ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENT MANAGEMENT PLAN

of

LONGA KOIRENG VILLAGE QUARRYING LEASE OF SANDSTONE, MURRUM AND SHALY EARTH

Located at

Longa Koireng, Tehsil- Kangchup Geljang, District- Kangpokpi, State- Manipur

Mine Lease Area: 5.16 Hectares

Proposed Production Capacity: 1,65,619.5 Cu.m per year

Project Cost: 250.0 Lac

NAME OF THE LABORATORY

M/S GEOGREEN TESTING LABORATORY, LUCKNOW

NABL ACCREDITATION NO TC-8121

Monitoring Period: December, 2020 to February, 2021

APPLICANT

M/S. HVS CONSTRUCTION MATERIALS PVT. LTD.

Proprietor: Shri Huidrom Vikramjit Singh

R/o Patsoi Lamkhai, New Cachar Road, NH-7,

District- Imphal West, State- Manipur

PREPARED BY

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AAQM	Ambient Air Quality Monitoring
CPCB	Central Pollution Control Board
dB	Decibel
DG	Diesel Generator
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
Hr	Hour
IMD	Indian Meteorological Department
ISCST	Industrial Source Complex, Short Terms
KLD	Kilo Liter Per Day
Km	Kilometer
KW	Kilo Watt
M	Meter
Masl	Mean Sea Level
mg	Milligram
MoEF&CC	Ministry Of Environment Forest and Climate Change
mRL	Mean Reference Level
MT	Million Tonne
MCu.m per	Million Tonn s Per Annum
OB	Over Burden
R&R	Rehabilitation & Resettlement
RDS	Respirable Dust Sampler
RPM	Respirable Particulate Matter
RSPM	Respirable Suspended Particulate Matter
SEIAA	State Level Environmental Assessment Authority
SOI	Survey Of India
SPCB	State Pollution Control Board
SPM	Suspended Particulate Matter
TDS	Total Dissolve Solid
ToR	Terms of Reference
TS	Total Solid

Chapter 1. INTRODUCTION OF THE PROJECT

1.1 Purpose of the Report

The purpose of the Environmental Impact Assessment (EIA) study is to ensure that all impacts whether direct or indirect and particularly environmental, social and economic impacts are fully examined and addressed.

EIA is one of the established management tools for integrating environmental concerns in development process and for improved decision making as there is a need to synchronize the developmental activities with the environmental concerns into the larger interest of society. The growing awareness, over the years, on environmental protection and sustainable development, has given further emphasis to the implementation of sound environmental management practices for mitigating adverse impacts from developmental activities.

EIA systematically examines both beneficial and adverse consequences of the proposed project and ensures that these impacts are taken into account during the project design. By considering environmental effects and mitigation early in the project planning cycle, there are many benefits, such as protection of the environment, optimum utilization of resources and saving overall time and cost of the project. Properly conducted EIA also lessens conflicts by promoting community participation, informs decision-makers, and helps lay the base for environmentally sound projects.

Environmental Management plays a vital role in sustainable development of a country. Recognizing its importance, the Ministry of Environment and Forest, Government of India had formulated policies and procedures governing the industrial and other developmental activities to prevent indiscriminate exploitation of natural resources and to promote integration of environmental concern in project development. The Ministry of Environment, Forest &Climate Change, Govt. of India made environmental clearance (EC) for certain development projects mandatory through its notification of 27/01/1994 under the Environment Protection Act, 1986. Keeping in view of the experience gained in environmental clearance process over a period of one decade, the MoEF&CC came out with Environment Impact Notification, S.O.1533I, as dated 14/09/2006 and further various amendments done on 01/12/2009, 04/04/2011, 13/12/2012, 13/03/2013, 09/09/2013, February 2014, October 2014 and also the EIA guidance Manual for Mining of Minerals of

MoEF&CC, Govt. of India, for seeking environmental clearance for mining of Sandstone, Murrum and Shaly Earth in the applied mining lease area. As per the Amendment in EIA Notification 2006 on 15th January 2016 a single EIA/EMP Plan can be proposed for cluster of Mines of within 500 meter of periphery for homogenous minerals**.** It has been made mandatory to obtain environmental clearance for different kinds of developmental projects (Schedule-1 of notification). The notification has classified projects under two categories-A and B. Category-A Projects (including expansion and modernization of existing projects) require clearance from Central Government (Ministry of Environment and Forest, Govt. of India) while category-B1 projects should be considered by State Level Environmental Impact Assessment Authority (SEIAA), constituted with the approval of MoEF&CC.

The major objectives of the report are:

- To establish the present environmental scenario
- To anticipate the impact of proposed project and
- To suggest preventive and mitigative measures

The present report has been prepared for the purpose of obtaining environmental clearance in compliance to the ToR issued for the mining of Sandstone, Murrum and Shaly Earth.

1.2 Identification of Project Proponent & Status of Lease:

Mining lease over an area of 5.16 ha, is granted to Shri Huidrom Vikramjit Singh Managing Director of M/s. HVS Construction Materials Pvt. Ltd.as per mining lease order no. D(5)-94/IND/2019 dated Imphal 2nd December, 2019.

1.3 Brief Description of the Project

The proposed project is "Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth" Area: 5.16 Ha., Located at Longa Koireng, Tehsil- Kangchup Geljang, District-Kangpokpi, State- Manipur. The mining will be done by opencast semi mechanized method of mining with drilling and blasting.

The project has been proposed for the Mining of Sandstone, Murrum and Shaly Earth from the Govt. degraded forest land of 5.16 ha area by open cast semi-mechanized method of mining.

Sandstone, Murrum and Shaly Earth will be extracted using opencast semi-mechanized methods with drilling and blasting. Loading will be done by the loader. The mineral is not

meant for captive use. The extracted / collected Sandstone, Murrum and Shaly Earth will be sold in the local market.

The estimated project cost is Rs. 250.0 Lac/-. As per the approved mining plan the proposed rate of production is 1,65,619.5 Cu.m per year of Sandstone, Murrum and Shaly Earth. The Mineable Reserve of Sandstone, Murrum and Shaly Earth are 22,25,207.95 Cu.m. The production of Sandstone, Murrum and Shaly Earth in the mining plan period will be 8,30,520 Cu.m in 5 years. As per approved mining plan the total life of mine is 10 years.

As per the EIA notification of the MoEF dated 14th September, 2006 as amended on 1st December 2009, 4th April, 2011, 13th December 2012, 13th March 2013, 9th September 2013, 28th February 2014 and 25thJune 2014 & 15th January 2016 and MoEF&CC O.M. dated 12th December, 2018 the proposed mining project is categorized as category 'B1' project. The EIA-EMP report is prepared as per the ToR granted under the EIA Notification 2006 & its amendments thereof. Further to assess the impact on environment due to proposed mine, it is necessary to ascertain present status of environment prevailing at the project site and proposed operation including identification and Assessment of impact on the environment.

1.4 Project Nature, Size & Location

The proposed project is "Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth". The total lease area considered is 5.16 ha of govt. degraded forest land. The method of mining is open cast semi-mechanized where drilling and blasting is required. As per the EIA notification of the MoEF dated 14th September, 2006 as amended on 1st December 2009, 4th April, 2011, 13th December 2012, 13th March 2013, 9th September 2013, 28thFebruary 2014 and 25th June 2014 & 15th January 2016, and MoEF&CC O.M. dated 12th December, 2018 the proposed mining project is categorized as category 'B1' project.

I. Size

The proposed maximum rate of production is 1,65,619.5 Cu.m per annum of Sandstone, Murrum and Shaly Earth.

II Location

<table>
<tr><th>Lessee/applicant</th><th>Area (Ha)</th><th>Location</th><th colspan="3">Co-ordinates</th></tr>
<tr><td rowspan="2">Shri Huidrom Vikramjit Singh</td><td rowspan="2"></td><td rowspan="2">Longa Koireng, Tehsil- Kangchup</td><td>Boundary Pillar</td><td>Latitude (N)</td><td>Longitude (E)</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Managing Director of M/s. HVS Construction Materials Pvt. Ltd.	5.16	Geljang, District- Kangpokpi, State- Manipur	B1	24° 47' 48.11"	93° 44' 24.72"
			B2	24° 47' 51.25"	93° 44' 27.13"
			B3	24° 47' 53.48"	93° 44' 29.71"
			B4	24° 47' 53.30"	93° 44' 32.65"
			B5	24° 47' 50.38"	93° 44' 35.60"
			B6	24° 47' 46.93"	93° 44' 33.03"
			B7	24° 47' 44.31"	93° 44' 30.59"

1.5 Project importance to the Country & Region

This project involves collection of Sandstone, Murrum and Shaly Earth due to their most diversified use. It is a basic raw material required for manufacturing industries improving the construction activities like buildings, road, bridges infrastructure etc. The requirement for these minerals is always high in the nearby cities, towns and villages. Also, the project will generate direct and indirect employment opportunities to the nearby villages. Economy of the area will get a boost and there will overall growth of the region. Also, the management of Mining will conduct medical camps at regular interval for villagers and labours. The CER activity will improve the overall development of the area such as providing infrastructure like school furniture, water tankers etc.

1.5.1 Statutory Requirements

The entire statutory requirement related to the proposed project is provided as per the chronological sequence in the tables given below:

Table 1-1 : Statutory Requirement

S.No.	Particulars	Details	Issued by / Approved By
1	Mine Lease Order	Lease issued vide letter no. D(5)-94/IND/2019 dated Imphal, the 2nd December, 2019 (Attached as **Annexure-I**)	The Directorate of Trade, Commerce & Industries, Govt. of Manipur
2	Approved Mine Plan	Mining plan issued vide no. D(5)-94/IND/2019 Dated Imphal, the 7th March, 2020. (Attached as **Annexure-II**)	The Joint Director (G), Directorate of Trade, Commerce & Industries, Manipur
3	Terms of	1/92/2020(EIA)/DoE&CC dated,	The Director & Member

	Reference (ToR)	Imphal, the 5th March, 2021. (Attached as **Annexure III**)	Secretary, SEIAA, Manipur

1.6 Scope of the Study

The State Level Expert Appraisal Committee (SEAC) considered the project during its meeting held 3th March, 2021. Based on the information contained in the documents submitted, SEIAA, Manipur prescribed the Terms of Reference (TOR) vide letter no. 1/92/2020(EIA)/DoE&CC dated, Imphal, the 5th March, 2021. The points raised by the SEIAA, Manipur in the TOR and its compliance are given hereunder:-

Table 1-2: ToR Compliance

S. No.	TOR POINTS	COMPLIANCE STATUS
1.	A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.	Copy of mining lease order in the name of Shri Huidrom Vikramjit Singh Managing Director of M/s. HVS Construction Materials Pvt. Ltd. and is enclosed as **Annexure-I.**
2.	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.	All documents including mine plan, EIA are compatible with one another in terms of mine area, production levels, waste generation and its management if any, mining technology etc. All documents are in the name of Shri Huidrom Vikramjit Singh Managing Director of M/s. HVS Construction Materials Pvt. Ltd.. Copy of Mining Lease order in the name of Shri Huidrom Vikramjit Singh Managing Director of M/s. HVS Construction Materials Pvt. Ltd. is enclosed as **Annexure-I.** Approved mining plan enclosed as **Annexure-II**.
3.	All corner coordinates of the mine lease area, superimposed on a high	All coordinates of the mine area, superimposed on High Resolution

S. No.	TOR POINTS	COMPLIANCE STATUS
	resolution imagery/ Topo-sheet, 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).	Imagery/Toposheet, Topographic sheet is presented in Chapter 1 of this EIA/EMP Report as Figure No. 1.1,Geology of the area is presented in Chapter 2 of this EIA/EMP Report. Land Use/Land Cover analysis for mine lease and study area using remote sensing techniques has been conducted and LULC map shown in is present in Chapter 3 of this EIA/EMP Report.
4.	Information should be provided in Survey of India Topo-sheet in 1:50000 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.	Information is provided in Survey of India Toposheet in 1:50,000 scale which clearly indicates geological map of the area, geomorphology of land forms of the area, important water bodies, streams and rivers and soil characteristics.
5.	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.	Copy of Mining Lease order in the name of Shri Huidrom Vikramjit Singh Managing Director of M/s. HVS Construction Materials Pvt. Ltd. is enclosed as **Annexure-I.** The proposed mine site is Govt. degraded forest land. We have taken NOC from the Forest Department for mining activities on the Govt. degraded forest land in favour of Sri Laishram Noren Singh, Proprietor of M/s. Noren Enterprises is enclosed as **Annexure-IV.**
6.	It should be clearly stated whether the	The Environmental Policy of the

S. No.	TOR POINTS	COMPLIANCE STATUS
	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 stockholders at large, may also be detailed in the EIA Report.	Proprietor is given in section 10.16 in chapter 10.
7.	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open caste mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	Blasting and Slope details are given in Chapter-2. Their mitigation measures and safeguards are discussed in chapter-10 of EMP section.
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	The Study area for collection of baseline data was taken 10 KM. It is also given in the Figures mentioned in chapter-3 for landuse, air and noise monitoring, water and soil sampling sites.

