous scope for sericulture or silk worm rearing industry.

Ornamental Plants:

The forests of study area are treasure house of valuable products such a timber, fuel wood, fodder, resin, tannin, gums, shellac, fiber, latex, essential oils, fats, edible fruits, honey and a large number of medicinal plants. Study area is well known for bay leaves and cinnamon. *Morus alba*, *Quercus semiserrata* and a number of other tree species play a vital role in the economy of the State, being the host plants for rearing of silk worms for sericulture. **The common ornamental trees are:**

Cassia fistula, *Cassia nodosa*, *Jacaranda acutifolia*, *Magnolia griffithii*, *Lagerstroemia indica*, *Callistemon viminalis*, *Rhododendron spp.* The other seasonal ornamental plants are *Dahlia*, *Canna*, *Gladiolus*, *Hydrangium*, *Begonia*, *Tropaeolum*, *Aster*, *Polargonium*, *Antirrhinum*, *Crinum*, *Celosia*, *Kniphofia*, *Impatiens*, *Chrysanthemum*, *Petunias*, *Pansy*, *Calendula*, *Sweet peas* and *Salvia*. Many climbers like *Bougainvillea*, *Rosa*, *Jasminum*, etc. are quite common. Orchids like *Phaius*, *Paphiopedilum* and *Cymbidium spp.* are also cultivated. Other ornamentals grown in gardens are *Hibiscus*, *Hydrangea*, *Gardenia*, *Poinsettia*, *Dahlia*, *Canna*, *Gladiolus*, *Begonia*, *Tropaeolum*, *Aster*, *Polargonium*, *Antirrhinum*, *Crinum*, *Celosia*, *Holly hock*, *Kniphofia*, *Impatiens*, *Chrysanthemum*, *Petunia*, *Pansy*, *Calendula*, *Sweet Pea*, *Salvia*, *Roses*, *Bougainvillea*, *Jasminum* etc. A few Orchids like *Phais*, *Dendrobium* and *Cymbidium* varieties are also cultivated.

Ornamental Plants:

The forests of study area are treasure house of valuable products such a timber, fuel wood, fodder, resin, tannin, gums, shellac, fiber, latex, essential oils, fats, edible fruits, honey and



a large number of medicinal plants. Study area is well known for bay leaves and cinnamon. Morus alba, Quercus semiserrata and a number of other tree species play a vital role in the economy of the State, being the host plants for rearing of silk worms for sericulture. The common ornamental trees are: Cassia fistula, Cassia nodosa, Jacaranda acutifolia, Magnolia griffithii, Lagerstroemia indica, Callistemon viminalis, Rhododendron spp. The other seasonal ornamental plants are Dahlia, Canna, Gladiolus, Hydrangea, Begonia, Tropaeolum, Aster, Polargonium, Antirrhinum, Crinum, Celosia, Kniphofia, Impatiens, Chrysanthemum, Petunias, Pansy, Calendula, Sweet peas and Salvia. Many climbers like Bougainvillea, Rosa, Jasminum, etc. are quite common. Orchids like Phaius, Paphiopedilum and Cymbidium spp. are also cultivated. Other ornamentals grown in gardens are Hibiscus, Hydrangea, Gardenia, Poinsettia, Dahlia, Canna, Gladiolus, Begonia, Tropaeolum, Aster, Polargonium, Antirrhinum, Crinum, Celosia, Holley hock, Kniphofia, Impatiens, Chrysanthemum, Petunia, Pansy, Calendula, Sweet Pea, Salvia, Roses, Bougainvillea, Jasminum etc. A few Orchids like Phais, Dendrobium and Cymbidium varieties are also cultivated.

Agriculture:

The East Khasi Hills District showcases a rich tapestry of agriculture, characterized by a variety of crops suited to its unique geography and climate. Major food crops include Paddy, Maize, and Millets, alongside a range of vegetables such as Potato, Cabbage, Cauliflower, and Chilies, primarily cultivated during the rainy season. Cash crops like Jute, Mesta, Ginger, and Black Pepper are also significant, contributing to both local diets and the economy. Additionally, Areca nut, Betel, and Pineapple are cultivated in limited areas, reflecting the region's agricultural diversity and cultural practices.

The district's agricultural practices have adapted over time, especially in the denuded Eastern slopes, where land has been reclaimed for cultivation. While horticulture is not a primary focus for most locals, there is a notable collection of orchids from natural sources for sale in Shillong, highlighting the area's biodiversity. Community and private croplands are vital for sustaining livelihoods, demonstrating the interdependence of agriculture and local culture in the East Khasi Hills.



Medicinal plants:

Different parts of many plants growing in study have been put to medicinal use. Among the important and recognized medicinal plants found and cultivated in the study area are Ipecac, Rauvolfia serpentina, Cinchona, Abromine, Chaulmoogra oil, Croton oil, Eucalyptus, Castor oil, Chiretta, *Solanum khasianum*, *Casearia vareca*, *Zanthoxylum armatum*, *Hedyotis scandens*, *Paederia foetida*, *Salix alba*, *Anacardium occidentale*, *Cinnamomum* and *Taxus baccata*. A list of trees including the shrubs, herbs and climber is given in Table 3.18.

Table 3.18: List of Flora in Buffer zone

S. No.	Plant Species	Family	Local Name
Trees			
1.	<i>Aglaia perviridis</i>	Meliaceae	-
2.	<i>Albizia procera</i>	Mimosaceae	Dieng Sohriew
3.	<i>Altsonia scholaris</i>	Apocynaceae	-
4.	<i>Artocarpus lacucha</i>	Moraceae	Dieng Sohrytet
5.	<i>Aphanomixis polystachya</i>	Meliaceae	Dieng-soh-sying
6.	<i>Bauhinia purpurea</i>	Caesalpiniaceae	Me-gong
7.	<i>Beilschme roxburghiana</i>	Laraceae	-
8.	<i>Beilschmiedia roxburghiana</i>	Lauraceae	-
9.	<i>Bombax ceiba</i>	Bombacaceae	Dieng ruin
10.	<i>Callicarpa arborea</i>	Verbenaceae	Dieng-lakhoit
11.	<i>Camellia caudata</i>	Theaceae	
12.	<i>Caryota urens</i>	Arecaceae	Dieng Lakhar
13.	<i>Casearia vareca</i>	Flacourtiaceae	-
14.	<i>Castanopsis indica</i>	Fagaceae	Dieng sohot
15.	<i>Castanopsis purpurella</i>	Fagaceae	-
16.	<i>Castanopsis tribuloides</i>	Fagaceae	-
17.	<i>Cinnamomum granduliflerum</i>	Lauraceae	-
18.	<i>Cinnamomum tamala</i>	Lauraceae	Dieng Latyypad
19.	<i>Citrus latipes</i>	Rutaceae	Dieng sohkyphor
20.	<i>Coffea khasiana</i>	Rubiaceae	-
21.	<i>Desmos longiflorus</i>	Schisandraceae	-
22.	<i>Diospyros kaki</i>	Ebenaceae	Dieng-iong
23.	<i>Dysoxylum gobara</i>	Meliaceae	Sla-luchai
24.	<i>Engelhardtia spicata</i>	Juglandaceae	Gandmowa



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

25.	<i>Erythrina stricta</i>	Papilionaceae	-
26.	<i>Eurya acuminata</i>	Theaceae	Dieng shit
27.	<i>Eurya cerasifolia</i>	Theaceae	-
28.	<i>F. oligodon</i>	Moraceae	-
29.	<i>Ficus geniculate</i>	Moraceae	Phrap-agar
30.	<i>Ficus hirta</i>	Moraceae	Dieng jri
31.	<i>Ficus nerifolia</i>	Moraceae	Dieng jri
32.	<i>Garcinia xanthochymus</i>	Cluciaceae	Jharambi
33.	<i>Glochidion hirsutum</i>	Euphorbiaceae	-
34.	<i>Gynocadia odorata</i>	Flacourtiaceae	-
35.	<i>Homalium schlichii</i>	Flacourtiaceae	-
36.	<i>Hydnocarpus kurzi</i>	Flacourtiaceae	-
37.	<i>Itea macrophylla</i>	Itaceae	
38.	<i>L. khasyana</i>	Lauraceae	-
39.	<i>Lagerstroemia hirsute</i>	Lythraceae	Taman
40.	<i>Lannea coromandelica</i>	Anacardiaceae	Jhingran
41.	<i>Lindera latifolia</i>	Lauraceae	-
42.	<i>Litsea citrate</i>	Lauraceae	
43.	<i>Lithocarpus elagans</i>	Fagaceae	-
44.	<i>Litsea lancifolia</i>	Lauraceae	-
45.	<i>Macaranga denticulate</i>	Euphorbiaceae	Dieng Lakhar
46.	<i>Michelia glabra</i>	Magnoliaceae	-
47.	<i>Miliusa globose</i>	Anonaceae	-
48.	<i>Myrica esculanta</i>	Myricaceae	Dieng sohphie
49.	<i>Oroxylum indicum</i>	Bignoniaceae	Pharri
50.	<i>Parkia roxburghii</i>	Mimosaceae	Dieng jariat
51.	<i>Persea odoratissima</i>	Lauraceae	Kaula
52.	<i>Picresema sp.</i>	Simaroubiaceae	-
53.	<i>Pithecellobium monadelphum</i>	Mimosaceae	-
54.	<i>Pinus khasiana</i>	Pinaceae	Dieng kseh
55.	<i>Podocarpus nerrifolia</i>	Podocarpaceae	-
56.	<i>Pyrularia edulis</i>	Santalaceae	-
57.	<i>Quercus griffithii</i>	Fagaceae	-
58.	<i>Rhus acuminata</i>	Anacardiaceae	Dieng sohma
59.	<i>Rhus javanica</i>	Anacardiaceae	-



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

60.	<i>Samanea saman</i>	Mimosaceae	--
61.	<i>Sapindus rarak</i>	Sapindaceae	-
62.	<i>Schefflera bengalensis</i>	Araliaceae	-
63.	<i>Schefflera hypoleucea</i>	Araliaceae	-
64.	<i>Schima wallichii</i>	Theaceae	Dieng ngan
65.	<i>Schima wallichii</i>	Theaceae	Dieng ngan
66.	<i>Stereospermum chelonoides</i>	Bignoniaceae	Padal
67.	<i>Styrax serrulatum</i>	Styraceae	-
68.	<i>Saurauia punduana</i>	Actinidiaceae	-
69.	<i>Syzygium cuminii</i>	Myrtaceae	Dieng Jamun
70.	<i>Syzygium tetragomum</i>	Myrtaceae	Dieng-soh-sarlei
71.	<i>Tetradium fraxinifolium</i>	Rutaceae	-
72.	<i>Trema aboimensis</i>	Ulmaceae	-
73.	<i>Vaccinium donianum</i>	Ericaceae	-
74.	<i>Villebrunea integrifolia</i>	Urticaceae	-

Shrubs

1.	<i>Aeschynanthus hookeri</i>	Gesneriaceae	-
2.	<i>Andrachne cordifolia</i>	Euphorbiaceae	-
3.	<i>Aralia thomsonii</i>	Araliaceae	
4.	<i>Artabotrys caudatus</i>	Annonaceae	-
5.	<i>Aspidopterys roxburghiana</i>	Malpighiaceae	-
6.	<i>B. platyphylla</i>	Urticaceae	-
7.	<i>Bambusa tulda</i>	Poaceae	-
8.	<i>Boehmeria macrophylla</i>	Urticaceae	-
9.	<i>Boehmeria sidaefolia</i>	Urticaceae	
10.	<i>Breynia retusa</i>	Eupobiaceae	
11.	<i>Calamus floribundus</i>	Arecaceae	-
12.	<i>Cassia floribunda</i>	Fabaceae	
13.	<i>Chromolaena odoratum</i>	Asteraceae	-
14.	<i>Clerodendrum colebrookianum</i>	Verbenaceae	-
15.	<i>Corylopsis himalayana</i>	Hamamelidaceae	
16.	<i>Desmodium triquetrum</i>	Papilionaceae	-
17.	<i>Embelia subcoriacea</i>	Myrsinaceae	
18.	<i>Embelia vestita</i>	Myrsinaceae	
19.	<i>Erythroxylum kunthianum</i>	Erythroxylaceae	



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

20.	<i>Euonymus lowsonii</i>	Celastraceae	
21.	<i>Eupatorium adenophorum</i>	Asteraceae	
22.	<i>F. lanceolata</i>	Moraceae	-
23.	<i>Ficus clavate</i>	Moraceae	
24.	<i>Ficus scandens</i>	Moraceae	-
25.	<i>Indigofera heterantha</i>	Papilionaceae	-
26.	<i>Isodon ternifolius</i>	Lamiaceae	-
27.	<i>Ixora acuminata</i>	Rubiaceae	-
28.	<i>Jasminium dispernum</i>	Oleaceae	
29.	<i>L. crispa</i>	Leeaceae	-
30.	<i>Lasianthus lucidus</i>	Rubiaceae	-
31.	<i>Lantana camara</i>	Verbeniaceae	-
32.	<i>Lasianthus sikkimensis</i>	Rubiaceae	-
33.	<i>Leea aequata</i>	Leeaceae	-
34.	<i>Liculia pinceana</i>	Rubiaceae	-
35.	<i>Loranthus odoratus</i>	Loranthaceae	-
36.	<i>Loxostigma griffithii</i>	Gesneriaceae	-
37.	<i>Measa indica</i>	Myrsinaceae	
38.	<i>Micromelum integerrimum</i>	Rutaceae	-
39.	<i>Mimosa rubecaulis</i>	Mimosaceae	-
40.	<i>Mussaenda roxburghii</i>	Rubiaceae	-
41.	<i>Melastoma nepalensis</i>	Myricaceae	-
42.	<i>Osbeckia nepalensis</i>	Lythraceae	-
43.	<i>Oxyspora paniculata</i>	Lythraceae	-
44.	<i>Pentapanax fragrans</i>	Araliaceae	-
45.	<i>Phlogacanthus thyrsoiflorus</i>	Acanthaceae	-
46.	<i>Piper pedicellatum</i>	Piperaceae	-
47.	<i>Plectranthus striatus</i>	Lamiaceae	
48.	<i>Polygonum molle</i>	Polygonaceae	
49.	<i>Prinsepia utilis</i>	Rosaceae	
50.	<i>Psychortia curviflora</i>	Rubiaceae	
51.	<i>Psychortia erratica</i>	Rubiaceae	
52.	<i>Psychotria denticulata</i>	Rubiaceae	-
53.	<i>R. ellipticus</i>	Rosaceae	-
54.	<i>R. moluccanus</i>	Rosaceae	-



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

55.	<i>R. paniculatus</i>	Rosaceae	-
56.	<i>R. rosaefolius</i>	Rosaceae	-
57.	<i>Rhynchosyris vestitum</i>	Gesneriaceae	
58.	<i>Rubus acuminatus</i>	Rosaceae	-
59.	<i>Rubus assamensis</i>	Rosaceae	
60.	<i>Rubus ellipticus</i>	Rosaceae	
61.	<i>Rubus khasiana</i>	Rosaceae	
62.	<i>S. surettense</i>	Solanaceae	-
63.	<i>Senecio cappa</i>	Myricaceae	
64.	<i>Shutaria vestida</i>	Rubiaceae	
65.	<i>Solanum aculeatissimum</i>	Solanaceae	
66.	<i>Solanum ferox</i>	Solanaceae	-
67.	<i>Strobilanthes auriculata</i>	Acanthaceae	-
68.	<i>Trevesia palmata</i>	Araliaceae	-
69.	<i>Viburnum foetidum</i>	Caprifoliaceae	
70.	<i>Viscum articulatum</i>	Loranthaceae	-

Herbs

1.	<i>Sida cordata</i>	Malvaceae	-
2.	<i>Borreria sp.</i>	Rubiaceae	-
3.	<i>Cyperus flavidus</i>	Cyperaceae	-
4.	<i>Impatiens khasiana</i>	Balsaminaceae	-
5.	<i>Oxalis corniculata</i>	Oxalidaceae	-
6.	<i>Trigonella foenum-graecum</i>	Papilionaceae	-
7.	<i>Melilotus indica</i>	Papilionaceae	
8.	<i>Desmodium triquetrum</i>	Papilionaceae	
9.	<i>Drymaria cordata</i>	Caryophyllaceae	
10.	<i>Hedyotis vestita</i>	Rubiaceae	-
11.	<i>H. scandens</i>	Rubiaceae	-
12.	<i>Ageratum conyzoides</i>	Asteraceae	-
13.	<i>Blumea chinensis</i>	Asteraceae	-
14.	<i>Crepis japonica</i>	Asteraceae	-
15.	<i>Inula cappa</i>	Asteraceae	-
16.	<i>Mikania macrantha</i>	Asteraceae	-
17.	<i>Senecio araneosus</i>	Asteraceae	-
18.	<i>Lophatherum gracile</i>	Poaceae	-



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

19.	<i>Isachne himalaica</i>	Poaceae	-
20.	<i>Selaginella semicordata</i>	Selaginallaceae	-
21.	<i>Hedychium ellepticum</i>	Zingiberaceae	-
22.	<i>Globba clarkia</i>	Zingiberaceae	-
23.	<i>Begonia palmata</i>	Begoniaceae	-
24.	<i>Impatiens khasiana</i>	Balsaminaceae	-
25.	<i>Impatiens banthamii</i>	Balsaminaceae	-
26.	<i>Commelina paludosca</i>	Commelinaceae	-
27.	<i>Panicum brevifolium</i>	Poaceae	-
28.	<i>Murdannia gigantean</i>	Commelinaceae	-
29.	<i>Aeginetia indica</i>	Orobanchaceae	-
30.	<i>Carex filicina</i>	Cyperaceae	-
31.	<i>Crassocephalum crepidioides</i>	Asteraceae	-
32.	<i>Achyrospermum wallichianum</i>	Lamiaceae	-
33.	<i>Elatostema dissectum</i>	Urticaceae	-
34.	<i>Elsholtzia blanda</i>	Lamiaceae	-
35.	<i>Arisaema tortuosum</i>	Araceae	-
36.	<i>Dianella ensata</i>	Liliaceae	-
37.	<i>Cyanotis vaga</i>	Commelinaceae	-
38.	<i>Balanophora dioica</i>	Balanophoraceae	-
39.	<i>Murdannia nudiflora</i>	Commelinaceae	-
40.	<i>Sonerila khasiana</i>	Melastomaceae	-

Climbers

1.	<i>Cocculus macrocarpus</i>	Menispermaceae	-
2.	<i>Stephania glabra</i>	Menispermaceae	-
3.	<i>Toddalia asiatica</i>	Rutaceae	-
4.	<i>Celastrus monosperma</i>	Celastraceae	-
5.	<i>Cayratia mollissima</i>	Vitaceae	-
6.	<i>Cissus adnate</i>	Vitaceae	-
7.	<i>Tetrastigma discolor</i>	Vitaceae	-
8.	<i>Mucuna monosperma</i>	Papilionaceae	-
9.	<i>Entada phaseoloides</i>	Mimosaceae	-
10.	<i>Hedera nepalensis</i>	Araliaceae	-
11.	<i>Jasminum dispersum</i>	Oleaceae	-
12.	<i>Ichnocarpus frutescens</i>	Apocynaceae	-



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

13.	<i>Marsdenia tinctoria</i>	Asclepiadaceae	-
14.	<i>Porana paniculata</i>	Convolvulaceae	-
15.	<i>Thunbergia grandiflora</i>	Acanthaceae	-
16.	<i>Aristolochia roxburghiana</i>	Aristolochiaceae	-
17.	<i>Dioscorea bulbifera</i>	Dioscoreaceae	-
18.	<i>Smilax aspericaulis</i>	Smilacaceae	-
19.	<i>Rhaphidophora decursiva</i>	Araceae	-

Table 3.19: List of Orchids reported in Khasi Hills

Name of plant species	Family	Status as per IUCN/BSI
<i>Ceropegia angustifolia</i>	Asclepiadaceae	Vulnerable NE Hilly region, Khasi
<i>Fimbristylis stolonifera</i>	Cyperaceae	Rare in abandoned jhum of Khasi hills
<i>Elaeocarpus prunifolius</i>	Elaeocarpaceae	Rare
<i>Paphiopedilum venustum</i>	Orchidaceae	Vulnerable
<i>Vanda coerulea</i>	Orchidaceae	Rare
<i>Cleyera japonica</i>	Theaceae	Rare
<i>Metathelypteris decipiens</i>	Thelypteridaceae	Rare / Endemic
<i>Coryphopteris didymochlaenoides</i>	Thelypteridaceae	Rare / Endemic Fern





Oxalis Species



Microphylla Species



Fern Species (Asplenium)



Lygodium Species





Pseudognaphalium



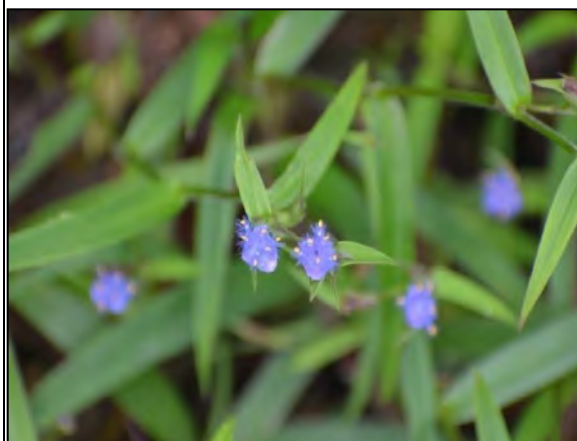
Uncaria Species



Polygonum Species



Fern Species



Cynotis Species



Selaginella Species.





Pavetta Species



Cosmos Species

Pitcher Plant (Carnivorous
Plants/Insectivorous Plants)

Costus Species

Figure: 3.17 Plant species from the study area**Faunal Diversity (Meghalaya State):**

More than 110 mammal species are reported from the Meghalaya Forests, but none is endemic to the state. Some of the species of conservation importance include tiger (*Panthera tigris*), clouded leopard (*Pardofelis nebulosa*), Asian elephant (*Elephas maximus*), wild dog (*Cuon alpinus*), Malayan sun bear (*Ursus malayanus*), sloth bear (*Melursus ursinus*), large Indian civet (*Viverra zibetha*), Chinese pangolin (*Manis pentadactyla*), Indian pangolin (*Manis crassicaudata*), Assamese macaque (*Macaca assamensis*), bear macaque (*Macaca arctoides*), and capped leaf monkey (*Semnopithecus pileatus*). The tiger, clouded leopard, Asian elephant, Assamese macaque, bear macaque, capped leaf monkey, wild dog, sloth bear, and smooth-coated otter are threatened species (IUCN 2000). There are about 2,000 elephants in the Garo Hills and 500 in Jaintia Hills. The wild Buffaloes are also found in the forests of Meghalaya. Frogs and toads represent amphibians. Three types of reptiles - lizards, tortoises and snakes, are reported from the state. Several species of fishes and crabs are also found.



Faunal survey was carried out for the species of Mammals, Birds, Herpetofauna and Insects and the study of mammals and birds were studied by placing systematic transects at different sampling locations in the study area. This exploration of the species was carried out with respect to the habitat types and altitudes where they occurred. A study and survey of Birds (resident, migratory), land animals including mammals, reptiles and insects and aquatic flora and fauna including fish species was undertaken during the study period by a team of experienced biologists. Fauna of Meghalaya (Volume I and II), published by the Zoological Society of India, Meghalaya Flora and Fauna by the Directorate of information and Public relations, Government of Meghalaya and published Scientific reports have been used as references. As far as the larger vertebrates including Carnivores and reptiles are concerned, the data is based mainly on secondary sources corroborated by local residents. Birds have been watched using binoculars, photographed for identification. But the list of birds is based both on primary and secondary sources. Butterflies are based mainly on primary observations.

Mammals

All the sampling for mammalian fauna was carried out in the morning and evening time by using 2-3 km long transects and animal trails. The focus of the sampling was towards the direct sighting of animals but indirect signs like scats, pellets, pugmarks, scraps, vocalizations, horns etc. were also recorded during the survey walk and refereed for the presence of animals. The indirect evidences and information of the animal presence has been also collected through the interviews of local people and available literature. A list of mammals reported from the catchment area is given in Table 3.20 the list is mainly based on secondary sources.

Table 3.20: List of Mammalian Species

S. No.	Scientific Name	Common Name	Family	IWPA, 1972
1.	<i>Suncus murinus</i>	House Shrew	Soricidae	Least Concern
2.	<i>Suncus fellowesgordoni</i>	Pigmy Shrew	Soricidae	Least Concern
3.	<i>Anourosorex squamipes</i>	Chinese Mole Shrew	Soricidae	Least Concern
4.	<i>Muntiacus muntjak</i>	Barking deer	Cervidae	Sch III
5.	<i>Dremomys lokriah</i>	Long-nosed Squirrel	Sciuridae	Sch II (Part I)
6.	<i>Callosciurus pygerythrus</i>	Hoary Bellied Squirrel	Sciuridae	Sch II (Part I)



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment


7.	<i>Parascaptor leucura</i>	Indian Mole	Talpidae	Sch IV
8.	<i>Rattus niviventer</i>	House Rat	Muridae	Sch IV
9.	<i>Chiropodomys gliroides</i>	Pencil-tailed Tree Mouse	Muridae	Sch V
10.	<i>Berylmys bowersi</i>	White-toothed Rat	Murinae	Sch V
11.	<i>Berylmys mackenziei</i>	Keneth's Rat	Murinae	Sch V
12.	<i>Leopoldamys edwardsi</i>	Long-tailed giant Mouse	Murinae	Sch V
13.	<i>Rhizomys pruinosus</i>	Hoary Bamboo rat	Spalacidae	Sch-V
14.	<i>Cannomys badius</i>	Lesser Bamboo Rat	Spalacidae	Sch-V
15.	<i>Rhinolophus pusillus</i>	Least Horseshoe bat	Rhinolophidae	Sch IV

Table 3.21: List of Reptilian fauna recorded from the study area

S.No.	Common name	Latin name	Distribution	Status ZSI /IUCN	IWPA, 1972 Schedule
1.	Lizard	<i>Cyrtodactylus khasiensis</i>	Widespread	Common	II (Part II)
2.	Lizards	<i>Cosymbotus platyurus</i>	Widespread	Common	II (Part II)
3.	Lizards	<i>Calotes emma</i>	Widespread	Common	II (Part II)
4.	Lizards	<i>Calotes jerdoni</i>	Widespread	Common	II (Part II)
5.	Lizards	<i>Calotes versicolor</i>	Widespread	Common	II (Part II)
6.	House Gecko	<i>Hemidactylus brooki</i>	Widespread	Common	II (Part II)
7.	Black Krait	<i>Bungarus niger</i>	Common	Scarce	II (Part II)
8.	Banded Krait	<i>Bungarus fasciatus</i>	Common	Scarce	II (Part II)
9.	Pit Viper	<i>Trimeresurus albolabris</i>	Common	common	II (Part II)

Avifauna

Bird survey was conducted on the same transects and trails marked for mammal's survey. The whole sampling was carried out in fixed width trails of 2-3 km wherever the terrain permits and point counts were carried out at a fixed distance at more or less at regular intervals. A prismatic field binocular (10X50) was used for the bird watching during transect walk mostly during morning and evening hours at nearby habitations as well as near to water bodies in the study area. An on-spot identification of birds has been carried out with the help of pictorial guides/literature published by Grimmett et al. (2011). A list of local, resident, migrant and

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

vagrant birds of the catchment area of the Umngot River is given in Table 3.22. The list shows none of species belong to the Schedule I category of the IWPA, 1972.

Table 3.22: List of avifauna recorded from the study area

S. No.	Common name	Scientific Name	Order	Residential status	IWPA, 1972 Schedule
1.	Assam Bamboo Partridge	<i>Bambusicola fytchii</i>	Galiformes	Local migrant	IV
2.	Assam Black Partridge	<i>Francolinus</i>	Galiformes	Local migrant	IV
3.	Black winged kite	<i>Elanus caeruleus</i>	Falconiformes	Local migrant	IV
4.	Cattle Egret	<i>Bubulcus ibis</i>	Ciconiformes	Local migrant	IV
5.	Common Teal	<i>Anas crecca</i>	Ciconiformes	Local migrant	IV
6.	Coot	<i>Fulica atra</i>	Gruciformes	Resident	IV
7.	Eastern Grey Goose	<i>Anser</i>	Ciconiformes	Migratory	IV
8.	Eastern Grey Heron	<i>Ardea cinerea</i>	Ciconiformes	Local migrant	IV
9.	Eastern Purple Heron	<i>Ardea purpurea</i>	Ciconiformes	Local migrant	IV
10.	Great egret	<i>Ardea alba</i>	Ciconiformes	Local migrant	IV
11.	Indian Moorhen	<i>Gallinula chloropus</i>	Gruciformes	Local migrant	IV
12.	Khalij Pheasant	<i>Polyplectron bicalcaratum</i>	Galiformes	Local migrant	IV
13.	Large cormorant	<i>Phalacrocorax carbo sinensis</i>	Felicaniformis	Local migrant	IV
14.	Large Indian Kite	<i>Milvus migrans</i>	Falconiformes	Local migrant	IV
15.	Lesser whistling Teal	<i>Anas javanica</i>	Ciconiformes	Local migrant	IV
16.	Little Bustard Quail	<i>Turnix sylvatica</i>	Gruciformes	Local migrant	IV
17.	Little cormorant	<i>Phalacrocorax niger</i>	Felicaniformis	Local migrant	IV
18.	Little grebe	<i>Podiceps rufficollis</i>	Podicipediformis	Migratory	IV
19.	Little green Heron	<i>Ardea striatus</i>	Ciconiformes	Local migrant	IV
20.	Night Heron	<i>Nycticorax nycticorax</i>	Ciconiformes	Local migrant	IV
21.	Paintail	<i>Anas acuta</i>	Ciconiformes	Local migrant	IV
22.	Peacock Pheasant	<i>Polyplectron bicalcaratum</i>	Galiformes	Vulnerable	IV
23.	Smaller / median Egret	<i>Egretta intermedia</i>	Ciconiformes	Local migrant	IV



Project:- “Rusiar Limestone Mine”

Applicant:- Smt Seisoh Syiemlieh

Chapter – III–Description of Environment

24.	Pheasant tailed Jacana	<i>Hydrophasianus chirurgus</i>	Gruciformes	Resident	IV
25.	Red Wattled Lapwing	<i>Vanellus indicus</i>	Gruciformes	Resident	IV
26.	Eastern golden Plover	<i>Pluvialis dominica</i>	Gruciformes	Resident	IV
27.	Eastern Little Ringed Plover	<i>Charadrius dubius curonicus</i>	Gruciformes	Resident	IV
28.	Spotted Sandpiper	<i>Tringa glareola</i>	Gruciformes	Resident	IV
29.	Common sandpiper	<i>Tringa hypoleucos</i>	Gruciformes	Resident	IV
30.	Fantail Snipe	<i>Gallinago gallinago</i>	Gruciformes	Local migrant	IV
31.	Woodcock	<i>Scolopax rusticola</i>	Gruciformes	Resident	IV
32.	Painted snipe	<i>Rostratula benghalensis</i>	Gruciformes	Local migrant	IV
33.	Wedge tailed Pigeon	<i>Treron spenura</i>	Columbiformes	Resident	IV
34.	Bengal green Pigeon	<i>Treron phoenocoptera</i>	Columbiformes	Resident	IV
35.	Indian Blue rock Pigeon	<i>Columba livia</i>	Columbiformes	Resident	IV
36.	Indian Ring Dove	<i>Streptopelia decaocto</i>	Columbiformes	Resident	IV
37.	Indian spotted dove	<i>Streptopelia chinensis</i>	Columbiformes	Resident	IV
38.	Northern Ring nosed Parakeet	<i>Psittacula krameri</i>	Psittaciformes	Resident	IV
39.	Northern blossom headed Parakeet	<i>Psittacula cyanocephala</i>	Psittaciformes	Resident	IV
40.	Indian Lorikeet	<i>Loriculus vernalis</i>	Psittaciformes	Resident	IV
41.	Red winged crested Cuckoo	<i>Clamator coromandus</i>	Cuculiformes	Local migrant	IV
42.	Common Hawk Cuckoo	<i>Cuculus varius</i>	Cuculiformes	Local migrant	IV
43.	Indian Cuckoo	<i>Cuculus micropterus</i>	Cuculiformes	Local migrant	IV
44.	Khasi Hills Cuckoo	<i>Cuculus canorus</i>	Cuculiformes	Resident	IV
45.	Indian Koel	<i>Eudynamis scolopacea</i>	Cuculiformes	Local migrant	IV



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

46.	Grass Owl	<i>Tyto capensis</i>	Strigiformes	Local migrant	IV
47.	Eastern Palm Swift	<i>Cypsiurus parvus</i>	Apodiformes	Local migrant	IV
48.	Indian Pied Kingfisher	<i>Ceryle rudis</i>	Coraciiformes	Local migrant	IV
49.	Assam Blue - eared Kingfisher	<i>Alcedo meninting</i>	Coraciiformes	Local migrant	IV
50.	Eastern White breasted Kingfisher	<i>Halcyon smyrnensis</i>	Coraciiformes	Local migrant	IV
51.	Burmese Roller	<i>Coracias bengalensis</i>	Coraciiformes	Local migrant	IV
52.	Assam Great Barbet	<i>Megalaima virens</i>	Piciformes	Local migrant	IV
53.	Blue throated Barbet	<i>Megalaima asiatica</i>	Piciformes	Local migrant	IV
54.	Eastern Rufus Woodpecker	<i>Micropternus brachyurus</i>	Piciformes	Local migrant	IV
55.	Black necked green Woodpecker	<i>Picus canus</i>	Piciformes	Local migrant	IV
56.	Pole headed Woodpecker	<i>Gecinulus grantia</i>	Piciformes	Local migrant	IV
57.	Green breasted Pitta	<i>Pitta sordida</i>	Piciformes	Resident	IV
58.	Black necked Oriole	<i>Oriolus xanthornus</i>	Piciformes	Resident	IV
59.	North Indian Black Drongo	<i>Dicrurus adsimillilis</i>	Piciformes	Local migrant	IV
60.	Assam Grey Drongo	<i>Dicrus leucophaeus</i>	Piciformes	Resident	IV
61.	Grey headed Myna	<i>Sturnus malabaricus</i>	Piciformes	Resident	IV
62.	Indian Pied Myna	<i>Sturnus contra</i>	Piciformes	Resident	IV
63.	Hill Myna	<i>Gracula religiosa</i>	Piciformes	Resident	IV
64.	Indian House Crow	<i>Corvus splendens</i>	Piciformes	Resident	V
65.	Eastern Jungle Crow	<i>Corvus macrorhynchos</i>	Piciformes	Resident	IV
66.	Indian wood Shrike	<i>Tephrodornis pondicerianus</i>	Piciformes	Local migrant	IV
67.	Small Grey	<i>Coracina</i>	Piciformes	Local migrant	IV
68.	Cuckoo Shrike	<i>melaschistos</i>			
69.	Finch billed Bulbul	<i>Spizixos canifrons</i>	Piciformes	Resident	IV
70.	Black headed Bulbul	<i>Pycnonotus atriceps</i>	Piciformes	Resident	IV
71.	Striated green Bulbul	<i>Pycnonotus striatus</i>	Piciformes	Resident	IV



72.	White throated Bulbul	<i>Criniger flaveolus</i>	Piciformes	Resident	IV
73.	Assam brown Babbler	<i>Pellorneum albiventris</i>	Piciformes	Resident	IV
74.	Long tailed Wren Babbler	<i>Spelaornis longicaudatus</i>	Piciformes	Local migrant	IV
75.	Red headed Babbler	<i>Stachrys chrysaea</i>	Piciformes	Local migrant	IV
76.	Yellow breasted Babbler	<i>Macronous gularis</i>	Piciformes	Local migrant	IV
77.	Red capped Babbler	<i>Tamalia pileata</i>	Piciformes	Local migrant	IV
78.	Assam orange Parrot bill	<i>Paradoxornis nipalensis</i>	Piciformes	Local migrant	IV
79.	Assam red headed Parrot bill	<i>Paradoxornis ruficeps</i>	Piciformes	Local migrant	IV

Butterfly/ Moth

The butterflies are beautiful day flying insects of order Lepidoptera which make excellent subject for natural history observation as they can be reared at home and can be easily observed for various stages of the development of organisms. Earlier butterflies classified into smaller families and India alone had 9 families. However, many of the older families are now merged into the family Nymphalidae and finally only 5 families maintaining across the world and all of which are represented in India. During the primary surveys for three seasons, a total of 14 species of butterfly were encountered from the study area. Blue Pansy, Common Marmon, Indian Cabbage White, Plain Tiger, Long-tailed Blue and Common Emigrant are most frequent species recorded from study area. No moth species has been recorded in primary survey (Table 3.23).

Table 3.23: List of Butterfly fauna recorded/compiled from the study area

S. No.	Scientific name	Family	Common Name	Status as per IWPA, 1972
1.	<i>Priniceps polyctor</i>	Papilionidae	Blue Peacock	-
2.	<i>Priceps Helenus</i>	Papilionidae	Red Helen	-
3.	<i>Priniceps castor</i>	Papilionidae	Common Ravan	-
4.	<i>Graphium sarpedon</i>	Papilionidae	Common Bluebottle	-
5.	<i>Graphium</i>	Papilionidae	Tailed Jay	-
6.	<i>Eurema hecabe</i>	Pieridae	Common Grass Yellow	-



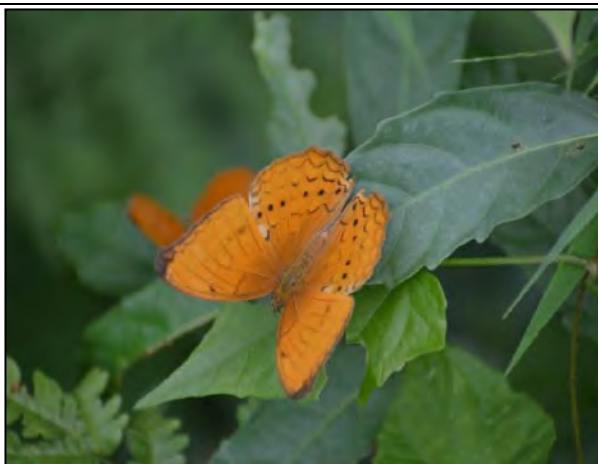
Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

7.	<i>Eurema blanda</i>	Pieridae	Three Spot Grass Yellow	-
8.	<i>Catopsilia Pomona</i>	Pieridae	Common Emigrant	-
9.	<i>Catopsilia pyranthe</i>	Pieridae	Mottled Emigrant	-
10.	<i>Hebomoia glaucippe</i>	Pieridae	Great Orange Tip	
11.	<i>Appias libythea</i>	Pieridae	Striped Albatross	IV
12.	<i>Appias lyncida</i>	Pieridae	Chocolate Albatross	II
13.	<i>Cepora nadina</i>	Pieridae	Lesser Gull	II
14.	<i>Pieris canidia</i>	Pieridae	Indian Cabbage White	-
15.	<i>Delias spasithoe</i>	Pieridae	Red-Base Jezebel	-
16.	<i>Jamides celeno</i>	Lycaenidae	Common Cerulean	II
17.	<i>Zizeeria karsandra</i>	Lycaenidae	Dark Grass Blue	-
18.	<i>Pseudozizeeria maha</i>	Lycaenidae	Pale Grass Blue	-
19.	<i>Zizina Otis</i>	Lycaenidae	Lesser Grass Blue	-
20.	<i>Chilades lajus</i>	Lycaenidae	Lime Blue	-
21.	<i>Zemeros flegyas</i>	Lycaenidae	Punchinello	-
22.	<i>Neptis soma</i>	Nymphalidae	Sullied Sailer	II
23.	<i>Neptis hylas</i>	Nymphalidae	Common Sailer	-
24.	<i>Euploea aglae</i>	Nymphalidae	Common Crow	-
25.	<i>Mycalesis mineus</i>	Nymphalidae	Dark-Brand Bushbrown	-
26.	<i>Ypthima huebner</i>	Nymphalidae	Common Fourring	-
27.	<i>Pelopidas mathias</i>	Hesperiidae	Small Branded Swift	-
28.	<i>Junonia almana</i>	Nymphalidae	Peacock Pansy	-





Glossy Tiger



Large Yeoman



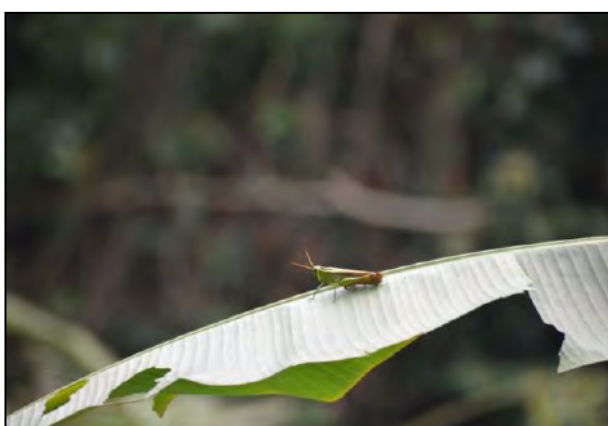
Pupa



Nephila Pilipes



Cicadas



Grasshopper

Figure 3.18: Butterfly fauna from the study area



Aquatic Ecology:-

An in-depth aquatic ecological study was carried out in the project area for three seasons as per the ToR provided by MoEF. Primary data on various components of aquatic biodiversity were collected through intensive field survey of the study area, aquatic sampling and consultation with local communities. Review of secondary data was also made for confirming the primary data. Secondary data review has been carried out by using published research papers/literatures.

Sampling Rationale for Aquatic Biodiversity: In order to understand aquatic ecosystem of river line running in project area, biological components which constitute the structure of an ecosystem, the major communities found in the stream; the bottom dwelling benthos were sampled. Since the benthic diatoms (a group of algae with silica walls) are abundant in the mountain streams, they were opted to represent the auto-trophs. In case of the hetero-trophs, the benthic macro-invertebrates with high indicator value were considered suitable. Fish is also an important part of the aquatic ecosystem for the same functions. It is a cheap source of high-quality animal protein and hence as nutritional food for the mountain communities and therefore is an integral part of their daily life. A qualitative study of these indicator groups provides the knowledge of aquatic flora and fauna while quantitative studies help to understand the community features such as taxonomic composition of species, abundances and assemblages which vary with the physical and chemical attributes of the ecosystem. The sampling was carried out during winter, summer and Monsoon seasons as per ToR provided by the MoEF. A total of 4 biological parameters were studied which are as follows:

Sampling for Plankton Communities (Phytoplankton and Zooplankton):

Plankton is sampled by sieving 100 liters of water through plankton net mesh size (25 μ). The sieved sample is preserved in 4% formalin for microscopic study. Density is computed by performing counts in S-R Cell according to Welch (1948). Identifications are performed with the help of standard keys (Edmondson 1959; Prasad & Mishra 1992, Krammer and Lange-Bertalot 1999; 2004; Lange Bertalot 2001, Jaiswal & Tiwari 2003).

Zoobenthos (Benthic Invertebrates):

The macro-invertebrate fauna is sampled by carefully lifting small boulders, cobbles and pebbles from the marked area (1 ft²) and washing in a bucket full of water by dipping number of times to dislodge the attached fauna. Soft substratum in the form of clay and silt is sampled with Ekman dredge. The sediments are sieved to obtain the fauna. Samples are preserved




Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

in 5% formalin for laboratory analysis. Macro-invertebrate samples are identified to family and class level with the help of standard keys (Edmondson 1959; Edington & Hildrew 1995). Nekton (Fish): Fish samples are collected by experimental fishing through cast net and gill net and local markets/shops. The samples are preserved in 10% formalin for species identification with the help of standard keys (Day 1958; Talwar & Jhingran 1991; Jayaram 2002). Fish samples are used for determining the food habits and the environmental resource base.