S. No.	TOR POINTS	COMPLIANCE STATUS
	period.	
9.	Land use of the study area delineating forest area, agriculture 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.	Land use is prepared for the study area of 10 km and clearly indicating forest area, agricultural land, grazing land, wildlife sanctuary reserve forest, water bodies, human settlements and other ecological features. Land use plan of the mine lease area is prepared encompassing pre-operational, operational and a post operational phase is discussed in Chapter 4, Section 4.1 with this EIA report.
10.	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.	Details of waste/overburdens are given in section 2.9.2 in chapter-2 and section 10.12 in chapter 10.
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 forest, based on which, the Certificate in this regard as mentioned above be issued. In all such	The Forest NOC has been taken from the concerned department by the project proponent. Copy of Forest NOC/ Clearance is enclosed as **Annexure-IV**.

S. No.	TOR POINTS	COMPLIANCE STATUS
	cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	
12.	Status of forest 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 forest clearance should also be furnished.	The Forest NOC has been taken from the concerned department by the project proponent. Copy of Forest NOC/ Clearance is enclosed as **Annexure-IV.**
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.	Certificate is enclosed as **Annexure-VIII**.
14.	The vegetation in the RF/PF areas in the study area, with necessary details, should be given.	The vegetation in the RF/PF areas in the study area, with necessary details is furnished in Chapter 3.
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.	Mitigation measures discussed in Chapter 4.
16.	Location of National Parks,	No such National Parks, Sanctuaries,

S. No.	TOR POINTS	COMPLIANCE STATUS
	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.	Biosphere Reserves, Tiger/Elephant Reserves (existing as well as proposed) are found within 10 km from the mine lease area.
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	Detailed Biological study for the study area (core zone & buffer zone) has been carried out and is discussed in Chapter 3, Section 3.7 with this EIA report. No scheduled-I fauna found in the study area.

S. No.	TOR POINTS	COMPLIANCE STATUS
	funds for implementing the same should be made as part of the project cost.	
18.	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 social-economic aspects should be discussed in the Report.	Not Applicable. There is no Project Affected People (PAP) by the proposed mining activities. Hence, there is no need of R&R Plan.
19.	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,	One season winter season baseline data was collected for the period of Dec. 2020 to Feb. 2021 duration. Details are given in Chapter-3.

S. No.	TOR POINTS	COMPLIANCE STATUS
	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 500m of the mine lease in the predominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	
20.	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 map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses	Air quality modeling has been carried out for the prediction of impacts by the mining activity on the quality of air in the surrounding area by using AERMOD View software. Details regarding air quality modeling have been incorporated in Chapter 4 Section 4.4 with this EIA report.

S. No.	TOR POINTS	COMPLIANCE STATUS
	showing pre-dominant wind direction may also be indicated on the map.	
21.	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 requirement for this project is 3.0 KLD. About 0.50 KLD of water will be required for domestic/drinking use, 1.0 KLD for dust suppression and 1.50 KLD for plantation. Water demand will be made available through water tanker supply from nearby Kotlen Village of Longa Koireng.
22.	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the project should be provided.	Not Applicable Water will be taken from near village through tanker, Hence not applicable.
23.	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.	The project will not consume water for its process except for drinking, dust suppression and plantation. Plantation is proposed which will increase the water holding capacity and help in recharging of groundwater.
24.	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.	As such mining activity will not deteriorate surface water and ground water quality because mining does not intersect ground water level. Impacts on water quality are discussed in chapter-3 and mitigation measures are given in chapter-4.

<table>
<tr><th>S. No.</th><th>TOR POINTS</th><th>COMPLIANCE STATUS</th></tr>
<tr><td>25.</td><td>Based on actual monitored data, it may clearly be shown weather 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 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.</td><td>Schematic diagram showing ground water table:
<table><tr><td rowspan="2">Elevation of mine lease area</td><td>Highest elevation 1286m AMSL</td></tr><tr><td>Lowest elevation 1181m AMSL</td></tr><tr><td>Ground level of nearby area</td><td>850m AMSL</td></tr><tr><td>Ground Water Level</td><td>40 m below ground level (m BGL) (810m AMSL)</td></tr><tr><td>Ultimate Depth of Mining</td><td>95 m (1191m AMSL)</td></tr></table>So, mining depth will not intersect the groundwater table. Hence, permission is not required from CGWA. Water will be met from private water tanker supply from nearby village.</td></tr>
<tr><td>26.</td><td>Details of any stream, seasonal or otherwise, passing through the lease area and modification/ diversion proposed, if any and the impact of the hydrology should be brought out.</td><td>No stream (seasonal/perennial) passes through the lease area. Thus, no modification/diversion is proposed.</td></tr>
<tr><td>27.</td><td>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.</td><td>Discussed in Chapter-2 under section 2.10.2.</td></tr>
</table>

28.	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular from (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.	Progressive Greenbelt Development Plan is being prepared for the mine lease and same will be executed up front on commencement of the project. Phase-wise plan of plantation is being prepared, local and native species and the species which are tolerant to pollution will be preferred. Details given in Chapter 6, Table 6.3. Certificate of Non-availability of Non forest Land for Compensatory Afforestation (CA) is attached as **Annexure-VII**.
29.	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	For mining operation purpose local labors will be deployed hence there will be no additional load on local or NH. Further considering 270 working days and maximum production 614 Cu.m day approximately 124 trucks (To and From) (capacity 10 Cu.m) will ply on NH-37 which is near to project site. Considering 8 hours working days hardly 16 trucks/hr will ply on the road at maximum production rate. Detail is

	agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	given in Chapter-4 under section 4.11.
30.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	Only temporary shelter facilities are proposed. No permanent structure will be built as the labours will be hired from the local villages.
31.	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.	Conceptual post mining land use and Progressive reclamation plan are given in Mining plan.
32.	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.	The working conditions in the mines are governed by the enactments of the as per the guidelines of the Mines Act, the management will take all necessary precautions. Normal sanitary facilities (Mobile toilet) will be provided within the lease area. The management will carry out periodic health check-up of workers. OHS plan is given in chapter-10.
33.	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.	A separate budgetary is allocated for public health implication, is incorporated in this EIA/EMP Report.

34.	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.	Labour will be hired from the local market and it will enhance their living standard by providing them employment in the vicinity.
35.	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 specific to the proposed Project.	Detailed Environmental Management Plan to mitigate the environmental impacts of the project has been detailed in Chapter 10 Section 10.1, 10.2, 10.3.
36.	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.	Agreed
37.	Details of litigation pending against the project, if any, with direction/order passed by any Court of Law against the Project should be given.	No litigation is pending against the project in any court.
38.	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	Project Cost is Rs. 250.0 Lac, EMP Cost is Rs.4.23 Lac. (Including CER/CER Budget is Rs. 5.0 Lac.)
39.	A Disaster management Plan shall be prepared and included in the EIA/EMP	Disaster Management Plan is prepared and detailed in the EIA report. Disaster

	Report.	management plan discussed in Chapter 7 Section 7.4.
40.	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.	Benefits of the project clearly indicating environmental, social, economic, employment potential, etc are incorporated as a separate chapter project benefits. Details regarding project benefits detailed in Chapter 8.
41.	The activities and budget earmarked for corporate Environmental Responsibility (CER) shall be as per Ministry's O.M. No.22-65/2017-IA.II (M) dated 01.05.2018 and the submitted at the time of the project included in the EIA/EMP Report.	Detailed CER/CSR is discussed in Chapter 7. Budget for CER/CSR is Rs 5.0 Lac.
42.	The action plan on the compliance of the recommendations of the CAG as per Ministry's circular No. J-11013/71/2016-IA. I (M) dated 25.10.2017 need to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.	The compliance of recommendations has been done in various Chapters.
43.	Compliance of the Ministry's Office Memorandum No. F: 3-50/2017-IA.III (Pt), dated 30.05.2018 on the Judgment of Hon'ble Supreme Court, dated the 2 August 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common cause versus Union of India needs to be submitted and included in the EIA/EMP Report.	Agreed.