Table 3.24: Distribution of Phytoplankton taxa in pond and river habitats

S. No.	Taxa
Cyanophyceae- Blue green algae	
1	<i>Oscillatoria sp.</i>
2	<i>Microcystis sp.</i>
3	<i>Leptolyngbya sp.</i>
4	<i>Anacystis sp.</i>
5	<i>Microcystis sp.</i>
6	<i>Anabaena spiroides</i>
Chlorophyceae- Green Algae	
7	<i>Ankistrodesmus falcatus</i>
8	<i>Closterium acutum</i>
9	<i>Cosmarium spp</i>
10	<i>Characium sp</i>
11	<i>Hyalotheca sp</i>
12	<i>Oedogonium sp.</i>
13	<i>Scenedesmus dimorphus</i>
14	<i>Cladophora sp.</i>
15	<i>Ulothrix sp.</i>
16	<i>Zygnema sp.</i>
17	<i>Spirogyra sp.</i>
18	<i>Chlorella sp.</i>
Euglenophyceae /Flagillates	
19	<i>Euglena vedinas</i>
20	<i>Chlamydomonas sp</i>
Bacillariophyceae-Diatoms	

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_ 779/ 2024-25/ DEIA/109	Rev No. 00

21	<i>Achnantheidium spp</i>
22	<i>Navicula spp</i>
23	<i>Synedra spp</i>
24	<i>Fragillaria spp</i>
25	<i>Nitzeschia spp</i>
26	<i>Cymbella spp</i>
27	<i>Gomphonema spp</i>
28	<i>Hantzschia amphioxys</i>
29	<i>Craticula sp</i>
30	<i>Denticula kutzing</i>
31	<i>Diatoma vulgare</i>

Zooplankton

Rotifers and cladocera larvae were chief component of zooplanktonic communities that serves as fish food. The taxa observed at different sites of Umngot river were *Rotaria sp*, *Brachionus spp*, *Fillinia sp.*, *Keratella sp.* (Rotifers) and *Bosmina sp.* (Cladocera). In case of zooplankton, a total 25 taxa were observed in all the three stations. Out of these 25 taxa, 5 taxa belong to class Protozoa, 9 belong to class Rotifera, 3 belongs to Copepoda, 6 belongs to Cladocerans and 2 from. Ostracos. Rotifera was most abundant group. Distribution of zooplanktons in Umngot river at different location is presented in table 3.25.

Table 3.25: Distribution of Zooplankton taxa in pond and river habitats

S. No.	Taxa
Protozoa	
1	Arcella discoida
2	Ceratium sp.
3	Paramecium sp.
4	Vorticella sp.
5	Didinium sp
Rotifera	
6	Asplanchnopus brightwelli
7	Brachionus sp.
8	B. rubens, B. bidens



9	B. caudatus
10	Filinia longiseta
11	Keratella tropica
12	Monostylla bulla
13	Trichocera longiseta
14	Rotaria sp
Copepoda	
15	Cyclops leuckarti
16	Diaptomus sp.
17	Mesocyclops hyalinus
Cladocera	
18	Daphnia corinata
19	Daphnia pulex
20	Daphnia circinate
21	Moina branchiate
22	Alona macrocopa
23	Bosmina loniotris
Ostracods	
24	Heterocypris sp
25	Cypris sp

Macro-Invertebrates

In riverine ecology and wetland ecosystem, benthic invertebrate fauna provides a crucial link between the primary producers (aquatic plants and algae) and the higher consumers (fish, birds, amphibians). As a food for higher consumers, they are particularly important as a source of protein. Birds require high protein levels during breeding and moulting, and duckling survival has been shown to increase with invertebrate abundance (Scheffer, 1998). Macro invertebrates are widely used as indicators of short- and long-term environmental changes in both lentic and lotic systems. They provide both a facility for examining temporal changes and integrating the effects of prolonged exposure to intermittent discharges or variable concentrations of pollutants (Hellawell, 1986). Thus, it is promising to characterize the changes occurring in these macro invertebrate communities to assess target ecosystems exposed to environmental disturbance. Macro-invertebrate's fauna comprises of 16 species belonging to order Ephemeroptera, Diptera, Odonata and Hemiptera (Table 3.26). The lower



density and diversity of macro-invertebrates can be attributed to the high-water velocity and lesser number of riffle-pool habitats. Species richness, density and species composition of macro- invertebrates are largely used as indicators of the water quality. Though, low richness and density of macro-invertebrate in Umngot River is due to washing out due to monsoonal rains and its naturally happening.

Table 3.26: Macrobenthos Invertebrate fauna in the Study Area

S. No.	Species
Ephemeroptera	
1	Ephemera nadinac
2	Ephemera sp
3	Ephemerella indica
4	Baetis simplex
5	Baetis festivus
6	Caenis latipennis
7	Epeorus gilliesi
8	Cinygmula sp.
9	Orthetrum sp
10	Chironomus sp
Odonata	
11	Orthetrum sp
Diptera	
12	Chironomus sp
13	Simulium sp
Hemiptera	
14	Aphids, Bugs, Necton & misquotes larvae:
	Anisops sp, Gyrimus sp
Molluscan	
15	Indian river Crab, keakura
16	Shrimps

Nektons (Fish community)

A total of 16 fish species from 7 families were reported from Umngot River from all primary as well as secondary sources. Considering the number of fishes in Umngot River and adjacent area, it can be concluded that the area is not rich ichthyofaunal diversity. The low



fish diversity in this area can be attributed to the nature of river and land use/land cover in the catchment and habitat structure including river morphology. It is observed that 50% of the fish species collected belonged to the family Cyprinidae. This perhaps may be due to the fact that fishes which are highly adaptable in the hill streams belong to the family Cyprinidae more than any other family. Genus like Garra, Psilorhynchus, Labeo, Cyprinus are inhabitants of hill streams. During the primary survey a total of 6 species were observed from the influence area of project. List of fish species reported/ observed in the study area are listed in table 3.27.

Table 3.27: Fish Species Composition in Study Area (Umngot River)

S. No.	Family	Fish Species	Local Name (Khasi)	IUCN status
1.	Bagridae	<i>Mystus cavasius</i>	Kha Kot / Kha Tyngkra	LC
2.	Balitoridae	<i>Balitora brucei</i>		VU
3.	Belonidae	<i>Xenentodon cancila</i>	Chowkli	VU
4.	Chacidae	<i>Chaca chaca</i>	Gajeb-bakau	NT
5.	Chandidae	<i>Chanda nama</i>	Kha Snad	
6.	Cyprinidae	<i>Chela laubuca</i>		LC
7.	Cyprinidae	<i>Cirrhinus reba</i>	Kha mirka	LC
8.	Cyprinidae	<i>Garra gotyla</i>	Doh Jei	VU
9.	Cyprinidae	<i>Garra lamta</i>	Doh Jei	LC
10.	Cyprinidae	<i>Labeo boga</i>	Kha bah	LC
11.	Cyprinidae	<i>Labeo calbasu</i>	Kha long	LC
12.	Cyprinidae	<i>Labeo gonius</i>	Kha ski	LC
13.	Cyprinidae	<i>Labeo pangusia</i>	Kha baw	NT
14.	Cyprinidae	<i>Puntius chola</i>	Shalynni	LC
15.	Mastacembelidae	<i>Macrognathus aral</i>	Kha Baien	LC
16.	Siluridae	<i>O. pabo</i>	Kha Babia	VU

Cropping and Irrigation Practices in the Study Area

As per Agro-Climate Zone (NARP), the district has been categorized as Sub-Tropical Hill Zone (NEH-5) and is covered under Eastern Himalayan Region (II) as per agro-climate zone (Planning Commission). Major crops grown are Rice, Maize, Pea, Cow pea, Soya bean, sesamum and Mustard. Fruits grown in the area are Khasi Mandrin, Assam Lemon, Pine Apple, Banana and Papaya. The prominent vegetables grown are Potato, Sweet potato, Tapicoa, Cabbage, Cucumber, Carrot, Onion and Pumpkin. Some spices crop like Ginger,



Turmeric and Chilies are also grown. Irrigation has so far played only a minimal role in the agricultural development of the district. The topography of the district makes alignment and construction of channels difficult and costly. Even where the lay of the land is favorable, irrigation is confined only to areas bordering major rivers and streams. The cultivators, therefore, have to depend on rainfalls to irrigate their land which seldom fail them. The study area covering Mawkynrew and Mawryngkneng blocks is a mountainous terrain with Quartzite (Shillong group) forms the main aquifer of the area, development of tube well is not lucrative for practicing irrigation. The people have to depend upon rainfed crops.

3.9.5 CONCLUSION

During the biodiversity assessment and concern with local stakeholder revealed that the project study area does not fall in migration route of migratory Birds. The study area does not form part of any National park, Wild life Sanctuary, and ecological sensitive area. On the other hand none of significant fauna present in core zone project area and no habitation of significant wild life in core zone of project. All the floral and faunal species reported from the core zone are common and widely distributed in the buffer zone also. So, it can be stated that the project and associated activities are unlikely to influence any floral and faunal components significantly provided that the suggestions / recommendations in this report are implemented. Strict implementations of EMP / mitigation measures are required to ensure that the biodiversity of the study area should not be impacted negatively.



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

3.10 SOCIO-ECONOMIC ENVIRONMENT

Analyzing the current socio-economic and cultural environment of a community requires up-to-date social and economic data to assess the impact of any developmental actions or projects on the local context. The present status of the social and economic conditions in a given area is referred to as the Baseline Socio-economic Status. Baseline data consists of essential information collected prior to the implementation of a project or scheme.

3.10.1 Methodology


The methodology used for the socio-economic impact assessment is outlined as follows:

- Detailed demographic information for the study area was gathered from secondary sources, including the Census of India, and subsequently analyzed.
- Primary data was collected at both village and ward levels in urban areas through structured questionnaires and interactions with various stakeholders involved in the project. This data was then analyzed to assess the prevailing socio-economic profile of the community.
- Using the information obtained from both primary and secondary sources, the potential impacts of the proposed project activities on the community were evaluated, and recommendations for further improvement were provided.

3.10.2 Strategy to Achieve Social Development Outcomes

Identify the likely social development outcomes of the project and propose a social development strategy, including recommendations for institutional arrangements to achieve them, based on the findings of the social assessment. The social development strategy could include measures that:

- ❖ Strengthen social inclusion by ensuring inclusion of both poor and excluded groups as well as then intended beneficiaries in the benefit stream, offer access to opportunities created by the project
- ❖ Empower stakeholders through their participation in design and implementation of the project, their access to information, and their increased voice and accountability (i.e. A participation framework); and
- ❖ Enhance security by minimizing and managing likely social risks and increasing the resilience of intended beneficiaries and affected persons to socioeconomic shocks.

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00


Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

3.10.3 Study Area and their Demographic Details

The study area comprises the project area and the area coming within 10.0 km radius of the project boundaries. It is spread over the administrative boundaries of 5 tehsils namely – Pynursla, Shella Bholaganj, Myllem, Mawphlang and Khatarshnong Laitkroh. The study area includes 35 villages. The list of villages falling in the study area is shown in Table 3.28:

Table 3.28: List of Villages


S. No.	Tehsil	Villages & distance from the project		
		0-2 km	2-5 km	5-10 km
1	Shella Bholaganj	Lailad	Bholaganj (Majai)	Dhorom
2		Shnongkawar	Byrong	Diengrai
3		Tyllap	Chaklabasti	Jalba
4		Umdud	Dhorombasti	Jatap
5		Umsaw	Diengkain	Kalatek
6		Wahjain	Diengsiar Mawlong	Kalibari
7			Khahumrin	Khahmohi
8			Kurikhal	Khliehumlang
9			Lad Sohbar	Lad Ryngud
10			Laitiam	Laitkynsew
11			Laittyra	Lubia
12			Lyngngar	Lum-U-Smon
13			Mawbang	Mawblang
14			Nayabasti	Mawlatang
15			Nongduh	Mawlong
16			Old Kamorah	Mawmluh
17			Ri-ngur	Mawshamok
18			Ryngud	Mawsiangei
19			Sohbar	Mawsmai
20			Thangkharang	Mustoh
21			Tharia	Nongriat
22			Umwai	Nongwar
23				Rangkamati
24				Saikarap
25				Siej
26				Sohkhmie
27				Sohlap
28				Suktia Inc. Diengsiar
29				Tyrna
30				Tyrngei
31				Umdohmawpud
32				Umtaru
33	Pynursla		Mawpathaw	Nongjri Bah

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

34				Nongjri Tluh
35				Nongjri War
36				Rana
37				Tishang

**Source: Census of India, 2011*

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

Table 3.29: Demographic details

S. No	Village	Population			Literacy		Illiterates		ST Total		SC Total		Total Workers	Main Workers	Marg Workers	Non-Work
		Male	Female	0-6 total	Male	Female	Male	Female	Male	Female	Male	Female				
1	Lailad	63	48	29	27	20	36	28	51	38	0	0	30	27	3	81
2	Shnongkawar	88	92	41	36	56	52	36	87	92	0	0	60	60	0	120
3	Tyllap	122	108	52	45	32	77	76	80	79	17	9	79	26	53	151
4	Umdud	78	72	35	49	46	29	26	73	65	0	0	51	38	13	99
5	Umsaw	339	308	160	139	86	200	222	316	306	0	0	332	187	145	315
6	Wahjain	3	0	0	3	0	0	0	3	0	0	0	3	3	0	0
7	Bholaganj (Majai)	620	605	238	357	286	263	319	79	89	0	0	370	364	6	855
8	Byrong	156	143	66	98	100	58	43	155	143	0	0	148	147	1	151
9	Chaklabasti	134	128	52	78	58	56	70	0	0	0	0	81	50	31	181
10	Dhorombasti	353	326	113	117	110	236	216	32	26	0	0	188	122	66	491
11	Diengkain	51	50	22	18	11	33	39	30	34	0	0	27	13	14	74
12	Diengsiar Mawlong	367	441	146	291	341	76	100	363	437	0	0	279	242	37	529
13	Khahumrin	433	391	210	66	45	367	346	320	286	0	0	248	245	3	576
14	Kurikhal	89	69	30	40	25	49	44	9	4	0	0	44	41	3	114
15	Lad Sohbar	83	63	27	47	46	36	17	83	63	0	0	62	55	7	84
16	Laitiam	329	312	104	165	193	164	119	327	312	0	0	222	221	1	419
17	Laittyra	222	217	56	172	174	50	43	220	210	0	6	181	92	89	258
18	Lyngngar	36	36	10	16	23	20	13	36	36	0	0	24	24	0	48
19	Mawbang	247	236	106	113	83	134	153	52	59	131	131	159	20	139	324
20	Nayabasti	365	315	103	183	120	182	195	199	159	0	0	210	148	62	470
21	Nongduh	208	216	60	174	177	34	39	207	216	0	0	154	152	2	270
22	Old Kamorah	1	4	3	1	0	0	4	1	4	0	0	1	1	0	4
23	Ri-ngur	62	72	28	43	50	19	22	62	71	0	0	52	52	0	82
24	Ryngud	339	291	129	173	176	166	115	338	287	0	0	232	228	4	398



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

25	Sohbar	532	540	182	284	301	248	239	529	531	0	0	406	400	6	666
26	Thangkharang	77	61	15	60	49	17	12	77	61	0	0	61	28	33	77
27	Tharia	96	49	26	61	23	35	26	66	41	1	2	67	59	8	78
28	Umwai	285	261	96	223	204	62	57	283	261	0	0	246	216	30	300
29	Mawpathaw	22	20	12	8	6	14	14	15	13	0	0	17	17	0	25
30	Dhorom	350	331	122	230	188	120	143	98	91	0	0	217	160	57	464
31	Diengrai	242	206	118	106	56	136	150	190	180	4	2	138	23	115	310
32	Jalba	2	0	0	1	0	1	0	2	0	0	0	2	2	0	0
33	Jatap	90	93	34	71	77	19	16	85	88	4	4	68	67	1	115
34	Kalatek	899	870	383	351	258	548	612	16	11	512	510	675	358	317	1094
35	Kalibari	357	317	139	208	147	149	170	0	0	205	191	177	71	106	497
36	Khahmohi	193	200	106	68	33	125	167	99	99	50	56	129	127	2	264
37	Khliehumlang	28	30	12	11	23	17	7	28	30	0	0	23	23	0	35
38	Lad Ryngud	53	51	21	29	22	24	29	53	51	0	0	33	33	0	71
39	Laitkynsew	244	230	72	203	189	41	41	232	229	0	0	198	158	40	276
40	Lubia	104	104	53	48	34	56	70	0	0	86	88	56	32	24	152
41	Lum-U-Smon	61	40	28	40	25	21	15	55	37	0	0	32	32	0	69
42	Mawblang	140	142	44	106	104	34	38	138	140	0	0	76	65	11	206
43	Mawlatang	131	134	60	25	25	106	109	131	133	0	0	157	2	155	108
44	Mawlong	383	338	161	215	171	168	167	256	230	1	1	228	221	7	493
45	Mawmluh	544	608	163	448	497	96	111	498	582	0	0	379	351	28	773
46	Mawshamok	87	96	26	76	77	11	19	86	95	0	0	76	74	2	107
47	Mawsiangei	166	150	72	81	87	85	63	166	150	0	0	124	55	69	192
48	Mawsmmai	230	245	85	175	175	55	70	226	245	0	0	147	131	16	328
49	Mustoh	236	215	83	194	166	42	49	234	213	0	0	170	152	18	281
50	Nongriat	73	63	29	55	45	18	18	73	63	0	0	49	48	1	87
51	Nongwar	266	296	83	223	249	43	47	266	295	0	0	184	140	44	378
52	Rangkamati	48	44	25	28	12	20	32	41	39	2	4	29	12	17	63
53	Saikarap	148	114	57	113	80	35	34	133	114	0	0	152	148	4	110



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

54	Siej	14	9	5	12	5	2	4	11	8	0	0	10	10	0	13
55	Sohkhmie	142	125	43	116	102	26	23	142	125	0	0	125	121	4	142
56	Sohlap	225	190	78	152	109	73	81	190	187	7	0	156	155	1	259
57	Suktia Inc. Diengsiar	265	257	113	153	139	112	118	263	253	0	0	213	194	19	309
58	Tyrna	382	360	135	300	285	82	75	378	356	0	0	245	241	4	497
59	Tyrngei	93	78	33	3	2	90	76	93	77	0	0	95	5	90	76
60	Umdohmawpud	127	139	56	90	81	37	58	123	136	3	2	83	80	3	183
61	Umtaru	419	382	145	178	96	241	286	309	294	3	2	242	231	11	559
62	Nongjri Bah	287	309	102	207	231	80	78	286	306	0	0	231	225	6	365
63	Nongjri Tluh	524	577	212	349	394	175	183	523	575	0	0	495	457	38	606
64	Nongjri War	338	342	153	216	209	122	133	335	340	1	0	308	299	9	372
65	Rana	75	66	31	47	39	28	27	74	66	0	0	49	49	0	92
66	Tishang	119	61	26	95	17	24	44	40	46	1	0	117	117	0	63
Total		13885	13286	5259	8110	7290	5775	5996	9966	9807	1028	1008	9922	7947	1975	17249

**Source: Census of India, District Handbook 2011*



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

3.10.3.1 Population within the Study Area

In the study area, there are 5311 households with an average household size of 5 members in a family. Out of the total households, 5.46 % falling within 0-2 km, 36.75% within 2-5 km and remaining 57.79 % households within 5-10 km.

The total population falling in the study area is 27171, out of which 4.86% resides within 0-2 km, 36.63% within 2-5 km and 58.51% within 5-10 km radius. Out of the total population, 51.10% are males 48.90% are females. The overall sex ratio of the study area is 957 females over 1000 males. The child population belong to 0-6 age group comprises of 19.63% of total population of the study area. The sex ratio of 0-6 population is 950 girl children over 1000 boys of the same age group.

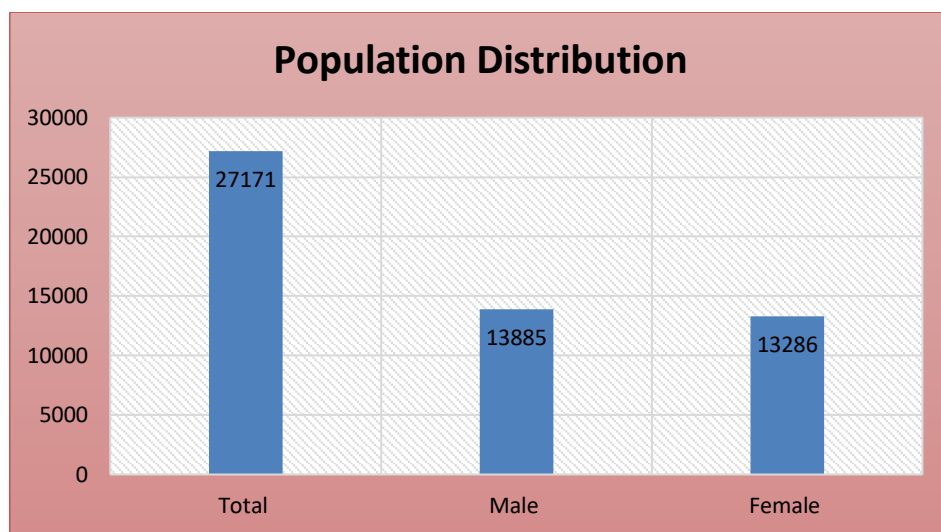


Figure 3.19 : Total Population within 10.0 km from Project Site

3.10.3.2 SOCIAL STRUCTURE

Schedule Caste Community: In the study area, 7.49% of total population belongs to Schedule Caste community. Out of which, 50.49% are males 49.51% are females, creating the sex ratio of 981 females per 1000 males in this community

Scheduled Tribe Community: In the study area, population belongs to Scheduled Tribe community is very high, just 72.77% of the total population. Out of the total ST population, 49.60% are males and remaining 50.40% are females, creating the sex ratio of 984 females over 1000 males among the ST community.



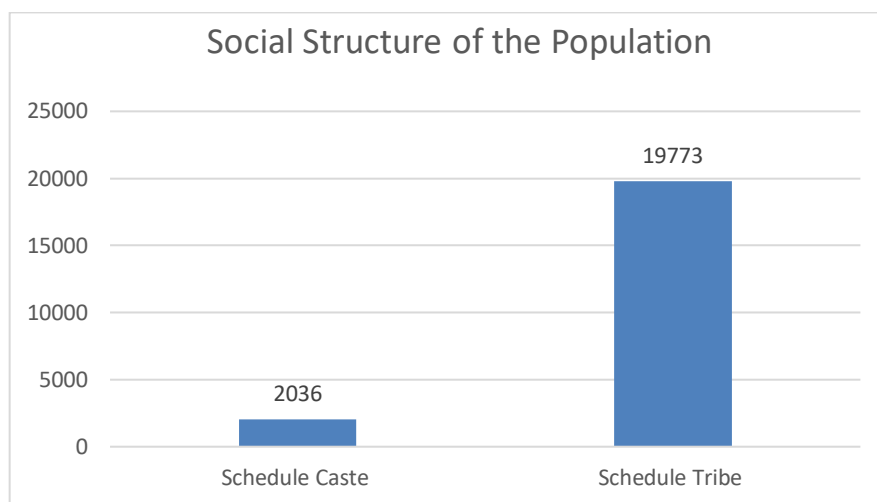


Figure 3.20: Schedule Caste & Schedule Tribe within 10.0 km of the study area

3.10.3.3 Literacy Status of the Study Area

In the study area, 56.68% of the total population is literate persons. Out of the total literates, 52.66% are male literates and 47.34% are female literates.

On the other hand, 43.32% of total population are illiterate, out of the total illiterate 49.06 % are males and 50.94% are females.

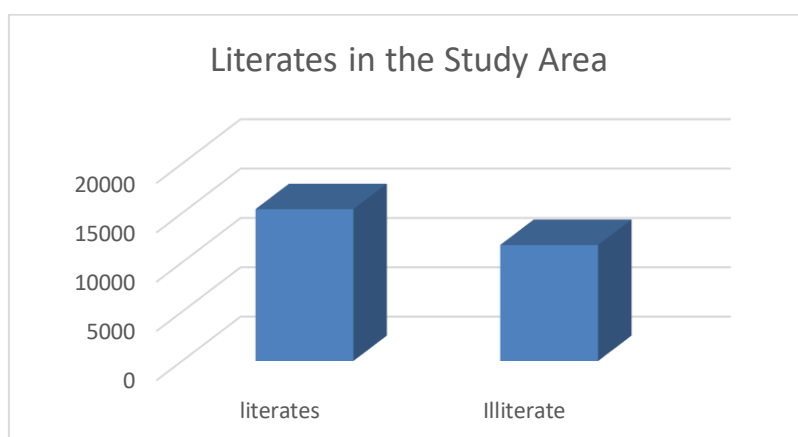


Figure 3.21: Males & Female Literacy Rate

3.10.3.4 Worker's Profile & Occupational Structure

The overall work participation in the study area is just 35.55% of the total population. Out of this, the male work participation is 68.98% and female work participation is 31.02%.

Out of the total workers, 85.62% are the main workers 14.38% are marginal workers.

Among all the work forces, males are mostly working in the nearby small industries, agriculture & allied activities, laborers, etc. However, women on the other hand work as marginal workers due to their occupancy in household and domestic chores. Apart from



the household works, most of the women work as marginal cultivators in their agricultural lands.



Figure 3.22: Work Participation of Males & Females in study area

3.10.4 PRIMARY SURVEY:

A. Methodology used for the Field Survey

In order to access and evaluate likely impacts arising out of any development projects on socio-economic environment, it is necessary to gauge the apprehensions of the people in the study areas.

B. Methodology applied for selection of sample & data collection

The methodology which is applied for primary source of data collection i.e. gathering data through field survey for socio-economic environment.

3.10.4.1 Non-Probability Random Sampling

A judgmental and purposive sampling method was used for choosing respondents of various sections of the society i.e. Local People, adult males and females, teachers, medical practitioners, businessmen, agricultural Labour, unemployed group etc. Judgmental and purposive sampling method includes the right cases from the total population that helps to fulfil the purpose of research needs.



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

3.10.4.2 Field Survey and Observations

Field survey and observations were made at each sampling ward area and the socio-economic status of that region was studied. Visits were made at nearby primary health centers to collect the requisite details of that region.

Areas of Observations	Description of Site Observations & Perception of Site Conditions & Problems	Remarks/Suggestions
Social set up	<ul style="list-style-type: none"> The social structure of East Khasi Hills and East Jaintia Hills presents a balanced blend of traditional tribal values and modern changes. Joint families, matrilineal property transfer, and socio-cultural structure of the local community are the unique identity of this region. New employment opportunities are also emerging due to increasing education and government involvement. Generally, a single kitchen is shared by the whole family, reflecting a community-oriented lifestyle. However, in some houses, there are two or more kitchens under the same roof. The property is usually passed on to the youngest daughter (Ka Khadduh). The daughter passes it on to her children, and men have limited rights in the property. After marriage, the man comes to live in the wife's house (matrilocal tradition). East Khasi Hills (Meghalaya) is mainly inhabited by tribal communities. Some members of the Scheduled Tribe (ST) community in East Jaintia Hills are engaged in both public and private sector employment. A noticeable number are employed as drivers, clerks, or in other supporting roles within government offices and private establishments. 	<ul style="list-style-type: none"> To bring about social reform through awareness campaigns to promote progressive ideas without compromising on cultural values.
Property Structure	<ul style="list-style-type: none"> People in this area live in concrete houses. These ashrams have a few rooms, a meeting or restaurant room, and an open courtyard. The houses here have modern amenities, such as cooling and heating systems, modern furniture, good kitchen and bathroom facilities, and often smart home technology. These houses also have better security, public transportation, and availability of many public services such as water, electricity, and internet. The roof of the house is often made of grass or bamboo, which is suitable for protection from rain. Some communities have community housing or joint housing for large joint families, in which several families live under the same roof. This practice is especially seen in the Khasi community, where property is owned by a woman due to the matriarchal society. 	<ul style="list-style-type: none"> Instead of traditional materials like bamboo and wood, the use of developed and sustainable materials like concrete and steel should be increased.
Education	<ul style="list-style-type: none"> Primary schools and some middle schools are located in many rural areas of East Khasi Hills, but senior 	<ul style="list-style-type: none"> Several awareness programs and



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

Areas of Observations	Description of Site Observations & Perception of Site Conditions & Problems	Remarks/Suggestions
	<p>secondary schools (classes 11-12) and higher education institutions are mostly in urban areas. As such, students have to travel to larger cities such as Shilling to receive education.</p> <ul style="list-style-type: none"> There is inequality in women's education in poor and tribal families of East Khasi Hills. Most women get busy in household chores after getting primary education. However, this situation is somewhat different due to the influence of matriarchal society, where the role of women is considered important in the family. Women often pursue education to fulfill household responsibilities and help with children's education. The number of women in higher education is relatively low. 	<p>initiatives are being carried out to promote female education.</p> <ul style="list-style-type: none"> Infrastructure of Govt schools should be improved. Women Education should be given more priority More girl schools with proper good teachers and infrastructure should be opened.
Health and Medical Facilities	<ul style="list-style-type: none"> Health Services Scientist: Some prominent individuals like former President or the Mountain have hired Health Services Scientist. While some Primary Health Centres (PHCs) and Health Sub-Centres (Sub-Centres) are located in rural areas, for the treatment of critical health care people often go to Shillong or the Health Department has set up medical colleges and speciality departments in the districts. 	<ul style="list-style-type: none"> Based on survey data, health centers should focus on areas where service delivery is lacking, such as increasing the number of medical professionals, updating medical equipment, or offering specialized services. Based on the survey data, health centers should focus on areas where service delivery is lacking, such as increasing the number of medical professionals, updating medical equipment, or providing specialized services. Qualified doctors are needed in the PHC-centers on daily/weekly basis.
Drinking water	<ul style="list-style-type: none"> <u>Natural water sources</u>: Most of the eastern East Khasi Hills are located in hilly and forest areas, where there is abundance of water resources. People here mainly get water from springs, rivers and natural water resources. In rural areas, there is more diversity on these water resources. <u>Rain Dependence</u>: Water supply in the district is often dependent on rainfall. Water availability is high during the monsoon, but water scarcity can occur during the summer season. Due to this, rainfall-based fluctuations in water availability are observed. 	<ul style="list-style-type: none"> More efforts to be made like large tanks or RWH pits and to arrest the Rain water and filtered it to be made fit for drinking. Water from underground water sources, such as hand pumps and tube wells, can often be



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

Areas of Observations	Description of Site Observations & Perception of Site Conditions & Problems	Remarks/Suggestions
		<p>contaminated with harmful chemicals such as arsenic, fluorine or sewage and agricultural runoff.</p> <ul style="list-style-type: none"> Quality of potable groundwater is needed to be checked. Treatment of the groundwater should be given importance. Rainwater harvesting systems should be promoted to reduce instability in water supply and address water scarcity during summer months.
Transportation	<ul style="list-style-type: none"> Public transport services in East Khasi Hills are mainly available in the form of buses and jeeps. These are mainly used to travel from urban areas and towns to rural areas. However, the number of buses is limited and many rural areas may lack public transport. Many people use personal vehicles such as cars, motorcycles, and bicycles. 	<ul style="list-style-type: none"> Rural transportation can be strengthened by planning better roads, affordable transport services and proper routes. Interior roads should be improved.
Electricity	<p>➤ Major problems related to electricity in rural areas -</p> <ul style="list-style-type: none"> ❖ Electricity supply is uneven in many villages. Power outages are common, and power supply is erratic during seasonal or peak times. ❖ Unstable power supply disrupts daily activities, including domestic work, education (especially for students), and business operations. In addition, problems also arise in hospitals, schools, and public services. ❖ Many rural areas suffer from low voltage and power fluctuations. This leads to poor power connectivity, causing dim lights and affecting the functionality of appliances. ❖ Due to high electricity rates, poor households are not able to afford electricity bills and often limit their use of electricity. This impacts living standards and affects economic activities. ❖ Solar energy has proven to be a sustainable and affordable option. Installing solar panels, solar power pumps, and solar lighting systems can be an effective way to provide electricity to remote villages. ❖ Solar energy can eliminate dependency on electricity supply in rural areas and can provide stable power supply even in government areas. 	<ul style="list-style-type: none"> Electricity facility available in all villages but the cases of frequent powercuts should be reported and taken care of with immediate effect so that it can be reduced. Measures such as solar energy, rural electrification, and energy efficiency can address power supply problems in rural areas, thereby improving living standards and boosting development in these areas.



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment

Areas of Observations	Description of Site Observations & Perception of Site Conditions & Problems	Remarks/Suggestions
Occupational Structure/Economic Condition	Occupational Structure: The occupational structure of East Khasi Hills is mainly based on agriculture, mining, exploitation of forest resources and to some extent local industries.	<ul style="list-style-type: none"> To make agricultural work more profitable, modern agricultural techniques and irrigation systems should be promoted.

3.11 Traffic study

Traffic study measurements were performed to assess impact on local transport infrastructure due to this mining project. Traffic study is carried out by understanding the existing carrying capacity of the road in the vicinity of site and flow towards PWD/NH/SH road in the area. Then depending on the capacity of the mine, the number of trucks that will be added to the present scenario will be compared to the carrying capacity as recommended by Indian Road Congress (IRC).

The mine site is connected to MDR 27, which is located 0.73 km to the east-southeast via a gravel road (Kachha Rasta). This road, in turn, links to SH 5, located 2.88 km to the north direction from the mine lease area. Traffic data was continuously collected over a 24-hour period through visual observation and vehicle counting, categorized into heavy motor vehicles, light motor vehicles, and two/three wheelers at SH 5. Due to high traffic volumes, two trained personnel were stationed at each observation point simultaneously, with one person assigned to each direction, ensuring continuous counting and recording of vehicle movements every hour.

The Level of Service (LOS) and the capacity of the roadway segments were computed according to the Indian Roads Congress (IRC) standards as outlined in the Guidelines for Capacity of Rural Roads in Hilly Areas, (IRC 64-1990). The following table presents the LOS standards adopted based on the volume-to-capacity (V/C) ratios at the intersections and their corresponding performance metrics.

Table 3.31: LOS Standards

V/C	LOS	Performance
0.0-0.2	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


	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Table 3.32: Existing PCU/Hour of SH-5

S. No.	Vehicles Distribution	No. of Vehicles Distribution/Day	Equivalent PCU Factor	PCU/Day	PCU/Hour
1.	Car	187	1	187	13.58
2.	Buses	26	3	78	4.25
3.	Trucks	79	3	237	19.25
4.	Two Wheelers	358	0.5	179	12.81
5.	Three Wheelers	22	1.5	33	2.69
6.	Tractors	22	1.5	33	3.63
	Total	694		747	31.125 or say ~ 32

Table 3.33: Existing Traffic Scenario

ROAD	V (Volume)		C (Capacity) <i>*As per IRC guidelines</i>		Existing V/C Ratio		LoS	
	PCU/Day	PCU/hr	PCU/Day	PCU/hr	PCU/Day	PCU/hr	PCU/Day	PCU/hr
SH-5	747	31.125	6000	250	0.1245	0.1245	A	

So, the existing Level of Service (LOS) at SH-5 is “A” i.e. Excellent.

Table 3.34: Incremental traffic after mining operation

Number of Working Days	300
Extraction and Transportation of Mineral per day	20.375 Tonnes
Working Hours	8 hours
Truck Capacity	20 Tonnes
Number of trucks required	$1.01875 = \sim 2$
No. of Trucks on road due to the mine (To & Fro)	2
No. of PCU deployed per day	6
No. of PCU deployed per Hour	0.25

Table 3.35: Incremental traffic Scenario in mining operation


Road	Increased PCU		V (Volume)		C (Capacity) <i>*As per IRC guidelines</i>		V/C Ratio		LoS	
	PCU/Day	PCU/hr	PCU/Day	PCU/hr	PCU/Day	PCU/hr	PCU/Day	PCU/hr	PCU/Day	PCU/hr
SH-5	6	0.25	747+ 6 = 753	$\frac{31.125}{8} + 0.25$ = 31.375	6000	250	0.0078	0.0078	A	



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – III–Description of Environment


3.11.1 Conclusion:

The LOS study shows that the existing traffic scenario is “Excellent” and the free flow of vehicles is observed during the study period. Due to the mine project the traffic density will increase as the entire mineral is being/will be transported through the SH-5 and the value of LOS would remain same i.e. Excellent.

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

CHAPTER - IV **ANTICIPATED** **ENVIRONMENTAL IMPACT** **AND MITIGATION MEASURES**

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

CHAPTER IV ANTICIPATED ENVIRONMENTAL IMPACT AND MITIGATION MEASURES

4.1 GENERAL

Environmental impacts both direct and indirect on various environmental attributes due to proposed mining activity will be created in the surrounding environment, during the pre- operational, operational and post–operational.

The impacts due to mining operations commence from the exploration activities, extend through extraction and processing of minerals, may continue up to post closure of the operation, with the nature and extent of impacts varying throughout the stages of project development.

Identification of possible impacts specific to an activity is an important task since this helps in focusing attention upon relevant environmental parameters and relating them with the activities involved. The following parameters are of significance in the environmental impact assessment and are being discussed in detail.

1. Land Environment;
2. Water Environment;
3. Air Environment;
4. Noise Environment;
5. Solid waste;
6. Biological;
7. Socio-Economic.

4.2 LAND ENVIRONMENT

Mining and its subsequent activities have been found to degrade the land to a significant extent. Overburden removal from the mine area results in a very significant loss of top soil. Also, creation of pit for mineral extraction changes the surface and drainage pattern.

4.2.1 SOURCE OF IMPECT

- Land Disturbance and Clearing
- Excavation and Surface Disturbance
- Waste Rock and Tailings Management



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

- Land Subsidence and Instability
- Visual and Aesthetic Change

4.2.2 IMPACT & MITIGATION MEASURES

Aspects	Impact	Mitigation Measures
Geomorphology of the study area.	Landforms alteration, Mountain top removal, creation of void.	Mitigation measures for mining impacts include land reclamation, minimizing disturbance, erosion control, effective water management, biodiversity protection, community engagement, and regular monitoring of restoration measures during and post-operation phase.
Soil Erosion and Degradation	Mining operations leads to disturbance of soil structure leading to erosion, loss of fertility, and compaction.	Garland Drains & siltation ponds will be constructed around the mine pit & waste dump area to prevent soil erosion by flowing water. Techniques such and planting vegetation will be implemented to prevent erosion of soil by air & water and restore the natural landscape. Reducing the use of heavy machinery during wet condition suggested, it will help to prevent soil compaction. Soil amendments and reclamation practices to restore soil quality will be adopted.
Deforestation and Habitat Destruction	Mining projects often lead to significant deforestation and habitat destruction by clearing vast areas of forest for extraction. This disrupts ecosystems, displaces wildlife, and reduces biodiversity. Additionally, the construction of infrastructure and waste disposal further exacerbates environmental damage.	Plantation will be carried out in statutory barrier, near rest shelter, site office & unworked area within the mining lease in first 5 year of mining development. more than 33% of lease area (i.e. 0.25 ha.) will be covered under plantation which includes 0.10 ha. undisturbed area, 0.01 ha area of waste dump & 0.14 ha area of upper benches of excavated pit
Visual Impact and Aesthetic Degradation	Mining projects results in alteration of natural landscapes and scenic views.	Landscaping and vegetation buffers will be established, and mining operations will be designed to minimize visible surface disturbance in sensitive areas.
Change in Topography, Sinkhole and Subsidence of land.	Mining activities will lead to alterations such as land subsidence, creation of large excavations or pits, and modification of natural	The topography of the lease area comprises of hilly terrain. There will be change in the topography of the lease area but the impact on the physical environment will be confined within the mine lease area only.



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

	drainage patterns & potentially affect surrounding habitats and communities.	Efforts is being/will be focused on careful planning, reclamation, and restoration measures to minimize long-term environmental consequences. Phase-wise plantation of lease area will enhance the scenic views & environment. 1.79 Ha area out of total area of excavation pit (2.690 Ha) will be developed as a water reservoir at the end of mine life. Filling of sinkholes can restore surface stability, restoring natural drainage patterns, and replanting vegetation to restore the area’s natural water balance.
The project area fall in earthquake Zone V	The high damage risk zone, indicates that mining activities in this area can pose greater harm to the land environment.	Stringent environmental controls, advanced technology for minimizing ecological impacts, and comprehensive monitoring and post-mining restoration efforts will be implemented effectively. The bench slope will be maintained 85° as suggested in the approved mining plan. Minimum bench width will be equal to height of bench. Slope study analysis will be conducted in regular intervals.
Removal of soil cover & Waste generation	There will be generation of Soil/Overburden & Mineral waste of considerable amount during the course of mining, so there will be a challenge regarding its management and disposal.	As per the approved Mining Plan around 9,375 tons of waste will be generated during the period of 5 year of Mining plan. Maximum waste will be used in construction and maintenance of approach roads, construction of site services and rest. The waste will also lifted by local habitants for constructing the walls along the agriculture field. The mineral waste is proposed to be dumped in southwestern side of the lease area near pillar ‘2’ in 0.01 ha. area for 6 m in height in two terraces of 3m height each. The waste dump will be stabilized by retaining walls of rubble stone. Parapet wall and drain will also be constructed towards lower altitude side to check the wash-off during monsoon. No separate soil is observed in the applied lease area. The soil that may come across during mining in patches or in cavities is being/will be scraped and stacked separately and to be used for plantation in monsoon. Thus there will be no permanent stack of



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

	soil.
--	-------

4.3 WATER ENVIRONMENT

4.3.1 SOURCE OF IMPACT

- Surface Water Runoff and Contamination
- Leaching and Seepage
- Acid Mine Drainage (AMD)
- Sedimentation:
- Changes in Hydrology:
- Accidental Spills and Discharges
- Open – Cast Mining
- Intersection of ground water table

4.3.2 IMPACT PREDICTION & MITIGATION MEASURES

Ground Water		
Aspect	Impact	Mitigation Measures
Ground water table intersection & depletion. Change in properties of aquifer.	Mine workings may intersect ground water table which may result in ground water contamination. Abstraction of ground water for mining operations may lead to depletion of water table. Also the mining operations Can affect the porosity and permeability of aquifers.	As per the approved mining plan the ground water table will not be encountered during entire working period of mining. The water requirement for the project will be 5.0 KLD, which will be met through tanker supply from nearby water streams. Hence, no ground water will be used for mining operations. After completing mining operations, efforts should be made to restore the natural recharge capabilities. Regular monitoring of groundwater quality to detect any changes in chemical composition is being/will be carried out.
Sewage from septic tank and soak pit.	The sewage from soak pit may percolate to the ground water table and contaminate it.	The daily sewage generation will be 0.7 KLD, which will be disposed of in septic tank and soak pit. Stabilized sludge will be used as manure for plantation.