Figure 1-1: Project Site

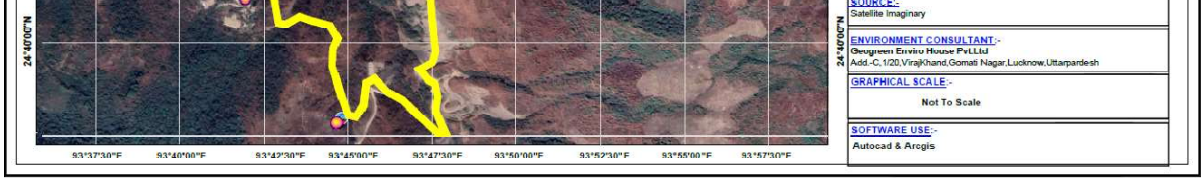


Figure 1-2: Transportation Map of Project Site

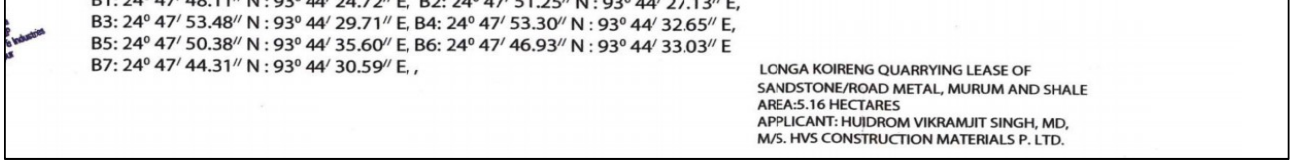


Figure 1-3: Surface Plan

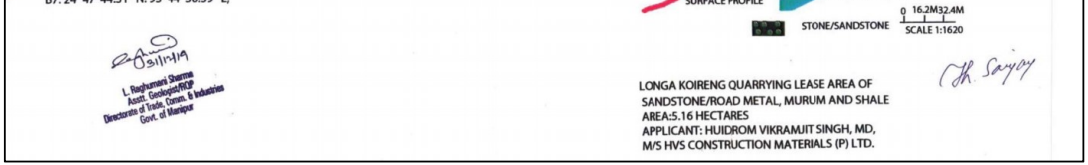


Figure 1-4: Geological Plan

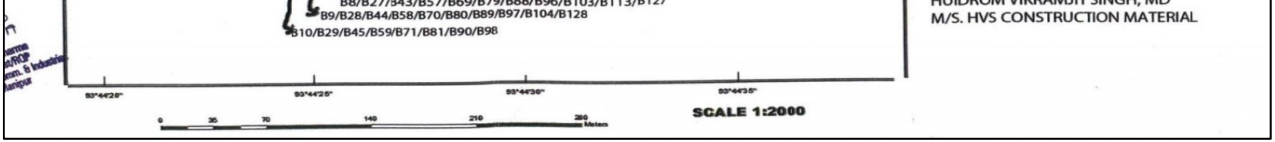


Figure 1-5: Mine Closure Plan

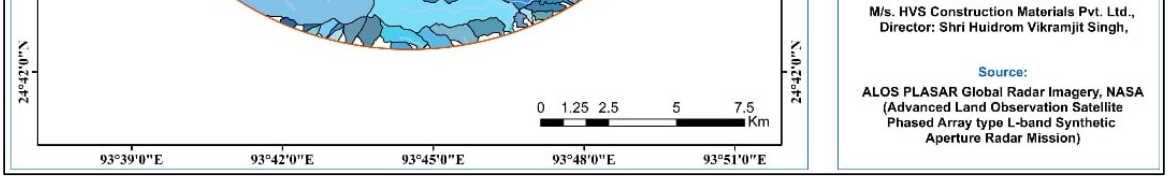


Figure 1-6: Watershed Map

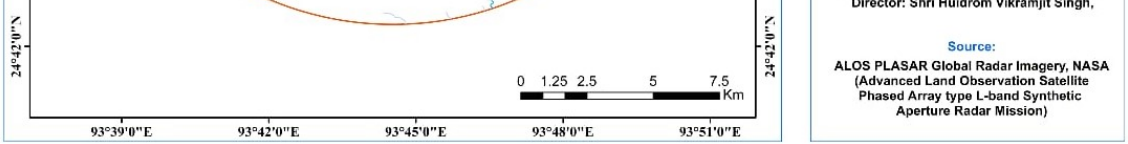


Figure 1-7: Drainage Network Map

Chapter 2. PROJECT DESCRIPTION

2.1 Type of Project

The proposed project is "Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth" having Area: 5.16 Ha., Located at Longa Koireng, Tehsil- Kangchup Geljang, District- Kangpokpi, State- Manipur.

The Ministry of Environment, Forest & Climate Change, Govt. of India made environmental clearance (EC) for certain development projects mandatory through its notification of 27/01/1994 under the Environment Protection Act, 1986. Keeping in view of the experience gained in environmental clearance process over a period of one decade, the MoEF&CC came out with Environment Impact Notification, S.O. 1533I, as dated 14/09/2006 and further various amendments done on 01/12/2009, 04/04/2011, 13/12/2012, 13/03/2013, 09/09/2013, February 2014, October 2014 and also the EIA guidance Manual for Mining of Minerals of MoEF&CC, Govt. of India, for seeking environmental clearance in the applied mining lease area. **As per the Amendment in EIA Notification 2006 and new directives from MoEF&CC's O.M. no. L-11011/175/2018-IA-II(M)dated 12.12.2018, relating to compliance to Hon'ble NGT order dated 13th September 2018, project falls under category B1 with project activity type "1(a)" (Mining of Minerals) as the total area is greater than 5 ha and less than 100 Ha, hence project comes under as Category–B1. The said project is under category B1 Project along with applicability of preparation of EIA/EMP Report.**

The estimated project cost is Rs. 250.0 Lac/-. As per the approved mining plan the proposed rate of production is 1,65,619.5 Cu.m per year of Sandstone, Murrum and Shaly Earth, The Mineable Reserve of Sandstone, Murrum and Shaly Earth are 22,25,207.95 Cu.m. The production of Sandstone, Murrum and Shaly Earth in the mining plan period will be 8,30,520 Cu.m in 5 years. As per approved mining plan the total life of mine is 10 years.

2.2 Need of the Project

This project involves collection of Sandstone, Murrum and Shaly Earth due to their most diversified use. Apart from this, the project will generate direct and indirect employment opportunities to the nearby villages. Economy of the area will get a boost and there will be overall growth of the region in terms of educational & industry. Also, the management of the mine will conduct medical camps at regular interval for villagers and labors.

Uses of Sandstone, Murrum and Shaly Earth:

- The murum used as cushion material to suppress the swelling of expansive soil. The better cushioning effect of murum can be attributed to cohesion present in it in addition to frictional characteristics and dense packing of particles.
- The mineral murum and shaly/slaty earth is used as construction materials. Murum and shaly earth are quite suitable for making road, railway line, embankment, filling up low laying areas, etc. These minerals produced and loaded in trucks and dispatched to various consumers in Manipur Valley.
- Sandstone, Murrum and shale can be used as construction materials in embankment, road, foundation, railway line, road metals, etc.

2.3 Location (Map Showing general location, specific location and project boundary with project layout) with coordinates

The proposed project is "Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth" having Area: 5.16 Ha., Located at Longa Koireng, Tehsil- Kangchup Geljang, District- Kangpokpi, State- Manipur. Location map and Google Earth Map of the project are given as Figure 2.1 and Figure 2.2.

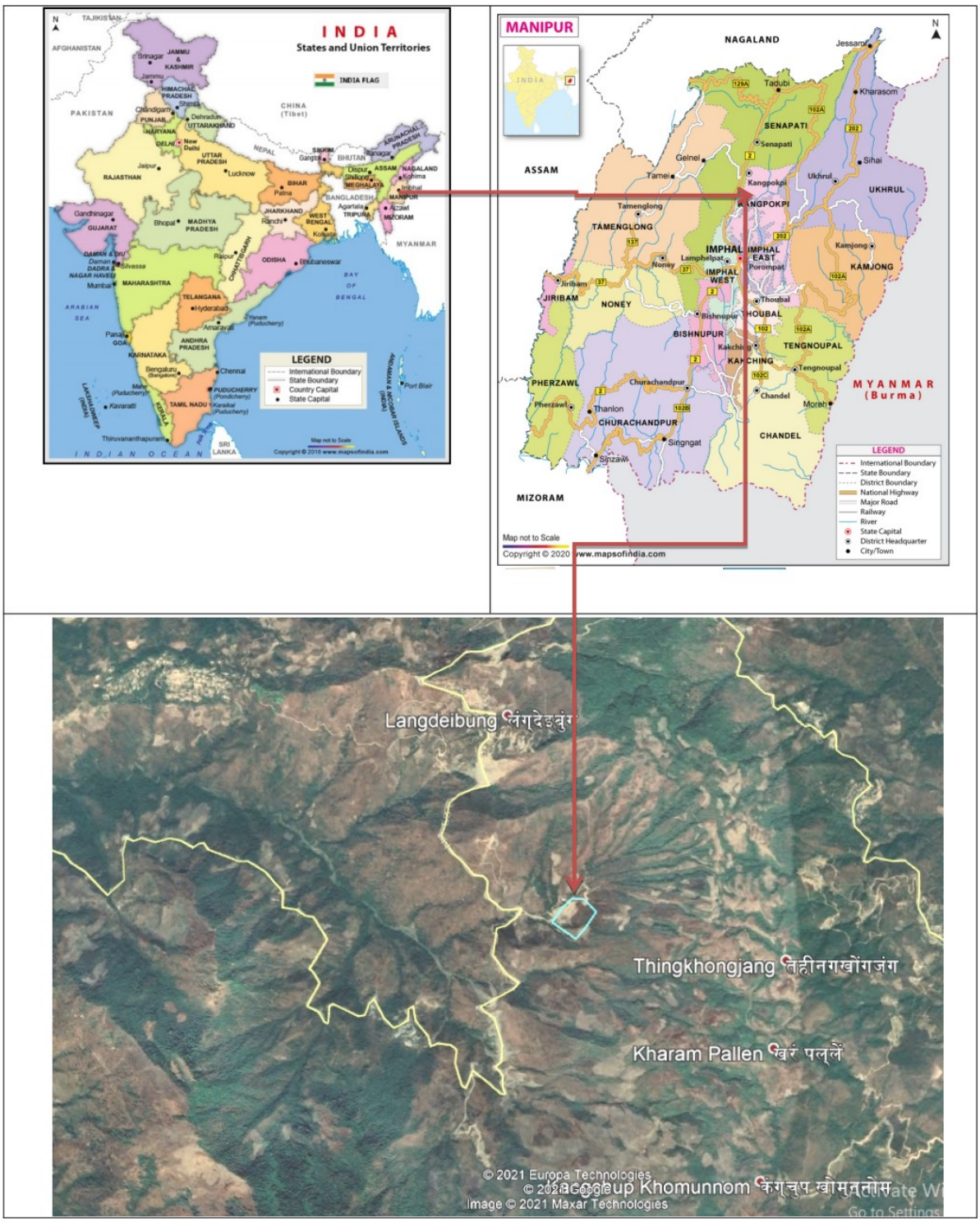


Figure 2-1: Location Map

Figure 2-2: Study Area of the Project

Table 2-1: Location (Coordinates) of the Project

<table>
<tr><td>Pillar Coordinates</td><td><table>
<tr><th>Boundary Pillar</th><th>Latitude (N)</th><th>Longitude (E)</th></tr>
<tr><td>B1</td><td>24° 47’ 48.11”</td><td>93° 44’ 24.72”</td></tr>
<tr><td>B2</td><td>24° 47’ 51.25”</td><td>93° 44’ 27.13”</td></tr>
<tr><td>B3</td><td>24° 47’ 53.48”</td><td>93° 44’ 29.71”</td></tr>
<tr><td>B4</td><td>24° 47’ 53.30”</td><td>93° 44’ 32.65”</td></tr>
<tr><td>B5</td><td>24° 47’ 50.38”</td><td>93° 44’ 35.60”</td></tr>
<tr><td>B6</td><td>24° 47’ 46.93”</td><td>93° 44’ 33.03”</td></tr>
<tr><td>B7</td><td>24° 47’ 44.31”</td><td>93° 44’ 30.59”</td></tr>
</table></td></tr>
<tr><td>Name of the Project</td><td>“Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth” (Area: 5.16 Ha.)</td></tr>
<tr><td>Address of Mine site</td><td>Longa Koireng, Tehsil- Kangchup Geljang, District- Kangpokpi, State- Manipur</td></tr>
<tr><td>Name & Address of Applicant</td><td>Shri Huidrom Vikramjit Singh Managing Director of M/s. HVS Construction Materials Pvt. Ltd.
R/o: Patsoi Lamkhai, New Cachar Road, NH-7, District- Imphal West, State- Manipur</td></tr>
<tr><td>Mineral</td><td>Sandstone, Murrum and Shaly Earth</td></tr>
<tr><td>Area (Ha) as per LoI</td><td>5.16 ha</td></tr>
</table>

2.4 Size or Magnitude of Operation

The entire lease hold area of 5.16 ha is lies in govt. degraded forest land. The land is totally has Sandstone, Murrum and Shaly Earth in huge amount. This land is good for mining. As per the approved mining plan the proposed rate of production is 1,65,619.5 Cu.m per year of Sandstone, Murrum and Shaly Earth.

Table 2-2: Site Connectivity

Particulars	Distance (KM)	Direction
NH-37	0.28	West
Karimganj Junction	138.60	West
Silchar Airport	78.20	West

2.4.1 Infrastructure

The infrastructure near the mine site.