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

Contamination of water table by leaching out of chemicals and heavy metals from mine wastes and tailings.	Leaching of chemicals and heavy metals from mine wastes, particularly tailings, can seep into groundwater aquifers, posing risks to local drinking water supplies, ecosystems, and long-term environmental health.	In this limestone mining operation, no chemicals or heavy metals will be used or generated, and the working depth will not reach the water table. Therefore, groundwater contamination is not a concern. Although the mitigation measures include proper tailings management, containment liners, effective water management, regular monitoring, reclamation plans, and community engagement to prevent leaching of chemicals and heavy metals into groundwater from mine wastes will be strictly followed.
--	--	--

Surface Water

Contamination of nearby water bodies	Contamination of nearby rivers, streams, and lakes due to runoff from mine site carrying sediments, heavy metals, and chemicals can degrade water quality, harm aquatic life, and affect downstream users.	In this limestone mining operation, no chemicals or heavy metals will be used or generated. Consequently, there is no risk of these substances being carried into nearby water bodies through surface runoff. Comprehensive water management plans will be developed to control runoff and manage water quality. Containment ponds, liners, and treatment facilities, such as sedimentation ponds, will be utilized to capture and treat water before discharge.
Alteration of Hydrology	Construction of mining infrastructure and changes in land use can alter natural drainage patterns and flow regimes which can disrupt aquatic habitats, reduce water availability at downstream, and affect ecosystems dependent on stable water flows.	Natural drainage outside the lease area will remain unaffected by mining activities inside. The lease area will be restored to its original condition to the greatest extent possible after mining operations are completed. However, during mining operations, surface runoff in the form of rainwater will occur only during the monsoon season. No water from the quarry will be directly discharged into any natural water course. Accumulated rainwater is being/will be partially utilized for dust



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

		<p>suppression and afforestation. Given limestone's permeable nature, much of the water will percolate below the quarry surface.</p> <p>Rainwater will follow the natural topography of the lease area.</p> <p>Erosion control measures, including re-vegetation, construction of garland drains, and siltation ponds, will be implemented to minimize sediment runoff and safeguard water quality.</p>
--	--	---

4.4 AIR ENVIRONMENT

4.4.1 INTRODUCTION

The major sources of air pollution problems are due to fugitive dust emission due to excavation, loading and transportation of mineral which is more prominent in open cast mines. The intensity of dust generation in the mining is influenced by factors such as hardness of rock, mining technology and material handling etc.

4.4.2 ASSESSMENT OF ANTICIPATED IMPACT


I. About AERMOD

AMS/EPA Regulatory Model (AERMOD version-9.5) is a steady-state plume model. It is designed to apply to source releases and meteorological conditions that can be assumed to be steady over individual modelling periods (typically one hour or less). AERMOD has been designed to handle the computation of pollutant impacts in both flat and complex terrain within the same modelling framework.

The American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee (AERMIC) was formed to introduce state-of-the-art modelling concepts into the EPA's air quality models. Through AERMIC, a modelling system, AERMOD, was introduced that incorporated air dispersion bases on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain.

II. Assumption

The dispersion modelling assumption considered is as follow:

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

- The terrain of the study area was considered as flat;
- Stability class and atmospheric inversion level is based on software’s database
- Steady-state conditions (constant source emission strength)
- Wind speed, direction and diffusion characteristics of the plume are constant
- Conservation of mass, i.e. no chemical transformations take place

III. Input Parameters

A. Meteorological Parameters

The hourly meteorological data considered were wind speed, wind direction, ambient atmospheric temperature, cloud cover, relative humidity & rainfall ceil height.

B. Point Source Emissions

Air dispersion modelling methodology - Emission from all the stacks were analyzed for their impacts on the GLC for various distances using the dispersion modelling guidelines of AERMOD, developed by the AERMIC (American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee) as directed by CPCB. Maximum Ground Level Concentration (GLC’s) of PM10, and PM2.5 due to project activity were predicted. The pollutants considered are pollutants emitting from the Drilling, Blasting, Loading, unloading, and Transportation activities.

The details of mining activity are provided below in Table 4.2.

Table 4.2: Mining Activity

Details	Parameter
Production /Day	163 Tonnes/day
Bulk Density	2.5 gm/cc
Width of Bench	6.0 m
Depth of Hole	6.0 m
Diameter of hole	100 m
Spacing	4.0 m
No of trips per day	8
Truck Capacity	20 tonnes
Length and width of haul road	500 m and 7 m
Mean wind Speed	2.58 m/s
Working hours per day	8 hours
Total working days	300

** Site Center Lat/Long - 25°10'50.17"N, 91°44'25.57"E*



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

Considering the above inputs emission for particulate matter were calculated using the AP42, USEAP equations for various activities and NO_x and CO from CPCB criteria.

Table 1.3: Emission for various activities from mine

Parameter	PM10 (g/s)	PM2.5(g/s)	NO _x (g/s)	CO (g/s)
Drilling	0.043813248	0.029208832	--	--
Blasting	0.023642231	0.015761487		
Loading & unloading	6.36406E-05	4.24271E-05	--	--
Vehicular Movement	0.064648005	0.04309867	0.000486111	0.000208333


Table 4.4: Maximum Ground Level Concentration for all activities

Parameter	Maximum GLC	Distance in meter from site	Direction from site
PM10 (µg/m ³)	5.50727	Mine site	At site
PM2.5 (µg/m ³)	3.62321	Mine site	At site
NO _x (µg/m ³)	0.31884	Mine site	At site
CO (mg/m ³)	0.0000017	Mine site	At site

The isopleths and results of incremental ground level concentrations for PM₁₀, PM_{2.5}, NO_x & CO of the project are given in **Figure 4.1 to Figure 4.4**.

IV. Final Incremental GLCs on Baseline AAQM


The maximum incremental GLCs due to the project for various parameters are superimposed on the maximum baseline concentrations recorded during the study period. The cumulative concentrations (baseline + incremental) after implementation of the project are tabulated below in **Table 4.5**.

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

Table 4.5: Cumulative Impact at Monitoring Locations

Location Code	AAQM Location Name	Maximum Baseline Concentration				Predicted GLC at Monitoring Location due to all sources				Cumulative GLC (Baseline + Predicted)			
		Max Baseline Conc.PM ₁₀ (µg/m ³)	Max Baseline Conc.PM _{2.5} (µg/m ³)	Max Baseline Conc. NOX (µg/m ³)	Max Baseline Conc.CO (mg/m ³)	Predicted GLC (µg/m ³) –PM ₁₀	Predicted GLC (µg/m ³) –P PM _{2.5}	Predicted GLC (µg/m ³) –PNOX	Predicted GLC (mg/m ³) –CO	Total GLC (µg/m ³) – PM ₁₀	Total GLC (µg/m ³) –P PM _{2.5}	Total GLC (µg/m ³) – NOX	Total GLC mg/m ³) –CO
A1	Mine Site	79.82	39.27	19.5	0.92	5.50727	3.62321	0.31884	0.0000017	85.32727	42.89321	19.81884	0.9200017
A2	Bholaganj Bazar	73.32	32.81	13.61	0.48	0.00497	0.00327	0.00029	0.00000160	73.32497	32.81327	13.61029	0.48000160
A3	Bholaganj	70.61	27.58	16.39	0.92	0.00493	0.00324	0.00029	0.00000016	70.61493	27.58324	16.39029	0.92000016
A4	Chakalabasti	78.45	38.14	18.36	0.59	0.00398	0.00262	0.00023	0.00000013	78.45398	38.14262	18.36023	0.59000013
A5	Diengkain	74.65	45.12	20.31	0.58	0.00142	0.00093	0.00008	0.00000004	74.65142	45.12093	20.31008	0.58000004
A6	Mawthang	65.80	24.77	15.4	0.54	0.0005	0.00033	0.00003	0.00000002	65.8005	24.77033	15.40003	0.54000002
A7	Sohbar	75.28	32.04	14.75	0.79	0.00123	0.00081	0.00007	0.00000004	75.28123	32.04081	14.75007	0.79000004
A8	Mawpathaw	72.16	45.22	19.6	0.79	0.00138	0.00091	0.00008	0.00000004	72.16138	45.22091	19.60008	0.79000004

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”

Applicant:- Smt Seisoh Syiemlieh

Chapter – IV– Anticipated Environmental Impact
and Mitigation Measures

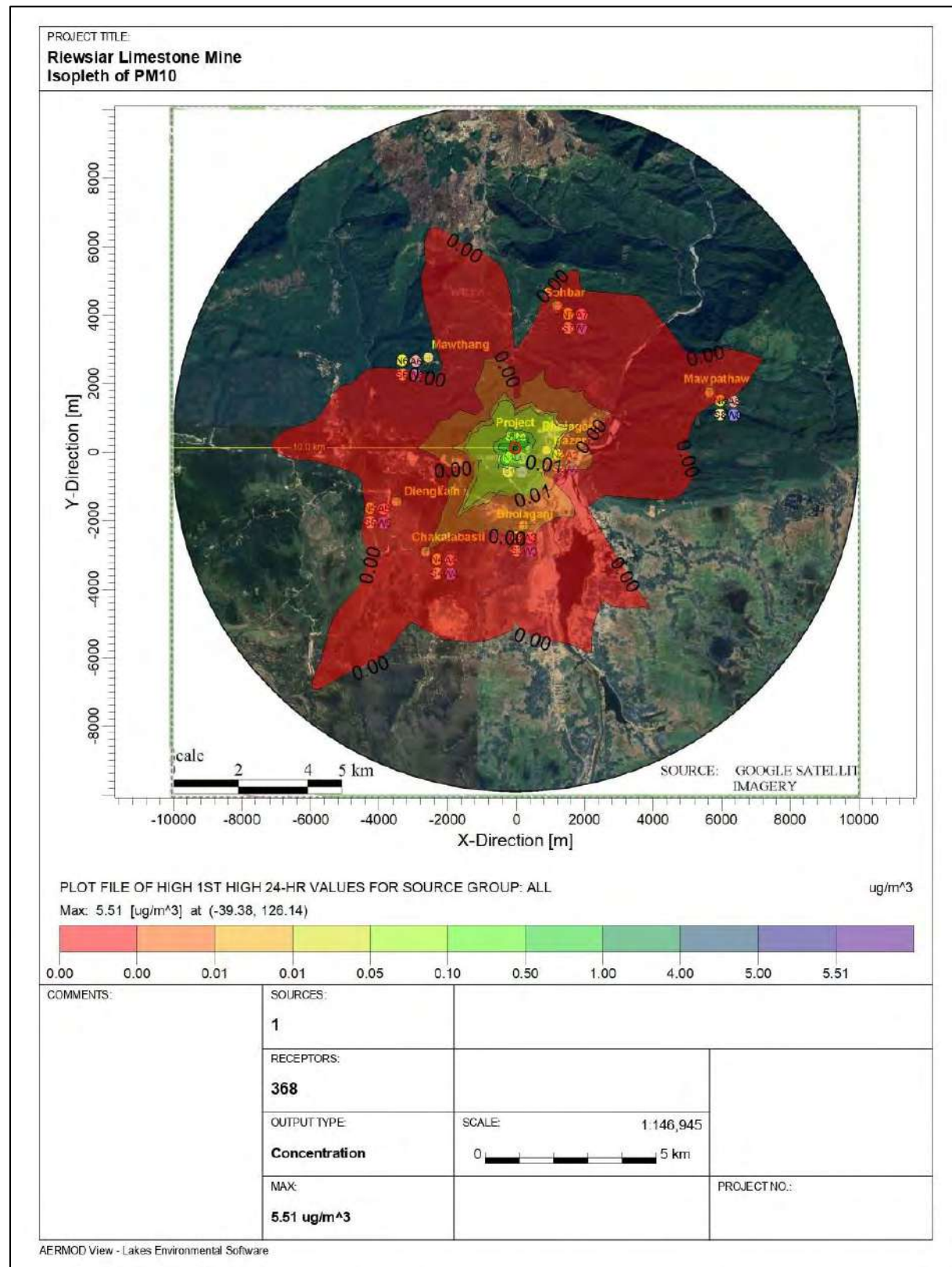


Figure 4.1: Map showing Isopleths of PM₁₀



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

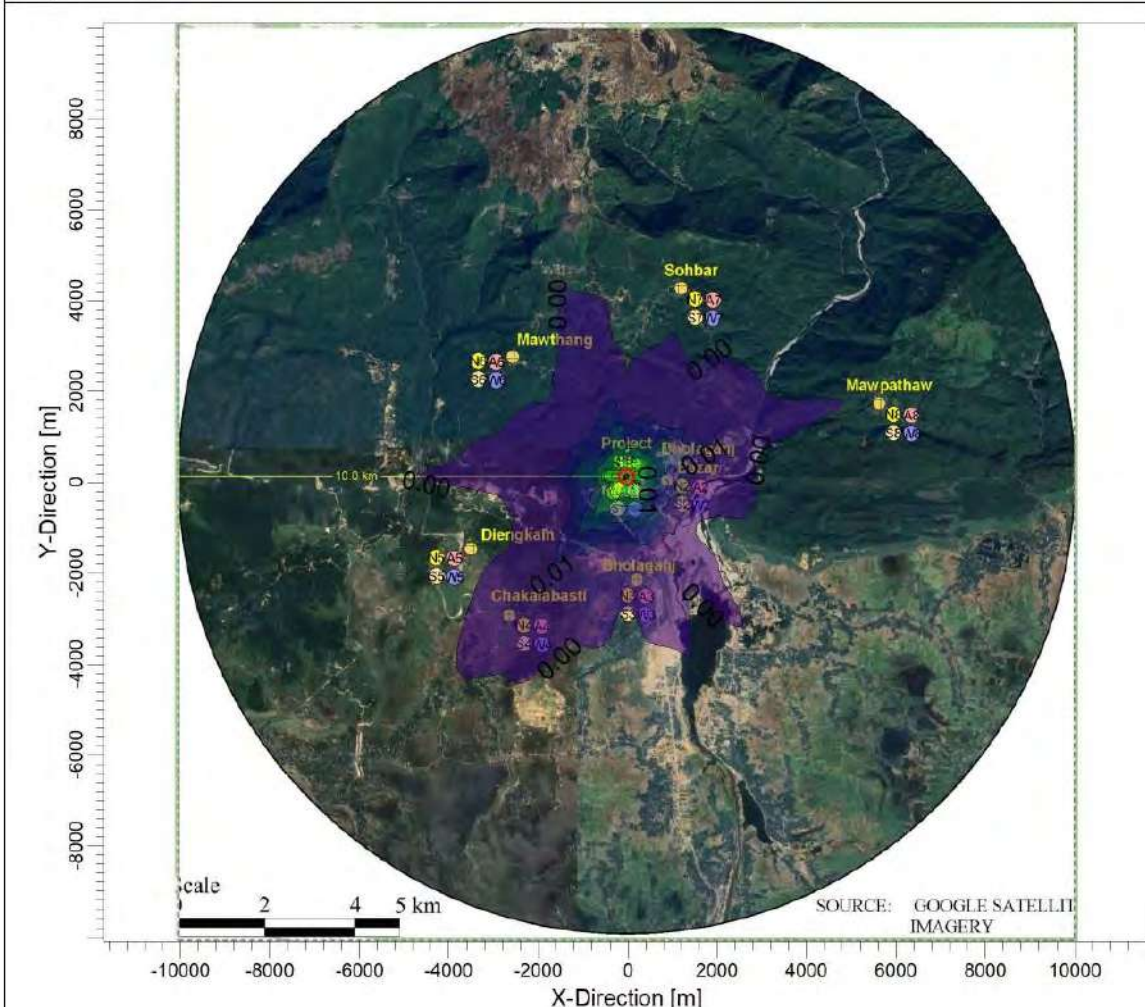
Project:- “Rusiar Limestone Mine”

Applicant:- Smt Seisoh Syiemlieh

Chapter – IV– Anticipated Environmental Impact
and Mitigation Measures

PROJECT TITLE:

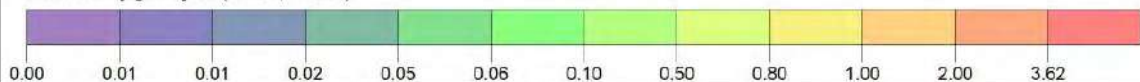
**Riewsiar Limestone Mine
Isopleth of PM_{2.5}**



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL

ug/m³

Max: 3.62 [ug/m³] at (-39.38, 126.14)



COMMENTS:

SOURCES:

1

RECEPTORS:

368

OUTPUT TYPE:

Concentration

SCALE:

1:146,945

0

5 km

MAX:

3.62 ug/m³

PROJECT NO:

AERMOD View - Lakes Environmental Software

Figure 4.2: Map showing Isopleths of PM_{2.5}

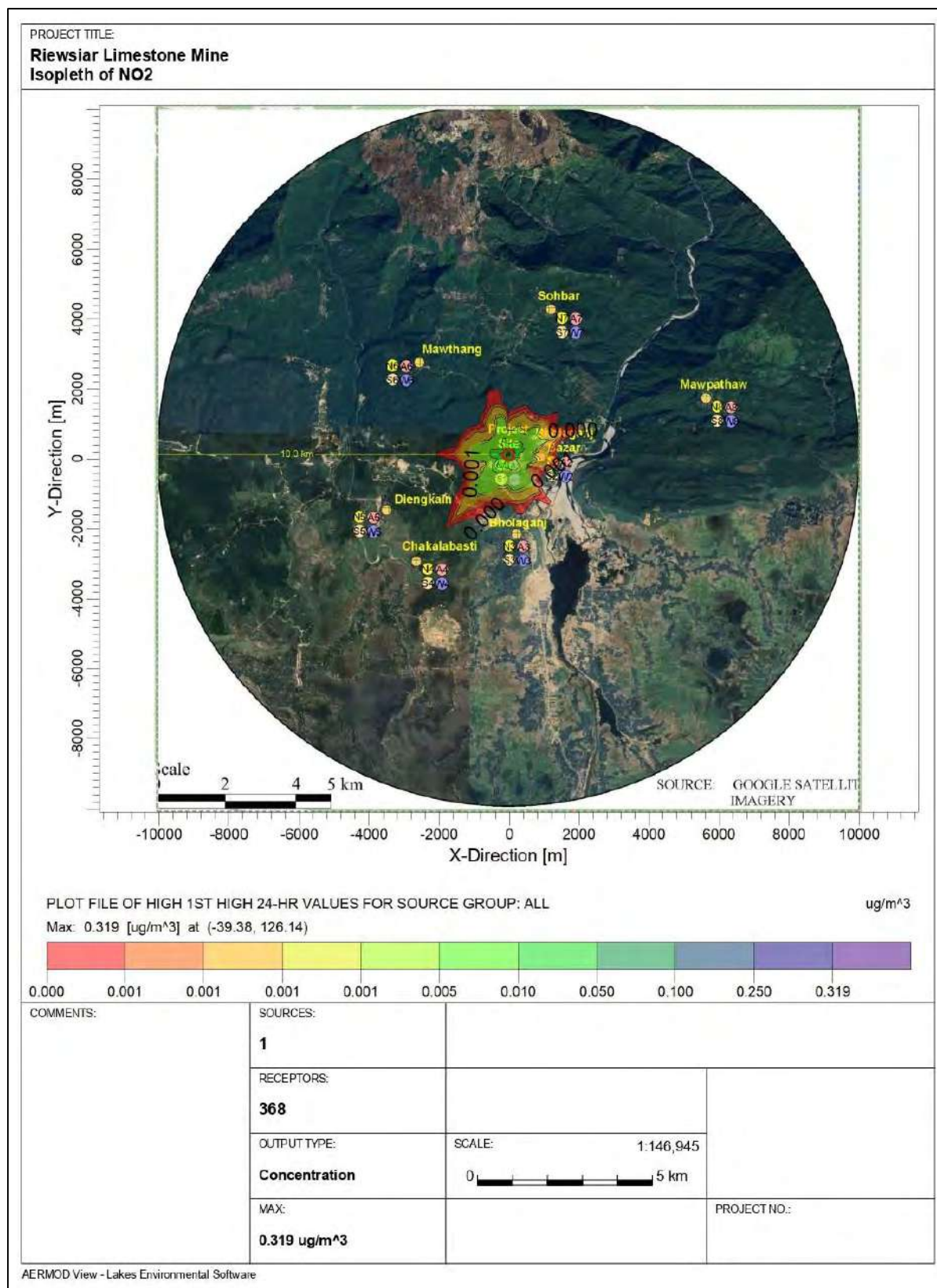


Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Figure 4.3: Map showing Isopleths of NO_x (As NO₂)

Project:- “Rusiar Limestone Mine”

Applicant:- Smt Seisoh Syiemlieh

Chapter – IV– Anticipated Environmental Impact
and Mitigation Measures

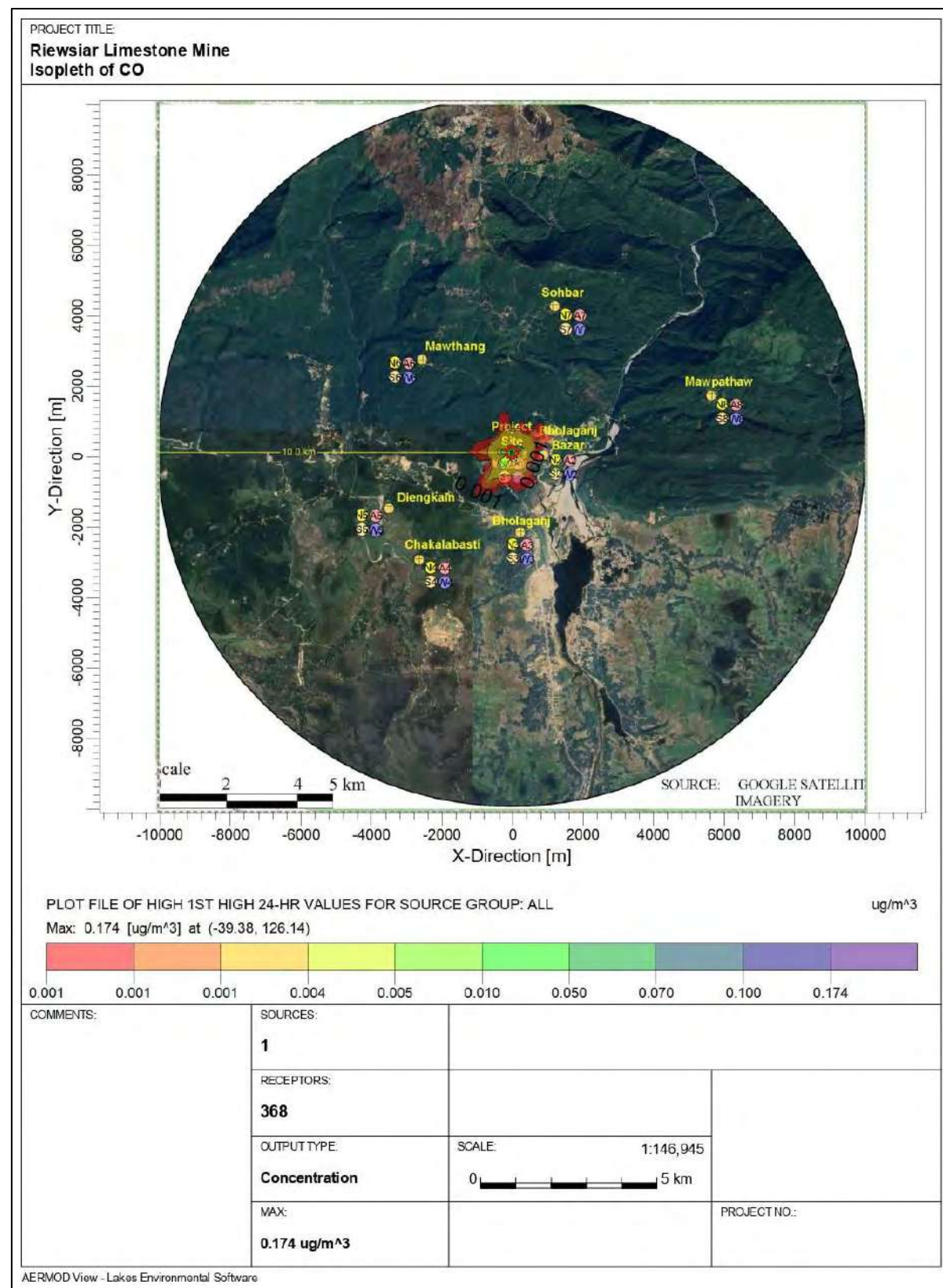


Figure 4.4: Map showing Isopleths of CO



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

4.4.3 MITIGATION MEASURES FOR ANTICIPATED IMPACT


Aspects	Impact	Mitigation Measures
Dust Emissions	Mining activities, including excavation and transportation, can release large amounts of dust into the air, affecting air quality and respiratory health of workers and nearby habitants.	Dust suppression techniques, such as water spraying, dust suppressants, and proper road maintenance, to reduce airborne particulate matter will be adopted. At the conceptual stage, more than 33% of lease area (i.e. 0.33 ha.) will be covered under plantation which includes 0.20 ha. Undisturbed area and 0.13 ha area of upper benches of excavated pit.
Particulate Matters	Mining Operations can generate particulate matter (PM10 and PM2.5), which can lead to respiratory problems and contribute to smog formation.	Mine workers is being/will be provided with personal protective equipment's (PPEs) like earmuffs/ earplugs, helmets, face masks, gloves, goggles. Regular health checkup of workers and nearby peoples will be carried out by PP at his own cost.
Vehicular Emissions	Heavy machinery and transport vehicles emit pollutants such as nitrogen oxides (NO _x), sulfur dioxide (SO ₂), and volatile organic compounds (VOCs).	Heavy machinery and transport vehicles equipped with modern emission control technologies will be used. Regular maintenance and servicing of these will be carried out.
Fugitive Emissions	Dust & pollutants can escape from mine sites, contributing to air pollution.	Disturbed areas will be reclaimed with vegetation to stabilize soil and reduce dust emissions. Local communities will be informed and involved in air quality management plans to address concerns and enhance transparency.



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

4.5 NOISE ENVIRONMENT

Aspect	Impact	Mitigation Measures
High Noise Levels	Mining activities, including drilling, blasting, and heavy machinery operation, generate high noise levels that can disturb mine workers, nearby communities and wildlife.	<p>Barriers or acoustic enclosures around noisy equipment to reduce noise transmission will be constructed.</p> <p>Drilling equipment’s will be regularly maintained as per maintenance manual. Anti-vibration mounts for compressors will be provided.</p> <p>Each blast will be carefully planned, checked and executed under the supervision of statutory personnel.</p> <p>Noisy activities will be scheduled during less sensitive times and noise reduction technologies in equipment is being/will be implemented.</p> <p>Compact and leveled haul road are proposed for smooth running of transport vehicles.</p> <p>Optimum parameters for drilling and blasting will be designed to have controlled blasting which will reduce noise and vibrations.</p> <p>Blasting will be carried out during day time and not on cloudy days.</p>
Continuous Operation	Ongoing operations, such as conveyor belts and crushers, contribute to sustained noise pollution.	<p>Regularly maintain and service machinery to ensure it operates efficiently and minimizes unnecessary noise.</p> <p>Speed of trucks will be limited to prevent undue noise from empty trucks.</p> <p>Adequate silencers in HEMM are provided to reduce generation of noise. All HEMMs will be equipped with closed cabins for operators.</p>

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

Health Effects	<p>Prolonged exposure to high noise levels can cause hearing loss, stress, and sleep disturbances in humans, and may also disrupt animal behavior and communication.</p>	<p>Hearing protection equipment for workers will be provided and administrative controls to limit exposure to high noise levels will be implemented.</p> <p>Task rotation of workers will be done to reduce exposure to high noise level.</p> <p>Plantation will be carried out along the periphery of the lease area. The plantation minimizes propagation of noise and also arrests dust.</p> <p>Regular health checkup will be conducted for any such health implications.</p> <p>Periodical monitoring of noise will be done.</p>
-----------------------	--	---

4.6 BIOLOGICAL ENVIRONMENT

4.6.1 ANTICIPATED IMPACT ON BIOLOGICAL ENVIRONMENT

The major adverse impacts due to pre-mining phases are loss of habitat, biodiversity, rare flora and fauna and other aquatic life, migration of wildlife and overall disruption of the area. During post-mining phase after land restoration, ecology may effectively improve. The adverse impact on fauna and flora would be mainly due to Human activity, Noise, vibration and Land Degradation. The impact on the fauna and flora of the buffer zone due to mining activity is marginal and not increase in future. The major impacts on biodiversity as well as environment are shown below.

- Clearing of vegetation from land used for quarry, dumping of overburden, construction of infrastructure.
- Deforestation when mine is situated in forest area.
- Disturbance in wild life and other fauna due to clearing of vegetation/deforestation.
- Noise and vibrates due to blasting and machine operations drive away animals and birds from the region.
- Degradation of aquatic flora and fauna due to discharge of polluted water.
- Mining can affect vegetation in the core zone. The mining activity will generate dust which may impact the nearby biological environment.
- Removal of vegetation (flora) due to excavation for mining purposes.




Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

- Dust generation during mining and transportation may impact vegetation.

A mining project can only commence with knowledge of the extent and value of the mineral ore deposit. Information about the location and value of the mineral ore deposit is obtained during the exploration phase. This phase includes surveys, field studies, and drilling test boreholes and other exploratory excavations. Wildlife is a broad term that refers to all plants and any animals (or other organisms) that are not domesticated. Mining affects the environment and associated biota through the removal of vegetation and topsoil, the displacement of fauna, the release of pollutants, and the generation of noise

1. Habitat Loss: - Wildlife species live in communities that depend on each other. Survival of these species can depend on soil conditions, local climate, altitude, and other features of the local habitat. Mining causes direct and indirect damage to wildlife. The impacts stem primarily from disturbing, removing, and redistributing the land surface. Some impacts are short-term and confined to the mine site; others may have far-reaching, long-term effects. The most direct effect on wildlife is destruction or displacement of species in areas of excavation and piling of mine wastes. Mobile wildlife species, like game animals, birds, and predators, leave these areas. More sedentary animals, like invertebrates, many reptiles, burrowing rodents, and small mammals, may be more severely affected. If streams, lakes, ponds, or marshes are filled or drained, fish, aquatic invertebrates, and amphibians are severely impacted. Food supplies for predators are reduced by the disappearance of these land and water species. Many wildlife species are highly dependent on vegetation growing in natural drainages. This vegetation provides essential food, nesting sites, and cover for escape from predators. Any activity that destroys vegetation near ponds, reservoirs, marshes, and wetlands reduces the quality and quantity of habitat essential for waterfowl, shore birds, and many terrestrial species. The habitat requirements of many animal species do not permit them to adjust to changes created by land disturbance. These changes reduce living space. The degree to which animals tolerate human competition for space varies. Some species tolerate very little disturbance. In instances where a particularly critical habitat is restricted, such as a lake, pond, or primary breeding area, a species could be eliminated. Surface mining can degrade aquatic habitats with impacts felt many miles from a mining site. For example, sediment contamination of rivers and streams is common with surface mining.

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

2. Habitat fragmentation: - Habitat fragmentation occurs when large areas of land are broken up into smaller and smaller patches, making dispersal by native species from one patch to another difficult or impossible, and cutting off migratory routes. Isolation may lead to local decline of species, or genetic effects such as inbreeding. Species that require large patches of forest simply disappear.

Table 4.6: Illustrative examples of mining activities, aspects and biodiversity impacts

Activity	Examples of Aspects	Examples of Biodiversity Impact
Extraction	Land clearing	Loss of habitat, introduction of plant disease, siltation of watercourses
Blasting	Dust, noise, vibration	Smothering stomata, disturbance of fauna
Digging and Hauling	Dust, noise, vibration, water pollution	Disruption of watercourses, impacts on aquatic ecosystems due to changes in hydrology and water quality.
Waste Dumping	Clearing, water and soil pollution	Loss of habitat, soil and water contamination, sedimentation, acid mine drainage
Air emissions	Air pollution- Particulate Matter, Nitrogen Oxides, Sulfur Oxides, Carbon Monoxide	Emitted from the combustion of fossil fuels in mining equipment and vehicles.
Provision of accommodation	Land clearing, soil and water pollution, waste generation	Loss of habitat, sewage disposal and disease impacts, pests, disturbance of wildlife
Activity	Examples of Aspects	Examples of Biodiversity Impact
Roads and rail	Land clearing	Habitat loss or fragmentation, waterlogging upslope and drainage shadows down slope
Population growth	Land clearing or increased hunting	Loss of habitat or species, stress on local and regional resources, pest introduction, clearing
Water Pollution	Heavy Metals	Metals such as lead, mercury, arsenic, cadmium, and chromium can be released into water sources from the mining



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

		process. These metals are toxic to aquatic life and can pose significant health risks to humans.
--	--	--

Noise and vibration due to operation of mining machineries, drilling and blasting and mineral transportation may drive away the animals and birds.

Effect on eco-sensitive areas like National Park, Wildlife Sanctuary, Biosphere Reserves or Tiger Reserves - Mining operations can have profound and often detrimental effects on eco-sensitive areas such as National Parks, Wildlife Sanctuaries, Biosphere Reserves, and Tiger Reserves. The impacts can be extensive, affecting biodiversity, ecosystem functions, and the overall health of these protected areas. Key effects include:


- **Habitat Destruction:** Mining activities often require the clearing of large areas of land, leading to the destruction of habitats for many species. This can result in the loss of biodiversity and the displacement or death of wildlife.
- **Water Pollution:** Contaminants from mining can enter water bodies, leading to the pollution of rivers, streams, and lakes. This can harm aquatic life and the animals that depend on these water sources for drinking and habitat.
- **Noise Pollution:** The noise generated by mining machinery, blasting, and transport can disturb wildlife, leading to stress, altered behavior, and disruptions in breeding patterns.
- **Disruption of Ecosystem Services:** Mining can disrupt vital ecosystem services such as water filtration, flood control, and carbon sequestration. This not only affects wildlife but also human communities relying on these services.

Mining may drive away the wild life from their habitat, and significantly affect wildlife

4.6.2 PROPOSED MITIGATION MEASURES

The various mining activities within the project area pose a threat to local wildlife. Additionally, the habitat for wildlife is being reduced due to the forest area affected by the similar projects. Therefore, the Wildlife Mitigation Measures (Site Specific) aim to ensure safe passage for existing wildlife from the project area to nearby forested areas, while also improving habitats in the surrounding regions.

Certain measures will need to be implemented within the mining area itself, while others can be executed beyond the project area by the Government (Forest Department) with

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

financial support from the user agency. Based on the identified threats to wildlife outlined in the previous chapter, a comprehensive set of mitigation measures is being or will be prepared to address these concerns.

Both the impacted area and the surrounding region will be treated for habitat improvement, ensuring that more fodder and water become available for wildlife.

The activities undertaken in the project area will pose a significant threat to wildlife. Therefore, it is essential to minimize these risks. The following steps will be implemented within the lease area:


1. Safe passage to Existing Wild-life
2. Restoration of habitat
3. Waste Management
4. Physiographic change of Habitat (Land Management)
5. Soil and water conservation
6. Control of Dust & Water, Noise pollution
7. Barbed wired fencing to prevent fall of animals in the mining pits
8. Anti-poaching /anti-depredation activity
9. Provision of hired vehicle for Rapid Response Team
10. Health Camps and Cattle Immunization
11. Awareness, Training and Capacity building

4.6.3 BUDGET ALLOCATION FOR GREENBELT PLANTATION

To mitigate the negative impact of mining, a phase wise green belt will be developed in 7.5m statutory barrier, near rest shelter, site office & unworked area within the mining lease in next five years of plan period.

At the conceptual stage, more than 33% of lease area (i.e. 0.33 ha.) will be covered under plantation which includes 0.20 ha. Undisturbed area and 0.13 ha area of upper benches of excavated pit.

Requirements for plants for afforestation and reclamation is as follows:-

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

Table 4.7: Greenbelt Development Program

Year	Safety Zone and Unworked Area (Inside the ML)		Waste Dump (Inside the ML)		*Reclaimed Area		Total		Amount (@ ₹ 1000 per sapling) (In lacs)
	Area (Ha)	No. of Trees	Area (Ha)	No. of Trees	Area (Ha)	No. of Trees	Area (Ha)	No. of Trees	
Existing	--	--	--	--	--	--	--	--	--
I	0.04	40	--	--	--	--	0.04	40	0.40
II	0.04	40	--	--	--	--	0.04	40	0.40
III	0.04	40	--	--	--	--	0.04	40	0.40
IV	0.04	40	--	--	--	--	0.04	40	0.40
V	0.04	40	--	--	--	--	0.04	40	0.40
End of life of mine	--	--	--	--	0.13	130	0.13	130	1.30
Total	0.20	200	-	-	0.13	130	0.33	330	2.94

***Reclaimed Area- Plantation on the upper benches of excavated pit (as shown in Conceptual Plan)**

Note:

- As per the MoEF&CC OM No. vide No. 22-34/2018-IA.III dated 16th Jan 2020 it will be ensured that after completion of mining operations re-grassing of the mining area and any other area which may have been disturbed due to the mining activities will be restored to a condition which is fit for growth of fodder, flora, fauna etc.
- All other costs like labor costs for plantation, soil filling dressing, irrigation etc. will also borne by client/proponent.

Table 4.8: List of species for planting in mine areas

S. No.	Species	Local Names
1	<i>Thysanolaena maxima</i>	Synsar (K) Saliva (G)
2	<i>Neyraudia reynaudiana</i>	Burma reed
3	<i>Imperata cylindrica</i>	Cogon grass
4	<i>Saccharum arundi naceum</i>	Hardy sugar cane
5	<i>Saccharum spontaneum</i>	Wild sugarcane
6	<i>Arunda donax</i>	Giant cane
7	<i>Bambusa tulda</i>	Siej (K) Wati (G)
8	<i>Mucuna bracteata</i>	--
9	<i>Litsea monopetela</i>	--
10	<i>Litsea cubeba</i>	--
11	<i>Trema orientalis</i>	Dieng Lattar (K) Phakram (G)
12	<i>Cinanomum tamala</i>	Latyrpad (K) Teji-bol (G)
13	<i>Emblica officinalis</i>	Sohmylleng (K)



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

		Ambare (G)
14	<i>Macaranga denticulata</i>	Lakhar (K) Chagro (G)
15	<i>Artocarpus heterophyllus</i>	Sohphan (K) Tebrong (G)
16	<i>Syzygium cumini</i>	Soh-um (K) Khimkhol (G)
17	<i>Artocarpus chaplasi</i>	Dieng Soham (K) Bol-sram (G)
18	<i>Albizia procera</i>	Kreit (K) Goroi (G)
19	<i>Bombax ceiba</i>	Rui (K)
20	<i>Daubanga grandiflora</i>	Bai (K)
21	<i>Erithrina indica</i>	Dieng song (K) Mendal (G)
22	<i>Gmelina arborea</i>	Dieng Laphiang (K) Bolgippok (G)
23	<i>Michelia champaca</i>	Dieng rai (K) Tita chap, Champe (G)
24	<i>Schima wallichii</i>	Dieng ngan (K) Bol dak (G)
25	<i>Sapium baccatum</i>	Dieng jalong (K)
26	<i>Toon ciliata</i>	Bti (K) Poma (G)


4.6.4 PLANTATION TECHNIQUE AND CARE

Plantation Technique:-

Following basic procedures need to be followed for greening the area.

- Plantation of tree species required approx. 1m³ pit for soil enrichment
- Pit should be filled with imported soil with 3:1:1 the ratio of sand, silt and farm yard manure.
- Obtain well-grown saplings of recommended species from the nearby Forest Department nursery.
- Make 1m diameter ring bund around the planted saplings for water retention.
- Watering of sapling is species specific, therefore watering need to be done once in 2 or 3 days for a period of two years.
- Soil work and weeding need to be done once in a two months.

Monitoring Protocol

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

- The plantations need to be managed by regular watering, soil enrichment work, applying manure, weeding and provide proper protection.
- Replacement of sapling (replanting) required whenever mortality occurs in the plantation during the growth stage.
- Plantation requires after care for a period of minimum five years till the saplings attain matured tree stage.
- Any damage to the developed greenbelt due to any natural or cattle activity should be redeveloped and maintained by the agency.

4.7 SOCIO-ECONOMIC IMPACT & MITIGATION MEASURES

S. N	Aspects	Anticipated Impacts	Mitigation Measures
Negative Impacts & Mitigation			
1	Social Challenges	Increased population and economic activity can strain local social services and infrastructure.	Partnerships will be developed with local governments and NGOs to enhance social services. Community development programs to address social challenges will be implemented.
2	Cultural Impact	Mining operations can disrupt traditional lifestyles and cultural practices of indigenous or local communities	Local communities will be engaged in culturally sensitive planning and decision-making processes. Cultural preservation initiatives will be supported and local traditions respected.
3	Community Health	mining activities can include issues such as air and water pollution, noise pollution, increased risk of respiratory diseases, potential exposure to hazardous chemicals, and disruption of access to clean water sources	Regular health checkup of workers and nearby locals will be conducted. Records of the worker's health and safety will be maintained. Training is being/will be provided to the workers. Personal Protective equipment's is being/will be provided to workers. The safety and well-being of workers is being/will be ensured in accordance with mining rules and regulations.
4	Human Settlement	Mining projects can also cause, displacement, increased crime, economic inequality, infrastructure strain, and long-term legacy problems, significantly impacting nearby human settlements and their quality of life.	Nearest settlement is 2.3 km away in SSW. There is no physical or economic displacement due to the project and will not be future. Mitigation measures for nearby human settlements include, investing in community health and infrastructure, ensuring fair economic benefits,



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

			involving local communities in decision-making etc.
Positive Impacts			
S.N	Aspect	Positive Impacts	
5	Income Revenues and	Enhancement of average income for locals engaged in similar mining activities directly and indirectly. Increase in tax revenues of local and central government. Successful operation of the plant will attract additional industrial investments, benefiting both society and the nation.	
6	Livelihoods	Approximately 10 No. of people will get directly employed from the mining project. Anticipated creation of new direct and indirect employment opportunities. Expected increase in non-agricultural livelihood opportunities, both directly and indirectly related. The minimal influx of personnel is expected during the operational phase.	
5	Physical Infrastructure	The road and power networks in the area are expected to be strengthened as part of sequential development.	


4.8 IMPACT ON OCCUPATIONAL HEALTH & SAFETY

Healthy and safe working conditions are among the first expectations for sustainability, i.e. the expectation that risks in mining will not deprive workers of their livelihoods or of their quality of life. Occupational injuries and ill-health have huge social and economic implications for individuals, their families and their communities. They also have an adverse impact on the economy of the society as a whole.

Occupational accidents and health hazards can also affect public health and safety, and the environment. The effect on the health and safety of people, costs to the economy and impacts the environment. Efforts is being/will be made to address occupational health and safety with broader social agenda for sustainable development.

Hazards, which are associated with poor engineering design, contribute to increased safety risks.

Although health risks can be avoided by implementing controls at source in the work environment, designing such controls for mining environment presents considerable challenges because dust and noise are generated by mining itself. A range of control measures that act together to reduce exposure to such risks is therefore necessary. These could include methods for minimizing dust levels by reducing dust generation and methods for dilution, suppression, capture, and containment.

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

While significant uncertainties remain in controlling dust exposures and maintaining the effectiveness of controls, the use of appropriate personal protective equipment (PPE) is important.

Exposure to Dust - Exposure to fine particulates is associated with work in most of the dust-generating stages notably from excavation, mineral handling, and transportation.

Methods to prevent and control exposure to dust include the following:

- Control of dust through water spraying,
- Use of PPE, as appropriate (e.g. masks and respirators) to address residual exposures.

Physical hazards - Injuries during Project operation are typically related to slips and falls; contact with falling / moving objects; and lifting / over-exertion. Other injuries may occur due to contact with, or capture in, moving machinery (e.g. trucks). In case of any accident immediate & proper first-aid medical care shall be provided at the applied mine site.

Pre-Placement Medical Examination and Periodical Medical Examination Schedules

The fresh employees when taken are thoroughly medically examined under initial medical examination and thereafter during continuation of employment; the periodic medical examination is being/carried out.

Measures to Control Occupational Health Hazard & Safety

The working in the applied lease area is being/will be done with all safety measures under the supervision of qualified staff. The workers is being/will be provided dust mask, safety boot, helmet and other safety equipment. A well-equipped first aid box is being/will be maintained at site.