Table 2-3: Infrastructure around Mine Site

S. No.	Category	Name	Distance (km)	Direction
1	Road	NH-37	0.28	West
2	Town	Kangchup Geljang	10.0	North-East
3	Airport	Silchar Airport	78.20	West
4	Railway connectivity	Karimganj Junction	138.60	West
5	School	Nonghup Haram Govt High School, Longa Koireng	4.0	East
		UJB School, Kabui Anouba	5.93	South-East
6	Hospital	Shija Hospitals and Research Institute (SHR)	18.0	North-East
		Mother's Care Children Hospital & Research Centre, Imphal	18.65	East
7	Worship place	FNLBC Church, Pholjang	2.70	East
		S.Lhangnom Baptist Church NLBC, Senapati	2.0	North-East

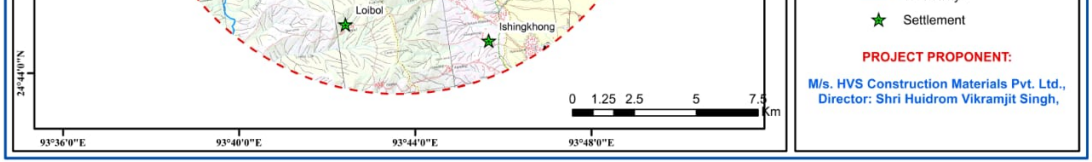


Figure 2-3: Topographic Map of Study Area

Plate 1: Site Photograph

2.5 Estimation of Reserves

The detailed exploration of mineral in the area has not been carried out. Therefore, the estimation of the mineable reserve has been considering the deposit to be massive and continuous. The period of quarrying lease is 10 years. The lease area is marked as B1, B2, B3, B4, B5, B6 & B7 for mining of mineral as may be seen in the Surface Plan. The mineable reserve of the area calculated roughly upto lowest level/bottom level is:

Volume of mineral = Cross Sectional Area X Influence length

= 8945.2 sq.m. X 248.76 m

= 22,25,207.95 Cu.m

Mineable Reserves and Anticipated Life of Mine:

The estimated project cost is Rs. 250.0 Lac/-. As per the approved mining plan the proposed rate of production is 1,65,619.5 Cu.m per year of Sandstone, Murrum and Shaly Earth, The Mineable Reserve of Sandstone, Murrum and Shaly Earth are 22,25,207.95 Cu.m. The production of Sandstone, Murrum and Shaly Earth in the mining plan period will be 8,30,520 Cu.m in 5 years. As per approved mining plan the total life of mine is 10 years.

2.6 Proposed Project Schedule for Approval and Implementation

Project activities will be started immediately after obtaining Environmental Clearance from SEIAA, Imphal, Manipur. Project activities will be commencing as per the 5-year Mining Plan.

2.7 Technology and Process Description

2.7.1 Method of Mining

The opencast method of mining with semi mechanization is proposed to excavate the mineral. The proposed Bench height is 5m and width 6m is proposed each considering semi-mechanization. Approach roads are available in the lease area and will be provided in future as required time to time. 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 water tanker supply 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. The soil which may come across during mining in patches or in cavities will be scraper and stacked separately to be used for plantation ion monsoon.
3. The proper plantation will be done in the lease area and nearby the lease area in each monsoon and will report 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 Longa Koireng 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 will be dumped at one place towards in the lease area. Some waste will be dumped outside the lease area in lessee's land.
8. The site services, site office, water tanks, workshops, pantry, bathrooms etc will be provided in or near the lease area (outside the lease area).

2.7.2 Use of Explosive

The stipulated target of production& hardness and nature of the rock deposits, use of explosive is suggested as and when required. For this applicant is suggested to approach the competent authority to take permission to use of explosive in a proper way.

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

i) Drilling

Different parameters considered for drilling are as follow:

Parameters	Amount
Mineral to be extracted	8,30,520 CuM
No. of working days per year	270 days
Minerals to be handled per day	613.41 CuM
No. of shift per day	1
Depth of hole	1.5m
Spacing of holes	2.0 m 2.5m
Burden of each hole	1.0 m – 1.5 m
Pattern of holes	Staggered
Inclination of hole	Vertical
Yield per hole	3.0 CuM
No. of holes per day	22-23
Type of drill machine to be used	Handheld Jack Hammer Drill
Diameter of hole	25mm
No. of drill machine to be used	20 Nos.
BLASTING	
Parameters	Quantity
Yield per hole	3 CuM
Powder factor	5.50 MT/Kg
Charge per hole	1.50 kg
Explosive to be used	Geletin & ANFO
Detonators	Electric
Dalay detonators	25ms.

ii) Explosive and Blasting Parameter:

Primary blasting parameters-			
1.	Type of explosive	:	High Explosive
2.	Yield per hole	:	3 Cu.m
3.	Diameter of hole	:	25mm
4.	Charging pattern	:	
i.	Bottom charge	:	High Explosive
ii.	Column charge	:	ANFO
5.	Minimum no. of hole per day	:	8-10
6.	Manner of Blasting	:	Electrical
7.	Sequence of blasting	:	Multiholes
8.	Charge per hole	:	1.50 kg
9.	Cartridge	:	0.50 kg
10.	ANFO	:	2.40 kg
11.	Detonators	:	Short delay Electric

iii) Type of explosive

An available in the local market it is suggested to use 25mm Slurry explosives (Class-II) in the proposed quarry. The available brands are Powergel, Superdyne, Dynex90, etc.

In addition to above ANFO (Ammonium Nitrate Fuel Oil Mixture) may be used to reduce the cost of explosive. It is prepared by mixing Prilled Ammonium Nitrate with HSD oil in the proportion of 94.5 : 5.5. The ration of both the explosives will be as below:

Slurry explosives will be as below:

Slurry explosives : ANFO = 37.5 : 62.5

iv) Blasting Operation:

The blasting operation shall be undertaken by competent persons as per Mining Rules & Regulations in force with maximum precautions to make the blasting operation safe.

Frequency of blasting can be optimized by use of delay detonators to reduce the noise and ground vibration within the threshold limit. Blasting pattern, stemming, charge per hole should

be designed on the basis of field trails to strategic points before blasting shall have to be provided.

v) Storage of Explosives:

In view of the existing law and other situation of the State frequent transportation of explosives from Imphal to quarry site is a risk. Therefore, it is suggested to obtain help of CRPF, Langjingor to procure explosives for 5 to 6 days and store in their custody in an explosive van, the stored explosives may be used for blasting in the quarry as and when required.

2.7.3 Requirement of Machinery (During 5 years of proposed period)

Equipment requirement:

- Drill machine Requirements
- Excavator Requirements
- Jack hammers and pneumatic breakers are for small hole drilling as required at different places.
- For operating one jack hammers at different places, one mobile compressor is proposed.
- One water tank is proposed for supply of water at different places and for spray water on approach roads.
- Tippers will be brought by the buyers of Sandstone, Murrum and Shaly Earth.

The following machineries are proposed (As per MMMCR 2016):

Item	Quantity
Compressor of 120 psi	One mobile/ tractor mounted or stable
Jack hammer and other Pneumatic	Two Jack hammers, Two Pneumatic Breakers
Hydraulic excavator with rock breaker arrangements	Two
Long hole drill machine	One
Tractor with water tank	One
Other machinery	As needed

2.7.4 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
Area	4.38 ha.
Depth	Up to 1191mRL,or 95 meters maximum

2.7.5 The Final Slope Angle Adopted

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

2.7.6 Ultimate Capacity of Dumps

This sandstone, murum and shale quarry has considerable quantity of overburden mainly as top soil and waste rocks. The top soil should be removed and stored separately, while the solid wastes should be stored in the external dumps keeping the area to be back filling free. These external dumps should be stored in benches, which come up during the mining operations. With the progress of the mine face and availability of space for back filling, the waste rocks are first utilized to fill the voids up to a planned level. The top soil stored separately should then be laid over it to sustain plant growth.

2.8 Proposed Year Wise Production for First five Years

The proposed year wise production of mineral is given below in the table:

Table 2-4: Year-wise Proposed Production

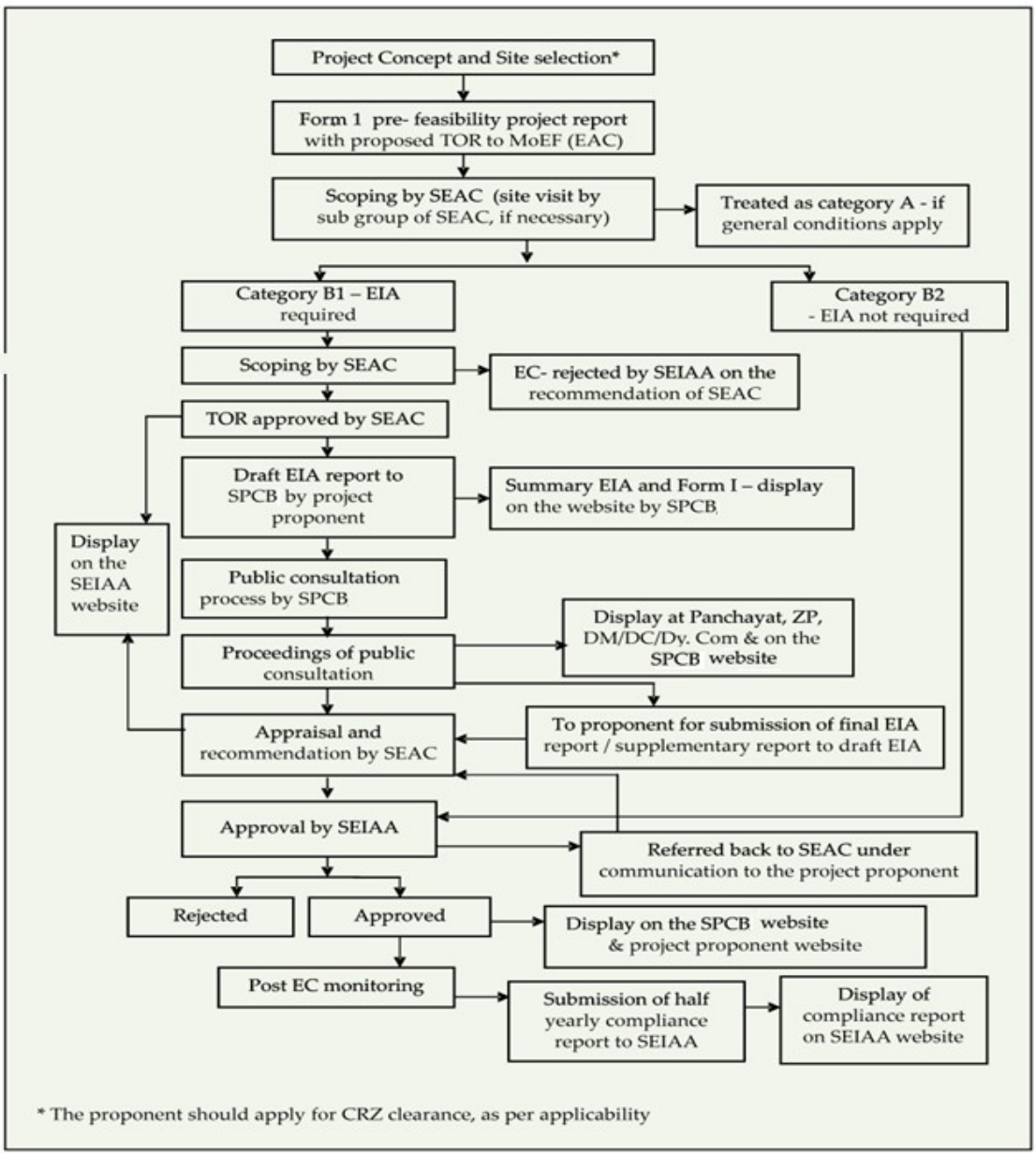
Year	Tentative excavation of mineral in Cu.m.
I	1,65,930.60
II	1.67,528.95
III	1.64,028.05
IV	1,66,973.50
V	1,63,636.40
Average	**1,65,619.5 Cu.m.**

2.9 Project description including drawings showing project layout, components of project etc. Schematic representations of the feasibility drawings which give information important for EIA purpose.