For mitigating aspect, the following measures will be implemented:

- Regular water sprinkling on haul roads.
- Dust mask will be provided to the workers.
- Periodical medical examinations will be carried out for the workers as per Norms.
- Medical records will be maintained.
- Medical facilities to the workers.
- Any early symptom of diseases, if observed, such workers will be taken off from the dusty atmosphere and will be employed at other suitable place.
- Personal Protective Equipment's will be provided to the workers.



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – IV– Anticipated Environmental Impact and Mitigation Measures

- Vocational Training will be provided to the workers.
- Safety of the employee during mining is being/will be taken care as per Mine Regulations.
- A budget of ₹1.00 Lacs as Capital Cost & ₹ 2.00 Lacs as recurring cost is assigned for Labour welfare and occupational safety.


4.9 ENVIRONMENTAL ACTION PROGRAMME

The project proponent Smt Seisoh Syiemlieh is quite conscious of its responsibility for maintaining clean and a healthy environment. The management is also keen to modify and make more efficient measures towards suppression of pollution sources. Adequate fund for Pollution Control Measures are provided as a part of overall project financing to ensure the availability of proper treatment facilities. The overall investment in the project is assumed to be ₹ 11.0 lakhs. The breakup of the proposed cost for Environment Management Programme is given as under:-

Table 4.9: Provision for Environmental Protection Measures

S.N	Description	Capital Cost (₹ in Lacs)	Recurring Cost (₹ in Lacs)
1.	Environmental Monitoring(Air, Water, Noise and Soil)	-	2.00
2.	Water sprinkling for control of fugitive emission during loading and unloading, transportation/water sprinkling measures.	-	0.50
3.	Provision of fencing around mine pit	0.20	0.05
4.	Construction and Maintenance of approach Road/haul Road	1.00	0.50
5.	Construction & Maintenance of Settling Tank, Garland Drains etc.	1.00	0.10
6.	Greenbelt Development including plant cost, tree guard and maintenance	2.94	1.0
7.	Retaining Wall around the dump area	0.50	--
8.	Blasting related safeguard expenses (Caution boards, Silencer Blower)	0.10	0.05
9.	Providing proper facility such as barrels for storage, handling of spent oils (if generated from machinery, D.G. Sets) classified as hazardous waste which will sold to CPCB/RSPCB authorized recyclers	0.10	0.05
Total (in Lacs)		5.84	4.25

This cost towards Environment Management Plan will be spent phase-wise along with the growth of project.

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev No. 00

CHAPTER - V

ANALYSIS OF ALTERNATIVES

(TECHNOLOGY AND SITE)



CHAPTER V ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

5.1 SITE ALTERNATIVE

The Letter of Intent (LOI) for mineral Limestone, Area: 1.0 hectare was sanctioned in favour of Smt Seisoh Syiemlieh by Office of Divisional Forest Officer Khasi Hills Division & Ri Bhoi (T) Division, Shillong vide letter no.KH/8/ML/Limestone/68/2655 dated 30.08.2024 for mining purpose only. Hence, no alternative site has been examined as the project is mineral specific.

5.2 ALTERNATIVE FOR TECHNOLOGIES

No alternative technology has been examined as the project is mineral specific. The mining work will be carried out in lease area by open cast semi-mechanized method.



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – VI – Environmental Monitoring Programme

CHAPTER–VI

ENVIRONMENTAL MONITORING PROGRAMME



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev. No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – VI – Environmental Monitoring Programme

CHAPTER VI ENVIRONMENTAL MONITORING PROGRAMME

6.1 INTRODUCTION

Regular monitoring of environmental parameters is of immense importance to assess the status of environment during project operation. The knowledge of baseline conditions and the monitoring programme will serve as an indicator to assess any deterioration in environmental conditions due to the proposed “Rusiar Limestone Mine” and to enable taking up suitable mitigation steps in time to safeguard the environment. Monitoring is important for control of pollution since the efficiency of control measures can only be determined by monitoring.

Therefore, regular monitoring programme of the environmental parameters is essential to take into account the changes in the environmental quality.

6.2 ENVIRONMENTAL MONITORING AND REPORTING PROCEDURE

Monitoring will conform that commitments are being met. The objectives of the monitoring are:-


- Measure effectiveness of operational procedures;
- Conform statutory and corporate compliance; and
- Identify unexpected changes.

Smt Seisoh Syiemlieh, for its “Rusiar Limestone Mine” shall engage third party services of NABL certified and MoEF&CC recognized environmental laboratory for carrying out environmental monitoring of the core and the buffer area.

6.3 ENVIRONMENTAL MONITORING SCHEDULE

Services of NABL certified and MoEF&CC recognized monitoring laboratory shall be sourced to monitor and assess the current environmental scenario and to comply with environmental monitoring and reporting requirements as per statutory clearances.

Environmental monitoring for the mining operations will be conducted for the following parameters:

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – VI – Environmental Monitoring Programme

Ambient Air Quality Monitoring

Ambient air quality monitoring within core & buffer zone, considering the predominant wind direction.

Water Monitoring

Ground water quality & level in core & buffer zone shall be monitored through a network of wells and piezometers and analyzed as per IS-10500, 2012.

Surface water sample from locations in and around the core zone shall be collected and analysed periodically.

The impact of mining operations on ground water level shall be monitored. The ground water level shall be monitored monthly and its impacts assessed and reported to CGWA periodically.

Noise Level

Noise level monitoring of mine equipment shall be done on monthly basis. In case of overhauling of major equipment noise measurements shall be done before and after overhaul.

Soil Environment

Soil quality within M.L Area and in buffer area shall be monitored periodically at designated locations once in six months, especially for heavy metals.

Environmental Monitoring Schedule will be prepared covering various phases of project advancement, such as development and operational phase. The environmental monitoring program to be implemented is given in Table 6.1.



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – VI – Environmental Monitoring Programme

Table 6.1: Post EIA Environmental Monitoring Programme

S. N.	Environmental Component		Parameters	Monitoring		Measurement Method	Location
				Duration	Frequency		
1.	Meteorological		Wind Speed; Wind Direction; Max. Temperature; Min. Temperature; Dry bulb temperature; Wet Bulb temperature; Relative Humidity; Rainfall; Cloud cover.	24 hourly continuous	Regularly in One season by Weather Monitoring Station.	IS 5182 Part 1-20 Automatic Weather Monitoring station.	Mine Site
2.	Ambient Air		PM10, PM2.5, SO2, NOX & CO and Lead in PM or as prescribed by CPCB/ SPCB/ MoEF&CC	8 hours	Quarterly/ Half Yearly	Fine Dust Sampler and Reparable Dust Sampler	1 static and 1 dynamic locations within ML Area & 5 locations in buffer area (third party monitoring)
4.	Noise & Vibration	Ambient	Spot Noise level recording Leq (day), Leq (night), Leq (dn)	(24 hours monitoring on hourly basis)	Once in a season	IS: 4954-1968 as adopted by CPCB.	07 (Core Zone-1 and Buffer zone-6) (Mine Boundary, High noise generating areas within the lease
		Work Zone					Mine site



Gaurang Environmental Solutions Pvt. Ltd.	Page
Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – VI – Environmental Monitoring Programme

		Peak particle velocity	--	--	Regularly During blasting operations	PPV Meter	Around the project Area. or 150-200 mtr from the blasting site.
5.	Water Quality	Ground water	Physico-chemical & microbiological characteristics.	--	Once in a season	Ground Water- As per IS: 10500, 2012 or as prescribed by CPCB/ SPCB/ MoEF&CC.	7 locations (Core Zone-1 and Buffer Zone-6) Mine Effluents, Set of grab samples taken in Post Monsoon Season for ground and Surface water in the vicinity.
		Hydrogeology	Water level in the open wells in core and buffer zone around 1 km at specific wells.	--	Monthly once in Every Monitoring wells	Surface Water- Parameters specified under IS:3025 as prescribed by	Piezometric wells in & around ML Area
		Surface Water	Physico-chemical & microbiological characteristics.	--	Once in a season	CPCB/SPCB/MoEF&C C	Two locations within the study area. (upstream and downstream)



Gaurang Environmental Solutions Pvt. Ltd.


Report Ref: GESPL_779/ 2024-25/ DEIA/109

Page

Rev. No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – VI – Environmental Monitoring Programme

6.	Soil Environment	Composite sample from the site for Physio-chemical parameters	Once in a quarter		Collected and analyzed as per soil analysis reference book, M.I. Jackson and soil analysis reference book by C.A. Black	04 locations in and around M.L Area
7.	Health	Occupational Health	<ul style="list-style-type: none"> • Initial Medical Examination (IME) • Periodic Medical Examination (PME) 	<ul style="list-style-type: none"> • Once in 3 years for age > 45 years • Once in 5 year for age ≤ 45 years 	--	All employees

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – VI – Environmental Monitoring Programme

6.4 PROPOSED MONITORING SCHEDULE DURING OPERATIONAL PHASE

The major attributes which merit regular monitoring based on the environmental setting and nature of project activities are listed below:-

- Source emission and ambient air quality;
- Ground water levels and ground water quality;
- Waste water & treated water quality;
- Soil quality;
- Noise levels (equipment and machinery noise levels, occupational exposures and ambient noise levels); and
- Ecological preservation and plantation

6.5 MONITORING METHODS

6.5.1 AIR QUALITY MONITORING

Work Zone Monitoring

The concentration of air borne pollutants in the workspace/ work zone environment is being/will be monitored periodically. If concentrations are higher than threshold limit values the source of fugitive emissions will be identified and necessary measures is being /will be taken as detailed in EMP.


Ambient Air Quality Monitoring

The ground level concentration of PM₁₀, PM_{2.5}, SO₂, NO_x, and CO (as per CPCB/MoEF&CC Norms) in the ambient air will be monitored at regular intervals. Any abnormal rise will be investigated to identify the causes and an appropriate action will be initiated. Greenbelt will be developed for minimizing dust propagation.

6.5.2 MONITORING OF WATER QUALITY

Monitoring of Ground Water

The monitoring of groundwater is the most important tool to find out the depletion/ increase in level of water table. Water table will be monitored at regular intervals by network of wells and piezometers within the lease area& buffer zone. Records of analysis

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – VI – Environmental Monitoring Programme

will be maintained.

Water and Wastewater Quality Monitoring

To ensure a strict control over the water consumption, flow meters shall be installed for all major inlets. All leakages and excess shall be identified and rectified. In addition, periodic water audits will be conducted to explore further possibilities for water conservation. Domestic waste water will be disposed of in septic tank followed by soak pit.

6.5.3 MONITORING NOISE LEVELS

Noise level in the work zone environment will be monitored. The frequency will be once in a season in work zone. Similarly, ambient noise levels near habitations will also be monitored once in three months. Audiometric tests will be conducted periodically for the employees working close to the high noise sources.

6.5.4 OCCUPATIONAL HEALTH MONITORING

The mine workers health monitoring is very important to identify any occupational health impacts arising out of the operations and the environmental conditions. All workers shall undergo a pre-employment medical health checkup at the time of joining and undergo periodic health checkup as per the stipulations of DGMS and records shall be maintained.

6.6 EIA FOLLOW UP

Voluntary reporting of environmental performance with reference to the EMP will be undertaken by Smt Seisoh Syiemlieh.

The EMC will coordinate regarding the monitoring programme at mines as per the regulatory requirement and data/report thus, generated will continue to be regularly furnished to the concerned regulatory agencies.


The half yearly compliance report in respect of conditions of Environmental Clearance granted by SEIAA, Meghalaya will be submitted regularly to respective authorities. The frequency of compliance reporting will be on six monthly basis to Meghalaya State Pollution Control Board (MSPCB), Regional office, MoEF&CC and CPCB.



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – VI – Environmental Monitoring Programme

6.7 CONCLUSION

Post Environmental monitoring is an essential step in the EIA process, if the predicted impacts, the efficiency of mitigation measures and the shortcomings of prediction methods, measures and even regulations are to be verified and EIA practice improved. Environmental indicators could contribute to designing and evaluating monitoring programs, thus improving establishment of the cause effect relationship and the reporting and communication of environmental data.

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

CHAPTER - VII

ADDITIONAL STUDIES



CHAPTER VII ADDITIONAL STUDIES

7.1 INTRODUCTION

The draft EIA/EMP report of “Rusiar Limestone Mine” by Smt Seisoh Syiemlieh is being submitted as per Terms of Reference (TOR) for the conduction of Public Hearing. The issues raised during the Public Consultation will be addressed and included in the final EIA/EMP report, along with a time-bound action plan.

7.2 RISK ANALYSIS AND DISASTER MANAGEMENT PLAN

Mining basically is a hazardous profession requiring stringent safety measures to avoid incidences involving life and damage to machineries. It may cause extensive damage to property and serious disruption in work inside and outside the premises. Such situations need positioning of emergency response plan which can be executed without the loss of time. Time factor is the essence in dealing emergencies to minimize the loss of human life and disruption of work.

Any accident may develop into a major emergency even with the best safety measures and programmes in mining. Hence, an emergency preparedness plan will be planned properly and documented for ease of implementation at the time of need without losing time and avoiding and delays.

7.2.1 OBJECTIVES OF DISASTER MANAGEMENT PLAN

The objectives of DMP is to describe the company’s emergency preparedness, organization, the resource availability and response actions applicable to deal with various types of situations that can occur at mines in shortest possible time.

Thus, the overall objectives of the emergency plan are summarized as:-

- Rapid control and containment of Hazardous situation.
- Minimizing the risk and impact of event/ accident.
- Effective prevention of damage to property.

In order to achieve effectively the objectives of emergency planning, the critical elements that form the backbone of Disaster Management Plan (DMP) are:-

- Reliable and early detection of an emergency and immediate careful planning.



- The command, co-ordination and response organization structure along with availability of efficient trained personnel.
- The availability of resources for handling emergencies.
- Appropriate emergency response action.
- Effective notification and communication facilities.
- Regular review and updating DMP.
- Training of the concerned personnel.

Steps taken for minimizing the effects may include rescue operations, first aid, evacuation, rehabilitation and communicating promptly to people living nearby.

7.2.2 IDENTIFICATION OF HAZARDS AND MITIGATION MEASURES

The following types of hazards are identified and precautions to be taken against them are enumerated below:-

7.2.2.1 Fall of Sides & Roof

- Flatter slope angles are adopted where occurrences of loose earth are encountered.
- Unmanageable heights are not created.
- Loose rocks are properly dressed.
- Nature and structure of the rocks are properly studied for their slips.
- Bench height will be kept with respect to the digging depth of excavating equipment. In case of semi mechanized open-cast, mine bench height is will be kept 6.0m. The width of the bench will not be less than the height.
- No overhang/ under cutting will be allowed to be created in benches.
- Overloading of dumpers will not be allowed. Large size of material will not be loaded at the top of the dumpers to prevent its falling and causing injury to persons.

7.2.2.2 Storage and use of Explosives

- Safe practices will be adopted while using explosives and it is will be kept and stored in magazine, duly licensed.
- DGMS qualified blaster will be appointed for carrying out blasting operations.
- All precautions will be taken before blasting like removal of persons, equipments from the place of blasting to the safe distance.



- Proper record of receipt, storage and use of explosives/ fuel will be kept and maintained by properly authorized persons.
- Explosives is will be used as per the requirement. No overcharging/ undercharging of holes is will be allowed.
- All entries to the blasting area will be blocked and guarded to prevent inadvertent entry of persons.
- Alert through hoisting red flag will be given for cautioning/ warning to persons nearby before blasting.

7.2.2.3 Storage of Oil and Fuel

- Due care will be taken to avoid oil spillage.
- Oil collecting bins will be placed before taking out oil from drums/ barrels to prevent spillage on the ground. Storage will not be allowed beyond necessity.
- Sand will be spread on floor. It will be regularly scrapped and removed.
- Sand baskets will be provided within the easy reach of persons near the area of fuel/ lubricant storage.
- Sufficient no. of foam type fire extinguishers will be provided.
- All equipments deployed in the mine will be provided with fire extinguishers CO₂ type to deal with electrical fires.
- Fire hydrant will be provided with long hose pipe near the mine.

7.2.2.4 Water

- Proper drainage will be maintained to eliminate inundation of working pits during rains from run-off water.
- Garland drains will be constructed and will be maintain to prevent outside water entering the mine pit.
- Sumps with adequate capacity will be developed inside the mine.
- Pumping system with adequate pumping capacity will be deployed to deal with accumulated water.
- Dumping area will be benched and sloped at the top towards the low altitude side.
- Parapet wall of (1m x 1m) will be provided on the low altitude side of the dumps.
- Siltation ponds (3m x 3m x 2m) will be provided to arrest silt coming with runoff water/ garland drains.



7.3 OCCUPATIONAL HEALTH HAZARDS

Open cast method involves dust generation by excavation, loading and transportation of mineral. At site, during excavation and loading activity, dust is main pollutant which affects the health of workers whereas environmental and climatic conditions also generate the health problems.

Addressing the occupational health hazard means gaining an understanding of the source (its location and magnitude or concentration), identifying an exposure pathway (e.g. a means to get it in contact with someone), and determination of likely a receptor (someone receiving the stuff that is migrating).

Occupational hazard due to open cast mining mainly comes under the physical hazards. Possible physical hazards are as below mention:-

7.3.1 PHYSICAL HAZARDS DUE TO MINING OPERATIONS

Following health related hazards were identified in open cast mining operations to the workers:-

1. **Light:** - The workers may be exposed to the risk of poor illumination or excessive brightness. The effects are eye strain, headache, eye pain and lachrymation, congestion around the cornea and eye fatigue.
2. **Heat and Humidity:** - The most common physical hazard is heat. The direct effects of heat exposure are burns, heat exhaustion, heat stroke and heat cramps; the indirect effects are decreased efficiency, increased fatigue and enhanced accident rates. Heat and humidity are encountered in hot and humid condition when temperatures and air temperatures increase in summer time up to 48°C or above.
3. **Eye Irritation:** - During the high windy days in summer the dust could be the problems for eyes like itching and watering of eyes.
4. **Respiratory Problems:** - Large amount of dust in air can be a health hazard, exacerbating respiratory disorders such as asthma and irritating the lungs and bronchial passages.
5. **Noise Induced Hearing Loss:** - Machinery is the main source of noise pollution at the mine site.



7.3.2 MANAGEMENT

Particulars	Control Measures
Heat & Light	<ul style="list-style-type: none"> ➤ The mine site will have adequate drinking water supply so that workers do not get dehydration. ➤ Lightweight and loose-fitting clothes having light colors will be preferred to wear. ➤ Rigorous exercise and more physical activities will be avoided in hot weather.
Noise	<ul style="list-style-type: none"> ➤ Noise exposure measurements will be taken to determine the need for noise control strategies. ➤ The personal protective equipment will be provided for each mine workers. ➤ Supervisor will be instructed for reporting any problems with hearing protectors or noise control equipment. ➤ At noisy working activity, exposure time will be minimized. ➤ Machineries will be labeled with noise levels.
Respiratory	<ul style="list-style-type: none"> ➤ PPE's like face mask, ear plugs, helmets, shoes etc. will be provided during mining activity. ➤ Periodic medical examinations is will be provided for all workers. ➤ Awareness program will be organized for workers.

7.3.3 MEDICAL EXAMINATION SCHEDULE

To minimize the health impacts PPE's like dust masks, ear plugs/ muffs and other equipments will be provided for use by the work personnel. All workers will be subjected to Initial Medical Examination as per Mines Rule 1955 at the time of appointment. Periodical Medical Examination will be conducted at least once in five years. Medical camps will be organized. The detail of health check up and periodical medical examination schedule is given below in Table 7.1.

Table 7.1: Medical Examination Schedule


S. No.	Activities	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
1.	Initial Medical Examination (Mine Workers)					
a.	Physical Check - up		--	--	--	--
b.	Psychological Test		--	--	--	--
c.	Audiometric Test		--	--	--	--
d.	Respiratory Test					
2.	Periodical Medical Examination (Mine Workers)					



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter – VII – Additional Studies

a.	Physical Check - up	--				
b.	Audiometric Test	--				
c.	Eye Check - up	--				
d.	Respiratory Test					
3.	Medical Camp (Mine Workers & Nearby Villagers)	--				
4.	Training (Mine Workers)					

Medical Follow ups: - Work force will be divided into three targeted groups age wise as follows:-		
Age Group	PME as per Mines Rules’ 1955	Special Examination
Less than 25 years	Once in a Five Years	In case of emergencies
Between 25 to 40 Years	Once in a Five Years	In case of emergencies
Above 40 Years	Once in a Three Years	In case of emergencies
Medical help on top priority immediately after diagnosis/ accident is the essence of preventive aspects.		

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

CHAPTER - VIII

PROJECT BENEFITS



CHAPTER VIII PROJECT BENEFITS

8.1 GENERAL

Mining operations engage with local and indigenous communities and generate net benefits by: -

- Provision of well paid-employment under conditions that comply with accepted labour standards;
- Provision for educating and training programmes;
- Development of local industries and businesses;
- Support of government initiatives and social activities;
- Investment in infrastructure development that benefits the communities;
- Provision of health and sanitation programmes (such as malaria prevention vaccination and the related);
- Complying by the laws of the Federal, state and municipal of the project location
- Increase the local employment and generate skilled employees

8.2 EMPLOYEMENT

8.2.1 DIRECT EMPLOYMENT

The proposed project will provide employment to 19 people. Considering that some of the skilled personnel to be employed for the project will not be from the surrounding area. Unskilled/ semi or skilled personnel are from within the study area, the project will add to the well being of the area.

8.2.2 INDIRECT EMPLOYMENT

The project will also provide some indirect employment to the people of nearby area of mine site. Locals will be engaged in petty shops like tea shop, vehicle repair centre etc. It will provide need-based opportunity to the locals. The project will provide following indirect employment to the local people: -

- The limestone available will provide agency employment in the value chain analysis, for place utility and retail.
- Transportation and warehousing in the region required to transfer the mineral will eventually be needed and therefore trucks and jobs in logistical activities will come up



- There will be development of externalities for the mine workers petty shops (tea, repair stations for trucks etc.) as supporting services
- As there would be vocational training camps and Technical Training of mining to the regional people, hence there will be potential manpower available for the proposed and surrounding mines of the Tehsil.
- Indigenous people are will be skilled for sustainable development.

8.3 IMPROVEMENTS IN PHYSICAL AND SOCIAL INFRASTRUCTURE

The project will enhance the socio-economic activities in the adjoining areas. This will result in the following benefits: -

- Improvements in physical infrastructure;
- Improvements in social Infrastructure;
- Increase in employment potential;
- Contribution to the exchequer;
- Post-mining enhancement of green cover.

8.3.1 IMPROVEMENTS IN PHYSICAL INFRASTRUCTURE

It is a limestone mining project. It will give numerous positive impacts on society such as growth in schools, hospitals etc. It will also attract other entrepreneur to establish their venture in the region.

The project will improve the physical infrastructure of the adjoining areas. This will include the following: -

- Improved road communication;
- Strengthening of existing community facilities through the Community Development Programme;
- Rain water reservoir to augment the water availability for irrigation and plantation;
- Skill development & capacity building like vocational training to persons for income generation.
- Awareness program and community activities, like health camps, family welfare programs, immunization camp, plantation etc.



8.3.2 IMPROVEMENTS IN SOCIAL INFRASTRUCTURE

There will be some obvious changes in various environmental parameters due to mining activity. Increase socio-economic activities, creation of new employment opportunities, infra-structural development, better educational and health facilities.

Following are the benefits in specific area of social domain: -

Socio-Economic: - There will be positive impact in socio-economic area due to increased economic activities, creation of new employment opportunities, infrastructural development and better educational and health facilities.

Health Care Facilities: - Company will undertake awareness program and community activities like health, camps, family welfare camps etc.

Employment Potential: - There is a possibility of creation of direct and indirect employment opportunities due to working of this mine.

The mine will contribute to the Exchequer of State and Central Government as per norms.

8.4 HEALTH

Periodic medical checkups as per Mines Act/ Rules and other social development and promotional activities will be undertaken. All this to lift the general health status of the residents of the area around mines.

8.5 OTHER BENEFITS

The other tangible benefits include metrics and improvements demonstrating process and system cost savings, compliant inspections and customer audits, faster product approvals and manufacturing throughput, less rejected material, reduced nonconformance issues, and more efficient continuous improvement and project implementation. Intangible benefits include improved staff morale, quick, more accurate and transparent decision making, increased staff accountability and an enhanced culture of quality throughout the organization.



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Chapter – IX – Environmental Cost Benefit Analysis

CHAPTER - IX **ENVIRONMENTAL COST** **BENEFIT ANALYSIS**




Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Chapter – IX – Environmental Cost Benefit Analysis

CHAPTER IX ENVIRONMENTAL COST BENEFIT ANALYSIS

9.1 ENVIRONMENTAL COST BENEFIT ANALYSIS

As per EIA Notification 14th September’ 2006, this chapter of the “Environmental Cost Benefit analysis is applicable only if it is recommended at the scoping stage. As per the ToR points issued by SEIAA, Meghalaya for the project; the Environmental Cost Benefit Analysis is not applicable.

	Gaurang Environmental Solutions Pvt. Ltd.	Page
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt Seisoh Syiemlieh	Chapter –X – Environmental Management Plan

CHAPTER -X

ENVIRONMENTAL MANAGEMENT

PLAN



Gaurang Environmental Solutions Pvt. Ltd.	Page
Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

CHAPTER X ENVIRONMENTAL MANAGEMENT PLAN

10.1 INTRODUCTION

A site-specific Environmental Management Plan is formulated and diligently practiced at Rusiar Limestone Mine, subsequent to this EIA study as per the Terms of Reference to ensure that the appropriate environmental management practices are followed in compliance with the environmental legislations.

10.2 COMPONENTS OF EMP

Following elements are the major components of Environment Management Plan:-

Commitment and policy: To implement environment management plan that comprehensively covers all issues related to air, land and water.

Planning: This head includes identification of environmental impacts, legal requirements and setting environmental objectives.

Implementation: This comprises of resources available for the project, accountability of employees, contractors training of operational staff associated with environmental control facilities and documentation of measures to be taken.

Measurement and evaluation: This includes monitoring, corrective actions and record keeping.

The following Policy & Programs shall be developed to ensure proper implementation of EMP for the limestone mining project:

- Formulating Environment, Occupational Health & safety and quality Policy
- Formation of Environment Management Cell (EMC)
- Greenbelt Development & Plantation Programme
- Allocating annual budget for environmental management measures & ensuring implementation

10.3 INSTITUTIONAL ARRANGEMENTS FOR EMP IMPLEMENTATION

10.3.1 CORPORATE ENVIRONMENT POLICY

The Company shall draft a well laid down Corporate Environment Policy covering the nine key principles including Environment prescribed by SEBI vide Circular No. CIR/ CFD/ CMD/ 10/ 2015 dated November 04, 2015.



The key principles to be covered under the policy are as follows-

1. Ethics, Transparency and Accountability
2. Sustainability
3. Wellbeing of Employees
4. Disadvantages, vulnerable and marginalized stakeholders
5. Human Rights
6. Environment
- 7.
8. Public and regulatory policy advocacy
9. Inclusive growth and equitable development
10. Value to Customers

10.3.2 REDRESSAL MECHANISM

The Environmental Management Committee shall oversee the implementation of the Policy and address the stakeholders’ grievances related to the said Policy.

- **Independent Audit/ Evaluation of working of the Policy**

Independent Audit/ evaluation of implementation & effectiveness of the Policy will be done by the Internal Auditor on annual basis and report the same to the Chief Financial Officer and Whole Time Director, being designated by the Board of Directors as responsible Director for the preparation and implementation of the Corporate Environment Policy.

- **Reporting Mechanism**

The company shall report extensively on their operations in the annual report, highlighting their vision, commitment and achievements and have a copy of the same accessible to its stakeholders on the company website.

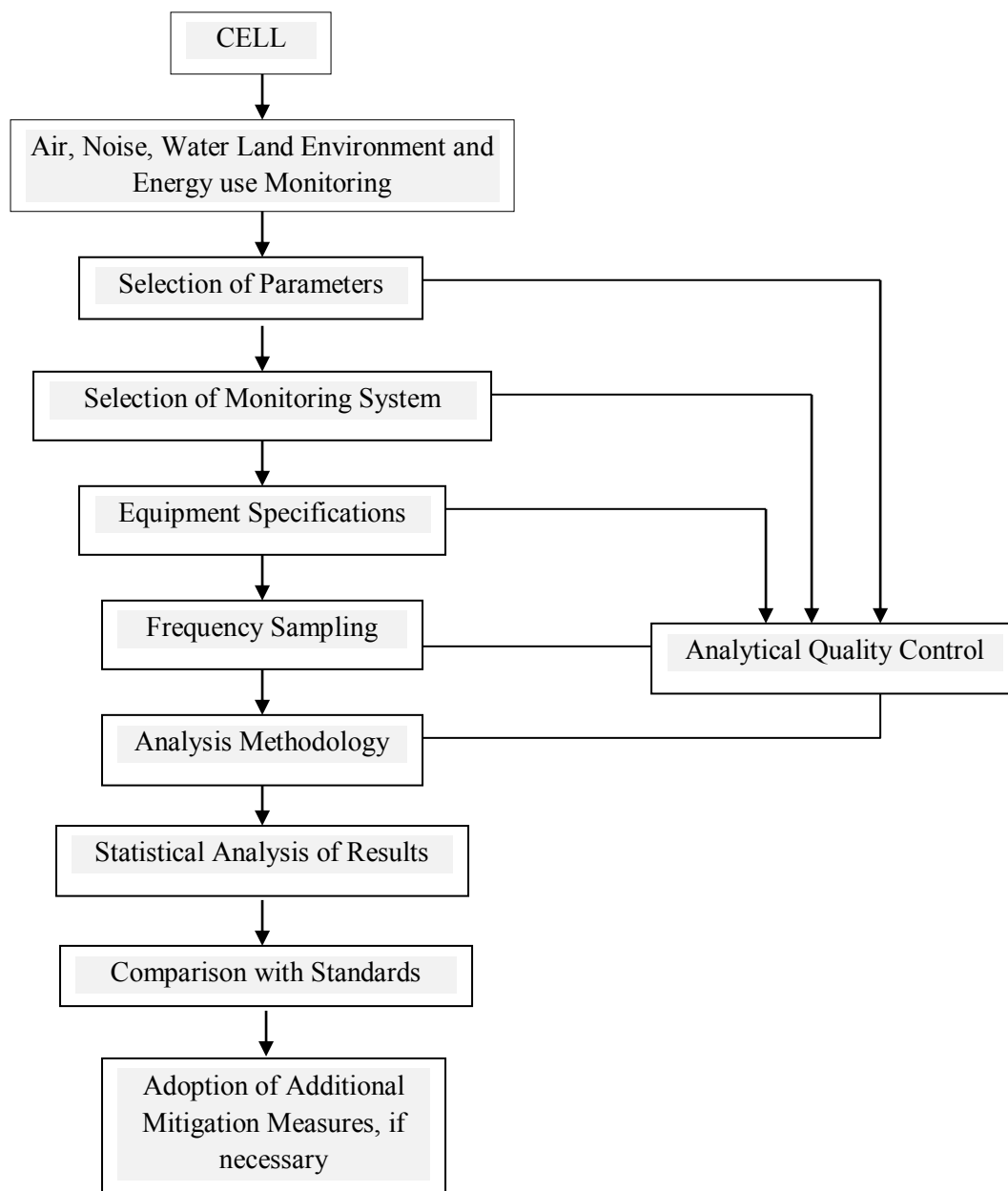
The company shall monitor and communicate their progress on environmental parameters in the annual report.

10.3.3 ENVIRONMENTAL MANAGEMENT CELL (EMC)

To comply with environmental quality standards, regular inspections, audits & monitoring of various environmental components is necessary. Shri Arbis Tangdhara will formulate an Environmental Management Cell (EMC) for environmental monitoring and reporting. The EMC will be responsible for pollution monitoring and implementation of control measures as discussed in Chapter IV of this EIA/EMP Report. Suitably qualified personnel including



an engineer & technicians is deputed for maintenance, up-keep and monitoring of the pollution control equipment. The Organizational structure of EMC is given below:-



10.3.4 RESPONSIBILITIES OF EMC

The responsibilities of the EMC include the following:-

1. Environmental monitoring of the core and buffer zone.
2. Verifying adequacy & ensuring smooth running of pollution control equipment.
3. Specification and regulation of maintenance schedules for pollution control equipment.
4. Ensuring that environmental standards viz. ambient air quality, water and effluent quality, noise level, soil quality stipulated in statutory clearances are maintained.



5. Monitoring the progress of green belt development.
6. Ensuring optimum usage of natural resources including water.
7. Carrying out the Environmental Management Plan.
8. Ensuring compliance of statutory clearances and submission to concerned authorities.
9. Maintain documentation of good environmental practices and applicable environmental laws as ready reference.
10. Maintain environment related records.
11. Coordination with regulatory agencies, external consultant, monitoring laboratories.
12. Maintain log of public complain and the action taken.
13. Organizing meetings of the Environmental Management Committee and reporting to the technical head, project head and location head.

The applicant believes in sustainable development and is committed towards effective environmental management as an integral part of its business.

The applicant will ensure compliance with all environmental laws and regulations applicable to its activities, including mining, storage, and transportation of limestone. The applicant will also work towards minimizing its environmental footprint and will obtain the following certifications as part of its commitment to good management practices:

- ISO 14001:2015
- ISO9001:2015
- BS OHSAS 45001: 2018

10.4 ACTIVITIES FOR EMP IMPLEMENTATION

1. Training and Environmental Awareness;
2. Documentation and record keeping;
3. Reporting Procedures;
4. Stakeholder/ Project Proponent engagement;
5. Auditing;
6. Responding to Non-compliance.

10.5 ENVIRONMENTAL ACTION PROGRAMME

The applicant “Smt. Seisoh Syiemlieh” is aware of their responsibility for maintaining clean environment & shall ensure sustainable development. Adequate funds for pollution control measures will be provided as a part of overall project financing to ensure the availability of



proper pollution control facilities. The EMP budget is ₹ 5.84 Lacs (capital cost) and the recurring cost is ₹ 4.25 Lacs per annum for the environment protection program. Details are given in Chapter IV of this EIA/EMP report.

Table 10.1: Environment Management Plan & Responsibility

S. No.	Designation	Nos.	Role/ Responsibilities
1.	Mines Manager	01	<ul style="list-style-type: none"> Responsible for discharging duties as Mines Manager of “Rusiar Limestone Mine” as per Mines Act 1952, MMR 1961, Mines Rules 1955, MCDR 2017 and Office Memorandum issued by regulatory authorities from time to time. To identify and comply with the applicable Statutory & Regulatory requirements. Create awareness on potential environmental aspects & occupational hazards & risk. Ensure judicious use of all natural resources including energy, minerals, water etc. Ensure environment friendly operations with a view to keep the emissions/effluents within the prescribed norms. To plan for new equipment, equipment modification etc. for quality improvement in mine operations, reduction of environmental impact & Risk etc.) in consultation with Operations Head. To identify, control and reduce the EHS hazards and risks. Training need assessment of employees for effective implementation of the EMP & notify Incident controller in case of any emergency. To ensure effective & continuous operation of pollution control & safety equipment. Overall environmental performance of the Mines. Coordination with statutory / regulatory bodies/authorities. Ensure the EMP is implemented and is effective. Assist the Environment Manager with regulatory authorities and/or community consultation (i.e. addressing complaints).
2.	Environmental Manager &	02	<p>Implement EMP as stipulated.</p> <ul style="list-style-type: none"> Ensure that all the applicable environmental parameters are



S. No.	Designation	Nos.	Role/ Responsibilities
	Environment Engineer		<p>regularly monitored & reports submitted to the concerned regulatory authorities.</p> <ul style="list-style-type: none"> • Ensure that the environmental objectives and targets are established and achieved. • Review and evaluate contractor’s EMP to ensure that the same is consistent with the EMP of the “Rusiar Limestone Mine”. • Coordinate with regulators and other agencies as required in unison with the Mines Manager for effective implementation of the EMP. • Assist operations staff in improving work practices / procedures or adding more stringent requirements / controls) • Ensure that any change in any of the activities/ equipment/processes is duly evaluated in order to ensure no increase in or introduction of new environmental risks or impacts. • Ensure that the requirements of the EMP and related management programs have been addressed in all contractor environmental management documentation. • Undertake regular audits (or appoint an appropriately qualified external auditor) for evaluating the environmental performance of the mine. • Undertake routine environment monitoring as per schedule. • Daily inspection of the premises, preparing inspection reports. • Checking of emission/ noise level of mining equipment for mid-course correction. • Ensure that regular water sprinkling is done on the haul roads and around waste dumps for effective control of fugitive emissions • Supervising the overall progress of environmental management programs and ensuring all applicable regulations are adhered to. • Prepare and submit regular reports to concerned authorities • Assist horticulturist in developing greenbelt in mining premises in line with stipulated guidelines



S. No.	Designation	Nos.	Role/ Responsibilities
			<ul style="list-style-type: none"> Assist mining engineers in implementing best waste management practices Coordinate with mining and other concerned engineers for effective implementation of the EMP
3.	Horticulturist	01	<ul style="list-style-type: none"> Planning for plantation and greenbelt development in mining area Seek assistance from local forest department regarding selection of species for plantation Ensure regular watering of saplings is done as per schedule to ensure maximum survival rate. Ensure optimum survival of saplings Development of lawns and gardens around office and other areas Ensure regular maintenance of saplings planted in mining area
4.	Mechanical Engineer	01	<ul style="list-style-type: none"> Daily inspection of machinery & equipment Regular maintenance of equipment as per Original Equipment Manufacturer (OEM) recommendations Keeping maintenance logs Regular monitoring of fuel consumption of vehicles and coordination with suppliers/ OEM if the fuel consumption exceeds the committed values. Ensure that the mining machinery conform to the applicable environmental norms Ensure that the emission/noise levels from the mining machinery do not exceed the permissible levels
5.	E&I Engineer	01	<ul style="list-style-type: none"> Ensure electrical supply in mining area for operation of monitoring and measuring instruments Troubleshooting, maintenance and periodic calibration of environmental monitoring equipment. Maintain appropriate inventory of spares.



10.6 CONCLUSION

Various aspects of mining activities were considered and related impacts were evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan has been prepared and fund has been allocated for the same. Details are given in Chapter IV. The EMP is dynamic, flexible and subjected to periodic review.

Senior Management of the project shall conduct a review of EMP and its implementation to ensure that the EMP remains effective and appropriate. Thus, proper steps shall be taken to accomplish all the goals mentioned in the EMP so that existing mining project brings a net positive impact in the study area.



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Chapter – XI –Summary and Conclusion

CHAPTER - XI

SUMMARY AND CONCLUSION



Gaurang Environmental Solutions Pvt. Ltd.	
Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

CHAPTER XI SUMMARY AND CONCLUSION

11.1 INTRODUCTION

The “Rusiar Limestone Mine” coming up at Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya. The total lease area of the project is 1.0 Ha. The mining activity will be carried out by open cast semi-mechanized method.

The project activity is listed at item 1(a) B1 Mining of Minerals in Schedule of EIA Notification, 2006 and subsequent amendments thereafter as category “B1” project and hence require prior Environmental Clearance.

However, as per the EIA Notification No. S. O. 3977 (E) dated 14th August’ 2018 for Sand Mining and other Minor mineral Mining projects in Cluster situation having Cluster area of Mine leases > 5 ha and < 25 ha with no individual lease > 5 ha comes under category “B2” and public hearing is not required for appraisal of EC.

As per the Ministry of Environment, Forest & Climate Change Office Memorandum dated 12th December, 2018 “If the cluster or an individual lease size exceeds 5 ha the EIA/EMP be made applicable in the process of grant of prior Environmental Clearance”. The total cluster area is 5.23 Ha.

11.1.1 LOCATION OF LEASE AREA

The mining lease is coming up at Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya. The mining lease area is 1.0 ha with proposed production capacity of 48,900 TPA of ROM (Mineral Limestone- 44,025 TPA & Mineral Waste/Subgrade- 4,875 TPA).

11.1.2 DETAIL OF MINING LEASE

S. No.	Particulars	Details
1.	Name of Project	Rusiar Limestone Mine
2.	Location	Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya
3.	Lease Area	1.0 Ha.
4.	Land Type	Private Land
5.	Seismic Zone	zone V very high damage risk zone (MSK IX or more) category



11.2 PROJECT DESCRIPTION

The Letter of Intent (LOI) for mineral Limestone, Area: 1.0 hectare was sanctioned in favour of Smt. Seisoh Syiemlieh by Office of Divisional Forest Officer Khasi Hills Division & Ri Bhoi (T) Division, Shillong vide letter no.KH/8/ML/Limestone/2655 dated 30.08.2024. The Mining Plan with PMCP has been approved by the Mining Engineer, Directorate of Mineral Resources Meghalaya: Shillong vide letter NO/DMR/MM/203/2024/04-A dated 27.11.2024.

The mineable reserves are about 2,76,345 MT to produce limestone at the rate of 48,900 TPA of ROM (Mineral Limestone- 44,025 TPA & Mineral Waste/Subgrade- 4,875 TPA).

The mining operations will be carried out by open cast semi - mechanized method.

11.2.1 GEOLOGY

Regional Geology

The generalized stratigraphic sequence of the region is given below:-

Table 11.1: Regional Geology

Geological Age	Group Name	Formation Name	Rock Type
Recent	Newer Alluvium	Unclassified	Sand, Silt and Clay
-----UNCONFIRMITY-----			
Pleistocene	Older Alluvium	Unclassified	Sand, Clay, Pebble, Gravel and boulder deposits
-----UNCONFIRMITY-----			
Mio-Pliocene	Dupitula Group	Unclassified	Mottled Clays, Feldspathic sandstone and conglomerate.
-----UNCONFIRMITY-----			
Oligo-Miocene	Garop Group	Chengopara Formation Baghmara Formation Simsang Formation	Sand, Siltstone, Clay, Mart Feldspathic Sandstone, Pebble, Conglomerate, Clay, Silty Clay. Shale, Sandstone, Mart



Project:- “Rusiar Limestone Mine”

Applicant:- Smt. Seisoh Syiemlieh

Chapter – XI –Summary and Conclusion

Eocene	Jaintia Group	Kopili Formation Shella Formation Langpar Formation	Siltstone-sandstone alternations, sand Alternation of sandstone-lime stone Calcareous Shale, Sandstone, Limestone
Upper Cretaceous	Khasi Group	Mahadek Formation Bottom Conglomerate Formation Jadukata Formation	Arkose (glaucconitic) Conglomerate, Arkose Sandstone- Conglomerate alternation
-----UNCONFIRMITY-----			
Jurassic	Sylhet Trap	-	Basalt, alkali Basalt, Rhyolite acid tuff.
-----UNCONFIRMITY-----			
Pre-Cambrian	-	Intrusives (Acid and Basic) Shillong Group	Ponphyritic and coarse granites, aplite, quartz vein, epidiorite, dolerite, basalt Quartzite, Phyllite, Conglomerate
-----UNCONFIRMITY-----			
Archaean	-	Gneissic Complex	Biotite- gneiss, Biotite-Hornblend gneiss, granitic gneiss, Migmatite, mica-schist, sillimanite- quartz schist, biotite- granulite-amphibolites, pynoxene-granulite etc.

Source: - Approved Mining Plan dated 27.11.2024

Local Geology: -

Table 11.1(a): Local Geology

Geological Age	Group Name	Formation Name	Rock Type
----------------	------------	----------------	-----------



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Rev. No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Chapter – XI –Summary and Conclusion

Recent	Newer Alluvium	Unclassified	Sand, Silt and Clay
-----UNCONFIRMITY-----			
Eocene	Jaintia Group	Shella Formation	Lime Stone

Physiography

The topography of the lease area is Hilly and Stony. The elevation range within the lease area is 183 mRL highest contour to 141 mRL lowest contour.