The project has been proposed for the mining of Sandstone, Murrum and Shaly Earth from the land by open cast semi-mechanized method. Mining will be confined to the allotted lease area from which maximum 1,65,619.5 Cu.m per annum of Sandstone, Murrum and Shaly Earth will be excavated and the estimated Project Cost is Rs.250.0 Lac.

The Sandstone, Murrum and Shaly Earth will be excavated by Open Cast semi-mechanized method of mining. Loading of mineral and waste in trucks/ tippers and tractor trolleys is to be done by hydraulic loaders. The mineral is not meant for captive use. The extracted/ collected Sandstone, Murrum and Shaly Earth will be used in construction.

The schematic presentation of requirements on Environmental Clearance of "Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth" is detailed as below:-



(Adopted from Technical Guidance Manual of Mining)

2.9.1 Land Use Pattern of the mine site

The land is totally Stony-Hilly and has Sandstone, Murrum and Shaly Earth in large amount. This land is good for mining. There is no forest land or agriculture in the mine lease area.

Table 2-5: Landuse Pattern of the Mine Site

S.No.	Item	As on date (ha)	End of 5th year (ha)	End of lease (ha)
1	Area to be excavated	-	4.38	4.38
2	Storage of top soil	-	-	-
3	Overburden dump	-	-	-
4	Mineral/Sub-grade stack	-	-	-
5	Infrastructure	-	-	-
6	Roads	-	0.16	0.16
7	Green belt/ Safety Barrier Zone	-	0.62	0.62
8	Reclamation	-	-	-
9	Virgin Land	-	-	-
Total Area		**5.16**	**5.16**	**5.16**

2.9.2 Nature of Waste Generation

No waste will be generated during the plan period. As the mineral is 100% recoverable. The top soil if found will be stacked separately will be used in greenbelt development.

Apart from this, small amount of municipal waste will be generated due to labour activity; however collection bins will be provided for the same and will be disposed off in municipal waste management unit.

2.10 Utilities

2.10.1 Water Supply & Requirement

Total water requirement for this project is 3.0 KLD. About 0.50 KLD of water will be required for domestic/drinking use, 1.0 KLD for dust suppression and 1.50 KLD for plantation. Water demand will be made available through water tanker supply from nearby Leinganglok of Longa Koireng village.

2.10.2 Water Levels (schematic)

Elevation of mine lease area	Highest elevation 1286m AMSL
	Lowest elevation 1181m AMSL
Ground level of nearby area	850m AMSL

Ground Water Level	40 m below ground level (m BGL) (810m AMSL)
Ultimate Depth of Mining	95 m (1191m AMSL)

2.10.3 Power

No power consumption will be there, as mine will work only in day time.

2.10.4 Manpower

The following employment is proposed from nearby local area:

- Highly Skilled: 1
- Skilled: 2
- Semi Skilled: 2
- Un Skilled: 5 (as per semi mechanization)

Total men requirement will be 10.

The following 4 supervisory personnel are proposed with management chart:

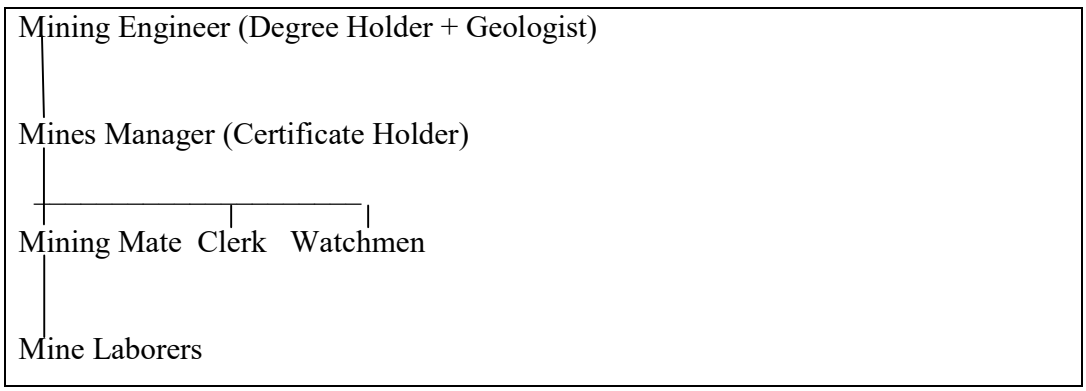


Figure 2-4: Management Chart for Mine Operation

About 10 manpower shall be engaged through project proponent for management, staff, handling and loading of Sandstone, Murrum and Shaly Earth in mining area, besides plantation activity with proper maintenance.

2.10.5 Use of Mineral

Diversified use of Sandstone, Murrum and Shaly Earth is emerging as important mineral. It is a basic raw material required for manufacturing industries improving the construction activities like buildings, road, bridges infrastructure etc. The requirement for these minerals is always high in the nearby cities, towns and villages. This will bridge the gap between supply and demand of

Sandstone, Murrum and Shaly Earth not only in the region but also State. Sandstone, Murrum and Shaly Earth demand has been on an upsurge in India due to the high-rise demand in the Industry. Demand in this region is being driven by mega infrastructure and new industries projects.

2.10.6 Mineral Beneficiation

There will be no mineral beneficiation required for Sandstone, Murrum and Shaly Earth. The excavated mineral will be directly loaded into the truck and trolley.

2.11 Assessment of New & untested technology for the risk of technological failure

The proposed project is a Sandstone, Murrum and Shaly Earth mining activity which will be done by open cast with semi-mechanized method as per the MoEF&CC, New Delhi guidelines. Hence, no new technology is assessed.

2.12 Transportation and Communication

Kangpokpi District in the state of Manipur is a newly created district by the Government of Manipur vide Govt. notification No.16/20/2016-R dated 08-12-2016 and subsequent corrigendum dated 14-12-2016 of Secretariat; Revenue Department, Govt. of Manipur. Kangpokpi District Headquarter is situated at Kangpokpi Town which is at an altitude of 1181 metres from Mean Sea Level and at a distance of about 45 kms from the state capital, Imphal. Kangpokpi District comprises of mainly Nine (9) sub-divisions viz, Kangpokpi, Saitu-Gamphazol, Saikul, Kangchup-Geljang, Bungte-Chiru, Island, Champhai and Lhungtin. These nine (9) Sub-Divisions boundaries form the boundary extent of Kangpokpi District.

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Chapter 3. DESCRIPTION OF ENVIRONMENT

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out for the winter season covering December-2020 to February 2021.

3.1 Study area, period, components & methodology

The main objectives of describing the environment, which may be potentially affected, are (i) to assess present environmental quality and the environmental impacts and (ii) to identify environmentally significant factors. The chapter contains information on existing environmental scenario of the proposed project study area.

3.1.1 Study Area

Studies of various environmental parameters have been done within 10 Km radius area of the proposed project site.

3.1.2 Study Period

The baseline environmental study has been done for the period of December, 2020 to February, 2021 by Data generation with respect to air, water, soil quality, noise status, meteorology etc. was carried out by ***M/s Geogreen Testing Laboratory, Lucknow*** an ISO 9001:2008, OHSAS 18001:2007, 14001:2015(EMS) Certified & by National Accreditation Board for Testing & Calibration Laboratories (NABL) Certificate No. T-8121. All the field studies for baseline data generation were carried out during December-2020 to February 2021.

3.1.3 Components & Methodology

The scoping and the extent of data were formulated based on interdisciplinary team discussions, and professional judgment keeping in view of ToR assigned by SEIAA Manipur. The base line studies started with reconnaissance survey and the site visits in the study area for fixing the monitoring locations for collection of the primary data. Various Government and other organizations were approached for getting information for the secondary data.

3.1.4 Establishment Of Baseline For Valued Environmental Components, As Identified In The Scope:

The scope of the study is as per standard ToR issued by SEAC Manipur. Based on the submissions and presentation made by the project proponent, the SEAC Manipur has issued the ToR for the EIA study on vide letter No. 1/92/2020(EIA)/DoE&CC dated, Imphal, the 5th March, 2021 (ToR Letter is attached as ***Annexure-III***). As part of the study, description of biological environment and human environment such as environmental settings, demography & socio-economics, land-use/ land cover, ecology & biodiversity have been carried out for entire 10 km radius.

- Land Environment
- Air Environment
- Noise Environment
- Soil Environment
- Water Environment
- Biological Environment
- Socio-economic Environment

Study Area

Study area for baseline data collection covers a 10 Km radius from the mine lease periphery. Further, the study area has been divided into two zones namely "Core Zone" and "Buffer Zone". Core zone comprises of the mine lease area within the mine lease boundary while the area around the mine lease periphery covering 10 Km radius area constitutes the Buffer Zone. Map showing study area of the proposed project in Figure 1.1 & 1.2 in Chapter-1.

Location of the project

The mining lease has been granted in favor of Shri Huidrom Vikramjit Singh Managing Director of M/s. HVS Construction Materials Pvt. Ltd. for an area of 5.16 ha in Longa Koireng, Tehsil- Kangchup Geljang, District- Kangpokpi, State- Manipur. The mine site is located at the distance of 10.0 Km from Kangchup Geljang Town. Geographical location of mine lease area is covered under Survey of India Toposheet No. 83H/9.

Methodology adopted for Baseline Study

The methodology for conducting the baseline data collection was adopted from Technical Guidance Manual of Mining Project available on the MoEF&CC website. Baseline information with respect to Land, Water, Air, Noise, Biological and Socio-economic quality status in the study area were collected by conducting primary sampling/field studies during winter season December-2020 to February-2021. The characteristics of baseline status of study area with respect to the parameters are discussed.

3.2 Land Environment:

3.2.1 Geology

The geology o the area is given below:

3.2.1.1 Regional Geology:

Geology of Manipur is of recent origin. The state is a part of Trans Himalayan geological formation. Tectoncally, the whole of Manipur forms a part of great geosynclines were argillaceous deposited in furrows and ridges. Sediments deposited in geosynclines were argillaceous deposited in furrows and arenaceous and calcareous sediments in the ridges.

The rock formation occurring in the state are the Cretaceous limestones, the Disang group with Sarpentinte, the Barail group, the Surma group and the Tipam group.

Hill ranges of Manipur are dominantly consists of Tertiary sediments with minor amount of igneous and metamorphic. Tertiaries are generally flysch sediment and constitutes nearly 70% of the state area. The rest 30% includes ophiolite mélange and associated pelagic sediments, metamorphic and cretaceous limestone occurring only in the eastern part of the state.

The Manipur Nagaland hills belong to Indo Burmese range, divided into three metamorphic divisions.

1. The Naga Patkal Hills
2. The Chin Hills and
3. Arakan Yuma Hills

The aforesaid Manipur Nagaland hills have an accurate trend with convex side pointing towards India. Its southern part is known as the Manipur Hills.

General lithological trend are NNE to SSW. A generalized geological succession of Manipur as detailed below:

Litho Units and Age	**Description of Rocks**
Alluviums (Quaternary)	Dark grey to black clay, silt and sand deposit of fluvio lacustrine origion. Mainly alluvium is in the Barak Valley Area. Clay, sand, gravel, boulder deposits of foot hills and old river terraces.
---------- Stratigraphic Break ----------	
Tipam Group (Miocene)	Mottled clay, mottled sandy clay, sandy shale, cley shale and sandstone. Greenish to blue medium to coarse ferruginous sandstone with sand shale and clay.
Surma Group (Upper Oligocene to Milocene)	Shale, sandy shale, silt stone, ferruginous sand stone. Alteration of sandstone and shale with argillaceous horizons in the middle and minor conglomerate.
----------Unconformity----------	
Barail Group (Upper Eocene)	Massive to thickly bedded sandstones. Alteration of shale stone.