11.2.2 GEOLOGICAL AND MINEABLE RESERVES

Mineable Reserve : 2,76,345 MT

Production : 44025 TPA of Limestone

Life of Mine :~ 6.28 or say 7 Years as per the approved mining plan.

11.2.3 MINING

Opencast method of mining with semi mechanization will be adopted to excavate the mineral.

The salient features of mode of working as per approved Mining Plan with PMCP are:-

- Bench height and width are proposed to be kept 6 m each.
- Blasting will be done by short or long holes with permission of DGMS.
- The pneumatic breaker and hydraulic breakers will be used for the excavation of mineral.
- Fencing around the pit/excavation will be provided to check the inadvertent entry of human and livestock in the working zone.
- Garland drains with parapet walls be provided around the pit to avoid the surface runoff during the monsoon.
- Waste is proposed to be dumped in southwestern side of the lease area near pillar ‘2’ in 0.02 ha. area for 6 m in height in two terraces of 3m height each.
- Proposed bench slope is 85⁰.
- In the period of mining plan the lessee will develop six benches i.e. From Bench levels 171 mRL (Top Bench), 165 mRL, 159 mRL, 153 mRL, 147 mRL and 141 mRL (Lowest Bench).
- The approach roads will be provided time to time up to faces from nearest tar road.
- Drinking water will be brought from public water supply available at village and stored in water pitchers at site office and near the working sites for drinking purpose and in cement tanks near the site office for other purpose.
- The soil which may come across during mining will be scraped and stacked separately to be used for plantation during each monsoon.



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Rev. No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Chapter – XI –Summary and Conclusion

11.2.4 PRODUCTION DETAILS

The year wise development of mines for five years will progress as per the table below:-

Table 11.2: Production Details


Year	Tentative Excavation in Tons (ROM)	Waste/Sub Grade of Limestone in Tons	Mineral Limestone in Tons
First Year	48,900	4,900	44,000
Second Year	48,900	4875	44025
Third Year	48,900	4,900	44,000
Forth Year	48,900	4,900	44,000
Fifth Year	48,900	4,900	44,000
Total	2,44,500	24,500	2,20,000
<i>Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.</i>			

11.2.5 LAND USE PATTERN

Land use plan of the mine lease area to encompass pre-operational, operational and post-operational phases is given below: -

Table 11.3: Land Use Pattern

S. No.	Land use Category	Present (Ha)	End of 5th year (Ha)	End of mine (Ha)
1.	Top Soil Dump	--	--	--
2.	Overburden Dump	--	0.02	0.02
3.	Excavation (voids Only)	--	0.64	0.64 (0.13 ha. -Plantation on Upper benches & 0.49 ha- Water reservoir)
4.	Roads	--	0.02	0.02
5.	Buildup Area	--	--	--
6.	Township Area	--	--	--
7.	Afforestation	--	0.10	0.20
8.	Reclamation (Backfilled)	--	--	--
9.	Mineral Storage	--	--	--
10.	Processing (Crushing)	--	--	--
11.	Undisturbed area	1.0	0.22	0.12
Total		1.0	1.0	1.0
<i>Source: As per Approved Mining Plan along with PMCP dated 27.11.2024.</i>				

	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

11.3 DESCRIPTION OF THE ENVIRONMENT

For monitoring the environmental parameters like meteorology, air, water, soil and noise quality, the monitoring stations have been established at nine locations in the study area. The baseline data has been collected in the Post Monsoon Season (October 2023 to December 2023). The detail of the sampling locations is given in below: -

Table 11.4: Sampling Location

S. No.	Sampling Location	Distance (Km)	Direction	Components
1.	Mine Site (Smti. Seisoh Syiemlieh)	--	--	Air, Ground Water, Noise, Soil
2.	Bholaganj Bazar	0.9	E	Air, Ground Water, Noise, Soil
3.	Bholaganj	2.3	S	Air, Ground Water, Noise, Soil
4.	Chakalabasti	4.0	SW	Air, Ground Water, Noise, Soil
5.	Diengkain	3.85	WSW	Air, Ground Water, Noise, Soil
6.	Mawthang	3.65	NW	Air, Ground Water, Noise, Soil
7.	Sohbar	4.3	NNE	Air, Ground Water, Noise, Soil
8.	Mawpathaw	5.9	ENE	Air, Ground Water, Noise, Soil

11.3.1 LAND ENVIRONMENT

11.3.1.1 Soil Quality

Soil samples were collected at six representative sampling locations. The soil analysis results are given below: -

pH	:	7.32 to 7.84
Soil Conductivity	:	298 to 451 μ mhos/cm
Nitrogen as N	:	of 0.041 to 320 Kg/ Hectare
Phosphorus as P	:	10.84 to 18.67 mg/kg

11.3.2 WATER ENVIRONMENT

Ground Water

Eight ground water samples have been considered in the study area. The analysis results are as given below: -

The analysis results indicate that pH of the groundwater was found to be in range of 7.26-7.65. The TDS were found to be in the range of 285-448.0 mg/l. Other parameters like Calcium, Magnesium, Chlorides, Sulphates and Nitrates were found within the prescribed limits. The physico – chemical analysis for the other parameters were also within the



permissible limits as per the standards as per IS: 10500. The water quality is non- potable in nature.

11.3.3 AIR ENVIRONMENT

To assess the baseline status of the air quality in the study area systematic ambient air quality monitoring has been carried out for criteria pollutants (PM₁₀, PM_{2.5}, NO_x, SO₂ and CO) at eight representative ambient air quality monitoring stations.

Ambient Air Quality

Ambient air quality monitoring has been carried out with a frequency of two days a week at eight locations covering one complete season i.e. December 2024 to February 2025. Various statistical parameters like 98th percentile, average, maximum and minimum values have been computed from the observed raw data for all the AAQ monitoring stations. These are compared with the standards prescribed by Central Pollution Control Board (CPCB) for rural and residential zone.

The observation based on the perusal of the results is summarized below:-

PM₁₀:-The maximum value for PM₁₀ observed at Mine Site 79.82 µg/m³ and minimum value for PM₁₀ observed at Mawthang 53.4 µg/m³. The 24 hours applicable limit for Industrial, Residential Rural and Other Areas is 100 µg/m³.

PM_{2.5}:-The maximum value for PM_{2.5} observed at Mawpathaw 45.22 µg/m³ and minimum value for PM_{2.5} observed at Mawthang 19.21 µg/m³. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 60 µg/m³.

SO₂:- The maximum value for SO₂ observed at Diengkain 18.56 µg/m³ and minimum value for SO₂ observed at Bholaganj Bazar 5.84 µg/m³. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 80 µg/m³.

NO_x:-The maximum value for NO₂ observed at Diengkain 20.31 µg/m³ and minimum value for NO₂ observed at Bholaganj Bazar 9.45 µg/m³. The 24 hours applicable limit for industrial, Residential Rural and Other Areas is 80 µg/m³.

CO:-The maximum value for CO observed at Mine Site-0.92 mg/m³ and minimum value for CO observed at Bholaganj Bazar 0.25 mg/m³. The 8 hours applicable limit for Industrial, Residential Rural and other areas is 2.0 mg/m³.

Conclusion: The results of the monitored data indicate that the ambient air quality of the region in general conforms to the norms of National Ambient Air Quality standards of CPCB, at all locations monitored.



11.3.4 NOISE ENVIRONMENT

The noise monitoring has been conducted for determination of noise levels at seven locations in the study area. The noise levels at each location were recorded for 24 hrs. The results obtained were compared with the national standards and were found to be within the standards.

RESULT

A) Day time Noise Levels L_{eq} (day)

The day time L_{eq} (day) noise levels at all locations were observed to be in the range of 51.6-58.7 dB (A). The maximum noise level of 58.7 dB (A) was observed at Mine site and the minimum noise level of 51.6 dB (A) was observed at Mawpathaw during the study period. It is observed that the day time noise levels are in accordance to the prescribed limit of 75dB (A) in the study area.

B) Night time Noise Levels L_{eq} (night)

The night time L_{eq} (night) noise levels at all the residential locations was observed to be in range of 38.5- 43.2 dB (A). The maximum noise level of 43.2 dB (A) was observed at Sohbar and the minimum noise level of 38.5 dB (A) at Diengkain during the study period. It has been found that the night time noise levels at Mine Site were found to little very high due to vehicular movement, within the prescribed standard of 70 dB(A).

11.3.5 SOCIO-ECONOMIC ENVIRONMENT

Analyzing the current socio-economic and cultural environment of a community requires up-to-date social and economic data to assess the impact of any developmental actions or projects on the local context. The present status of the social and economic conditions in a given area is referred to as the Baseline Socio-economic Status. Baseline data consists of essential information collected prior to the implementation of a project or scheme.

METHODOLOGY

In the study area, 4.33% of total population belongs to Schedule Caste community. Out of which, 50.31% are males 49.69% are females, creating the sex ratio of 988 females per 1000 males in this community.

Scheduled Tribe Community: In the study area, population belongs to Scheduled Tribe community is 49.50% of the total population. Out of the total ST population, 49.50% are males and remaining 50.50% are females, creating the sex ratio of 1020 females over 1000 males among the ST community.

LITERACY STATUS OF THE STUDY AREA



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Rev. No. 00

In the study area, 56.68% of the total population is literate persons. Out of the total literates, 52.66% are male literates and 47.34% are female literates.

On the other hand, 43.32% of total population are illiterate, out of the total illiterate 49.06 % are males and 50.94% are females.

WORKER’S PROFILE & OCCUPATIONAL STRUCTURE

The overall work participation in the study area is just 35.55% of the total population. Out of this, the male work participation is 68.98% and female work participation is 31.02%.

Out of the total workers, 85.62% are the main workers 14.38% are marginal workers.

Among all the work forces, males are mostly working in the nearby small industries, agriculture & allied activities, laborers, etc. However, women on the other hand work as marginal workers due to their occupancy in household and domestic chores. Apart from the household works, most of the women work as marginal cultivators in their agricultural lands.

11.3.6 BIOLOGICAL ENVIRONMENT

The biological environment of Meghalaya, encompassing diverse terrestrial and aquatic ecosystems, is assessed for environmental impact to protect flora and fauna. The state's 22,429 km² area includes 8,514 km² of forests, with 722.36 km² under direct State Forest Department control. Forest types are classified as tropical, subtropical, and temperate, with variations including evergreen, semi-evergreen, moist and dry deciduous, and grasslands. The temperate forests occur at higher elevations, while grasslands result from deforestation. As of 2001, Meghalaya's forest cover is 15,584 km², about 69.5% of the state's area, with significant portions managed by local councils and traditional institutions.

Floral Diversity in Study Area

Study Area
Flora
Climbers –19 Species
Herbs – 40 Species
Shrubs - 70 Species
Tree – 74 Species
Orchids- 8 Species
Fauna



Reptiles - 9 Species

Butterfly/ Moth –28 Species

Mammals –15 Species

Avifauna-79 species

Sampling for Plankton Communities (Phytoplankton and Zooplankton):**Phytoplankton**

Plankton is sampled by sieving 100 liters of water through plankton net mesh size (25 μ). The sieved sample is preserved in 4% formalin for microscopic study. Density is computed by performing counts in S-R Cell according to Welch (1948). Identifications are performed with the help of standard keys (Edmondson 1959; Prasad & Mishra 1992, Krammer and Lange-Bertalot 1999; 2004; Lange Bertalot 2001, Jaiswal & Tiwari 2003).

Zooplankton (Benthic Invertebrates):

The macro-invertebrate fauna is sampled by carefully lifting small boulders, cobbles and pebbles from the marked area (1 ft²) and washing in a bucket full of water by dipping number of times to dislodge the attached fauna. Soft substratum in the form of clay and silt is sampled with Ekman dredge. The sediments are sieved to obtain the fauna. Samples are preserved in 5% formalin for laboratory analysis. Macro-invertebrate samples are identified to family and class level with the help of standard keys (Edmondson 1959; Edington & Hildrew 1995).

Nekton (Fish): Fish samples are collected by experimental fishing through cast net and gill net and local markets/shops. The samples are preserved in 10% formalin for species identification with the help of standard keys (Day 1958; Talwar & Jhingran 1991; Jayaram 2002). Fish samples are used for determining the food habits and the environmental resource base..

Macro-Invertebrates

In riverine ecology and wetland ecosystem, benthic invertebrate fauna provides a crucial link between the primary producers (aquatic plants and algae) and the higher consumers (fish, birds, amphibians). As a food for higher consumers, they are particularly important as a source of protein. Birds require high protein levels during breeding and moulting, and duckling survival has been shown to increase with invertebrate abundance (Scheffer, 1998). Macro invertebrates are widely used as indicators of short- and long-term environmental changes in both lentic and lotic systems. They provide both a facility for



examining temporal changes and integrating the effects of prolonged exposure to intermittent discharges or variable concentrations of pollutants (Hellowell, 1986). Thus, it is promising to characterize the changes occurring in these macro invertebrate communities to assess target ecosystems exposed to environmental disturbance. Macro-invertebrate's fauna comprises of 16 species belonging to order Ephemeroptera, Diptera, Odonata and Hemiptera (Table 3.26). The lower density and diversity of macro-invertebrates can be attributed to the high-water velocity and lesser number of riffle-pool habitats. Species richness, density and species composition of macro- invertebrates are largely used as indicators of the water quality. Though, low richness and density of macro-invertebrate in Umngot River is due to washing out due to monsoonal rains and its naturally happening.

S. No.	Species
Ephemeroptera	
1	Ephemera nadinac
2	Ephemera sp
3	Ephemerella indica
4	Baetis simplex
5	Baetis festivus
6	Caenis latipennis
7	Epeorus gilliesi
8	Cinygmula sp.
9	Orthetrum sp
10	Chironomus sp
Odonata	
11	Orthetrum sp
Diptera	
12	Chironomus sp
13	Simulium sp
Hemiptera	
14	Aphids, Bugs, Necton & misquotes larvae:
	Anisops sp, Gyrinus sp
Molluscan	
15	Indian river Crab, keakura
16	Shrimps

Nektons (Fish community)

Umngot River has 16 fish species from 7 families, with 50% from Cyprinidae, indicating low ichthyofaunal diversity. The limited diversity is due to river morphology and land use.

Six species were observed in the project's influence area.



During the biodiversity assessment and concern with local stakeholder revealed that the project study area does not fall in migration route of migratory Birds. On the other hand, none of significant fauna present in core zone project area and no habitation of significant wild life in core zone of project. All the floral and faunal species reported from the core zone are common and widely distributed in the buffer zone also. So, it can be stated that the project and associated activities are unlikely to influence any floral and faunal components significantly provided that the suggestions/recommendations in this report are implemented. Strict implementations of EMP/ mitigation measures are required to ensure that the biodiversity of the study area should not impacted negatively.

11.4 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

The summary of anticipated adverse environmental impacts due to the existing mine and mitigation measures are given below: -

Soil Environment		
Aspects	Impact	Mitigation Measures
Geomorphology	Mining alters landforms, creates voids, and disrupts terrain.	Implement land reclamation, minimize disturbance, control erosion, manage water effectively, protect biodiversity, engage with the community, and monitor restoration efforts.
Soil Erosion and Degradation	Mining disturbs soil, leading to erosion and compaction.	Construct garland drains and siltation ponds, plant vegetation, reduce heavy machinery use in wet conditions, and apply soil amendments for reclamation.
Deforestation and Habitat Destruction	Mining causes deforestation and disrupts ecosystems.	Conduct plantation in statutory barriers, around infrastructure, and unworked areas; ensure more than 33% of the lease area is replanted by the end of mining.
Visual Impact and Aesthetic Degradation:	Mining alters landscapes and scenic views.	Establish landscaping and vegetation buffers to minimize visible disturbance
Change in Topography, Sinkholes, and Subsidence	Mining creates land subsidence and alters drainage patterns.	Confine impacts to the lease area, focus on careful planning, reclamation, phase-wise plantation, and develop water reservoirs.
Earthquake Zone V	Mining in high-risk areas poses significant environmental harm.	Implement strict environmental controls, advanced technology, and comprehensive monitoring; maintain bench slopes as per the mining plan and conduct slope stability studies.
Removal of Soil Cover and Waste	Mining generates significant waste and	Manage waste through proper dumping, stabilize waste dumps with retaining walls, and use extracted



Project:- “Rusiar Limestone Mine”

Applicant:- Smt. Seisoh Syiemlieh

Chapter – XI –Summary and Conclusion

Generation:	soil.	soil for plantation to avoid permanent stockpiles.
Water Environment		
Ground Water		
Groundwater table intersection and depletion; changes in aquifer properties.	Mining may intersect and contaminate groundwater and affect aquifer properties.	Pit limits are set to avoid groundwater. Water needs will be met through tanker supply from nearby water streams, not groundwater. Post-mining, natural recharge will be restored, and groundwater quality will be regularly monitored.
Sewage from septic tanks and soak pits.	Sewage could percolate and contaminate groundwater.	Sewage will be managed with septic tanks and soak pits. Stabilized sludge will be used for plantation.
Leaching of chemicals and heavy metals.	Leaching from mine wastes could contaminate groundwater.	No chemicals or heavy metals will be used. Proper tailings management, containment liners, and effective water management will be enforced. Regular monitoring will ensure groundwater protection.
Surface Water		
Contamination of nearby water bodies.	Runoff may carry sediments and chemicals, potentially degrading water quality and harming aquatic life.	No chemicals or heavy metals will be used. Water management plans will effectively manage runoff through the use of containment ponds and sedimentation facilities
Alteration of hydrology.	Mining can alter drainage patterns and reduce downstream water availability, affecting ecosystems.	Natural drainage will remain unaffected. Post-mining restoration will return the area to its original condition. Rainwater will be managed and utilized, with erosion control measures in place to protect water quality.
Air Environment		
Emissions from heavy machinery and transport vehicles	Emission of pollutants (NOx, SO ₂ , VOCs) contributes to air pollution.	Equip machinery with modern emission controls, perform regular maintenance, and reclaim disturbed areas with vegetation to stabilize soil and reduce dust. Engage local communities in air quality management plans.
Dust and pollutants from mine sites	Dust and pollutants escaping from mine sites contribute to air pollution.	Reclaim disturbed areas with vegetation to stabilize soil and reduce dust. Involve and inform local communities in air quality management plans to address concerns and improve transparency.
Noise Environment		
High Noise Levels	Disturbs workers, nearby communities, and wildlife.	Construct noise barriers, maintain equipment, use anti-vibration mounts, schedule noisy activities during less sensitive times, implement noise reduction technologies, plan controlled blasting, and ensure smooth haul roads.



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Rev. No. 00

Project:- “Rusiar Limestone Mine”

Applicant:- Smt. Seisoh Syiemlieh

Chapter – XI –Summary and Conclusion

Continuous Operation	Sustained noise pollution from conveyor belts and crushers.	Regular maintenance of machinery, limit truck speeds, install silencers in equipment, and provide closed cabins for operators
Health Effects	Hearing loss, stress, sleep disturbances, and disruption of animal behavior.	Provide hearing protection, implement administrative controls, rotate tasks, carry out perimeter plantation, conduct regular health checkups, and perform periodical noise monitoring.

Socio-Economic Environment

Negative Impacts & Mitigation

Social Challenges	Increased population and economic activity can strain local social services and infrastructure.	Partnerships will be developed with local governments and NGOs to enhance social services. Community development programs to address social challenges will be implemented.
Cultural Impact	Mining operations can disrupt traditional lifestyles and cultural practices of indigenous or local communities	Local communities will be engaged in culturally sensitive planning and decision-making processes. Cultural preservation initiatives will be supported and local traditions respected.
Community Health	mining activities can include issues such as air and water pollution, noise pollution, increased risk of respiratory diseases, potential exposure to hazardous chemicals, and disruption of access to clean water sources	Regular health check-up of workers and nearby locals will be conducted. Records of the worker’s health and safety will be maintained. Training will be provided to the workers. Personal Protective equipment’s will be provided to workers. The safety and well-being of workers will be ensured in accordance with mining rules and regulations.
Human Settlement	Mining projects can also cause, displacement, increased crime, economic inequality, infrastructure strain, and long-term legacy problems, significantly impacting nearby human settlements and their quality of life.	Nearest settlement is 2.3 km away in SSW. There is no physical or economic displacement due to the project and also not predicted in future also. Mitigation measures for nearby human settlements include, investing in community health and infrastructure, ensuring fair economic benefits, involving local communities in decision-making etc.

Positive Impacts

Income and Revenues

- Enhancement of average income for locals engaged in similar mining activities directly and indirectly.
- Increase in tax revenues of local and central government.
- Successful operation of the plant will attract additional industrial investments, benefiting both society and the nation.



Gaurang Environmental Solutions Pvt. Ltd.

Report Ref: GESPL_779/ 2024-25/ DEIA/109

Rev. No. 00

Livelihoods

- Approximately 19 No. of people will get directly employed from the mining project.
- Anticipated creation of new direct and indirect employment opportunities.
- Expected increase in non-agricultural livelihood opportunities, both directly and indirectly related.
- The minimal influx of personnel is expected during the operational phase.

Physical Infrastructure

- The road and power networks in the area are expected to be strengthened as part of sequential development.

Biological Environment

<ul style="list-style-type: none"> • Clearing of Vegetation • Noise and Vibration from Mining Activities • Discharge of Polluted Water • Dust Generation • Removal of Vegetation for Excavation. 	<ul style="list-style-type: none"> • Deforestation, disturbance to wildlife, and degradation of aquatic flora and fauna. • Displacement of animals and birds, disturbance to local wildlife. • Degradation of aquatic flora and fauna. • Impact on nearby vegetation and biological environment. • Loss of flora and potential disruption to the local ecosystem. 	<p>Conduct Assessments: thorough EIA report has been prepared to understand potential impacts and design appropriate mitigation measures.</p> <p>Avoid Sensitive Areas: The mining lease is situated on private land, and there are no national parks or wildlife sanctuaries within a 10-kilometer radius of the lease area. Therefore, the likelihood of impacting sensitive areas is minimal.</p> <p>Species Surveys: A survey has been conducted to determine the presence of any Schedule I species or sensitive flora and fauna within the study area. There is not any sensitive flora fauna or schedule 1 species found in the study area.</p> <p>Restoration Plans: Develop plans for ecosystem restoration and use native species for replanting.</p> <p>Water and Air Management: Control water contamination and air pollution through proper management and monitoring.</p> <p>Safe Disposal: Handle mining waste responsibly and explore recycling opportunities.</p> <p>Soil Stabilization: Implement erosion control methods like silt fences and vegetation planting.</p> <p>Stakeholder Involvement: Engage with local communities and address their concerns through education and feedback.</p> <p>Continuous Monitoring: Track environmental impacts and report on compliance with mitigation measures.</p> <p>Adhere to Regulations: Follow environmental regulations and permit requirements</p>
---	--	---

1.5 ENVIRONMENTAL MONITORING PROGRAMME**11.5.1 AIR**

Air quality monitoring will be carried out as per norms of SPCB and CPCB.



11.5.2 WATER

Regular monitoring of ground water quality will be carried out at suitable locations. Water samples will be collected four times in a year i.e. Pre - Monsoon, Monsoon, Post - Monsoon and Winter.

11.5.3 NOISE

Noise level will be recorded periodically at mine site near operating machines during day and night time.

11.5.4 HEALTH AND SANITATION

Periodical medical checkup of workers will be done and medical facility will be provided also. Toilets and urinals will be provided near the mine site. Drinking water will be made available to the workers.

1.6 ADDITIONAL STUDIES

11.6.1 PUBLIC HEARING

Public hearing will be conducted as per the guidelines of EIA Notification 14th September, 2006 and its subsequent amendments.

11.6.2 RISK ASSESSMENT & MANAGEMENT

Risk analysis is the systematic study of uncertainties and risks encountered in various areas. Risk analysts seek to identify the risks involved in mining operations, to understand how and when they arise, and estimate the impact (financial or otherwise) of adverse outcomes. It also defines and analyzes the dangers to individuals, businesses and government agencies posed by potential natural and human-caused adverse events.

However, there are various factors, which can create unsafe working conditions/ hazards in mining of Limestone (minor minerals). The following types of hazards are identified during the limestone mining operations: -

1. Accident during mineral loading, transportation and dumping
2. Accident due to vehicular movement
3. Inundation/ Flooding

Following procedure will be followed for effective management of any disaster in the mine.



- Step 1: Identification of Disaster risk.
- Step 2: Identification of persons at risk
- Step 3: Removal of Hazard
- Step 4: Evaluation of the risk
- Step 5: Control measures to be taken
- Step 6: Maintain Assessment records
- Step 7: Review

11.7 PROJECT BENEFITS

The demand of limestone has been rising in the state as a result of rising in industrial activities and development of the existing project aims to fulfill the supply of limestone. The capacity of mine is 48,900 TPA of ROM (Mineral Limestone- 44,025 TPA & Mineral Waste/Subgrade- 4,875 TPA) aiming to fill the demand – supply gap.

This limestone mining will generate direct and indirect employment. Economy of the area will get a boost and there will be overall growth of the region in terms of education, health, training, awareness, transport, automobile, industry, and infrastructure. The standard of living accordingly will also get an upliftment on the positive side. Plantation will be carried out as social forestry programme in villages, school and the areas allocated by the Panchayat/ State authorities to improve environment of its surrounding area.

11.8 ENVIRONMENTAL MANAGEMENT PLAN

Environmental Management Plan (EMP) aims at the reservation of ecological system by considering in-built pollution abatement facilities at the mine site. Some of the major criteria governing the environmental measures will be adopted.

11.8.1 LAND USE MANAGEMENT

The following reclamation plan will be adopted in this mine.

- At the end of life of mine, total excavated area will be of 0.64 Ha.
- At the conceptual stage, more than 33% of lease area (i.e. 0.33 ha.) will be covered under plantation which includes 0.20 ha. Undisturbed area and 0.13 ha area of upper benches of excavated pit.



11.8.2 WATER POLLUTION MANAGEMENT

Some of the control measures adopted for controlling water pollution are as follows: -

- Based on results from monitoring corrective regulatory measures will be taken.
- Measurement of water level fluctuations to assess impact of mining activity on the water table depletion in close proximity of dug wells and bore wells.
- Regular monitoring and analysis of water samples at strategic locations will be carried out to monitor the water quality.
- Domestic waste water will be channelized into septic tank followed by soak pit.

11.8.3 AIR POLLUTION MANAGEMENT

Following mitigation measures are envisaged: -

- The speed of the vehicles will be maintained uniform.
- Regular pollution checks and certification of vehicles will be done.
- Limited number of mine-related vehicles will be maintained on the public roadways to reduce the traffic to minimize impacts on local people.
- The loaded vehicles will be covered with tarpaulin during transportation.
- Over loading will be avoided and free board will be left in the loaded trucks to prevent spillage.
- The roads will be maintained.
- Regular cleaning will be done to reduce the chances of road dust to become airborne.
- Water sprinkling will be done on a fixed stretch of paved road.
- Natural barriers will be developed along the roadside to control the dispersion of dust particles.
- Speed breakers is will be constructed to restrict the speed of transporting vehicles. However, limiting of vehicular speed will be adopted.
- Regular monitoring and analysis will be carried out through collection of air samples from strategic monitoring sites. If the parameters go beyond the permissible tolerance limits, corrective regulation measure will be taken.

11.8.4 NOISE POLLUTION MANAGEMENT

The following control measures are to be undertaken to bring down the noise levels:-

- Noisy activities will be scheduled at normal working hours (daytime hours) to the extent possible when the environment is least sensitive to noise impact.



- Regular inspection and maintenance of vehicles and equipment will be performed to ensure efficiency and worn parts will be replaced.
- The vehicles will be maintained in good condition and overloading will not be done.
- Speed limits will be enforced in relation to road conditions and on-route communities.
- Noise monitoring will be conducted on a regular basis to determine compliance with noise criteria.
- Personal Protective Equipments i.e., earmuffs and earplugs will be provided to workers, working in high noise areas.
- Periodical medical checkup will be organized for all workers to check any noise related health problems.
- Operational noise level status will be displayed on machines to identify the extent of noise level and to control the exposure times at which worker are exposed to higher noise levels.

11.8.5 OCCUPATIONAL HEALTH AND SAFETY

- To avoid any adverse effect on the health of the workers due to dust, noise etc. extensive measures has to be adapted related to safety aspect.
- Regular maintenance and testing all the tools & equipments as per manufacturer’s guidelines.
- Provision of personal protective equipment to the workers working in the mine.
- Periodical Medical Examination of all workers by medical specialists will be conducted.
- Awareness program will be organized for workers.

11.8.6 SOCIO-ECONOMIC MANAGEMENT

- Environmental Officer will be responsible to take care the performance of mine on environmental issues.
- The project will provide employment to 19 people. More employment opportunities will create in future from the project.
- Employment opportunities will be provided, along with periodic training to develop work skills preferring local candidates.
- Regular health camps will be carried out.



11.8.7 BIOLOGICAL MANAGEMENT

No adverse impact & no genetic diversity loss are anticipated from the mining activity. However, due care & extensive plantation activity will be undertaken to reduce impact from the activity.

11.9 CONCLUSION


EIA study was performed as per the approved ToR. Various environmental attributes were studied relating with aspects of mining activities. The related impacts were identified and evaluated. Considering all the possible ways to mitigate the environmental concerns Environmental Management Plan was prepared and accordingly fund was allocated. The EMP has been dynamic, flexible and subject to periodic review.

The project will increase the revenue of the State Govt. as well as it will help in the social upliftment of the local people. The greenbelt development programme will help in increasing the green cover in the nearby areas. Thus, the existing project is not likely to affect the environment or adjacent ecosystem adversely. The Senior Management will be responsible for the project review of EMP and its implementation to ensure that the EMP remains effective and appropriate. Thus, the proper steps will be taken to accomplish all the goals mentioned in the EMP and the project will bring the positive impact in the study area.



Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Chapter – XII –Disclosure of Consultant

CHAPTER - XII **DISCLOSURE OF CONSULTANT** **ENGAGED**

	Gaurang Environmental Solutions Pvt. Ltd.	Page No.
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Chapter – XII –Disclosure of Consultant

CHAPTER XII DISCLOSURE OF CONSULTANT ENGAGED


Name of the Project: - “Rusiar Limestone Mine”, Area – 1.0 ha,

Site Address: - Rusiar, Lynti Dkhar area Sohbar, Sohbar Sirdarship, District- East Khasi hills, Meghalaya

Proponent: Smt. Seisoh Syiemlieh

Disclosure of Consultants Engaged

Nature of consultancy	Name and address of the Consultant/expert/Agency	Approvals, if any from (NABL/DGMS/IBM/NRBPT/ MOEF/CPCB/others etc)*, give reference
EIA/EMP Organization	Gaurang Environmental Solutions Pvt. Ltd. (GESPL) #102, SNG, Shri Ratna Apartment, Peetal factory, Bani Park, Jhotwara road, Jaipur-302016 Ph:0141-4029115 E-mail- gaurangenviro@gmail.com	<p style="text-align: center;">NABET Accreditation: NABET/EIA/23-26/RA 0338 valid up to 07/12/2026</p>
Env. Coordinator	Mr. Abhishek Gautam *Team Member-Damini Kumari	
FAE-LU	Mr. Vinod kumar Verma	
FAE-AP	Ms. Pooja Yadav *Team Member-Damini Kumari	
FAE-AQ	Mr. Neha Bhargava	
FAE-WP	Ms. Pooja Yadav	
FAE-EB	Mr. Abhishek Gautam *Team Member-Damini Kumari	
FAE-NV	Mr. Mallikarjun Murthy Guttula	
FAE-SE	Mr. Gajendra Singh Rathore	
FAE-HG	Mr. Mukesh Suroliya	
FAE-RH	Mrs. Ginni Barotia	
FAE-SHW	Ms. Pooja Yadav	

	Gaurang Environmental Solutions Pvt. Ltd.	Page No.
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

Project:- “Rusiar Limestone Mine”	
Applicant:- Smt. Seisoh Syiemlieh	Chapter – XII –Disclosure of Consultant


FAE-GEO	Mr. Mukesh Suroliya	
FAE-SC	Mr. Pradyuman Deshpande	
Environmental Monitoring & analysis	Noida Testing Laboratories # GT-20, Sector-117, Noida, Gautam Budh Nagar-201301	Monitoring Period - December, 2024 to February, 2025 (Certificate No.: TC-6814 valid upto 02.12.2025)
Hydrogeological study	Mr. Mukesh Suroliya, GESPL	
Rainwater Harvesting	Mr. Mukesh Suroliya, GESPL	

* Only Govt. /Statutory Approvals to be mentioned. Put NA where not applicable. Add a brief resume where required.

RQPs (for ‘B1” category mines projects) to submit copy of valid document of Central/State Govt.

I hereby accept all the liabilities and obligations associated with the working and results of the above organizations submitted herein with the report.

Note: - The Consultant should submit the Accreditation letter from NABET regarding approval of sectors and experts.

	Gaurang Environmental Solutions Pvt. Ltd.	Page No.
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

Project: “Rusiar Limestone Mine”
Applicant: Smt Seisoh Syiemlieh

ANNEXURES



	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

Project: “Rusiar Limestone Mine”
Applicant: Smt Seisoh Syiemlieh

Annexure I

Copy of ToR Letter



	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00



File No: ML/SEAC/SEIAA/PP/EKH/102/2024

Government of India

Ministry of Environment, Forest and Climate Change

(Issued by the State Environment Impact Assessment Authority(SEIAA),
MEGHALAYA)



Dated 24/07/2025



To,

SEISOH SYIEMLIEH
Sohbar Village, East Khasi Hills, Meghalaya, 793108
seisohsyiemliehmining@gmail.com

Subject: Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding.

Sir/Madam,

This is in reference to your application for Grant of Terms of Reference under the provision of the EIA Notification 2006-regarding in respect of project Rusiar Limestone Mine for an area of 1.00 hectare submitted vide proposal number SIA/ML/MIN/517742/2025 dated 23/02/2025.

2. The particulars of the proposal are as below :

(i) TOR Identification No.	TO25B0108ML5974457N
(ii) File No.	ML/SEAC/SEIAA/PP/EKH/102/2024
(iii) Clearance Type	TOR
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vii) Name of Project	Rusiar Limestone Mine
(viii) Name of Company/Organization	SEISOH SYIEMLIEH
(ix) Location of Project (District, State)	EAST KHASI HILLS, MEGHALAYA
(x) Issuing Authority	SEIAA
(xi) Applicability of General Conditions	no
(xii) Applicability of Specific Conditions	no

3. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1(Part A and B) were submitted to the SEIAA for an appraisal by the State Expert Appraisal Committee (SEAC) under the provision of EIA notification 2006 and its subsequent amendments.

4. The above-mentioned proposal has been considered by State Environment Impact Assessment Authority(SEIAA) in the meeting held on 18/06/2025. The minutes of the meeting and all the Application and documents submitted [(viz. Form-1 Part A, Part B, Part C EIA, EMP)] are available on PARIVESH portal which can be accessed by scanning the

QR Code above.

5. The brief about configuration of products and byproducts and salient features of the project along with environment settings, as submitted by the Project proponent in Form-1 (Part A, B and C)/EIA & EMP Reports/presented during SEIAA are available on PARIVESH portal which can be accessed by scanning the QR Code above.
6. The SEIAA, in its meeting held on 18/06/2025, based on information & clarifications provided by the project proponent and after detailed deliberations recommended the proposal for grant of Terms of Reference under the provision of EIA Notification, 2006 and as amended thereof subject to stipulation of specific and general conditions as detailed in Annexure (2).
7. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the State Expert Appraisal Committee (SEAC) hereby decided to grant Terms of Reference for instant proposal of M/s. SEISOH SYIEMLEH under the provisions of EIA Notification, 2006 and as amended thereof.
8. The Ministry reserves the right to stipulate additional conditions, if found necessary.
9. The Terms of Reference to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.
10. This issues with the approval of the Competent Authority.

Copy To

1. The Dy. Director General of Forests (C), Regional Office, N.E.Z, Ministry of Environment, Forests & Climate Change (Mo EF & CC), Law-u-sib, Lumbatngen, Sawlad, Near M.T.C. workshop, Shillong- 793 021, for information.
2. The Deputy Commissioner, East Khasi Hills, Shillong, Meghalaya for information and necessary action.
3. The Divisional Forest Officer, East Khasi Hills & Ri Bhoi Territorial Division, Shillong for information and necessary action.
4. The Member Secretary, State Expert Appraisal Committee, Meghalaya for information and necessary action.
5. The Director, Directorate of Mineral Resources, Meghalaya, Shillong for information.
6. The Member Secretary, Meghalaya State Pollution Control Board, 'Arden', Lumpyngngad, Shillong – 793 014 for information and necessary action.

Annexure 1

Specific Terms of Reference for (Mining Of Minerals)

1. Specific Additional Conditions

S. No	Terms of Reference
1.1	No Objection Certificate from Khasi Hills Autonomous District Council is to be furnished while applying for Environmental Clearance.
1.2	Site photographs together with photographs and other related details of site visits by resource persons of NABET accredited consultant of project proponent, with their names and profession/designation, together with date(s) of visit, date(s) of data collection including names of

S. No	Terms of Reference
	instrument/machine actually used in the field, during preparation of EIA report, is to be clearly highlighted in the EIA/EMP report.
1.3	Boundary pillars with the height not less than 2.5 feet above the ground level and 1.5 feet below ground and minimum 8 inches on all face of pillar should be erected.
1.4	GPS coordinates of each pillar should be carved/painted clearly on the pillars with red colour.

Standard Terms of Reference for (Mining of minerals)

1.

S. No	Terms of Reference
1.1	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
1.2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given
1.3	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
1.4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/toposheet, 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)
1.5	Information should be provided in Survey of India Toposheet 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
1.6	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
1.7	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
1.8	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope

S. No	Terms of Reference
	study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided
1.9	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
1.10	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
1.11	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
1.12	A 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 to assist the Expert Appraisal Committees
1.13	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
1.14	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
1.15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given
1.16	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
1.17	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
1.18	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 alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and

S. No	Terms of Reference
	details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost
1.19	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 Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered
1.20	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
1.21	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
1.22	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
1.23	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated
1.24	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided
1.25	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
1.26	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
1.27	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

S. No	Terms of Reference
	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
1.28	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
1.29	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
1.30	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
1.31	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
1.32	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report
1.33	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
1.34	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
1.35	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
1.36	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
1.37	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

S. No	Terms of Reference
1.38	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
1.39	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given
1.40	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out
1.41	A Disaster management Plan shall be prepared and included in the EIA/EMP Report
1.42	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
1.43	Besides the above, the below mentioned general points are also to be followed:- a) All documents to be properly referenced with index and continuous page numbering. b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated. c) 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. d) Where the documents provided are in a language other than English, an English translation should be provided. e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted. f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF 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. g) 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. h) 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. i) 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

Annexure 2

Details of Products & By-products

Name of the product /By-product	Product / By-product	Quantity	Unit	Mode of Transport / Transmission	Remarks (eg. CAS number)
Limestone	Limestone	44025	Tons per Annum (TPA)	Road	

Project: “Rusiar Limestone Mine”
Applicant: Smt Seisoh Syiemlieh

Annexure II

Sohbar Sirdarship NOC



Gaurang Environmental Solutions Pvt. Ltd.	
Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

Office of the
SOHBAR SIRDARSHIP

P.O. Sohbar, East Khasi Hills District, Meghalaya - 793108

Under Rule S(S) of the Khasi Hills Autonomous District (Appointment and Succession of Chiefs and Headman) Rules 2015 of the United Khasi - Jaintia Hills Autonomous District (Appointment and succession of Chiefs and Headman Act 1959).

Ref No. SSS/Adm/A-48/2022-24/40


Date 24/05/2024

No Objection Certificate

This is to Certify that the Elaka Sohbar has no objection to **Smti Seisoh Syiemlieh**, daughter of **Smti Nondini Syiemlieh**, an inhabitant of **Sohbar, Sohbar Sirdarship**, East Khasi Hills to apply the Mining Lease from the Concern Authority, to extract the Limestone from the grove of Artcy Tymmeniang name **"Ri-U-Siar"** Lynti Dkhar Area According to the Lease Agreement Dt. 9th.04.2024 situated at Sohbar Sirdarship, East Khasi Hills. The Total Area of the land about **15,918**. Square Meter.

Wish her every success

Date: Sohbar
The 24/05/2024.


(K.S. Lyngskor)
Sirdar
Sohbar Sirdarship

Project: “Rusiar Limestone Mine”
Applicant: Smt Seisoh Syiemlieh

Annexure III

LOI & Lease documents



	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00



GOVERNMENT OF MEGHALAYA
DEPARTMENT OF FORESTS & ENVIRONMENT
OFFICE OF THE DIVISIONAL FOREST OFFICER, EAST KHASI HILLS &
RIBHOI TERRITORIAL DIVISION, SHILLONG



No.KH/8/ML/Limestone/68/ 2655

Dated Shillong, the 30th/August/2024

To,

Smti.Seisoh Syiemlieh,
Sohbar Village,
Sohbar Sirdarship,
East Khasi Hills.



Subj: Issue of Letter Of Intent (LOI) in respect of Smti.Seisoh Syiemlieh for grant of Mining Lease.

Ref: No. nil dated 30.08.2024.

APPROVED

Sir,

With reference to the above mentioned subject, I am to inform you that this office had examined your application for grant of Mining Lease for limestone on an area of 1.0 ha located at Rusiar, Lynti Dkhar Area, Sohbar Sirdarship East Khasi Hills District, along with the Non Forest Land Certificate that was issued to you vide this office letter No. KH/8/NOC/Limestone/41/Pt IV/2620 dated 30th August 2024.

Now therefore, as per Rule 10 of the Meghalaya Minor Mineral Concession Rule (MMMCR), 2016 and in pursuance of the Government Notification No.FOR.135/2015/661 dated 16th November 2016, the Letter of Intent (LOI) is hereby issued for the Grant of Mining Lease subject to the following conditions :

1. You shall prepare the Mining Plan through the consultant empanelled by Mining and Geology Department, Govt. of Meghalaya and same shall be duly approved by the Director of Mineral Resources, Shillong.
2. You shall also obtain the following documents:
 - a. Environment Clearance from the State Environment Impact Assessment Authority (SEIAA).
 - b. Consent to Establish (CTE) from the Meghalaya State Pollution Control Board (MSPCB).
 - c. Self declaration form for due adherence of labour laws and labour safety standards.

All these documents/ clearances are to be submitted to this office within a period of 6 months for taking further necessary action.

Yours Faithfully,

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Divisional Forest Officer
East Khasi Hills & Ri Bhoi (T) Division,
Shillong.

Forest Management Building, 1st Floor
Lower Lachumiere, Shillong - 793001

Phone No: 0364-2226375
Email Id :dfotkhasihills@gmail.com



मेघालया MEGHALAYA LEASE AGREEMENT

00AA 394206

THIS DEED OF LEASE AGREEMENT is made on this the 9th day of April, 2024 at Shillong.

BETWEEN

APPROVED

SMTI. ARTCY TYMMENNIANG, Daughter of Smti. Sikiar Tymmennieng, aged about 37 years, resident of Sohbar Village, Sohbar Sidarship, East Khasi Hills District-793108, Meghalaya, hereinafter referred to as the **LESSOR** (which term unless repugnant to the context shall always mean and include her legal heirs, successors, administrators and assigns) of the **ONE PART**.