Disang Group (Upper Cretaceous)	Dark grey to black splintery and earthly colored shale and silt stone and sandstone.

----------Unconformity----------

Ohiollite Malange Zone	Basic, Ultrabasic (Both intrusive and extrusive) peridotite gabbro, serpentinite, etc.

----------Unconformity----------

Metamorphic complex	Low to medium grade metamorphic rocks such as phyllite schist, quartzite, marble, quartz-chlorite-mica schist etc.

----------Unconformity----------

Basement Complex

3.2.1.2 Local Geology

The geology of the lease area is a massive body sandstone. The rock is fined grained dark grey in colour, very hard and compact. Thin shale (0.20m) parting of grey shales are associated with sandstone. Exposed rock formation shows that the area is little bit effected by weathering. The maximum thickness of sandstone The local geological section indicates that the topmost layer is covered by soil of bout 0.40m high underlain by highly weathered compact Murum and Shaly/ Slaty earth which dips almost vertical (>60°). The maximum thickness of sandstone beds is 1.5m to 2.0m. The dip and strike of the sandstone beds is N32°E-S32°W, amount of dip 42° and dipping toward north-west.

3.2.2 Geomorphology

Geomorphologically, Manipur Valley is virtually a flat alluvium filled valley. The valley is nearly 780 m high above the mean sea level with a very low southerly gradient. The Valley is surrounded in all sides by hill ranges of denudostructural nature trending NNE-SSW direction. A number of isolated hillocks of denudational remnants are found within the valley. Imphal River and its major tributaries: Iril, Imphal, Thoubal and Khuga Rivers are main drainage of the valley.

These rivers have a nearly NNE-SSW trend concurring with the regional structural trend.

Loktak Lake, the largest fresh water lake in the entire northeast India, lies in the south-western portion of the valley. Possibly it represents the lowest elevation of the valley. The lake also has a distinct and separate drainage system. The lake itself serves as an inland basin.

3.2.3 Topography

The topography the lease area is undulating hilly terrain and gently sloping towards south and south easterly. The proposed Lease area allotted, Murum and Shaly/ Slaty Earth Mining Lease Area, is of irregular shaped. As per statement furnished by Directorate of Trade, Commerce & Industries, the total area available for mining is about 5.16 hectares. The general slope of the area is towards north eastern side as the area itself rises from the west. The topography of the area is undulating one. The altitude ranges from 1181m at the bottom of the hill to 1286m at the hilltop. The proposed area is free from any valuable tree and usefull vegetation but covered with little vegetation like grass, scrubs etc.

3.2.4 Land Use Pattern

Introduction

Information on land use/ land cover is the basic prerequisite for land resource evaluation, environmental assessment, utilization and management. As a precursor, it is necessary to understand the 'cause and effect' of the transformations through scientific studies. The scope of the present study is limited to mapping the current land use / land cover pattern, their assessment, spatial distribution and extent using remote sensing and GIS techniques. The land environment will mainly deal with the land use, land cover within and buffer zone.

Methodology:

Image processing software and GIS Software were used for the project. Image Processing Software was used for digital processing of the spatial data. Digital image processing techniques were applied for the mapping of the land use/land cover classes of the provided area from the satellite data. The methodology applied comes under following steps:

- Satellite imageries for the Area of Interest were created through image processing software.

- Geometric correction includes correction for geometric distortions due to sensor, earth geometry variations and conversion of the data to real world coordinates.
- Image enhancement is one of the important image processing functions primarily done to improve the appearance of the imagery to assist in visual interpretation and analysis.
- Google image is used as a reference map for base layer preparation.
- Visual interpretation technique has been used for digitization of geographical feature for different land use and vegetation cover classes based on spatial pattern of geographic feature.

Results and conclusions:

Land use of Buffer zone:

The land use/ land cover map has been generated on 1:50,000 scale using topographical maps, Survey of India and ground truth information. Based on the methodology developed for the present land use/ land cover, categories have been grouped under the following major land use/land cover categories.

The land use distribution in the buffer zone of 10Km radius (from periphery) is given in the table given ahead.

3.1: Land Use Pattern of the Study Area

S. No.	Category	Area in Sq.m	Percentage
1	Built-Up	146836399.25	4.32
2	Agricultural land/ Fallow Land	72635386.16	21.12
3	River	2525872.23	0.73
4	Barren Rocky	7223203.89	2.10
5	Barren Land- Scrub/ Gullied/ Ravious land	13853192.97	4.50
6	Scrub Forest/ Forest Plantation	84307566.17	24.52
7	Evergreen-Semi-Deciduous Forest	146836399.25	42.70
Total Area		**343857593.78**	**100.00**

Built-up:

Built-up land includes the urban or rural settlements. The village locations and their area extent have been extracted from the satellite Imagery & topographical maps. The major built-up area is about 146836399.25 Sq.m. which is 4.32 percent of the total 10 km radius study area.

Agricultural land:

Based on satellite imagery, topographical maps and ground truth. The land use is mainly agricultural. The total agricultural area is about 72635386.16 Sq.m. which is 21.12 percent of the total study area.

River:

Based on satellite imagery, topographical maps and ground truth. River land their area extent has been extracted. The River area is about 2525872.23 Sq.m. which is 0.73 percent of the total 10 km radius study area

Barren Rocky:

Based on satellite imagery, topographical maps and ground truth. Barren Rocky their area extent have been extracted. This Barren Rocky area is about 7223203.89 Sq.m. which is 2.10 percent of the total 10 km radius study area.

Barren Land- Scrub/ Gullied/ Ravinous Land:

Based on satellite imagery, topographical maps and ground truth. Barren Land- Scrub/ Gullied/ Ravinous Land their area extent have been extracted. This Barren Land- Scrub/ Gullied/ Ravinous Land area is about 13853192.97 Sq.m. which is 4.59 percent of the total 10 km radius study area.

Scrub Forest/ Forest Plantation:

Based on satellite imagery, topographical maps and ground truth. Scrub Forest/ Forest Plantation their area extent have been extracted. This Scrub Forest/ Forest Plantation is about 84307566.17 Sq.m. which is 24.52 percent of the total 10 km radius study area.

Evergreen-Semi-Deciduous Forest:

Based on satellite imagery, topographical maps and ground truth. Evergreen-Semi-Deciduous Forest their area extent have been extracted. This Evergreen-Semi-Deciduous Forest is about 146836399.25 which is 42.70 percent of the total 10 km radius study area.

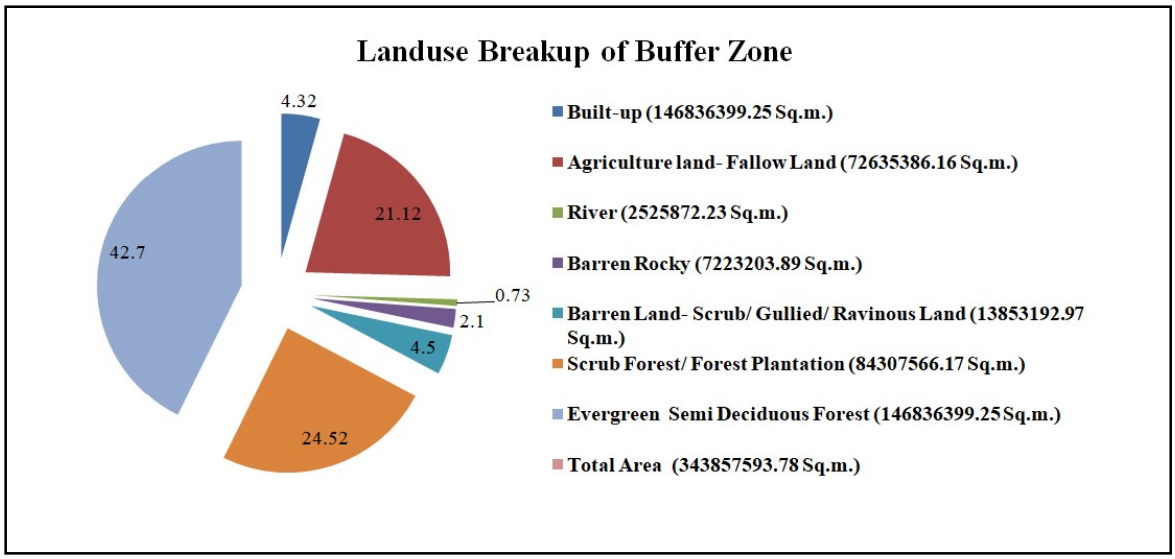
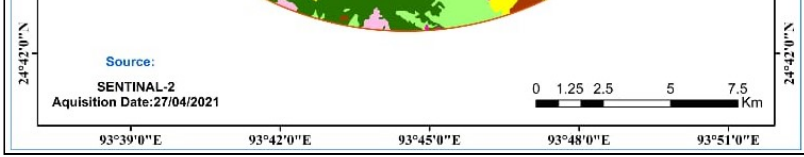


Figure No. 3.1: Land Use Breakup of Buffer Zone



Built-Up	[illegible]	4.32
Agricultural land-Fallow Land	72635386.16	21.12
River	2525872.23	0.73
Barren Rocky	7223203.89	2.10
Barren Land-Scrub/Gullied/Ravinous land	13853192.97	4.50
Scrub Forest/Forest Plantation	84307566.17	24.52
Evergreen-Semi-Deciduous Forest	146836399.25	42.70
TOTAL AREA	343857593.78	100.00

Figure No. 3.2: Land use Map of 10 Km Buffer Zone

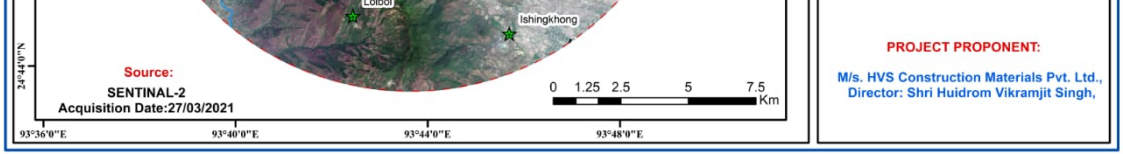


Figure 3-3: Satellite View Map of the Study Area (10 Km Radius from the Mine Site)

3.2.5 Seismicity and Flood Hazard Zonation of the Area

Many parts of the Indian subcontinent have historically high Seismicity. Seven catastrophic earthquakes of magnitude greater than 8 (Richter scale) have occurred in the western, northern and eastern parts of India and adjacent countries in the past 100 years. By contrast, peninsular India is relatively less seismic, having suffered only infrequent earthquakes of moderate strength. The main seismogenic belts are associated with the collision plate boundary between the Indian and Eurasian plates. The project site as well as study area lies in **Zone-V** of Seismic Zoning Map, and thus can be said to be located in an area of high seismic damage risk zone by national standards. Hence, the risk of earthquake at the site persists though there has to be no incident in the near past.

Floods:

India is vulnerable, in varying degrees, to a large number of natural as well as man-made disasters. As stated in the National Policy on Disaster Management, 2009, in India, 58.6 per cent of the landmass is prone to earthquakes of moderate to very high intensity; over 40 million hectares (12 per cent of the land) is prone to floods and river erosion; of the 7,516 kms long coastline, close to 5,700 kms is prone to cyclones and tsunami; 68 per cent of the cultivable area is vulnerable to drought and hilly areas are at risk from landslides and avalanches. Vulnerability to manmade disasters and emergencies of CBRN (Chemical, Biological, Radiological and Nuclear) origin is also on the rise. Heightened vulnerabilities to disaster risks can be related to expanding population, environmental degradation, unplanned urbanization, industrialization, etc. within high-risk zones.