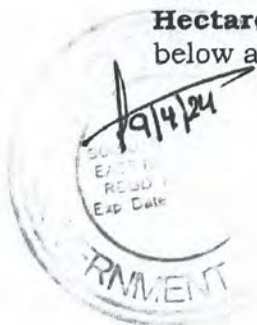
A. Tymmennieng

-AND-

SMTI. SEISOH SYIEMLIEH, son of Shri. Amiyo Dohkrut, aged about 35 years, resident of H/No.76, Sohbar Village, Sohbar Sidarship, East Khasi Hills District-793108, Meghalaya, hereinafter referred to as the **LESSEE** which term unless repugnant to the context shall always mean and include her legal heirs, successors and assigns of the **OTHER PART**.

WHEREAS the Lessor is the owner of a plot of land known as "RUSIAR", lying and situated at **Lynti Dkhar, Sohbar Sirdarship, East Khasi Hills District, Meghalaya**, measuring an area of **15,918 sq.mtrs or 1.59 Hectare** more or less, which is morefully described in the Schedule herein below and hereinafter referred to as the said **LANDED PROPERTY**.

Contd...P/2



Miner's Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



मेघालया MEGHALAYA

-2-

APPROVED

00AA 394185

AND WHEREAS the Lessor is desirous to lease the aforesaid landed property to the Lessee and the Lessee has agreed to take the same as per conditions hereunder contained for the purpose of extracting limestone.

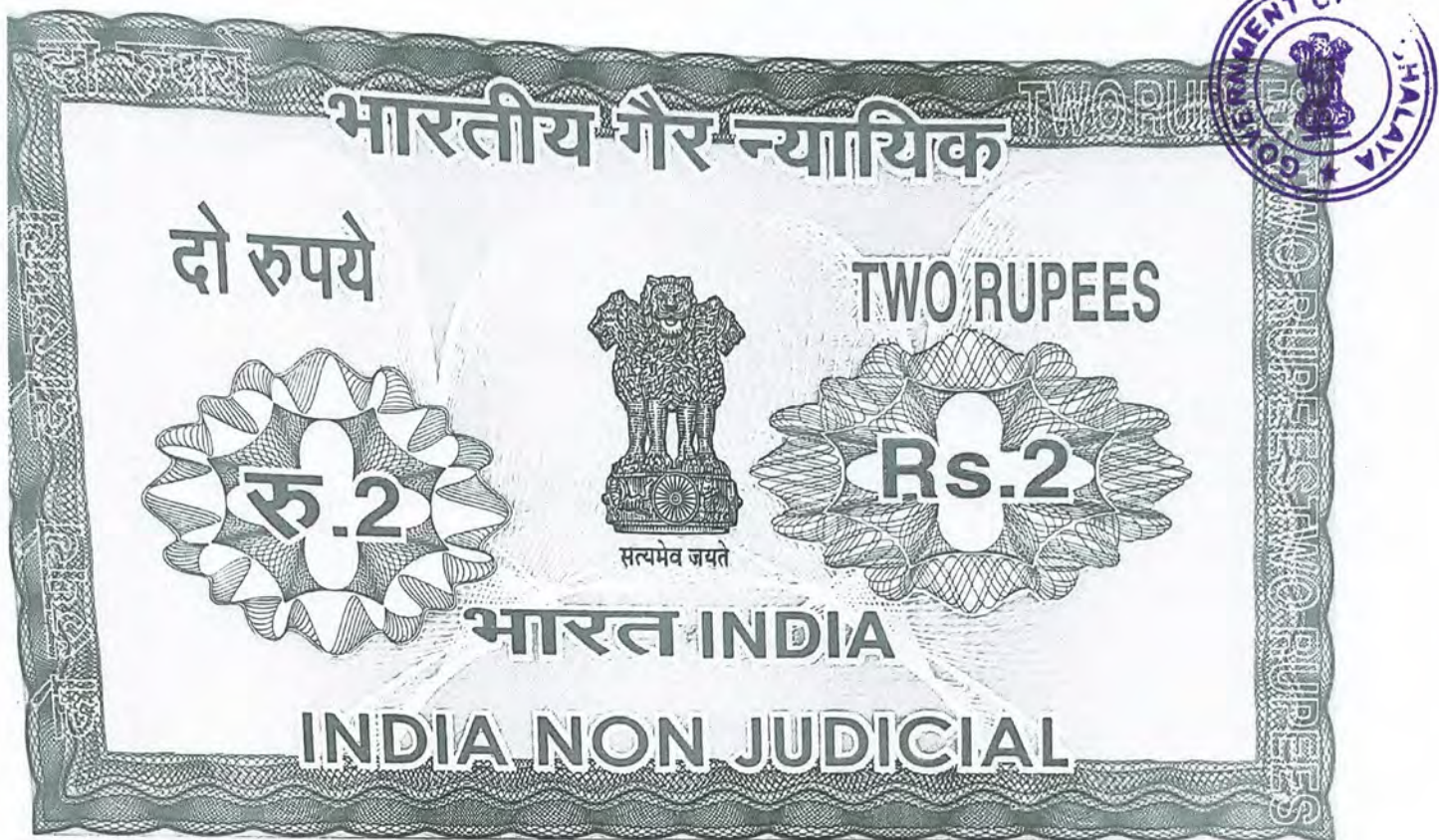
NOW BY THIS DEED it is hereby agreed that the Lessor shall give on lease the said landed property and the Lessee shall take on lease the said landed property on the following terms and conditions hereunder contained:-

NOW THIS DEED WITNESSETH AS FOLLOWS :-

- 1) That the Lease shall be for a period of **10 years @ Rs.50,000/-** per year.
- 2) That the Lease shall commence from the **01.05.2024**.
- 3) That the Lessee shall use the said landed property for extracting limestone only.
- 4) That the Lessee agreed with the Lessor to pay all rates, taxes and assessment whatsoever payable out of the said land.
- 5) That it is further agreed, declared and covenant by and between the parties that the said land will be used on the following terms and conditions :-
 - (a) The Lessee shall comply with the provisions of laws in force and shall be liable at all times during the said term to

Contd...P/3

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



मेघालया MEGHALAYA

3 APPROVED

00AA 394186

indemnify the Lessor against any breach of non-observance of those provisions.

- (b) The Lessee shall permit the Lessor at reasonable hours to enter and inspect the said premises without hindrance from the Lessee.
- (c) The Lessee shall use the said landed property for extracting limestone only from the said landed property.
- (d) The Lessee shall not assign, sublet or otherwise part with possession of the said premises of any part thereof to any other person.
- (e) The Lessee shall ensure that the surroundings of the said land leased shall not be affected in any way.
- (f) The Lessee shall not do anything pre-judicial to the Local Dorbar's directions and does not in any other way affect, disturb, annoy or cause any nuisance to the adjoining land and its neighbours.
- (g) The Lessee shall strictly observe the rule of the Dorbar and the prevailing laws for the time being in force.

Attyammenniang

[Signature]



Miner's Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Contd...P/4



मेघालया MEGHALAYA

4-APPROVED

00AA 394187

- (h) The Lessee hereby observing and performing the conditions herein contained shall quietly and peaceably possess and enjoy the said landed property during the said terms without any interruption and disturbance by the Lessor or any other person. In case of breach of any of these conditions to be observed and performed by the Lessee, the Lease may be terminated and the right of re-entry may be exercised at the option of the Lessor without prejudice to the Lessor's right to recover all arrears and any damages for breach of this Agreement.
- (i) The Lessee shall take all necessary precautions required to ensure safety of the said landed property and shall in no way endanger anybody including that of his workers and others.
- 6) That it is further agreed and declared that the expression Lessor used herein shall in addition to the Lessor herself, her successors and assigns and the expression Lessee used herein shall include in addition to the said Lessee, her heirs, successors, administrators, executors and assigns.
- 7) That in case of any breach or violation by any of the terms and conditions herein contained the parties shall be at liberty to approach the competent Court of Law for redressal of grievances.

A. Timmerman

[Signature]



Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Contd...P/5



मेघालया MEGHALAYA

-5- **APPROVED**
SCHEDULE OF THE LANDED PROPERTY

00AA 394188

ALL THAT PIECE AND PARCEL of the landed property known as "RUSIAR", lying and situated at **Lynti Dkhar, Sohbar Sirdarship, East Khasi Hills District, Meghalaya**, measuring an area of **15, 918 sq.mtrs or 1.59 Hectare** more or less which is butted and bounded on four sides as follows:-

EAST	:	Land of Smti. Rakhe Wahlang	-- 133Mtrs
WEST	:	Land of Shri.Dinoko Tynnaw	--150 Mtrs
NORTH	:	Land of Shri. L.R. Wanbah	-- 137 Mtrs
SOUTH	:	Land of Smti. Pyndap Ryngha	-- 088 Mtrs
AREA	:	15,918 sq.mtrs or 1.59 Hectares more or less.	

A. Tyanmeniang

[Signature]

Contd...P/6



Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



मेघालया MEGHALAYA

-6-

00AA 394189

IN WITNESS WHEREOF the parties to this Deed put their hands and signatures on the day, month and year first above written in presence of the following witnesses.

WITNESSES:-

APPROVED

1.

Name :

A. Tymmenniung
(SMTI. ARTCY TYMMENNIANG)
LESSOR

2.

Name :

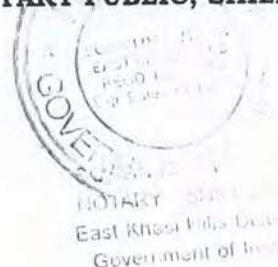
✓
(SMTI. SEISOH SYIEMLIEH)
LESSEE

Identified by :-

(Shri. David Gangte)
Advocate, Shillong.

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

NOTARY PUBLIC, SHILLONG



Project: “Rusiar Limestone Mine”
Applicant: Smt Seisoh Syiemlieh

Annexure IV

Non-Forest Land Certificate



	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00



GOVERNMENT OF MEGHALAYA
THE DEPARTMENT OF FORESTS AND ENVIRONMENT



OFFICE OF
THE DIVISIONAL FOREST OFFICER:: EAST KHASI HILLS & RI-BHOI (T) DIVISION::
SHILLONG

NO.KH/8/NOC/Limestone/41/Pt.IV/ 2620

Dated Shillong, the 30th /August/2024.

To, Smti. Seisoh Syiemlieh.
Sohbar Village,
Sohbar Sirdarship,
East Khasi Hills District,

Subj: Non Forest Land Certificate (NFLC): Limestone Quarry.

Ref: Your letter No. Nil dated. 9.08.2024.

Sir,

With reference to the subject cited above and also on perusal of your application and tree enumeration data conducted by the Assistant Conservator Of Forest i/c Southern Range Shillong, I have been directed to issue Non Forest Land Certificate (NFLC) for the applied area i.e 1.0 ha located at Rusiar.Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills District and subject to the following conditions :

1. You shall obtain Mining Lease / Quarry Permit under Meghalaya Minor Mineral Concession Rules, 2016.
2. The applied area is subject to inspection by the officials/ staff of this Division/ District Council.
3. This Non Forest Land Certificate (NFC) issued shall stand cancel on violation of any extant Acts and Rules of both the State Government and District Council.
4. The certificate shall be applicable only to the applied area (as indicated below) and as per map submitted to this Division.

Sl.no	GPS Co-ordinates	
1.	N - 25° 10' 48.41"	E - 91° 44' 26.38"
2.	N - 25° 10' 48.28"	E - 91° 44' 25.33"
3.	N - 25° 10' 48.54"	E - 91° 44' 25.08"
4.	N - 25° 10' 47.97"	E - 91° 44' 23.31"
5.	N - 25° 10' 49.27"	E - 91° 44' 23.26"
6.	N - 25° 10' 52.38"	E - 91° 44' 25.91"
7.	N - 25° 10' 52.62"	E - 91° 44' 27.56"
8.	N - 25° 10' 51.64"	E - 91° 44' 28.43"
9.	N - 25° 10' 50.29"	E - 91° 44' 26.45"

5. Felling of trees from the applied area shall be carried out only on prior permission from this Division.

APPROVED



Memo NO.KH/8/NOC/Limestone/41/Pt. IV/
Copy 1

Yours Faithfully,

Divisional Forest Officer
East Khasi Hills & Ri Bhoi (T) Division
Shillong

Dated Shillong, the ____ /August/2024.

1. The Principal Chief Conservator of Forests & HoFF Meghalaya, Shillong along with copy of Inspection Report, Tree Enumeration List and other relevant documents for favour of your information. This has a reference to his letter No.MFG.68/20/Vol-II/Pt/3768-76 dated 02nd July 2020.
2. The Conservator of Forests (T), Khasi and Jaintia Hills, Shillong, Meghalaya, along with copy of inspection report, Tree Enumeration List and other relevant documents for favour of your information.
3. The Member Secretary, State Environmental Impact Assessment Authority, Meghalaya for favour of your information.
4. The Member Secretary, Meghalaya State Pollution Control Board for favour of your information.
5. The Assistant Conservator of Forest i/c Southern Range, Shillong, for favour of his information and necessary action. He is also instructed to monitor/inspect the applied area for any violation under the extant Acts & Rules of both the State Government and District Council.

Minister Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Divisional Forest Officer,
East Khasi Hills & Ri Bhoi (T) Division,
Shillong

Project: "Rusiar Limestone Mine"
Applicant: Smt Seisoh Syiemlieh

Annexure V

Approved Mining Plan along with approval letter



	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

GOVERNMENT OF MEGHALAYA
DIRECTORATE OF MINERAL RESOURCES
SHILLONG.

No.DMR/MM/203/2024/04-A

Dated Shillong, the 27/11/2024.

To,

Smt. Seisoh Syiemlieh,
Sohbar Village, Sohbar Sirdarship,
East Khasi Hills District,
Meghalaya.

Sub: Approval of Mining Plan in respect of Limestone Mine of Smti. Seisoh Syiemlieh over an area of 1.00 ha. in Rusiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills District Meghalaya submitted under Rule 19 (1) of Meghalaya Minor Mineral Concession Rules, 2016.

Madam,

In exercise of the power conferred under Rule 10 (a) of Meghalaya Minor Mineral Concession Rules, 2016, I hereby approve the above said Mining Plan with following conditions.

- (i) The Mining Plan is approved without prejudice to any other law applicable to the mine area from time to time made by the Central Government, State Government or any other authority and without prejudice to any order or direction from any court of competent jurisdiction.
- (ii) The proposals shown on the plates and/or given in the document is based on the lease map/sketch submitted by the applicant/lease and is applicable from the date of approval.
- (iii) It is clarified that the approval of Mining Plan does not in any way imply the approval of the State Government in terms of any other provision of the Meghalaya Minor Mineral Concession Rules, 2016 or Acts and Rules relating to Mines and Minerals framed by Central Government and any other laws including Forest and Labour Laws.
- (iv) The Director of Mineral Resources does not undertake verification of the mining lease boundary on the ground and does not undertake any responsibility regarding the correctness of the boundaries of the precise area as furnished by the applicant/lessee.
- (v) At any stage, if it is observed/found that the information furnished data incorporated in the document are incorrect or misrepresent facts, the approval of the document shall be revoked with immediate effect.
- (vi) If this approval conflicts with any other law or court order/direction under any statute, it shall be revoked immediately.
- (vii) The granting authority may verify the Mining Lease boundary of the applied area.
- (viii) The granting authority may ensure that the Limestone raised from the above proposed Mining Lease is used only for the purpose indicated in the end use incorporated in the approved Mining Plan.

Encl: As above
3 (three copies of approved Mining Plan)

Yours faithfully,


(P.Ch.Marak)
Mining Engineer
Directorate of Mineral Resources
Meghalaya:::Shillong.

Memo. No.DMR/MM/203/2024/04-A

Dated Shillong, the 27/11 2024.

Copy to:

1. The Controller General, Indian Bureau of Mines, Govt. of India Ministry of Mines, Indira Bhavan, Civil Lines, Nagpur – 440 102 for information and necessary action.
2. The Director General of Mines Safety, Dhanbad, Jharkhand - 826016 for information and necessary action.
3. The Secretary to the Govt. of Meghalaya, Mining & Geology Department, Shillong for information and necessary action.
4. The Principal Chief Conservator of Forest, Meghalaya, Shillong for information and necessary action.
5. The Director of Mineral Resources, Meghalaya, Shillong for information.
6. The Commissioner of Labour, Meghalaya, Shillong for information and necessary action.
7. The Director of Mines Safety, Guwahati Region, Guwahati- Assam - 781020 for information and necessary action.
8. The Chairman, Meghalaya State Pollution Control Board, Lumpyngngad, Shillong for information and necessary action.
9. The Deputy Commissioner, East Khasi Hills District for information.
- ✓ 10. The RQP for information.


Director of Mineral Resources
Meghalaya :: Shillong.



CATEGORY B

MINING PLAN

WITH

PROGRESSIVE MINE CLOSURE PLAN

For
RUSIAR LIMESTONE MINE

At
RUSIAR, LYNTI DKHAR AREA,
SOHBAR SIRDARSHIP,
EAST KHASI HILLS DISTRICT,
MEGHALAYA

Over
AREA 1.00 HECTARES

APPROVED

(Prepared and submitted as per the Guide Lines of Indian Bureau of Mines, TMP Division,
Ministry of Mines, Govt. Of India, Vide their notification No.296/7/2000/MRC, dated 16 May
2011)

And

Rule 10(a) and Rule 19 of Meghalaya Minor Mineral Concession Rules, 2016

Lessee:-

SMT. SEISOH SYIEMLIH
SOHBAR VILLAGE, SOHBAR SIRDARSHIP
EAST KHASI HILLS DISTRICT
MEGHALAYA

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

PREPARED BY:-

JAIPAL SINGH

RQP/AJM/378/2015/A

TELEPHONE: 91 9485112301, 91 8955956927



Smt. Seisoh Syiemlieh

Sohbar Village, Sohbar Sirdarship
East Khasi Hills District
Meghalaya

APPROVED

AUTHORIZATION LETTER UNDERTAKING/CERTIFICATE FROM THE LESSEE

01. The Mining Plan with PMCP in respect of Limestone Mine, over an area of 1.00 ha, located at- Rusiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya under rule 10 (a) & 19 MMMCR 2016 has been prepared by RQP Shri Jaipal Singh (RQP/AJM/378/2015/A)

This is to request the Department of Mining and Geology, Meghalaya, to make any further correspondence regarding any correction of the Mining Plan with PMCP with the said recognized person at his address below:

Shri Jaipal Singh

RQP/AJM/378/2015/A

Qualified person as per rule 19(2) of MMMCR 2016

Validity upto 5.8.2025.

C-47, Raghu Marg,

Hanuman Nagar

P.O. Vaishali Nagar,

Jaipur, Pin 302021

E-mail: jaipal1965@gmail.com

I hereby undertake that all modification/ updating as made in the Mining Plan with PMCP by the said recognized person be deemed to have been made with our knowledge and consent and shall be acceptable on us and binding in all respects.

02. It is certified that the CCOM Circular no 2/2010 will be implemented and complied with when an authorized agency is approved by the State Government.
03. It is certified that the progressive Mine Closure Plan of Limestone Mine at Rusiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya of Smt. Seisoh Syiemlieh over an area of 1.00ha complies with all statutory rules, regulations, Orders made by Central or State Government, Statuary organization, Court etc which have been taken into consideration and wherever any specific permission is required the lessee will approach the concerned authorities.
The information furnished in the Progressive Mine Closure Plan is true and correct to the best of our kind knowledge and records.
- 04 "The provisions of Mines Act, Rules and Regulations made there under have been observed in the Mining Plan with PMCP over an area of 1.00 ha located at Rusiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya Belonging to Limestone Mine and where specific permissions are required, the applicant will approach the DGMS. Further, standards prescribed by D.G.M.S. in respect of miner's health will be strictly implemented."

Place- Sohbar Village, East khasi Hills

Dated- 15th October , 2024

Smt. Seisoh Syiemlieh
Applicant/ Lessee

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



Smt. Seisoh Syiemlieh

Limestone Mine

AREA 1.00 HECTARES

Home: Sohbar Village, Sohbar Sirdarship, East Khasi Hills, Meghalaya.

Site: Rusiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya.

PILLAR UNDERTAKING

APPROVED

I, Smt. Seisoh Syiemlieh the Lessee of Limestone Mining Lease over an area of 1.00 hectares located at Rusiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya; do hereby undertake that the boundary pillars of the mining lease area will be maintained properly.

A handwritten signature in blue ink, appearing to be "Seisoh Syiemlieh".

Smt. Seisoh Syiemlieh

Sohbar Village,
Sohbar Sirdarship,
East Khasi Hills,
Meghalaya

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Smti. Seisoh Syiemlieh

Limestone Mine

AREA 1.00 HECTARES

Home: Sohbar Village, Sohbar Sirdarship, East Khasi Hills, Meghalaya.

Site: Rusiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya.



END -USE UNDERTAKING

I, Smti. Seisoh Syiemlieh the lessee of Limestone Mining Lease over an area of 1.00 hectares located at Rusiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya; do hereby undertake that the Limestone from my Mining Lease will be used in kilns for manufacture of lime.

A handwritten signature in blue ink, appearing to be "Seisoh", is written above the name of the lessee.

Smti. Seisoh Syiemlieh

Sohbar Village, Sohbar Sirdarship,
East Khasi Hills,
Meghalaya.

APPROVED

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



SHRI JAIPAL SINGH

RQP/AJM/378/2015/A

Qualified person as per rule 19(2) of MMMCR 2016

C-47, Raghu Marg, Hanuman Nagar, P.O. Vaishali Nagar, Jaipur, Pin 302021

e-mail: jaipal1965@gmail.com

mobile: 91 9485112301

CERTIFICATE

APPROVED

It is certified that the Mining Plan along with Progressive Mine Closure Plan of Rusiar Limestone Mine at Rusiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya, Smt. Seisoh Syiemlieh over an area of 1.00 ha complies with all statutory rules, regulations, Orders made by Central or State Government, Statuary organization, Court etc which have been taken into consideration and wherever any specific permission is required the lessee will approach the concerned authorities.

The provisions of Mines Act, Rules and Regulations made there under have been observed in the Mining Plan with PMCP of Rusiar Limestone Mine at Rusiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya, Smt. Seisoh Syiemlieh over an area of 1.00 ha, and where specific permissions are required, the applicant will approach the DGMS. Further, standards prescribed by D.G.M.S. in respect of miner's health will be strictly implemented.

The provisions of MMMCR 2016 (Meghalaya Minor Mineral Concession Rules 2016) have been observed in the preparation of the Mining Plan with PMCP for Rusiar Limestone Mine, over an area of 1.00 ha of Smt. Seisoh Syiemlieh at Rusiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya and whenever specific permission are required, the lessee will approach the concerned authorities of Director of Mineral Resources Meghalaya.


The information furnished in the Mining Plan with PMCP is true and correct to the best of my knowledge.

Place-Shillong

Dated- 15th October, 2024


Jaipal Singh

Qualified Person under rule 19(2)
Of MMMCR 2016


Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

JAIPAL SINGH
RQP/AJM/378/2015/A



APPROVED

List of Chapters

Chapter	Title Of Text	Page
1	General	1
2	Location And Accessibility	3
3	Details Of Approved Mining Plan	6
4	Geology And Reserves	7
5	Mining	12
6	Mine Drainage	19
7	Stacking Of Mineral Rejects/Sub Grade Material And Disposal Of Waste	20
8	Use Of Mineral And Mineral Rejects	21
9	Processing Of Rom And Mineral Rejects	22
10	Others	23
11	Environment Management Plan	24
12	Progressive Mine Closure Plan	31-38

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



APPROVED

List of Annexure

<i>Numbers</i>	<i>Title</i>
1.	<i>Land Document</i>
2.	<i>Non-Forest Land Certificate</i>
3.	<i>Letter Of Intent</i>
4.	<i>RQP Certificate</i>

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



APPROVED

List of Plates

Number	Title
1	Location Plan
2	Key Plan
3	Environment Plan
4	Surface Geological Plan & Sections
5	Composite Plan & Yearwise Sections
6	Conceptual Plan
7	Progressive Mine Closure Plan

Min. g. Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



1.0 GENERAL

1.1 Introduction

Lessee:-

Smt. Seisoh Syiemlieh Lessee/Applicant of this mining lease for Limestone, area 1.00 hectares is interested to involve in mining with this mining lease located at Rusiar, Lynti Dkhar Area, Sohbar Sirdarship East Khasi Hills District, Meghalaya

Lease Details:-

APPROVED

Lessee	Smt. Seisoh Syiemlieh
Area of Lease	1.00 ha
Mineral	Limestone
Lease period	10 years
Non-Forest Clearance Certificate	KH/8/NOC/Limestone/41/Pt.IV/2620 Dated 30.08.2024
LOI Issued	KH/8/ML/Limestone/68/2655 Dated 30.08.2024
Reason for Submission Of Mining Plan	As the LOI issued for sanctioned of the mining lease, thus as per LOI for sanction of the lease this mining plan is prepared and submitted for approval.

For preparation of the Mining Plan with PMCP the lessee approached the RQP and authorized the RQP for preparation of Mining Plan with Progressive Mine Closure Plan.

The survey work was conducted in October 2024 and the plan with progressive mine closure plan has been prepared. This Mining Plan with Progressive Mine Closure Plan has been prepared as per the new guide lines provided by the approving authorities and circulars issued time to time.

Approach

From	To	Distance	Road
Mine Site	MDR27	2.2 Km	KR
Mine Site	Tharia (Village)	4.7 Km	KR, TR
Mine Site	Bholaganj (Medium size village)	3.5 Km	KR, MDR27
Mine Site	New Komorah (Village)	3.7 Km	KR, MDR27, TR
Mine Site	SH 5	9 Km	KR, MDR27, TR
Mine Site	Sohbar (Cherrapunji)	22.5 Km	KR, MDR27, TR, SH-5
Mine Site	Shillong	68 Km	KR, MDR27, SH-5, TR, NH206, NH106,
Mine Site	Shillong Airport	101	KR, MDR27, SH-5, TR, NH206, NH106,

Jaipal Singh
JAIPAL SINGH
RQP/AJM/378/2015/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



Mine Site	Guwahati Railway Station	168	KR, SH-5, TR, NH-206, NH-106, NH-6, NH-27
Mine Site	Bangladesh Border	1 km	Ariel Distance SE
KR- Kacha Rasta, TR- Tar Road, MDR - Major District Road, SH- State Highway, NH- National Highway			

1.2 General

a) Name and address of lessee

Smt. Seisoh Syiemlieh

Sohbar Village

Sohbar Sirdarship

East Khasi Hills

Meghalaya

APPROVED

b) Status of Lessee:

Private Individual.

c) Mineral which are included in prospecting license:

Not applicable.

d) Mineral which are included in the letter of Intent/ lease deed

Limestone.

e) Mineral which lessee intends to mine

Limestone.

f) Name of Recognized Person under MMMCR 2016

Who prepare the Mining Plan/ scheme

Name:

Jaipal Singh

RQP/AJM/378/2015/A

C-47, Raghu Marg,

Hanuman Nagar

P.O. Vaishali Nagar,

Jaipur,

Pin 302021

Telephone: 91-9485112301

Registration Number (under rule 22B of MCR 1960)

RQP/AJM/378/2015/A

Date of Grant- 6.08.2015

Valid up to - 5.08.2025.

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

JAIPAL SINGH
RQP/AJM/378/2015/A



2.0 LOCATION AND ACCESSIBILITY

a) **Lease Details**

Name of the mine:

Rusiar Limestone Mine

Rusiar, Lynti Dkhar Area,

Sohbar Sirdarship

East Khasi Hills District,

Meghalaya

b) **Name of Lessee:**

Smt. Seisoh Syiemlieh

Sohbar Village

Sohbar Sirdarship

East Khasi Hills

Meghalaya

APPROVED

c) **Details of lease area with location plan**

Location plan is enclosed as Plate-1.

Forest	Non Forest
Nil	1.00 hectare Own land (Private land) occupied by the lessee/ applicant

Weather the area falls under coastal Regulation Zone (CRZ)

No

Signature
JAIPAL SINGH
RQP/AJM/378/2015/A

Signature
Minister Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



Existence of public road/ railway line

From	To	Distance	Road
Mine Site	MDR27	2.2 Km	KR
Mine Site	Tharia (Village)	4.7 Km	KR, TR
Mine Site	Bholaganj (Medium size village)	3.5 Km	KR, MDR27
Mine Site	New Komorah (Village)	3.7 Km	KR, MDR27, TR
Mine Site	SH 5	9 Km	KR, MDR27, TR
Mine Site	Sohbar (Cherrapunji)	22.5 Km	KR, MDR27, TR, SH-5
Mine Site	Shillong	68 Km	KR, MDR27, SH-5, TR, NH206, NH106,
Mine Site	Shillong Airport	101	KR, MDR27, SH-5, TR, NH206, NH106,
Mine Site	Guwahati Railway Station	168	KR, SH-5, TR, NH-206, NH-106, NH-6, NH-27
Mine Site	Bangladesh Border	1 km	Ariel Distance SE
KR- Kacha Rasta, TR- Tar Road, MDR - Major District Road, SH- State Highway, NH- National Highway			
The lease area is near the road and connected by kacha rasta			
Nearest Railway Station is Guwahati RS- 168 kilometres from the lease area			
Nearest Airport is at Shillong around 101 kilometers.			
Nearest Town is Sohbar (Cherrapunji) 22.5 Km and Nearest Medium size village is Bholaganj 3.5 Km			
Nearest Secondary School, Market, PHC as hospital, Rest House, Circuit house, College etc are at Cherrapunji around 22.5 kilometers away.			
Market, School, PHC, Secondary School, etc are available at Bholaganj around 3.5 Km away.			
Water supply by Public water supply as available at Bholaganj and New Komorah from there it will be brought by for drinking purpose.			
Electric power is available along the tar road and at the mine office near the lease area			
Nearest State Highway SH5 is Northern and East side of the lease area 9 Km by road			
Bangladesh Border is around 1 kilometers (Aerial distance).			

- d) The Location Plan (not to scale) is enclosed (plate-1) showing the access routes with a Key plan (Plate-2).

JAIPAL SINGH
RQP/AJM/378/2015/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



e) Pillars of the lease area:

Pillar	Latitude	Longitude	Pillar	Pillar	Bearing	Distance (Mtrs)
1	25°10'48.41"	91°44'26.38"	1	2	262°15'	30
2	25°10'48.28"	91°44'25.33"	2	3	319°00'	10.5
3	25°10'48.54"	91°44'25.08"	3	4	250°30'	52.5
4	25°10'47.97"	91°44'23.31"	4	5	358°00'	40
5	25°10'49.27"	91°44'23.26"	5	6	038°00'	121
6	25°10'52.38"	91°44'25.91"	6	7	081°00'	47
7	25°10'52.62"	91°44'27.56"	7	8	141°00'	39
8	25°10'51.64"	91°44'28.43"	8	9	233°00'	70
9	25°10'50.29"	91°44'26.45"	9	10	182°00'	58

APPROVED

JAIPAL SINGH
RQP/AJM/378/2015/A

Minig Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

3.0 DETAILS OF APPROVED MINING PLAN/SCHEME OF MINING



3.1 Date and reference of earlier approved Mining Plan/ scheme

It will be a fresh area and thus this chapter is not applicable.

3.2 Details of last modification if any (for the previous approved period) of approved Mining Plan/ scheme indicating date of approval, reason for modification.

Not applicable.

3.3 Give review of earlier approved proposals (if any) in respect of exploration, excavation and reclamation etc.

Excavation:

Not applicable

Prospecting:

Not applicable.

Waste Disposal

Not applicable.

Plantation

Not applicable.

APPROVED

3.4 Indicate and give details of any suspension / closure/ prohibitory order issued by any Government agency under any rule or court of law

Not applicable.

3.5 In case the MP/SOM submitted under rules 10 (a) or under rule 19 of MMMCR 2016 for approval of modification, specify reason and justification under these rules.

Not applicable

Signature
JAIPAL SINGH
RQP/AJM/378/2015/A

Signature
Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



4.0 GEOLOGY AND RESERVES

- a) The elevation range within the lease area is 183mRL highest contour to 141mRL lowest contour. The mineral is exposed in the whole lease area. Drainage in the lease area is Southerly. General drainage outside the area is almost Southerly by non-perennial nalahs. The area is hilly and stony. Area broken by nalahs in the five kilometers periphery is illustrated on plate-2. No habitation located in and near the lease area. Nearest habitation is located in Tharia and Bholaganj Village. The deposit is in private land. The forestland not located in the area. No PWD road passes through the area.

b) Regional Geology

APPROVED

Regional Stratigraphic Succession

General Stratigraphic Sequence of the Formation of Meghalaya Plate

Geological Age	Group Name	Formation Name	Rock Type
Recent	Newer Alluvium	Unclassified	Sand, Silt and Clay
-----UNCONFIRMITY-----			
Pleistocene	Older Alluvium	Unclassified	Sand, Clay, Pebble, Gravel and boulder deposits
-----UNCONFIRMITY-----			
Mio- Pliocene	Dupitula Group	Unclassified	Mottled Clays, Feldspathic sandstone and conglomerate.
-----UNCONFIRMITY-----			
Oligo- Miocene	Garo Group	Chengopara Formation Baghmara Formation Simsang Formation	Sand, Siltstone, Clay, Mart Feldspathic Sandstone, Pebble, Conglomerate, Clay, Silty Clay. Shale, Sandstone, Mart
Eocene	Jaintia Group	Kopli Formation Shella Formation Langpar Formation	Siltstone-sandstone alternations, sand. Alternation of sandstone- lime stone Calcareous Shale, Sandstone, Limestone
Upper Cretaceous	Khasi Group	Mahadek Formation Bottom Conglomerate Formation	Arkose(glauconitic) Conglomerate, Arkose

JAIPAL SINGH
RQP/AJM/378/2015/A

M. V. S. Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



		Jadukata Formation	Sandstone- Conglomerate alternation
-----UNCONFIRMITY-----			
Jurassic	Sylhet Trap	-	Basalt, alkali Basalt, Rhyolite acid tuff.
-----UNCONFIRMITY-----			
Pre- Cambrian	-	Intrusives (acid and basic) Shillong Group	Ponphyritic and coarse granites, aplite, quartz vein, epidiorite, dolerite, basalt Quartzite, Phyllite, Conglomerate
-----UNCONFIRMITY-----			
Archaean	-	Gneissic Complex	Biotite- gneiss, Biotite- Hornblend gneiss, granitic gneiss, Migmatite, mica- schist, sillimanite- quartz schist, biotite- granulite- amphibolites, pynoxene- granulite etc.

Local Geology:

Succession of rocks in the lease area (Local Geology)

APPROVED

Geological Age	Group Name	Formation Name	Rock Type
Recent	Newer Alluvium	Unclassified	Sand, Silt and Clay
-----UNCONFIRMITY-----			
Eocene	Jaintia Group	Shella Formation	Lime Stone

c) DETAILED DESCRIPTION OF GEOLOGY

Lithology:

The limestone is exposed in the whole lease area. No other rocks exposed in the lease area.

[Signature]

JAIPAL SINGH
RQP/AJM/378/2015/A

[Signature]
Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

**Structure:**

The limestone has strike almost East to West and dip seems vertical in absence of workings. No fault, fold and geological disturbances are observed in the area.

Nature Of Mineralization:

The limestone of this area belongs to Shella Formation of Jaintia Group of Eocene age. The soil not observed. It comes across in small patches.

Effect Of Weathering:

The cracks and joints at surface are due to weathering effect.

Nature of Wall Rocks:

No wall rock is exposed in the area.

APPROVED

Geological Sections:

The Geological sections are prepared at 30m interval at central of the lease across the strike.

Recovery:

Recovery of the Limestone seems 90% in this deposit. Rest 10% is lower grade, intrusive and can be used as low grade or as other purpose. The recovery may increase or decrease as per the availability of limestone compactness.

Physical And Chemical Characteristics:

Physically the limestone is of light grayish in colour. As the rock is hard and compact the bulk density is 2.5 tons per cu. Meter of rock.


d) Name Of Prospecting Agency

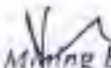
It will be a fresh mining lease for Lime Stone. Previously it was mapped by Geological Survey of India. The maximum area will be exposed by proposed mining, thus proposed prospecting will not require.

e) Details Of Prospecting/ Exploration Already Carried Out:

It is a fresh area. No old working observed. The lease area with details is shown on-Surface Geological Plan with spot levels.

f) Surface Cum Surface Geological Plan is Provided As Plate-4.**g) Surface Geological Plan is Provided As Plate-4.****h) Geological Sections Are Provided On Plate-4.**


JAIPAL SINGH
RQP/AJM/378/2015/A


Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

i) **Future Program Of Exploration:**

The prospecting is not required as maximum area will be excavated during the mining of next five years.

j) **Method Of Estimation Of Reserves:**

Reserves and Resources as per recent survey

The reserves are estimated by following formula

Volume of mineral = Area of section X Sectional influence length

Mineral in tons = Volume of mineral \times Recovery percentage \times Bulk density 2.5 tons per cu. metre).

The reserves are computed for proved, probable and possible categories.

The details are as follows:

The sections are prepared across the strike at 30 meters interval.

Proved Category:

The mineral is exposed up to 141mRL. In the lease area mineral is continuing in sides and depth of the area. The mineral is also exposed surrounding the lease area. Thus proved category reserves are computed up to 138mRL as shown on Surface Geological Plan. The surface limits are shown on plan and sections.

Reserve Calculations**APPROVED****Proved Category**

Section & Deposit	Area of section M ²	Sectional Influence length M	Volume of Mineral M ³	Volume of Useable Mineral 90% M ³	Mineral in Tones V x 2.5
AA'	2100	45	94500	85050	212625
BB'	3400	30	102000	91800	229500
CC'	3070	30	92100	82890	207225
DD'	2400	30	72000	64800	162000
Total					811350
Reserves in Nearest Tens					8,11,350

i) **Mineral Reserves/ Resources: Lime Stone**

A) Total Mineral Reserves	Limestone(tons)
Proved Mineral Reserves	2,76,345
Probable Mineral Reserves	0
Total Mineable Reserves	2,76,345
B) Total Remaining Resources	
Feasibility Mineral Resources	5,35,005
Pre-Feasible Mineral Resources	0
Inferred Mineral Resources	0

Jaipal Singh
JAIPAL SINGH
 RQP/AJM/378/2015/A

Mining Engineer
 Directorate of Mineral Resources
 Meghalaya, Shillong

**MINEABLE RESERVES AND ANTICIPATED LIFE OF THE MINE**

- The mineable reserves of Limestone is of the order of **2,76,345 MT**
- The production in the period of this Mining Plan will be around **2,20,025 MT** in 5 years.
- Balance reserves: $2,76,345 - 2,20,025 = 56,320$ MT
- Yearly Production target is **44,000 MT**.
- The balance reserves will sufficient for $56,320/44,025 = 1.28$ years
- Thus total life of the mine is $5 + 1.28 = 6.28$ years or Say **7 Years Approx**

Proved Category Calculated by sectional method **8,11,350** tones

Mineable reserves as per bench calculations = **2,76,345** tones

Block reserves = Total reserves – mineable reserves

$$= 8,11,350 - 2,76,345 = 5,35,005 \text{ tones}$$

In block reserves

In **7.5 meters** periphery = Periphery x 7.5 x Average Thickness x Recovery x Bulk Density

$$= 467 \times 7.5 \times 40 \times 90\% \times 2.5 \text{ tones}$$

$$= 3,15,225 \text{ tones}$$

Under slope of bench = Block reserves – periphery reserves

$$= 5,35,005 - 3,15,225$$

$$= 2,19,780 \text{ tones}$$

APPROVED

JAIPAL SINGH
RQP/AJM/378/2015/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



5.0 MINING

a) Briefly describe the existing and proposed method for excavation:

Existing Mining:

It will be a fresh mining lease for Lime Stone. The work will commence in the area after approval of mining plan, issuing of EC and agreement with Government.

Proposed Mining:

The proposed mining will be by heavy earth moving machineries, i.e. by hydraulic excavator, Loaders, Rock Breakers, Trippers, Short hole Blasting.

The opencast method of mining with semi mechanization is proposed to excavate the mineral and waste and for other mining activities. Bench height and width are proposed 6 meters each considering semi mechanization.

Approach roads will be provided time to time up to the faces from nearest tar road. Blasting will be done by short or long holes with the permission of DGMS. The pneumatic breaker and hydraulic breakers will be used for excavation of mineral.

The fencing around the pit/ excavation will be provided to check the inadvertent entry of human and livestock in the working zone.

The soil if comes across during mining in small layer or cavity will be scraped and stacked separately to be used for plantation during each monsoon.

Drinking water is being brought from public water supply available at village and stored in water pitchers at site office and near the working sites for drinking purpose and in cement tanks near the site office for other purpose.

The following works are proposed:

1. The barbed wire fencing will be provided around the proposed and existing workings to check the inadvertent entry of human and livestock in mining zone.
2. Whole area is excavated no soil is observed. If some soil came during mining in cavities then it will be used for plantation.
3. Proper plantation will be done in the lease area and nearby the lease area in each monsoon and will be reported to the department with photographs.
4. Garland drains with parapet walls will be provided around the pit to check the entry of monsoon flowing water towards working pit.
5. Drinking water will be brought from nearby village and stored in water pitchers for drinking purpose and in cement tanks for other purpose.
6. The workings will be done by maintaining the proper benches.
7. The waste is proposed to be dumped in Southern side of the lease area between pillar '1' & '2' in 0.02 ha area for 6 meters in height in two terraces of 3 meters height each.
8. The site services, site office, water tanks, workshops, kitchen, bathrooms etc will be located near lease area in lessee's land.

JAIPAL SINGH
RQP/AJM/378/2015/A

Miner's Engineer
Inspectorate of Mineral Resources
Meghalaya, Shillong



b) The Development year wise is proposed for first five years.

In the period of this Mining Plan the lessee will develop five benches i.e. From Bench levels 180mRL (Top Bench), 174mRL, 168mRL, 162mRL, 156mRL (Lowest Bench).

The approach roads up to faces will be provided time to time for movement of vehicles. The bench height and width are proposed 6 meters but the lessee may take permission from DGMS for bench height more than 6 meters.

The bench slope will be providing 85°. The loading will be from pits or from stocks.

The lessee will work as per proper benches and develop the benches as required but, in the manner, as proposed and as shown on plate-6. The length and width of workings are as per the situation at field.

Year	Bench number mRL	Area in Sq. Meter	Average Depth of bench in meter	Total volume in Cu. Meter	Waste in M ³	Mineral in M ³
I Year	180	2800	6	16800	1680	15120
	174	460	6	2760	280	2480
II Year	174	2340	6	14040	1400	12640
	168	920	6	5520	550	4970
III Year	168	2400	6	14400	1440	12960
	162	860	6	5160	520	4640
IV Year	162	3260	6	19560	1960	17600
V Year	162	1030	6	6180	620	5560
	156	2230	6	13380	1340	12040

Year wise development in tons

Year	Tentative excavation in tons (ROM)	Waste / sub-grade of Lime stone in tones	Mineral Lime Stone in tones
I Year	48,900	4,900	44,000
II Year	48,900	4,875	44,025
III Year	48,900	4,900	44,000
IV Year	48,900	4,900	44,000
V Year	48,900	4,900	44,000
Total	2,44,500	24,475	2,20,025

Dump re handling (for the purpose of recovery of mineral)
No recovery will be carried out from the dumps.

c) Enclose development plans and sections

The development plan and sections are enclosed as composite plan and sections.

JAIPAL SINGH
RQP/AJM/378/2015/A

Mining Engineer
Ministry of Mineral Resources
Meghalaya, Shillong



- d) Describe briefly giving salient features of the proposed method of workings indicating Category of Mine.