The State of Manipur is a multi-hazard state and is prone to disasters like earthquake, floods, cyclonic storms, etc. The State witnessed a major earthquake in 1897 and a number of subsequent earthquakes of varying intensities thereafter, as whole of Manipur state falls under Zone-V of the seismicity map of India. Flash Floods, fire, landslides, cyclonic storm and coal mine collapse and flooding are recurrent phenomena in the recent years which led to loss of many lives and extensive damage to properties in the state. It is therefore obvious that the state is in need of a Disaster Management (DM) Plan to direct all aspects of DM (including disaster preparedness, post-disaster response, short and medium in **Figure-3.3.**

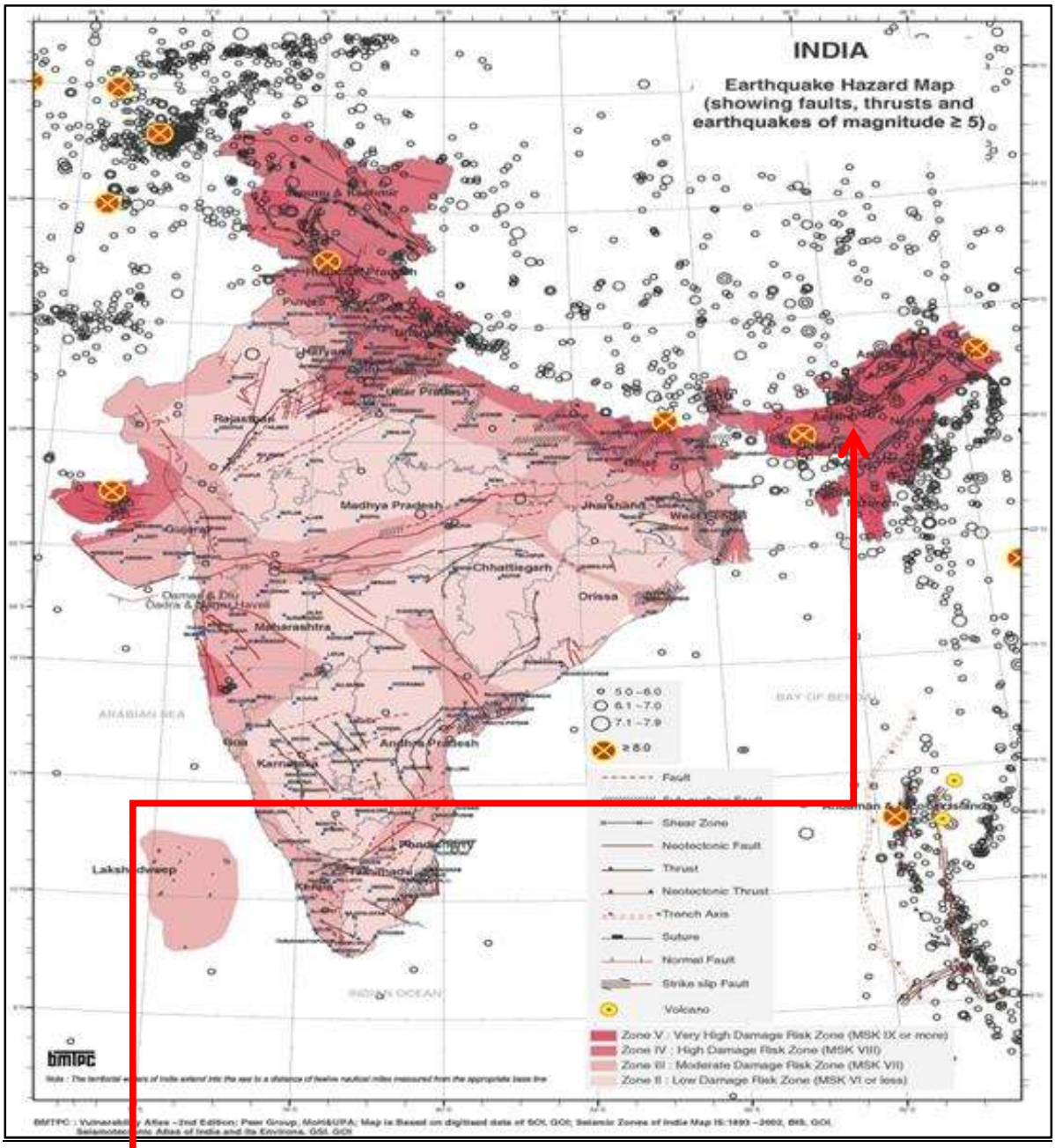


Figure 3-4: SEISMIC ZONE MAP

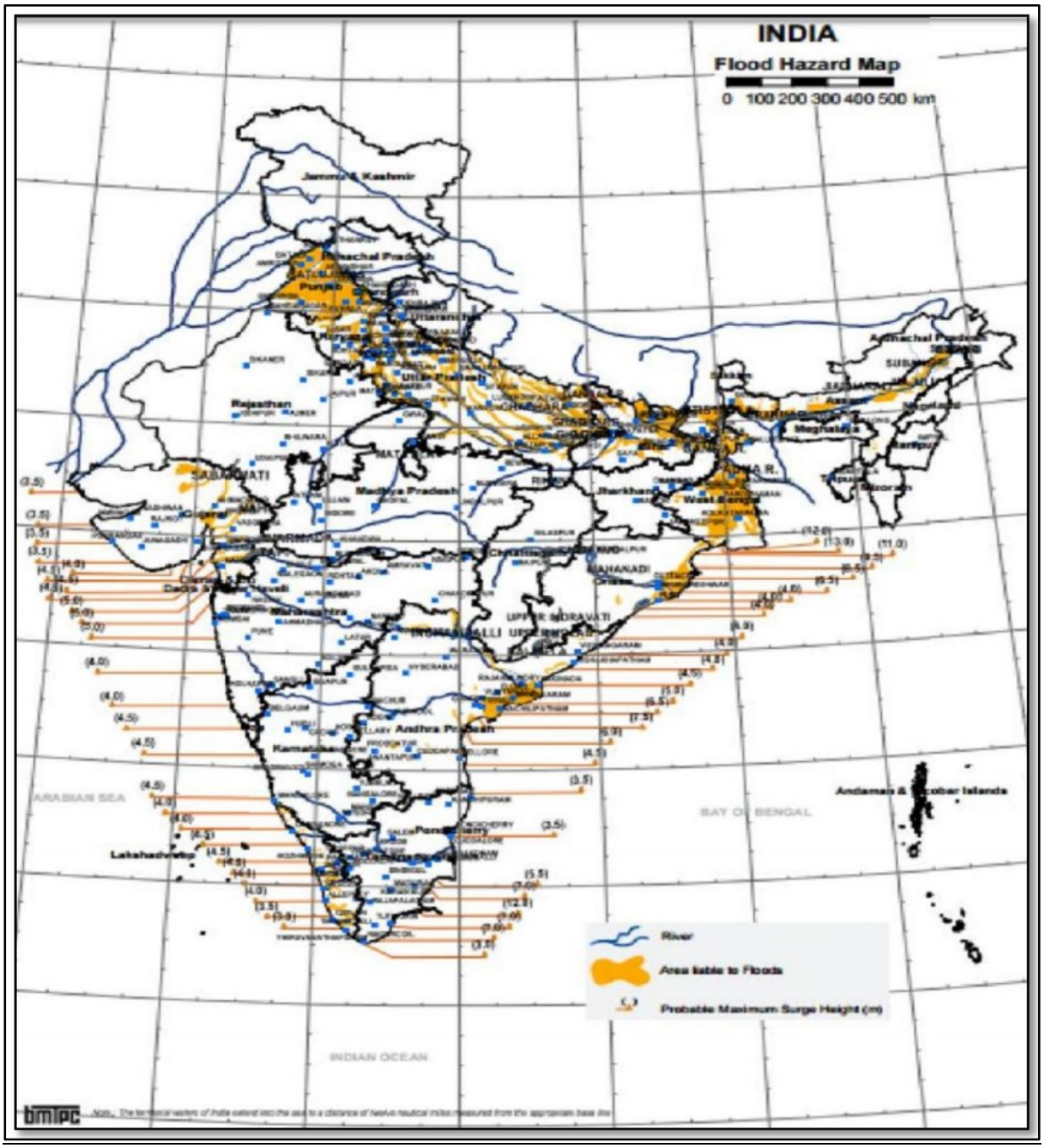


Figure 3-5: FLOOD HAZARD ZONATION MAP

SOURCE: *BMTPC: Vulnerability Atlas – 2nd Edition; Peer Group, MOH &UPA;Map is Based on digitized data of SOI, GOI*

Major environmental features in the study area:

Details of the important features along with other sensitive ecological locations in the study area are provided in Table 3-4.

Table 3:1 Environmental Sensitivity of study area

S. No.	Category	Name	Distance (km)	Direction
1	Road	NH-37	0.28	West
2	Town	Kangchup Geljang	10.0	North-East
3	Airport	Silchar Airport	78.20	West
4	Railway connectivity	Karimganj Junction	138.60	West
5	School	Nonghup Haram Govt High School, Longa Koireng	4.0	East
		UJB School, Kabui Anouba	5.93	South-East
6	Hospital	Shija Hospitals and Research Institute (SHR)	18.0	North-East
		Mother's Care Children Hospital & Research Centre, Imphal	18.65	East
7	Worship place	FNLBC Church, Pholjang	2.70	East
		S.Lhangnom Baptist Church NLBC, Senapati	2.0	North-East

3.3 Soil Environment

The entire plateau is devoid of soil while the slopes although have some soil cover but does not show prolific structures. High rainfall, hilly geography and nature of substrata are responsible for the loss of soil layer in the entire area. The soil at the mining site is found in gullies and crevices and cracks, which characterize the area. At places dense growth of grasses and shrubs, wild banana and undergrowth have helped in retaining the soil whose thickness rarely exceeds 50 cm.

Three soil types occur in the area viz., in crevices from hill slopes and from foot hills. As per their study, soil is characterized as sandy clay loam in texture in the crevices and sandy, soil in the foothills. The soil reaction was near neutral to slightly alkaline in all three types. The soil in crevices was reported rich in organic carbon, total nitrogen and available phosphorus.

3.3.1 Soil Quality and Characteristics

The information on soils has been collected from various secondary sources and also through primary soil sampling analysis of which is described in this section. The sampling locations have been finalized with the following objectives:

- To determine the base line characteristics.
- To determine the soil characteristics of proposed project site.
- To determine the impact of industrialization/urbanization on soil characteristics
- To determine the impacts on soils from agricultural productivity point of view.

3.3.2 Criteria Adopted for Selection of Sampling Locations

For studying the soil types and soil characteristics, six sampling locations were selected to assess the existing soil conditions representing various land use conditions and geological features.

3.3.3 Methodology and Sampling:

The homogenized soil samples collected at different locations were packed in a polyethylene plastic bag and sealed. The sealed samples were sent to laboratory for analysis. The important physical, chemical parameter concentrations were determined from all samples.

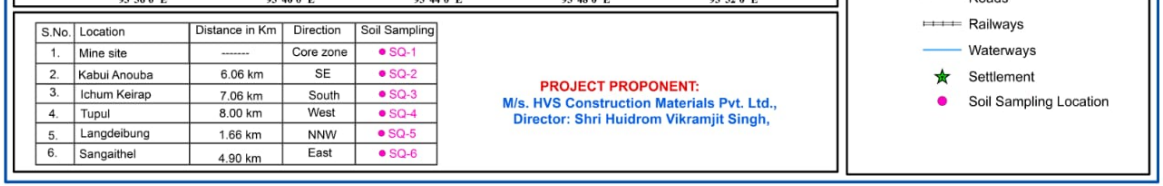
3.3.4 Soil Sampling Locations:

Details of the soil sampling locations are given in Table 3.4.