-Blasting

The blasting is needed to excavate the lime stone. The safe blasting is proposed by adopting all the safety measures as per Mines Act' and with the permission of DGMS.

i) Broad blasting parameters

-Deep Hole Blasting

Deep Hole Drill rod	6 meters effective length
Deep Hole Drill Machine	Down the hole drill
Burden	3 meter
Spacing	4 meter
Hole Diameter	4 inch (100mm)

-Short Hole

Drill rod	1.5 meters effective length
Drill machine	Jack Hammer
Burden	0.8 meter
Spacing	1.0 meter
Hole Diameter	32 mm

APPROVED

ii) Explosive Used

Blasting will be done by various types of explosives. Generally, the following conventional types of explosives are used in the mine.

Slurry explosive (AN based) viz. power gel, Acquadyne, Superdyne etc. are proposed as primer. Blasting agent is proposed as ammonium nitrate fuel oil (ANFO) mixture.

The ANFO mixture will be readily produced at site by mixing ammonium nitrate (94.5%) with diesel oil (5.5%). If ANFO is not allowed the other slurry explosive may be used.

Initiation is proposed by half second delay detonators.

iii) Powder Factor

Deep Hole:

Charges per hole is 0.125 kg of primer, 5.5 kg per meters of blasting agent and One detonator (as required by Mines Manager).

Powder Factor = $\frac{\text{Effective Depth of hole} \times \text{Burden} \times \text{Spacing} \times \text{Bulk Density}}{\text{Total charge in Kg}}$

$$\text{Powder factor} = \frac{6 \times 3 \times 4 \times 2.5}{0.125 + 33}$$

$$= 180/33.125 = 5.43 \text{ tons of rock/kg of explosive}$$

Short Hole:

Charges per hole is 0.125 kg of primer, 0.45 kg of blasting agent and One detonator.

JAIPAL SINGH
RQP/AJM/378/2015/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



$$\text{Powder Factor} = \frac{\text{Effective Depth of hole} \times \text{Burden} \times \text{Spacing} \times \text{Bulk Density}}{\text{Total charge in Kg}}$$

$$\begin{aligned} \text{Powder factor} &= \frac{1.5 \times 0.8 \times 1 \times 2.5}{0.125 + 0.45} \\ &= 3.00/0.575 = 5.21 \text{ tons of rock/kg of explosive} \end{aligned}$$

- iv) **Secondary Blasting**
Secondary blasting will not be needed

- v) **Storage of Explosive**

APPROVED

Annual excavation of Rock	48,900
Explosive for excavation of ton of rock	5.43 kg
Explosive for excavation of 48,900 tons of rock	$48,900/5.21 = 9,385.80 \text{ Kg}$
Quarterly Requirement of Explosive	$9,385.80 \text{ kg} / 4 = 2,346.45 \text{ Kg}$
Requirement @ 20%, use of Primer(Booster)	$2,346.45 * 0.20 = 469.28 \text{ Kg}$
Requirement @ 80%, use of ANFO	$2,346.46 * 0.80 = 1877.16 \text{ Kg}$
Advised capacity of Explosive magazine	500 Kg
Advised capacity of ANOF Storage	2000 Kg

—**Loading of Mineral and Material**

Loading of mineral and waste in trucks/tippers and tractor trolleys is to be done by hydraulic loaders.

—**Transportation of Material**

Transportation of waste material from workings to dump site is by trucks/tippers/ tractor trolleys. Limestone from face to consumers will be transported in hired trucks/ tractor trolleys.

—**Dewatering**

No water will be collected in mine in this five year plan period. So no dewatering need to be proposed.

—**Beneficiation**

No beneficiation will take place at site. The ROM mineral will be dispatched to the consumers.

JAIPAL SINGH
RQP/AJM/378/2015/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

**--Extent Of Mechanization (During 5 years of proposed period)**Assumptions:

Excavation target of Limestone per Year	48,900 ROM
Number of working days per year	300 days
Average excavation of Limestone per day	163 tons (approx)

Drilling Pattern:

Burden	0.8 meters
Spacing	1.0 meters
Depth	1.5 meters
Diameter of hole	34 mm
Tons per hole	3 tons (0.8 X 1.0 X 1.5 X 2.5=3 tons)
Number of holes required per day	163/3 = 54.33 or 55 holes per day
Jack hammers required @25 holes/Jack hammer/shift/day	55/25=2.2~3

Equipment Requirements:

- Excavator Requirements

APPROVED

Output excavator per day (Only 1 shift) @0.6 Cu M Bucket	200-300 tons
Total excavation	163 tons per day
Total Excavator required	163 /250 = 0.65 or 1 excavator

- Jack hammers are for small hole drilling as required at different places.
- For operating three jack hammers at different place, One mobile compressor is proposed.
- One water tank is proposed for supply of water for spray water on approach roads.
- Tipper will be brought by the buyers of limestone

The following machineries are proposed (as per MMMCR 2016):

S.No	Type	No.	Size/Capacity	Mode of Operation
1.	Jack hammer Drill	03	34 mm dia	Pneumatic
2.	Hydraulic excavator with rock breaker	01	0.6 mm dia	Diesel
3.	Compressor	01	100L/S	Diesel
4.	Tractor water tank	01	3000 Liters	Diesel
5.	Water Pump	01	5/10 HP	Diesel

JAIPAL SINGH
RQP/AJM/378/2015/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



e) Conceptual Plan

ULTIMATE EXTENT & SIZE OF THE PIT

The ultimate extent and size of the workings will be as follows:

Dimensions of workings are given below

Dimension	Deposit
Length	70 meter (Maximum)
Width	50 meter (Average)
Depth	45 meter

APPROVED

THE FINAL SLOPE ANGLE ADOPTED

Considering the stability of rocks the final slope angle or says ultimate pit slope is proposed 45° from vertical. This slope angle will remain quite safe for these deposits.

ULTIMATE CAPACITY OF DUMPS

Total waste will be of **24,475** tones. Maximum waste will be used in construction and maintenance of approach roads, construction of site services and rest. The waste is proposed to be dumped in Southern side of the lease area between pillar '1' & '2' in 0.02 ha area for 6 meters in height in two terraces of 3 meters height each. The waste dump will be stabilized by retaining walls of rubble stone. Parapet wall and drain will also construct towards lower altitude side to check the wash off during monsoon.

ULTIMATE PIT LIMIT

The section has been prepared and ultimate slope is drawn over the sections from end bottom point of possible reserves with ultimate slope (refer plate-4). The upper points of these slopes have been projected over the plan. By joining these points the ultimate pit limit has been drawn, which is shown on Conceptual Plan.

RECLAMATION

No reclamation is proposed during the period of this Mining Plan, as reserves will remain alive in the lease at the end of Mining Plan period. However, if reserve will be exhausted during the lease period, the exhausted benches will be reclaimed by mine rejects, spreading of topsoil and plantation will be done. It is also proposed to convert the pit into a water reservoir.

Signature
JAIPAL SINGH
RQP/AJM/378/2015/A

Signature
Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



LAND USE PATTERN

All figures in hectares

S.No	Item	As On Date	End Of 5th Year	End Of Lease
1	Area to be excavated	0.00	0.64	0.64
2	Storage of top soil	0.00	0.00	0.00
3	Overburden dump	0.00	0.02	0.02
4	Mineral/Sub-grade stack	0.00	0.00	0.00
5	Infrastructure	0.00	0.00	0.00
6	Roads	0.00	0.02	0.02
7	Green belt	0.00	0.10	0.20
8	Reclamation	0.00	0.00	*
9	Others	0.00	0.00	0.00
	Total Disturbed land	0.00	0.78	0.88

Reclamation	By Water Reservoir	0.09 ha
	By Plantation On Dump	0.02 ha
	By Plantation On Upper Benches	0.45 ha
	Total Reclaimed Area	0.56 ha

APPROVED

JAIPAL SINGH
RQP/AJM/378/2015/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



6.0 MINE DRAINAGE

- a) **Minimum and Maximum depth of water table based on observations from nearby wells and water bodies:**

In five Km periphery:

General ground level near the lease area is 35mRL in 0.5 Km periphery towards Southwestern side.

Data of ground water table is not available.

- b) **Indicate minimum and maximum depth of workings**

Minimum depth of workings: 156 mRL

Maximum depth of workings: 138 mRL up to mineable reserves.

APPROVED

- c) **Quality and quantity of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged**

As the data of ground water table is not available thus it is unknown- the quality and quantity of water likely to be encountered. However, if ground water is encountered, the lessee will take necessary permission before further progressing the work.


- d) **Describe regional and local drainage pattern with annual rain fall, catchment area, and likely quantity of rain water to flow through the lease area, arrangement to arresting the solid wash off etc.**


Local Drainage: Drainage in the lease area is almost Southerly.

Regional Drainage: General drainage outside the area is Southerly. The area is hilly and stony. Area broken by nalahs in the five kilometers periphery is illustrated on plate-2.

Natural Drainage: The monsoon water which directly precipitates over the workings will fill in the pit and rest water which precipitates outside the pit will flow down towards lower altitude side by the slope of the area into the siltation tank.

The water accumulated in the pit will be dewatered by 10 HP diesel operated pumps which will be used for plantation and rest of it will be passed through the siltation tank to settle the silt. The desilted water will be discharged into nearby nalahs/streams. The rubble stone walls are constructed towards lower side of the dumps to check the wash off during monsoon


JAIPAL SINGH
RQP/AJM/378/2015/A


Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



7.0 STACKING OF MINERL REJECTS/ SUB GRADE MATERIAL AND DISPOSAL OF WASTE

- a) Indicate briefly the nature and quantity of top soil, overburden/waste and mineral rejects to be disposed off.

Whole area is excavated no soil is observed. If some soil came during mining in cavities then it will be used for plantation. So no soil management required.

No mineral rejects come across during mining.

The waste dump management is discussed in the mining chapter in conceptual plan.


- b) The proposed dumping ground within the lease area be proved for presence or absence of mineral and be outside the UPL unless simultaneous backfilling is proposed or purely temporary dumping for a short period is proposed in mineralized area with technical constraints and justification

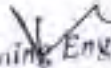
The details are given in Conceptual Mining Plan.

- c) Attach a note indicating the manner of disposal of waste, configuration and sequence of year wise build up of dumps along with the proposals for protective measures

The waste is proposed to be dumped in Southern side of the lease area between pillar '1' & '2' in 0.02 ha area for 6 meters in height in two terraces of 3 meters height each. The stone walls will be provided time to time towards lower altitude side of the dumps to arrest the solid wash off. Plantation will also provide along both side of the dump.

APPROVED


JAIPAL SINGH
RQP/AJM/378/2015/A


Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



8.0 USE OF MINERAL AND MINERAL REJECTS

- a) Describe briefly the requirement of end use industry specially in terms of physical and chemical compositions;

The lime stone will be used for making lime and/or as building material for building, road and other construction works.

- b) Give brief requirement of intermediate industries involved in upgradation of mineral before end use.

Not required.

APPROVED

- c) Give details requirement for other industries, captive consumption export associated industrial use


Not applicable


- d) Indicated precious physical and chemical specification stipulated by buyers

No specific grade is required by purchasers.

- e) Give details of processes adopted to upgrade the ROM to suit the user requirement

The lessee will dispatch the mineral in ROM form.


JAIPAL SINGH
RQP/AJM/378/2015/A


Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



9.0 PROCESSING OF ROM AND MINERAL REJECTS

No process takes place at mine site.

The ROM mineral is being dispatched to the consumers.

- a) If processing/ beneficiation of the ROM or Mineral Rejects is planned to be conducted, briefly describe nature of processing/ beneficiation.

Not Applicable.

- b) Give a material balance chart with a flow sheet or schematic diagram of the processing procedure indicating feed, product, recovery and its grade at each stage of processing

Not applicable.

APPROVED

- c) Explain the disposal method for tailings or reject from the processing plant

Not applicable

- d) Quantity and quality of tailing/ rejects proposed to be disposed

Not applicable.

- e) Specify quantity and type of chemicals if any to be used in the processing plant

Not applicable

- f) Specify quantity and type of chemicals to be stored

Not applicable

- g) Indicate quantity (Cu. M per day) of water required for mining and processing and sources of supply of water, disposal of water and extent of recycling.

Around 5 Cu. M. water required for mining for drinking and other purpose.
Drinking water will be sourced from nearby public water source/supply.
Water for other purposes will be sourced from siltation tank.

Summit
JAIPAL SINGH
RQP/AJM/378/2015/A

V
Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



10.0 OTHERS

a) Site services

The site office, workshop, rest shelters, kitchen etc are available near the lease area as shown on plate-3.

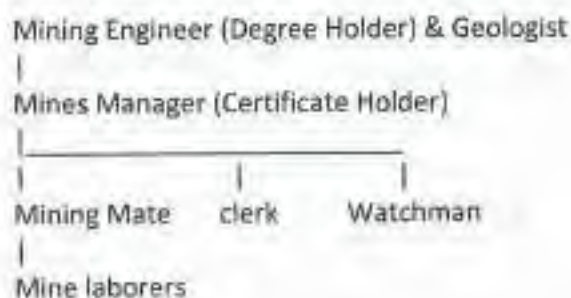
b) Employment Potential

The following employment is proposed:

Highly Skilled:	1
Skilled:	5
Semi-Skilled:	6
Un Skilled:	6

APPROVED

The following supervisory personnel are proposed with management chart:



c) Personal Protective Equipment

- Safety Helmet- Used for the safety of head
- Safety Goggles- Used for the safety of Eyes from sun, welding and other flying rock particles
- Dust Respirators: Used for dust free air at dusty areas in the mine
- Ear Plugs: Used for protection of air from unwanted sound i.e. noise pollution
- Safety Belts with Rope- For safety of body which may fall from high faces
- Hand Gloves- For protection of hand during welding or other hot things/ articles
- Safety Boots- For protection of foot from fall of Lime Stone and for safety from injury

d) Other requisite requirements for laborers

- WC (Latrines and Urinals) one for each and up to 50 laborers. Separate for Male and Females (Section 20 Mines Act, 33 of Mines Rules).
- Rest Shelter for laborers for taking rest during off hours (Rule 62 of Mines Rules).
- Water hut for storing of cold water for laborers (at least 2 liters for each labor for drinking purpose) (Section 19 Mines Act, 30 of Mines Rules).
- First Aid Boxes in sufficient numbers (Section 21 of Mines Act).

Signature
JAIPAL SINGH
RQP/AJM/378/2015/A

Signature
Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



11.0 ENVIRONMENT ASSESSMENT AND ENVIRONMENT MANAGEMENT PLAN

11.1 MEASURE TAKEN AND TO BE TAKEN FOR PROTECTION OF ENVIRONMENT IN AND AROUND THE LEASE AREA

Existing: Presently the lease is not sanctioned. Thus the aesthetic environment beauty of the area is good.

Proposed: Due to mining operations pits, dumps, roads etc will be developed. No tree will destroy by proposed mining activities. For protection of environment and improving the aesthetic beauty of the area following measures will be provided:

The mining will be systematic and scientific in supervision of technical staff.

The dump, stack will be at proper place as suggested and fully stabilized as proposed.

The plantation between tar road and mine site and along the lease area will improve the environment. Good scenario will develop by plantation for the people who travel on the road.

The land use by mining is as follows:

All figures in hectares

S.No	Item	As On Date	End Of 5th Year	End Of Lease
1	Area to be excavated	0.00	0.64	0.64
2	Storage of top soil	0.00	0.00	0.00
3	Overburden dump	0.00	0.02	0.02
4	Mineral/Sub-grade stack	0.00	0.00	0.00
5	Infrastructure	0.00	0.00	0.00
6	Roads	0.00	0.02	0.02
7	Green belt	0.00	0.10	0.20
8	Reclamation	0.00	0.00	*
9	Others	0.00	0.00	0.00
	Total Disturbed land	0.00	0.78	0.88

Flora and Fauna

Because of the diverse topography, abundant rainfall and varying climatic conditions, the state harbors diverse vegetation type that range from tropical and sub-tropical forests to subtropical grassland at higher elevations. Each of these vegetation types contains wide variety of plant lives that include orchids, epiphytes, bamboos and a large number of trees, shrubs. The flora of the area will improve by proposed plantation.

JAIPAL SINGH
RQP/AJM/378/2015/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



The fauna found as livestock and the rarely appearance of wild animals like Monkeys, Insects, Squirrels etc., which will be not affected by mining activities. The barbed wire fencing will be provided around the excavation to check the inadvertent entry of human and livestock and fauna. In absence of wild fauna no adverse impact will encounters thus no measures are called for. No adverse impact will be anticipated.

Climatic Conditions

APPROVED

The district East Khasi Hills with Shillong as District headquarter lies between 25°07" & 25°41" N Lat. and 91°21" & 92°09" E Long. Bounded by Ribhoi district in the North, West Jaintia Hills on the East, Bangladesh on the South and West Khasi Hills & South West Khasi Hills on the West.

The climate of the district ranges from temperate in the plateau region to the warmer tropical and sub-tropical pockets on the Northern and Southern regions. The whole of the district is influenced by the south-west monsoon which begins generally from May and continues till September. The weather is humid for the major portion of the year except for the relatively dry spell usually between December and March.

Summer is 28°C Maximum and Winter is 3.8°C Maximum. Average rainfall in the State is 12,000 mm.

Data source :

<https://eastkhasihills.gov.in/demography/>

<https://eastkhasihills.gov.in/district-profile/>


Public buildings, Places of Worship and Monuments

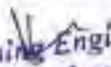
No such things are observed in and near the lease area thus no measures are called for.

The roads, highway observed in 5 kilometres periphery of the applied lease area are illustrated on plate-2.

Human Settlements

No human settlement observed in the lease area. Nearest village is Tharia and Bholanganj, in Sohbar Sirdarship. The main vocation of the habitants is agriculture. The habitants also have job at nearby mines and nearby towns.


JAIPAL SINGH
RQP/AJM/378/2015/A


Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



11.2 Measure Taken And To Be Taken For Dumping Overburden, Stacking Of Top Soil And Utilizations Of Top Soil

In Limestone mine the maximum quantity of excavated rock is sell able in the form of lump, grit and powder.

Waste dump and stabilization:


As per the Mining Plan around **24,475 tons** of waste will come across during the period of the Mining Plan. The waste will be used in construction and maintenance of approach roads, construction of site services. The waste will also lifted by local habitants for constructing the walls along the agriculture field.


The waste is proposed to be dumped in Southern side of the lease area between pillar '1' & '2' in 0.02 ha area for 6 meters in height in two terraces of 3 meters height each. The waste dump will be stabilized by retaining walls of rubble stone. Parapet wall and drain will also construct towards lower altitude side to check the wash off during monsoon.

APPROVED

Top soil

Whole area is excavated no soil is observed. If some soil came during mining in cavities then it will be used for plantation. Thus there will be no permanent stack of soil so no soil management required.


JAIPAL SINGH
RQP/AJM/378/2015/A


Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



11.3 Measure Taken And To Be Taken For Control Of Water, Noise And Air Pollution

Water:

During monsoon, the rain water of direct precipitation will collect in the working pits. The monsoon water of upper altitude side may also collect in the pit.

A drain will be provided towards higher altitude side of the pit to divert the rain water away from the pit.

The dewatering will be done through a sump made in the bottom of the pit and through a water tank/siltation tank at surface. Thus, the silt will be checked and not allowed to spread in the nearby area of lower altitude side and in agriculture lands.

The drinking water will be analyzed once in six months for quality. The source of drinking water is tube well and hand pumps, which are away from the area and thus not get any adverse effect from mining.

Air:

The magnitude of air pollution in a mine varies with method of mining, type of mineral, level of mechanization and beneficiation of mineral. The gaseous pollution in the mine is due to emissions from diesel engines, transport vehicles as well as during blasting. The dust pollution is due to movement of mine machineries etc. drilling, blasting and vehicular movement. The dust once allowed to go into atmosphere cannot be controlled. Hence, it is necessary to suppress and minimize the dust at its generating point/source as per the guidelines of MSPCB.

APPROVED

JAIPAL SINGH
RQP/AJM/378/2015/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

**Measures proposed:****Water pollution**

1. Outmost precaution will be taken that workings should not intersect the water table.
2. In case of intersection with ground water table, the lessee will immediately inform to the concerned authorities.
3. Before monsoon arrival, all drains must be cleaned for proper flow of water.
4. Regular cleaning of sump and surface tank for proper dewatering.
5. Proper maintenance of dewatering pump.
6. The drinking water will be analyzed twice in one year for quality i.e. the source of drinking water will be tube well and hand pumps.

Dust pollution

1. Sharp drill bits are used and the drilling machine is kept leakage proof. Dust extractor will be provided in drill machine.
2. Controlled blasting is proposed only on hire requirement after taking permission from DGMS and other local authorities. Water Sprinklers provided over haul road to control the fly of dust.
3. All the haul roads will be kept wide, leveled and compact. Regular water Sprinklers should be done on road from site to tar road once or twice in a day especially during dry season to check the generation of dust during vehicular movement.
4. The green belt as shown on plate 6 in and near the lease area will minimize dispersion of dust in nearby area. The proposed plantation is illustrated on the plan.
5. The proposed plantation along both sides of haul road from tar road and between tar road and mine site will also check the spread of dust in nearby area.
6. Monitoring in six months is proposed for assessment of impact for generation of dust due to vehicular movement, drilling, blasting and loading etc. and measures should be adopted to minimize the gaseous pollution.

Gaseous Pollution

1. The emissions from diesel engines will be minimized by proper maintenance of all diesel operated mine machineries like diesel engines, D.G sets and transport vehicles.
2. The gaseous pollution due to blasting is for a short duration. The gases are diluted by wind in a short period in opencast mining.
3. All the machineries like compressor, trucks should be operated by trained operators.
4. Gaseous pollution from diesel engines is proposed to minimize by using good quality of silencers.
5. Monitoring in one year is proposed for assessment of impact due to vehicular movement and measures should be adopted to minimize the gaseous pollution.

JAIPAL SINGH
RQP/AJM/378/2015/A

Mineral Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

**Noise Pollution**

1. The adequate silencers will be provided in diesel operated mine Machineries and trucks and tractors
2. Compact and leveled haul road are proposed for smooth running of transport vehicles
3. The transport vehicles should be filled up to rated capacity of the vehicle to minimize the noise
4. The shrubs and bushes located in the area and proposed plantation will check the propagation of noise.
5. The bumps on haul/ approach roads are proposed to remove time to time. The voids on haul roads are proposed to fill by waste and leveled time to time.

Personal protective equipment:

Safety helmet, safety shoes, safety belts will be provided to the laborers. Ear plugs will be provided to the workers who will work near the noise creating machines.

APPROVED

A handwritten signature in blue ink, appearing to read 'Jaipal Singh'.

JAIPAL SINGH
RQP/AJM/378/2015/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong




11.4 Contribution Regarding The Social Development Of The Nearby Residents

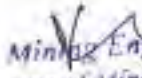
There is no impact of mining on local residents of the area as habitation is away from the applied lease area. The maximum persons will be employed from nearby villages. There is no source of employment in nearby area and thus the employment will develop by the proposed mining activity in nearby area. The villagers may use the waste free of cost. The applicant after become lessee will help in maintenance of village kacha roads with request of local bodies. The lessee will provide maximum assistant to local body on their request. The lessee will develop the plantation along the roads. The lessee will contribute some fund from the income and the fund will be used only for the social development of the people in the field of Education and medicine.

11.5 Details Of Health Checkup And Insurance Of All The Employed Persons (For Existing Lease)

Periodic health check up will be provided as per rules. The labour insurance will be provided as per rules.

APPROVED


JAIPAL SINGH
RQP/AJM/378/2015/A


Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

12.0 PROGRESSIVE MINE CLOSURE PLAN UNDER RULE 19 (1) (g) OF MMMCR 2016.



12.1 Environment Base Line Information's:

The lease area is non-forest land.

The present degradation of land is as follows

All figures in hectares

S.No	Item	As on date
1	Area to be excavated	0.00
2	Storage of top soil	0.00
3	Overburden dump	0.00
4	Mineral/Sub-grade stack	0.00
5	Infrastructure	0.00
6	Roads	0.00
7	Green belt	0.00
8	Reclamation	0.00
9	Others	0.00
	Total Disturbed land	0.00

APPROVED

Water Regime:

No water reservoir or perennial stream etc observed within 500 m of the lease area. A stream is present at 850 meters towards southeastern side of the mine. These will not get adverse impact from the proposed mining activities.

Quality of air:

The lease area is away from the habitation. Presently in absence of workings the air pollution is within limits.

Ambient Noise Level:

The noise level in the lease area is within the prescribed limit as there is no working in the area.

Flora and fauna:

Because of the diverse topography, abundant rainfall and varying climatic conditions, the state harbors diverse vegetation type that range from tropical and sub-tropical forests to subtropical grassland at higher elevations. Each of these vegetation types contains wide variety of plant lives that include orchids, epiphytes, bamboos and a large number of trees, shrubs. The flora of the area will improve by proposed plantation.

The fauna found as livestock and the rarely appearance of wild animals like Monkeys, Insects, Squirrels etc., which will be not affected by mining activities.

Sumit
JAIPAL SINGH
RQP/AJM/378/2015/A

V
Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



The barbed wire fencing will be provided around the excavation to check the inadvertent entry of human and livestock and fauna. In absence of wild fauna no adverse impact will encounters thus no measures are called for. No adverse impact will be anticipated.

Climatic Conditions:

The district East Khasi Hills with Shillong as District headquarter lies between 25°07" & 25°41" N Lat. and 91°21" & 92°09" E Long. Bounded by Ribhoi district in the North, West Jaintia Hills on the East, Bangladesh on the South and West Khasi Hills & South West Khasi Hills on the West.

The climate of the district ranges from temperate in the plateau region to the warmer tropical and sub-tropical pockets on the Northern and Southern regions. The whole of the district is influenced by the south-west monsoon which begins generally from May and continues till September. The weather is humid for the major portion of the year except for the relatively dry spell usually between December and March.

Summer is 28°C Maximum and Winter is 3.8°C Maximum. Average rainfall in the State is 12,000 mm.

Data source :

<https://eastkhasihills.gov.in/demography/>
<https://eastkhasihills.gov.in/district-profile/>

APPROVED

Human Settlement:

No human settlement observed in the lease area. Nearest village is Tharia and Bholaganj in Sohbar Sirdarship. The main vocation of the habitants is agriculture. The habitants also have job at nearby mines and nearby towns.

Public building, place of worship and monuments

No such things are observed in and around the lease area. The other things observed in five kilometers periphery is illustrated on plate-2


Indicate any sanctuary is located in the vicinity of leasehold

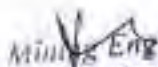
No sanctuary etc observed in the vicinity of the lease area.

12.2 Impact Assessment:

The land of the lease area will degrade by excavation, dumps and roads.

- i) The infrastructure, waste dump, roads, workings etc will be come across during the period of the Mining Plan. Thus, the fresh area will degrade by proposed workings.


JAIPAL SINGH
RQP/AJM/378/2015/A


Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



The land use at the end of five years will be as follows:

All figures in hectares

S.No	Item	As On Date	End Of 5th Year	End Of Lease
1	Area to be excavated	0.00	0.64	0.64
2	Storage of top soil	0.00	0.00	0.00
3	Overburden dump	0.00	0.02	0.02
4	Mineral/Sub-grade stack	0.00	0.00	0.00
5	Infrastructure	0.00	0.00	0.00
6	Roads	0.00	0.02	0.02
7	Green belt	0.00	0.10	0.20
8	Reclamation	0.00	0.00	*
9	Others	0.00	0.00	0.00
	Total Disturbed land	0.00	0.78	0.88

ii) Air Quality:

The quality of air is likely to be affected by drilling and transportation of mineral and waste. The drilling will be by wet process. The lessees will use rock breakers, pneumatic breakers for excavation of mineral and waste.

Water spray is being used over the haul/ approach roads time to time and this practice is proposed to continue in future.

APPROVED

iii) Water Quality:

The quality of water is affected by mining if ground water comes across in mining. As the data of ground water table is not available thus it is unknown- the quality and quantity of water likely to be encountered. However, if ground water is encountered, the lessee will take necessary permission before further progressing the work.

iv) Noise Level

The diesel operated machineries and blasting will create noise in the mining. The following measures are proposed:

High quality silencers will be provided to the diesel operated machineries uses for excavation and loading of mineral and waste and water pump etc. The approach roads will be provided smooth and wide.

v) Vibration level (Due to Blasting)

Blasting will be done in the area. The vibrations come across on small scale. The area is in interior, thus the impact will not very much significant.

vi) Water Regime:

No water reservoir or perennial stream etc. observed within 500 m of the lease area. A stream is present at 850 meters towards southeastern side of the mine. These will not get adverse impact from the proposed mining activities.

[Signature]

JAIPAL SINGH
RQP/AJM/378/2015/A

[Signature]
Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



vii) **Acid Mine Drainage**

Not applicable in this mine.

viii) **Surface subsidence**

It is an opencast mining and no such subsidence will come across in past by mining and none is expected by future mining.

ix) **Socio- Economic**

The socio-economic conditions of an area will improve by having an economic activity near by the habitation. The local habitants will get permanent extra income from the source of employment near the villages.

x) **Historical Monuments etc**

In absence of such monuments in and around the lease area no impact will be anticipated.

12.3 Progressive Reclamation Plan

The mining is from top to bottom side. The reserves will not exhaust during the period of this Mining Plan; as reserves will remain alive in the lease at the end of Mining Plan period. However, if reserve will be exhausted during the lease period, the exhausted benches will be reclaimed by mine rejects, spreading of topsoil and plantation will be done. It is also proposed to convert the pit into a water reservoir.

12.3.1 Mined Out Land

APPROVED

All figures in hectares

S.No	Item	As On Date	End Of 5th Year	End Of Lease
1	Area to be excavated	0.00	0.64	0.64
2	Storage of top soil	0.00	0.00	0.00
3	Overburden dump	0.00	0.02	0.02
4	Mineral/Sub-grade stack	0.00	0.00	0.00
5	Infrastructure	0.00	0.00	0.00
6	Roads	0.00	0.02	0.02
7	Green belt	0.00	0.10	0.20
8	Reclamation	0.00	0.00	*
9	Others	0.00	0.00	0.00
	Total Disturbed land	0.00	0.78	0.88

*

Reclamation	By Water Reservoir	0.09 ha
	By Plantation On Dump	0.02 ha
	By Plantation On Upper Benches	0.45 ha
	Total Reclaimed Area	0.56 ha

JAIPAL SINGH
RQP/AJM/378/2015/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

**12.3.2 Top Soil Management**

Whole area is excavated no soil is observed. If some soil came during mining in cavities then it will be used for plantation.

12.3.3 Tailing Dam Management

In absence of such tailing dams in the lease area and nearby no measures are called for.

12.3.4 Acid Mine Drainage

In absence of acid mine drainage, no management will be anticipated.

12.3.5 Surface Subsidence

Surface subsidence mitigation measures though backfilling of mine voids or by any other means and its monitoring mechanism.

APPROVED

A handwritten signature in blue ink, appearing to read 'Jaipal Singh'.

JAIPAL SINGH
RQP/AJM/378/2015/A

A handwritten signature in blue ink, appearing to read 'Mining Engineer'.
Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



The cost required for plantation (with watering, fencing and survival) and waste dump management etc. is given below.

The retaining wall is proposed to be constructed during next five years. The fencing will be provided in non-fenced area. The cost is given below in table.

ITEM	DETAILS	AREA (HECT)	QUANTITY	EXPENDITURE	REMARKS
(A) RECLAMATION AND REHABILITATION OF MINES OUT LAND/AREA	(i) Backfilling	Nil	NA	NA	"Nil" & "NA" because during the 5 years Plan period, the reserve remains alive.
	(ii) Afforestation on backfilled area	Nil	NA	NA	
	(iii) Others (please Specify) eg. Afforestation on exhausted benches	Nil	NA	NA	
	(iv) Pisciculture	Nil	NA	NA	
	(v) converting into water reservoir	Nil	NA	NA	
	(vi) Picnic Spot	Nil	NA	NA	
(B) STABILIZATION & REHABILITATION OF DUMPS (Within Lease)	(i) Terracing	One	-	-	Part of dumping
	(ii) Construction of parapet wall /retaining wall at toe of dump	17 running metre Per year	17 running metre Per year	Rs 3400/-	Toe of dump
	(iii) Construction of settling ponds (Garland drains etc)	93 running metre/year	93 running metre/year	Rs 18600/-	Periphery of Mine
	(iv) Afforestation on dumps	Nil	NA	NA	Continuous Dumping
(C) REHABILITATION OF BARREND AREA (Within Lease)	(i) Afforestation (Greenbelt building)	0.02 ha Per year	32 trees	8,000/-	Along lease boundary and along road
	(ii) Others (Please Specify) Wire Fencing	78 meter Per year	78 running meter per year	19,500/-	Around the excavation
(D) ENVIRONMENTAL MONITORING (Core Zone & Buffer Zone separately)	(i) Ambient air quality	Lease area	2 sample per year	6000/-	From lease area
	(ii) Water quality	well	2 sample per year	6000/-	From nearby well
	(iii) Noise Level Survey	Lease area	2 measurement per year	4000/-	Near working pits and hydraulic machineries
	Total	0.02 ha per year. Total 0.10 ha	85 meters parapet wall; 465 meters garland drain; 160 trees; 390 meters wire fencing; 30 samples of air, water and noise every year (in Mining Plan Period of 5 years)	65,500/- per year including all (Total for 5 years 3,27,500/-)	

JAIPAL SINGH
RQP/AJM/378/2015/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



12.4 DISASTER MANAGEMENT PLAN

No landslide and inundation like disaster were come across in this area and nearby the area in past. The workings are proposed from top to bottom by forming proper benches. The proposed workings will be by opencast mining method. Underground mining is not proposed. Face height will be maintained safe. No tailing dam is proposed. Thus high -risk accidents like land slide, subsidence, flood, inundation, fire, seismic activities etc. not come across. Small accidents like fire, explosion in explosives, accident and fall of face like disaster may come across. A firefighting station (sand filled buckets) is proposed at site in the supervision of mines manager and mate. After receiving the information, the officials will reach up the site and will remove men and machineries from the site. Magazine is proposed for storing the explosive and approved boxes are proposed for handling the explosive from magazine to site. Any person, who notices any explosion or accident, should immediately take steps to give warning by suitable mean and at the same time take necessary action for withdrawal of men from the site. He shall also inform the mines manager and other officials without any delay. The persons should be trained properly to handle the situation. Detailed warning system, implementation procedure, emergency control center, shall be maintained at the mine with names of trained persons. Proper arrangements should be made for treatment of injured persons. Firefighting arrangements should be provided at all the prone sites. All the safety equipment should be available at mine site. A vehicle should always remain at site. The lessee is capable to meet any type of risk. The fire stations are available within 10 Km, Dispensary is available at all prominent villages.

The responsible person is as follows:

Smt. Seisoh Syiemlieh Manager of the mine

12.5 MINE CLOSURE:

CARE AND MAINTENANCE DURING TEMPORARY DISCONTINUENCE:

No temporary discontinuance is proposed in the mining operation during the period of this progressive mine closure plan. During any discontinuance, the mining workings will be in the watch of a watchman. Before re-opening the mine, maintenance will be provided to all the machineries deployed at mine. Before the laborers enter the mine, the workings are proposed to be inspected by manager for safety purpose as per Mines Act.

12.6 Environmental Safeguard:

Systematic workings are proposed keeping in view the conservation of mineral, protection of Environment and safety of human and machineries.

No natural water courses are observed in and near the lease area and no such thing will be obstructed by proposed mining activities. Although no separate soil observed at proposed mining site, however if any soil comes across in thin layer or in cavities, it will be scraped and temporarily stacked separately at proposed site. The soil will be used for plantation during each monsoon. The waste generated during mining will be used in construction and maintenance of approach roads, construction of site services. The lessee will also sell the waste by permit from the concerning department. Rest of the waste will be dumped at proposed site as per the planning.

Smt. Seisoh Syiemlieh
RQP/JAIPAL SINGH
RQP/AJM/378/2015/A

V. Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



Regular water sprinkling will be provided over the approach road and all other dust creating points and places to minimize the dust during mining and other operations. Safe blasting as per Mines Act will be conducted by certified blaster by implementing all measures to arrest the fly rock and minimize the ground vibrations. The nearby structures should not be disturbed by blasting. Drilling will be either by wet process or by using dust extractors. In case of deep hole blasting the lessee will take permission from DGMS. For the safety of the laborers the personal protective devices will be provided and proper training will be provided for environment and safety. The height and width of the benches and face slope are proposed as per Metalliferous Mines Regulation 1961. Regular health checkups will be provided with periodically organized occupational health surveillance program for the workers. Insurance/Group insurance will be provided for all laborers as per rules. Vehicular emissions will be checked by adopting good quality of silencers and by maintaining wide and smooth roads. The noise level/pollution will be maintained within the permissible limit. Plantation as per approved planning will be provided in the lease area to increase the aesthetic environment of the lease area and nearby the lease area. The lessee will also follow the conditions imposed in the Environment Clearance for environment protection measures, CER, ESR, CSR etc.

12.7 FINANCIAL ASSURANCE

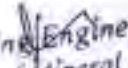
The financial assurance as security deposit of Rs 10,000/- (Rupees Ten thousand) will be provided to the concerned department as per Meghalaya Minor Mineral Concession Rules 2016.


Smt. Seisoh Syiemlieh
Lessee

APPROVED


Shri Jaipal Singh
RQP/AJM/ 378/2015/A

JAIPAL SINGH
RQP/AJM/378/2015/A


Mining Engineer
Department of Mineral Resources
Meghalaya, Shillong



मेघालय MEGHALAYA LEASE AGREEMENT

00AA 394206

THIS DEED OF LEASE AGREEMENT is made on this the 9th day of April, 2024 at Shillong.

BETWEEN

APPROVED

SMTI. ARTCY TYMMENNIANG, Daughter of Smti. Sirdar Tymmenniing, aged about 37 years, resident of Sohbar Village, Sohbar Sirdarship, East Khasi Hills District-793108, Meghalaya, hereinafter referred to as the **LESSOR** (which term unless repugnant to the context shall always mean and include her legal heirs, successors, administrators and assigns) of the **ONE PART**.

A-Tyymenniing

-AND-

SMTI. SEISOH SYIEMLIH, son of Shri. Amiyo Dohkrut, aged about 35 years, resident of H/No.76, Sohbar Village, Sohbar Sirdarship, East Khasi Hills District-793108, Meghalaya, hereinafter referred to as the **LESSEE** which term unless repugnant to the context shall always mean and include her legal heirs, successors and assigns of the **OTHER PART**.

AS

WHEREAS the Lessor is the owner of a plot of land known as "RUSIAR", lying and situated at **Lynti Dkhar, Sohbar Sirdarship, East Khasi Hills District, Meghalaya**, measuring an area of **15,918 sq.mtrs or 1.59 Hectare** more or less, which is morefully described in the Schedule herein below and hereinafter referred to as the said **LANDED PROPERTY**.

Contd...P/2

19/4/24
E. S. S. S.
R. M. S. S.

Min. Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



मेघालय MEGHALAYA

-2- APPROVED

00AA 394185

AND WHEREAS the Lessor is desirous to lease the aforesaid landed property to the Lessee and the Lessee has agreed to take the same as per conditions hereunder contained for the purpose of extracting limestone.

NOW BY THIS DEED it is hereby agreed that the Lessor shall give on lease the said landed property and the Lessee shall take on lease the said landed property on the following terms and conditions hereunder contained:-

NOW THIS DEED WITNESSETH AS FOLLOWS :-

- 1) That the Lease shall be for a period of **10 years @ Rs.50,000/-** per year.
- 2) That the Lease shall commence from the **01.05.2024**.
- 3) That the Lessee shall use the said landed property for extracting limestone only.
- 4) That the Lessee agreed with the Lessor to pay all rates, taxes and assessment whatsoever payable out of the said land.
- 5) That it is further agreed, declared and covenant by and between the parties that the said land will be used on the following terms and conditions :-
 - (a) The Lessee shall comply with the provisions of laws in force and shall be liable at all times during the said term to

Contd...P/3

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

A. Tyimmeniang



भारतीय गैर न्यायिक

दो रुपये

TWO RUPEES



भारत INDIA

INDIA NON JUDICIAL

मेघालया MEGHALAYA

3 APPROVED

00AA 394186

indemnify the Lessor against any breach of non-observance of those provisions.

- (b) The Lessee shall permit the Lessor at reasonable hours to enter and inspect the said premises without hindrance from the Lessee.
- (c) The Lessee shall use the said landed property for extracting limestone only from the said landed property.
- (d) The Lessee shall not assign, sublet or otherwise part with possession of the said premises of any part thereof to any other person.
- (e) The Lessee shall ensure that the surroundings of the said land leased shall not be affected in any way.
- (f) The Lessee shall not do anything pre-judicial to the Local Dorbar's directions and does not in any other way affect, disturb, annoy or cause any nuisance to the adjoining land and its neighbours.
- (g) The Lessee shall strictly observe the rule of the Dorbar and the prevailing laws for the time being in force.

A. Tyammingiang

[Signature]



Min. Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Contd...P/4



भारतीय गैर न्यायिक

दो रुपये

TWO RUPEES



भारत INDIA

INDIA NON JUDICIAL

मेघालय MEGHALAYA

4 APPROVED

00AA 394187

(h) The Lessee hereby observing and performing the conditions herein contained shall quietly and peaceably possess and enjoy the said landed property during the said terms without any interruption and disturbance by the Lessor or any other person. In case of breach of any of these conditions to be observed and performed by the Lessee, the Lease may be terminated and the right of re-entry may be exercised at the option of the Lessor without prejudice to the Lessor's right to recover all arrears and any damages for breach of this Agreement.

(i) The Lessee shall take all necessary precautions required to ensure safety of the said landed property and shall in no way endanger anybody including that of his workers and others.

6) That it is further agreed and declared that the expression Lessor used herein shall in addition to the Lessor herself, her successors and assigns and the expression Lessee used herein shall include in addition to the said Lessee, her heirs, successors, administrators, executors and assigns.

7) That in case of any breach or violation by any of the terms and conditions herein contained the parties shall be at liberty to approach the competent Court of Law for redressal of grievances.

A. Timmerman

San

19/12/24

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Contd...P/5



00AA 394188

A. Tannenbaum

[Signature]

[Signature]

पानास

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



मेघालय MEGHALAYA

-6-

00AA 394189

IN WITNESS WHEREOF the parties to this Deed put their hands and signatures on the day, month and year first above written in presence of the following witnesses.

WITNESSES:-

APPROVED

1.

Name :

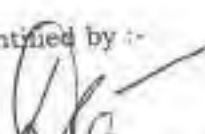
A. Tymanemmiang
(SMTI. ARTCY TYMMENNIANG)
LESSOR


2.

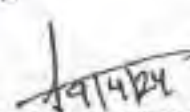
Name :

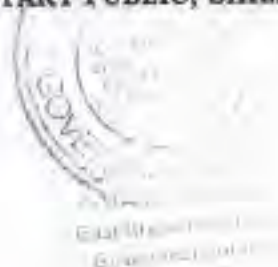
✓ 
(SMTI. SEISOH SYIEMLIEH)
LESSEE

Identified by :-


(Shri. David Gangte)
Advocate, Shillong.


Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong


NOTARY PUBLIC, SHILLONG





GOVERNMENT OF MEGHALAYA
THE DEPARTMENT OF FORESTS AND ENVIRONMENT
OFFICE OF
THE DIVISIONAL FOREST OFFICER:: EAST KHASI HILLS & RI-BHOI (T) DIVISION::
SHILLONG



NO.KH/8/NOC/Limestone/41/PLIV/ 2620

Dated Shillong, the 30th /August/2024.

To, Smti. Seisoh Syiemlieh,
 Sohbar Village,
 Sohbar Sirdarship,
 East Khasi Hills District,

Subj: Non Forest Land Certificate (NFLC): Limestone Quarry.

Ref: Your letter No. Nil dated: 9/08/2024.

Sir,

With reference to the subject cited above and also on perusal of your application and tree enumeration data conducted by the Assistant Conservator Of Forest i/c Southern Range Shillong, I have been directed to issue Non Forest Land Certificate (NFLC) for the applied area i.e 1.0 ha located at Rusiar, Lynti Dikhar Area, Sohbar Sirdarship, East Khasi Hills District and subject to the following conditions:

1. You shall obtain Mining Lease / Quarry Permit under Meghalaya Minor Mineral Concession Rules, 2016.
2. The applied area is subject to inspection by the officials/ staff of this Division/ District Council.
3. This Non Forest Land Certificate (NFC) issued shall stand cancel on violation of any extant Acts and Rules of both the State Government and District Council.
4. The certificate shall be applicable only to the applied area (as indicated below) and as per map submitted to this Division.

SLNo	GPS Co-ordinates	
1.	N - 25° 10' 48.41"	E - 91° 44' 26.18"
2.	N - 25° 10' 48.28"	E - 91° 44' 25.33"
3.	N - 25° 10' 48.54"	E - 91° 44' 25.08"
4.	N - 25° 10' 47.97"	E - 91° 44' 23.31"
5.	N - 25° 10' 49.27"	E - 91° 44' 23.26"
6.	N - 25° 10' 52.38"	E - 91° 44' 25.91"
7.	N - 25° 10' 52.62"	E - 91° 44' 27.56"
8.	N - 25° 10' 51.64"	E - 91° 44' 28.43"
9.	N - 25° 10' 50.29"	E - 91° 44' 26.45"

5. Felling of trees from the applied area shall be carried out only on prior permission from this Division.

APPROVED



Me/NO.KH/8/NOC/Limestone/41/PL IV/

Copy

Yours Faithfully,

Divisional Forest Officer
 East Khasi Hills & Ri Bhoi (T) Division
 Shillong

Dated Shillong, the /August/2024

1. The Principal Chief Conservator of Forests & HoFF Meghalaya, Shillong along with copy of Inspection Report, Tree Enumeration List and other relevant documents for favour of your information. This has a reference to his letter No MEG.68/20/Vol-II/Pl/3768-76 dated 02nd July 2020.
2. The Conservator of Forests (T), Khasi and Jaintia Hills, Shillong, Meghalaya, along with copy of inspection report, Tree Enumeration List and other relevant documents for favour of your information.
3. The Member Secretary, State Environmental Impact Assessment Authority, Meghalaya for favour of your information.
4. The Member Secretary, Meghalaya State Pollution Control Board for favour of your information.
5. The Assistant Conservator of Forest i/c Southern Range, Shillong, for favour of his information and necessary action. He is also instructed to monitor/inspect the applied area for any violation under the extant Acts & Rules of both the State Government and District Council.

Min V Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Divisional Forest Officer,
 East Khasi Hills & Ri Bhoi (T) Division
 Shillong



GOVERNMENT OF MEGHALAYA
DEPARTMENT OF FORESTS & ENVIRONMENT
OFFICE OF THE DIVISIONAL FOREST OFFICER, EAST KHASI HILLS &
RIBHOI TERRITORIAL DIVISION, SHILLONG



No.KH/8/ML/Limestone/68/ 2655

Dated Shillong, the 30th / August / 2024

To,

Smti. Seisoh Syiemlieh,
Sohbar Village,
Sohbar Sirdarship,
East Khasi Hills.



Subj: Issue of Letter Of Intent (LOI) in respect of Smti. Seisoh Syiemlieh for grant of Mining Lease.

Ref: No. nil dated 30.08.2024.

APPROVED

Sir,

With reference to the above mentioned subject, I am to inform you that this office had examined your application for grant of Mining Lease for limestone on an area of 1.0 ha located at Rusiar, Lynti Dkhar Area, Sohbar Sirdarship East Khasi Hills District, along with the Non Forest Land Certificate that was issued to you vide this office letter No. KH/8/NOC/Limestone/41/Pt IV/2620 dated 30th August 2024.

Now therefore, as per Rule 10 of the Meghalaya Minor Mineral Concession Rule (MMCCR), 2016 and in pursuance of the Government Notification No.FOR.135/2015/661 dated 16th November 2016, the Letter of Intent (LOI) is hereby issued for the Grant of Mining Lease subject to the following conditions :

1. You shall prepare the Mining Plan through the consultant empanelled by Mining and Geology Department, Govt. of Meghalaya and same shall be duly approved by the Director of Mineral Resources, Shillong.
2. You shall also obtain the following documents:
 - a. Environment Clearance from the State Environment Impact Assessment Authority (SEIAA).
 - b. Consent to Establish (CTE) from the Meghalaya State Pollution Control Board (MSPCB).
 - c. Self declaration form for due adherence of labour laws and labour safety standards.

All these documents/ clearances are to be submitted to this office within a period of 6 months for taking further necessary action.

Yours Faithfully,

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Divisional Forest Officer
East Khasi Hills & Ribhoi (T) Division,
Shillong.

Forest Management Building, 1st Floor
Lower Lachumiere, Shillong - 793001

Phone No: 0364-2226375
Email id :dfotkhasihills@gmail.com



भारत सरकार / GOVERNMENT OF INDIA
खान मंत्रालय / MINISTRY OF MINES
भारतीय खान ब्यूरो / INDIAN BUREAU OF MINES



Shri Jaipal Singh

APPROVED

अर्हताप्राप्त व्यक्ति के रूप में मान्यता प्रमाण पत्र

(खनिज रियायत नियमावली, 1960 के नियम 22सी के तहत)

CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON

(Under Rule 22C of Mineral Concession Rules, 1960)

श्री जयपाल सिंह पुत्र स्व. श्री गोरुराम निवासी सी-47, रघु मार्ग, हनुमाड नगर, पोस्ट- वैशाली नगर, जयपुर - 302021 (राजस्थान), जिनका फोटो और हस्ताक्षर ऊपर दिया हुआ है, तथा जिन्होंने अपनी अर्हता और अनुभव का संतोषजनक साक्ष्य दिया है, को खनन योजना तैयार करने हेतु खनिज रियायत नियमावली 1960 के नियम 22सी के तहत अर्हताप्राप्त व्यक्ति के रूप में मान्यता प्रदान की जाती है।

Shri Jaipal Singh S/o Late Shri Goru Ram R/o C-47, Raghu Marg, Hanuman Nagar, P.O- Vaishali Nagar jaipur-302 021 (Rajasthan), whose Photograph and signature is affixed herein above, having given satisfactory evidence of his qualifications & experience is hereby RECOGNISED under Rule 22C of the Mineral Concession Rules, 1960 as a Qualified Person to prepare Mining Plans.

उनकी पंजीयन संख्या है

RQP/AJM/378/2015/A

His registration number is

यह मान्यता दस वर्षों की अवधि के लिए मान्य है जो दिनांक 05 08.2025 को समाप्त होगी।

This recognition is valid for a period of ten years ending on

उनके द्वारा प्रस्तुत खनन योजना में गलत जानकारी/दस्तावेज पाए जाने की स्थिति में यह प्रमाण पत्र वापस लिया जाएगा/निरस्त किया जाएगा।

This certificate will liable to be withdrawn/cancelled in the event of furnishing the wrong information/documents in the Mining Plan submitted by him.

स्थान / Place : Ajmer

दिनांक / Date : 6.8.2015

क्षेत्रीय खान नियंत्रक / Regional Controller of Mines
भारतीय खान ब्यूरो / Indian Bureau of Mines
क्षेत्रीय खान नियंत्रक / Regional Controller of Mines
अजमेर / Ajmer Region
भारतीय खान ब्यूरो
Indian Bureau of Mines
अजमेर AJMER

Mining Engineer
Inspectorate of Mineral Resources
Meghalaya, Shillong



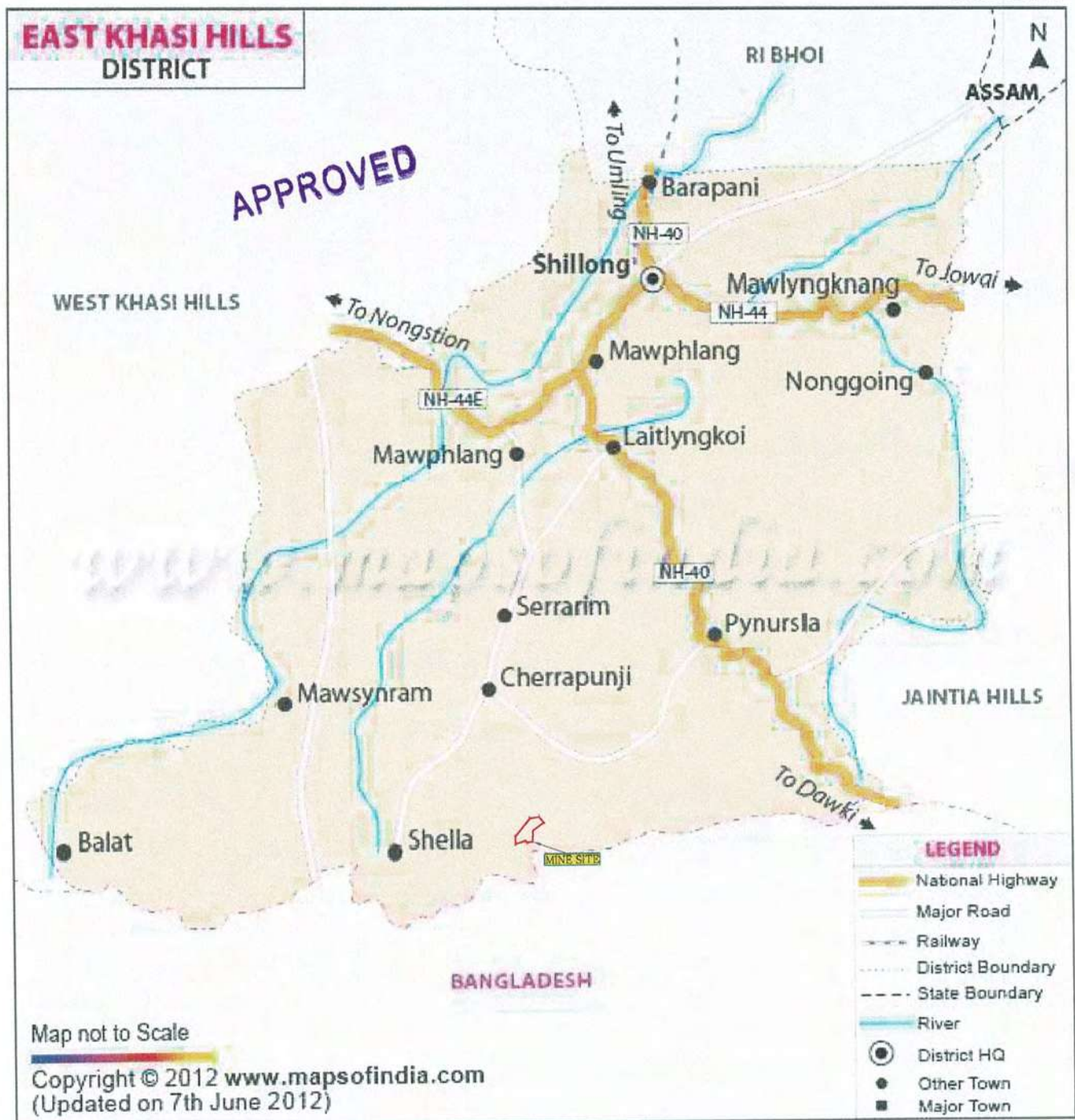
Location Map
Plate No.-1



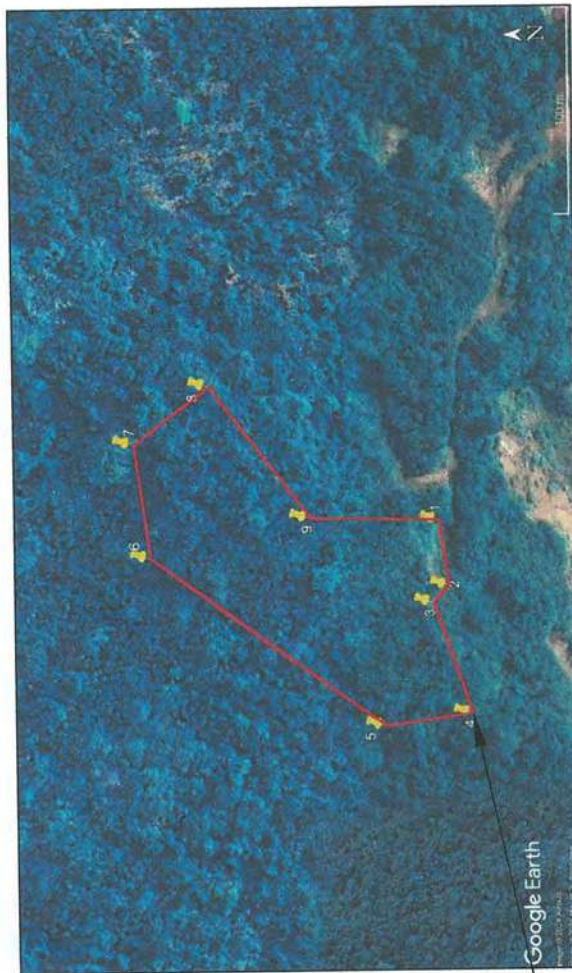
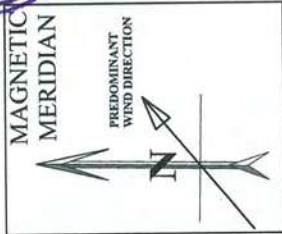
Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



Location Map
Plate No.-1



Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



Pillar	Latitude	Longitude
1	25°10'48.41"	91°44'26.38"
2	25°10'48.28"	91°44'25.33"
3	25°10'48.54"	91°44'25.08"
4	25°10'47.97"	91°44'23.31"
5	25°10'49.27"	91°44'23.26"
6	25°10'52.38"	91°44'25.91"
7	25°10'52.62"	91°44'27.56"
8	25°10'51.64"	91°44'28.43"
9	25°10'50.29"	91°44'26.45"

APPROVED

Min/Eng Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

KEY PLAN
PLATE No 2

S.NO.	PARTICULARS	REFR
1.	LEASE AREA	0
2.	NALAH	3
3.	VILLAGE	000
4.	ROAD, KACHA ROAD	==
5.	CHURCH	⦿

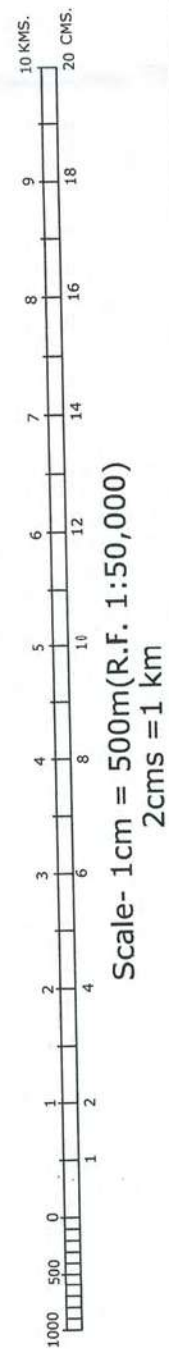
MINERAL : Lime Stone
LESSEE : Smti. Scisoh Syiemlieh
AREA : 1.00 Hect.

LOCATION

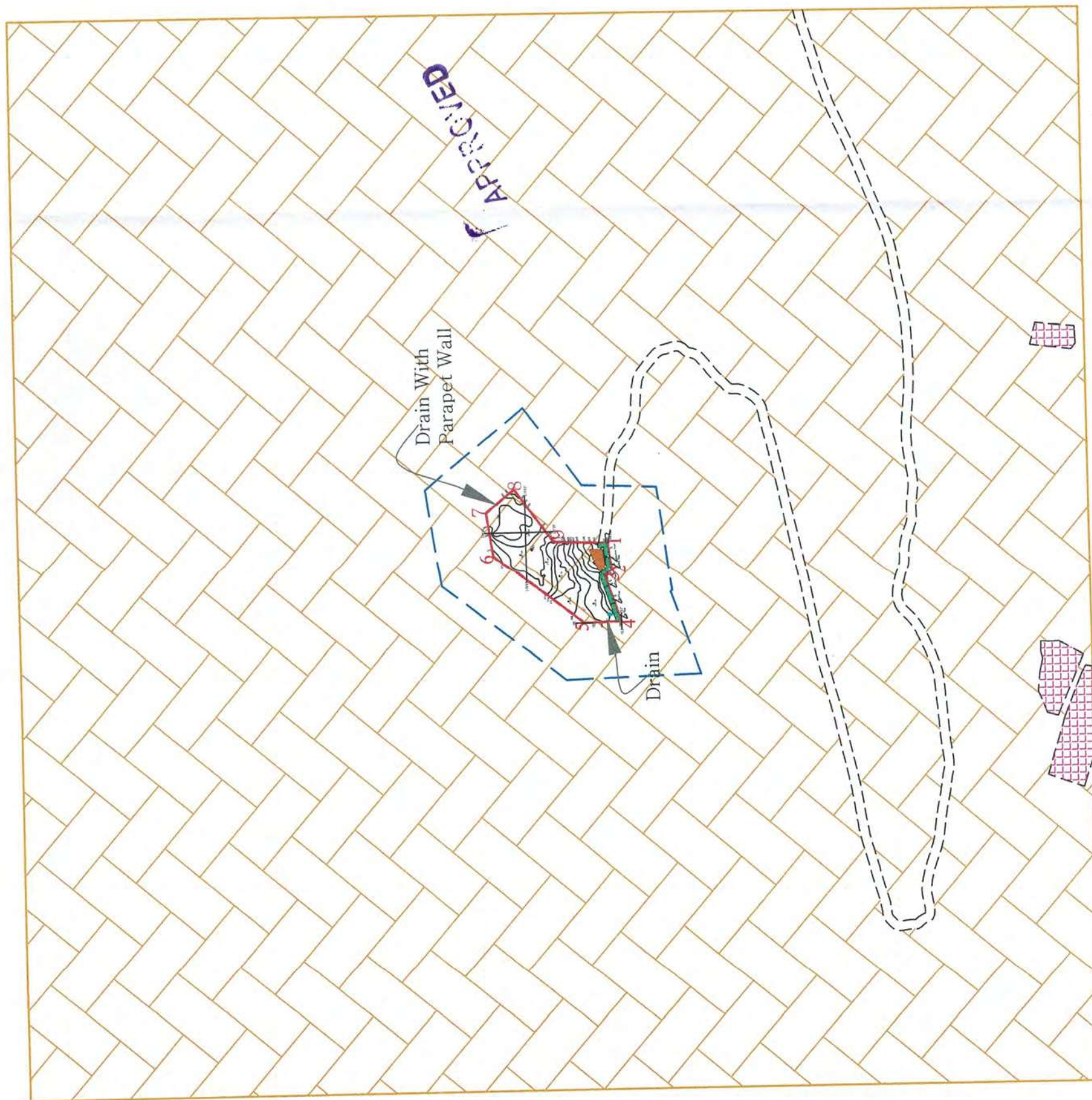
At : Rusiar, Lynti Dkhar area
District : East Khasi Hills
State : Meghalaya











PREPARED BY :

JAIPAL SINGH
RQP/AJM/378/2015/A
Lessee





Scale- 1cm = 500m(R.F. 1:50,000)
2cms = 1 km



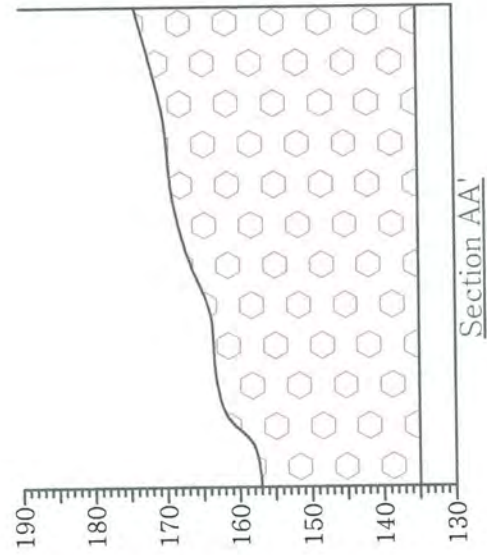
S.NO	PARTICULARS	SYMBOL
1.	Lease Boundary	
2.	Contour	
3.	Spot Level	
4.	Rasta	
5.	Habitat	
6.	Private Land	
7.	Proposed Waste Dump	
8.	Proposed Plantation	
9.	60M. Barrier Line	
10.	500M. Barrier Line	

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

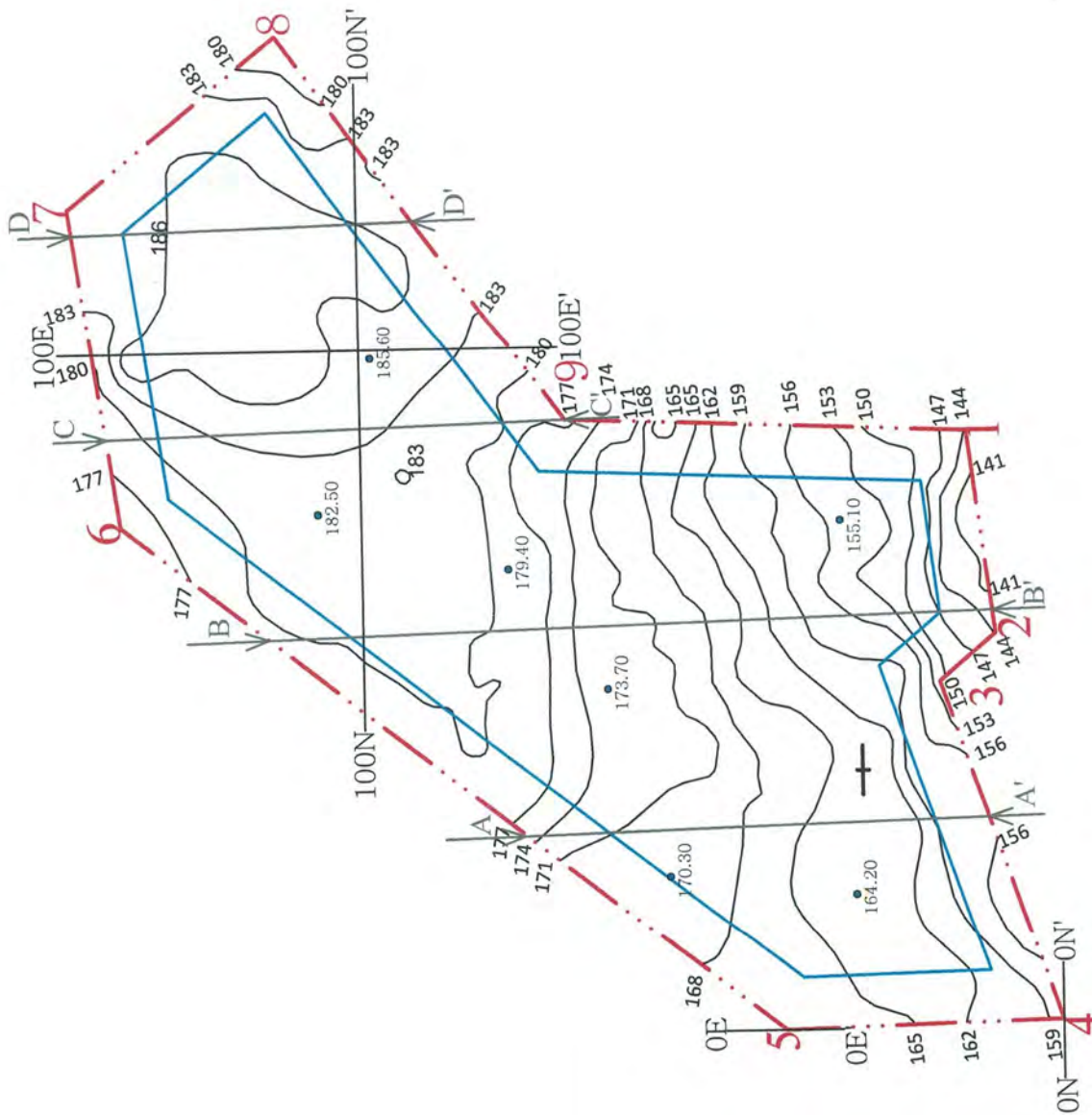
ENVIRONMENT PLAN		PLATE No.
		3
MINERAL : Lime Stone		
LESSEE : Smti. Seisoh Syiemlieh		
AREA : 1.00 Hect.		
<u>LOCATION</u>		
At	Rusiar, Lynti Dkhar area	
	Sohbar Sirdarship	
District	: East Khasi Hills	
State	: Meghalaya	
PREPARED BY :		
		
		LESSEE

Scale- 1Cm.= 50M. (1:5000)

LESSEE



APPROVED



S.No.	Particulars	Symbol
1.	Lease Boundary	—
2.	Contour	186
3.	Spot Level	• 185.60
4.	Pit	—
5.	Rasta	—
6.	Dip & Strike	—
7.	Ultimate Pit Limit	—
8.	Lime Stone	—

Mineral Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



Scale- 1Cm.= 10M. (1:1000)

SURFACE GEOLOGICAL PLAN & SECTIONS PLATE No. 4A

MINERAL : Lime Stone

LESSEE : Smti. Seisoh Syiemlieh

AREA : 1.00 Hect.

LOCATION

At : Rusiar, Lynti Dkhar area

Sohbar Sirdarship

District : East Khasi Hills

State : Meghalaya

Prepared By:

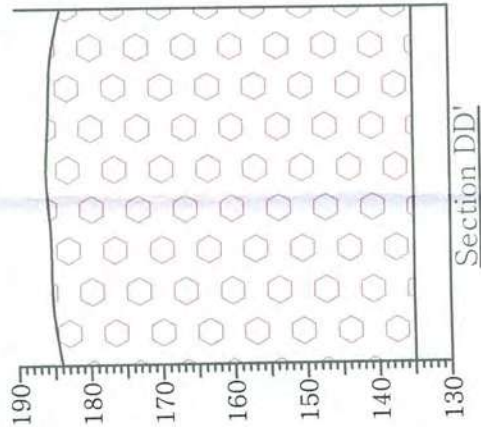
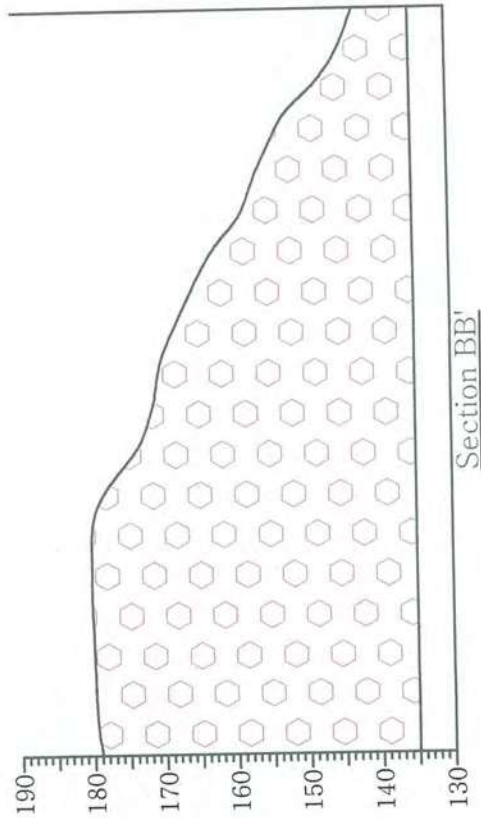
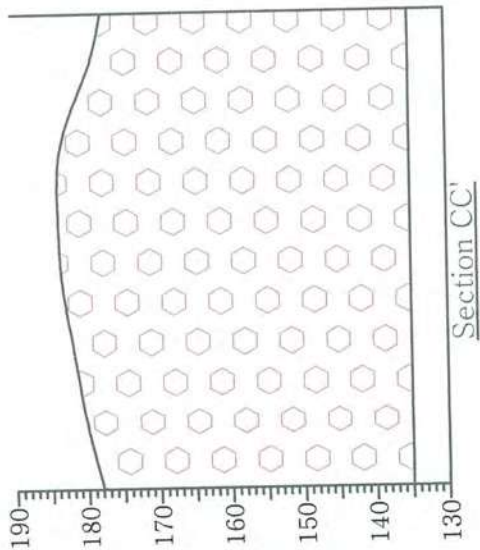
Jaipal Singh

JAIPAL SINGH
RQP/AJM/378/2015/A

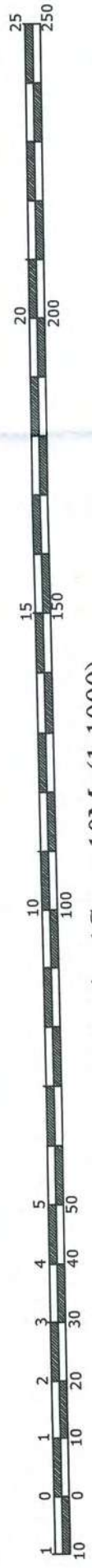
Lessee



APPROVED



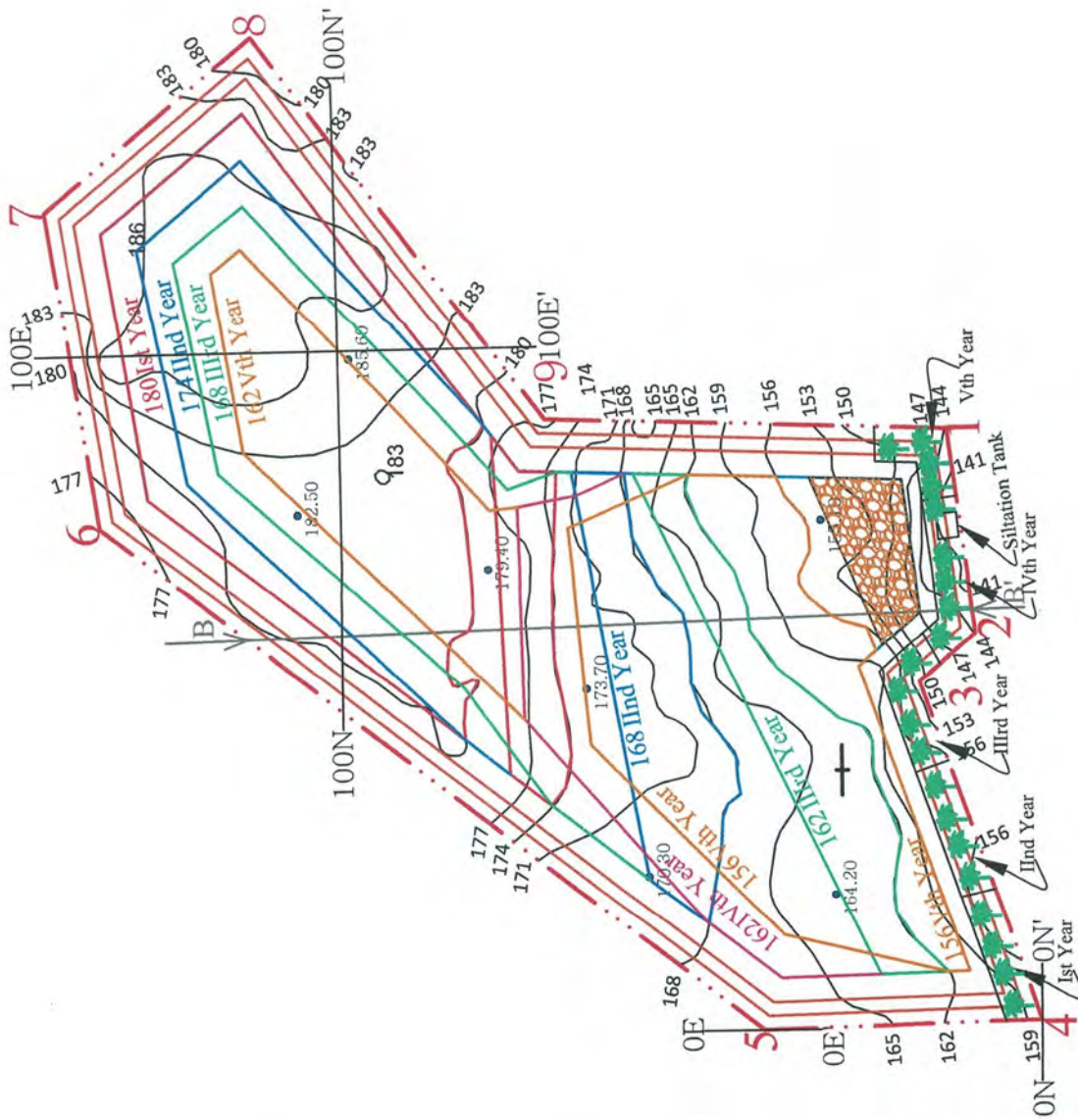
Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong



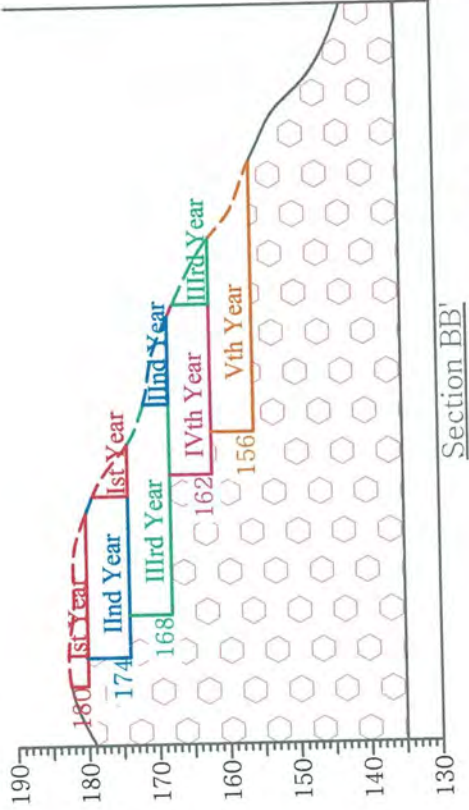
Scale- 1Cm.= 10M. (1:1000)

S.No.	Particulars	Symbol
1.	Lease Boundary	—
2.	Contour	186
3.	Spot Level	•185.60
4.	Pit	—
5.	Rasta	—
6.	Dip & Strike	—
7.	Ultimate Pit Limit	—
8.	Lime Stone	—

SURFACE GEOLOGICAL PLAN & SECTIONS		PLATE No.
		4B
MINERAL : Lime Stone		
LESSEE : Smti. Seisoh Syiemlieh		
AREA : 1.00 Hect.		
LOCATION		
At	: Rusiar, Lynti Dkhar area	
	Sohbar Sirdarship	
District	: East Khasi Hills	
State	: Meghalaya	
Prepared By:	JAIPAL SINGH	
	RQP/AJM/378/2015/A	
	Lessee	



APPROVED



Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

COMPOSITE PLAN & YEAR WISE SECTIONS
PLATE No. 5

S.No.	Particulars	Symbol
1.	Lease Boundary	—
2.	Contour	186
3.	Spot Level	• 185.60
4.	Pit	—
5.	Rasta	—
6.	Dip & Strike	—
7.	Ultimate Pit Limit	—
8.	Lime Stone	—
9.	Proposed Waste Dump	—
10.	Proposed Plantation	—
11.	Siltation Tank	—
12.	Drain	—

MINERAL : Lime Stone

LESSEE : Smti. Seisoh Syiemlieh

AREA : 1.00 Hect.

LOCATION

At : Rusiar, Lynti Dkhar area

Sohbar Sirdarship

District : East Khasi Hills

State : Meghalaya

Prepared By:

Signature

JAIPAL SINGH
RQP/AJM/378/2015/A

Lessee



Project: “Rusiar Limestone Mine”
Applicant: Smt Seisoh Syiemlieh

Annexure VI

Copy of Cluster Certificate



	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00

**GOVERNMENT OF MEGHALAYA
DIRECTORATE OF MINERAL RESOURCES
SHILLONG**

No. DMR/MM/203/2024/08

Dated Shillong, the 17th December 2024

TO WHOM IT MAY CONCERN

It is hereby certified that as on date, the approved mining plans indicated below are located within a distance of 500 meters from the periphery of the approved mining plan on Lime stone over an area 1.0 hectare located at Rusiar, Lynti Dkhar Area, Sohbar Sirdarship, District- East Khasi Hills, Meghalaya, of Smt Seisoh Syiemlieh r/o Sohbar village, Sohbar Sirdarship, District- East Khasi Hills, State- Meghalaya:

S. No.	Approved mining plan	Area (hectares)	Mineral	Distance from the approved mining plan of Smt. Seisoh Syiemlieh (metres)
1	Shri Arbis Tangdhara	0.47	Limestone	5
2	Shri Idalis Ryngnga	1.36	Limestone	74
3	Smt Ailadmon Japang	2.40	Limestone	128

Yours faithfully,



(P. Ch. Marak)
Mining Engineer,
Directorate of Mineral Resources
Meghalaya:::Shillong

Project: “Rusiar Limestone Mine”
Applicant: Smt Seisoh Syiemlieh

Annexure VII

Mine site Pillar Photographs



	Gaurang Environmental Solutions Pvt. Ltd.	
	Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00



Latitude: 25.179965
Longitude: 91.740598
Elevation: 157.76±49 m
Accuracy: 376.3 m
Time: 10-01-2025 08:58
Note: p1

Powered by NoteCam



Latitude: 25.180057
Longitude: 91.740375
Elevation: 132.16±59 m
Accuracy: 3.4 m
Time: 10-01-2025 09:37
Note: p2

Powered by NoteCam



Latitude: 25.180084
Longitude: 91.740315
Elevation: 134.66±26 m
Accuracy: 2.2 m
Time: 10-01-2025 09:38
Note: p3

Powered by NoteCam



Latitude: 25.179708
Longitude: 91.739359
Elevation: 261.96±163 m
Accuracy: 133.7 m
Time: 10-01-2025 09:45
Note: p4

Powered by NoteCam



Latitude: 25.18015
Longitude: 91.739787
Elevation: 146.26±30 m
Accuracy: 2.7 m
Time: 10-01-2025 09:47
Note: p5

Powered by NoteCam



Latitude: 25.181232
Longitude: 91.740432
Altitude: 111.5±139 m
Accuracy: 7.2 m
Time: 10-01-2025 10:04
Note: p6

Powered by NoteCam



Latitude: 25.181255
Longitude: 91.740975
Elevation: 178.14±46 m
Accuracy: 3.2 m
Time: 10-01-2025 10:08
Note: p7

Powered by NoteCam



Latitude: 25.181014
Longitude: 91.741172
Elevation: 179.34±20 m
Accuracy: 2.1 m
Time: 10-01-2025 10:10
Note: p8

Powered by NoteCam



Latitude: 25.18066
Longitude: 91.74073
Elevation: 157.56±41 m
Accuracy: 5.0 m
Time: 10-01-2025 09:03
Note: p9

Powered by NoteCam

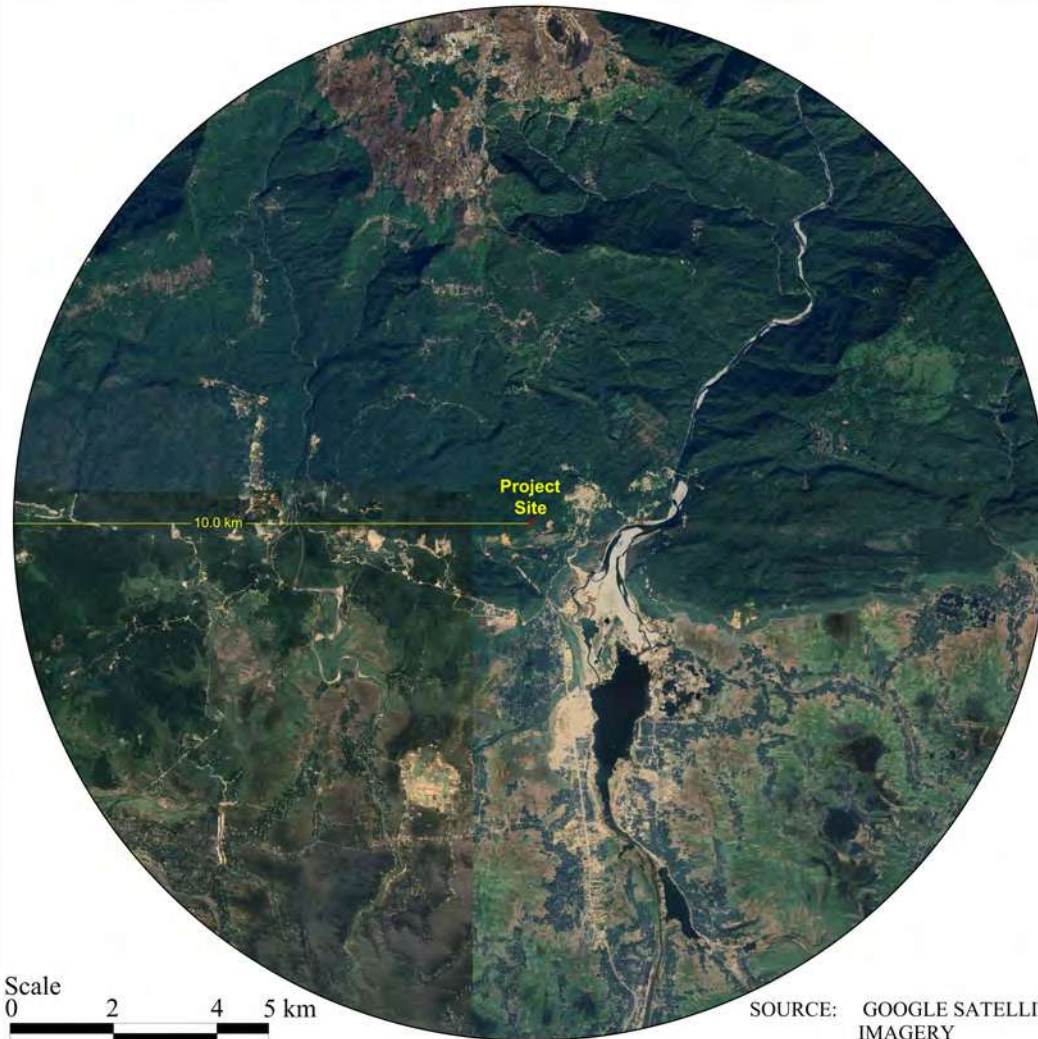
Project: “Rusiar Limestone Mine”
Applicant: Smt Seisoh Syiemlieh

Annexure VIII

10 Km Toposhet



Gaurang Environmental Solutions Pvt. Ltd.	
Report Ref: GESPL_779/ 2024-25/ DEIA/109	Rev. No. 00



Legend

Project site



TOPOGRAPHICAL MAP OF 10 KM RADIUS

Project Name - Rusiar Limestone Mine,
Area 1.00 Hectares, at Rusiar, Lynti Dkhar
Area, Sohbar Sirdarship, East Khasi Hills
District, Meghalaya
Promoter: Smt. Seisoh Syiemlieh, Sohbar
Village, Sohbar Sirdarship East Khasi
Hills, District Meghalaya

Scale
0 2 4 5 km

SOURCE: GOOGLE SATELLITE
IMAGERY



GAURANG ENVIRONMENTAL SOLUTIONS PVT. LTD.

SIMPLIFYING SUSTAINABILITY

Accredited EIA Consultant Organization by NABET, QCI, New Delhi at S. No. 102 in list of Accredited EIA Consultant Organizations (April, 2025)

#102, SNG, Shri Ratna Apartment, Near Tambi petrol pump, Peetal factory, Jhotwara Road, Jaipur-

302016 E-mail- gaurangenviro@gmail.com