Table 3:2 Soil Monitoring Station

Station No.	Location	Distance from Mining (in km)	Direction
SQ1	Mine Site	--	--
SQ2	Kabui Anouba	6.06	South-East
SQ3	Ichum Keirap	7.06	South

SQ4	Tupul	8.0	West
SQ5	Langdeibung	1.66	NNW
SQ6	Sangaithel	4.90	East



S.No.	Location	Distance in Km	Direction	Soil Sampling
1.	Mine site	-------	Core zone	SQ-1
2.	Kabui Anouba	6.06 km	SE	SQ-2
3.	Ichum Keirap	7.06 km	South	SQ-3
4.	Tupul	8.00 km	West	SQ-4
5.	Langdeibung	1.66 km	NNW	SQ-5
6.	Sangaithel	4.90 km	East	SQ-6

Figure 3-6: Monitoring Locations of soil sampling

15	Ca	meq /100gm	2.2	2.4	2.2	2.4	2.3	1.8
16	SAR	meq /100gm	0.62	0.72	0.81	0.86	0.72	0.78
17	Mg	meq /100gm	1.1	1.2	1.1	1.3	1.2	1

3.3.5 Observations:

The results of soil analysis are given below in Table 3-5 collected from six different locations as shown in Figure: 3.5.

Monitoring data shows that the texture of soil at all the locations is sandy clay. The monitoring sites have sand ranging from 15.48% to 23.16% in soil samples. Silt content varies from 39.73% to 46.39%, while Clay content varies from 34.71% to 40.08% in the soil samples.

1. The data shows that value of pH ranges from 5.09 at Tupul village to 5.98 at Ichum Keirap village indicating that soil samples vary from slightly alkaline in nature.
2. The conductivity at Tupul village is minimum 180 µmhos/cm, while in the Kabui Anouba it is maximum of 280 µmhos/cm.
3. Magnesium value ranges from 1.0 mg/100gm to 1.3 mg/100gm.
4. The average concentration of Nitrogen, Phosphorus and Potassium in the soil samples varies from 24.7 to 28.6 mg/100gm, 2.4 to 2.9 mg/100gm, 0.52 to 0.74 mg/100gm respectively.

Source: M/s Geogreen Testing Laboratory, Lucknow

3.4 Water Environment:

Mining and associated activities may affect the water quality of the region through run-off, extraction of minerals, water pollution, by increased suspended solid etc. Therefore, baseline information on water regime is very important. Water availability and water quality are two major aspects considered for baseline status of water environment.

3.4.1 Ground water& Surface Water

Ground water occurs in the pore spaces of the unconsolidated alluvial sediments in the zone of saturation. The near surface sediments are dominantly sandy clays and clays which grade into sediments having varied proportions of sand and clays.

The impact has been assessed on randomly selected surface and ground water sources falling within the impact zone. In order to assess the existing water quality, the Ground water samples were collected from 6 different locations and Surface Water quality from 4 locations within the study area and analysed it as per the procedure specified in standard methods for examination of

water and wastewater published by American Public Health Association and Bureau of Indian Standards (APHA/BIS).

Monitored values have been used for describing the water environment and assessing the impacts on it. To assess the water quality impacts, water resources in the impact area have been grouped into two classes.

- Ground water resources in the deeper strata of the ground
- Surface water resources

A) Ground Water

Six ground water samples were collected from the study area to assess the water quality during the study period. The ground water samples were drawn from the hand pumps and open wells being used by the villagers for their domestic needs. The details of the locations are given in **Table 3.6**and results are given in **Table 3.8** Sampling locations are presented in **Figure 3.6**.

Table 3:4 Ground Water Sampling Locations

Station No.	Location	Distance from Mining (km)	Direction
GWQ1	Kangchup Patjang	9.46	North-East
GWQ2	Kangmong	8.76	South-East
GWQ3	Lamlongei	8.76	North-East
GWQ4	Sangaithel	5.05	East
GWQ5	Sajal Kuki	7.50	South
GWQ6	Atom Ingkhol	9.22	ESE

B) Surface water

Four numbers of surface water samples were collected from rivers, lake and pond present within 10 Km of the project site. Surface water sampling locations is given in **Table 3.7**and results are given in **Table 3.9**Sampling locations are presented in **Figure 3.6.**

Table 3:5 Surface Water Sampling Locations

Station No.	Location	Distance from Mining(km)	Direction
SWQ1	Tupui River	3.71	North-West

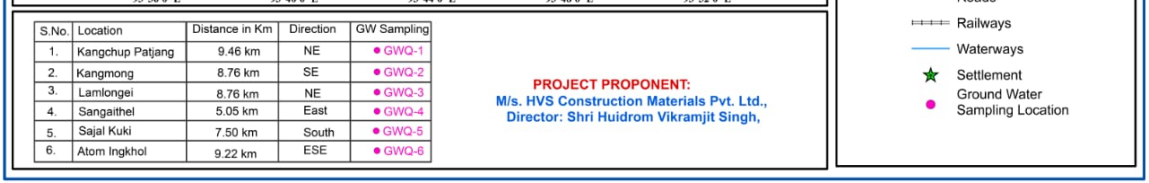


Figure 3-7: Ground Water Sampling Location Map

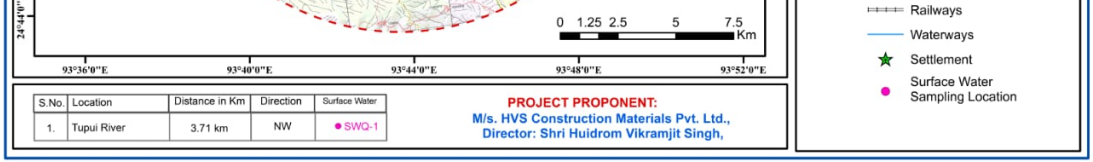


Figure 3-8: Surface Water Sampling Location Map

10	Ca	mg/L	3	6	8	6	2	8	6	9	0	2	1	4	6	7	4	8	6	3
11	Chloride as Cl	mg/L	8	10	6	9.00	4.00	8.00	7.00	5.00	8.00	7.00	5.00	10.00	7.00	8	5.00	10.00	7	9.00
12	Copper as Cu	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
13	Fluoride (as F)	mg/L	0.32	0.38	0.28	BDL	BDL	BDL	0.42	0.38	0.44	38.00	34.00	49.00	0.42	0.27	0.41	0.37	0.29	0.38
14	Free Residual	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

	Hg		01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
29	Chromium as Cr^{+6}	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Zinc as Zn, Max	mg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
31	Nickel(as Ni)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
32	Total Arsenic as	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

2	Odour	-	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable
4	pH	_	7.58	7.45	7.43
5	Temperature	°C	11.62	10.6	11.25

20	Iron as Fe	mg/L	0.27	0.29	0.25
21	Fluoride(as F)	mg/L	0.31	0.35	0.37
22	Boron	mg/L	<0.1	<0.1	<0.1
23	Total Suspended	mg/L	12	14	16

37	Copper (as Cu)	mg/L	<0.1	<0.1	<0.1
38	Total Coliform	MPN/100ml	260.00	280	240
39	Faecal Coliform	MPN/100ml	68.00	75	78

A review of the above chemical analysis reveals that there is some variation in chemical composition of water tapped from different sources but the ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed for drinking water standards promulgated by Indian Standards (IS: 10500). It can be observed that the surface water quality does not indicate any industrial pollution.

Note: The Water quality reports (GW and SW) are attached as ***Annexure-VI***.

3.5 Air Environment

3.5.1 Climate and Meteorology

The meteorological data helps for appropriate interpretation of the baseline status of the study area as well as for input into prediction models to evaluate air quality dispersion. Chronological data on meteorological parameters also plays an important role in identifying the general meteorological regime of the region. The climate in the region shows broadly four seasonal variations, namely:

Winter	:	December - February
Summer	:	March - Mid June
Monsoon	:	Mid June - September
Post-monsoon	:	October - November

On-site monitoring was undertaken for various metrological variables in order to generate the site-specific data. Data was collected at site every hour continuously from December-2020 to February-2021 covering winter season.

3.5.2 Methodology

The metrological parameter were recorded on hourly basis during the study period and comprises of parameter like wind speed, wind direction, (from 0 to 360 degree), temperature, rainfall & relative humidity.

Climate:

The climate of the district is directly controlled by the southwest monsoon originating from the Bay of Bengal and the Arabian Sea. The climate shows a variation from the warm, humid tropical in the plains in the eastern and southern part and temperate climate is experienced in the

western part around the district headquarter Kangpokpi. The climatic conditions vary substantially from place to place due to wide differences in altitude. Therefore, according to the prevailing weather condition over the years, the district can be grouped into four conspicuous seasons namely winter season, pre-monsoon season, monsoon season and retreating season.

Long-term Meteorology:

The nearest meteorological observatory of Indian Meteorological Department is located at Imphal/ Tulihal(A) approximately 32.0 Km from the proposed mine site. Climatological normal data for Imphal/ Tulihal(A). Observatory for the period 1981-2010 has been considered as the long-term meteorology of the study area, and a summary of the same has been provided in Table 3.10 and Table-3-11.

Temperature:

Climate of the area is semi arid zone type. The mean highest and mean lowest temperature remains around 33.9°C&1.1°C. Maximum precipitation takes place during month of June and July. The hottest months are May, June, July and coldest are of December and January.

अक्तूबर OCT	I II	926.9 923.1	22.5 23.4	20.3 20.7	28.7	17.2	31.7	12.5	33.5	5 2007	7.8	27 1987	82 78	22.5 22.6	5.5 4.3	3.9 2.8	122.3	7.3	268.7 1986	3.3 2006	119.4	5 1980	2.5
नवम्बर NOV	I II	929.5 925.6	17.2 19.3	15.4 16.4	25.9	11.1	29.1	6.2	30.7	1 2007	1.5	28 1969	82 74	16.4 16.7	4.6 2.8	3.3 1.7	34.7	2.4	182 1973	0	80.3	1 1991	2.3
दिसम्बर DEC	I II	930.3 926.4	12.6 16.1	11 13.1	22.9	6.1	25.4	2.4	28.9	3 1979	-1.7	29 1969	83 70	12.1 13	3.9 2.4	2.8 1.4	17.8	1	94 1966	0	89.6	13 1966	2.3
वार्षिक योग या माध्य ANNUAL TOTAL OR MEAN	I II	925 921.3	20.4 22.5	17.9 18.8	27.3	14.9	33.9	1.1	36.1 4	29 1999	-2.7 1	10 1970	78 70	19.5 19.7	5 4.5	3.3 2.7	1436.7	97.9	2194 1991	897.9 1979	158.6 7	30 1989	3.6
वर्षों की संख्या NUMBER OF YEARS	I II	24	24	24	30	30	30	30	55		55		24	24	24	24	30	30	56	56	56		30

NOV	II							0	0	7	23	1	0	0	4	5	3	4	7	76	3	14	7	4	2	4	20	5	1	0	0	0.3	5.1	23.1	1.4	0
दिसम्बर	I	1.9	0	0.1	13.6	0	0	0	0	3	28	0	2	1	3	2	0	1	0	91	2	7	13	7	2	3	14	9	3	1	1	8.4	17.4	5.3	0	0
DEC	II							0	0	8	23	0	1	1	3	4	3	7	7	74	4	16	7	3	1	6	20	4	1	0	0	0.2	7.5	22.8	0.5	0
वार्षिक योग	I																																			
या माध्य		140.7	0.5	43.6	39.6	0.4	0.8	0	1	80	284	1	2	3	6	5	2	2	2	77	24	53	71	166	51	30	89	203	40	2	1	16.7	104.4	237.7	6.1	0
ANNUAL	II																																			
TOTAL OR MEAN								0	3	161	201	1	1	2	6	5	4	13	14	54	21	81	81	152	30	29	137	181	18	0	0	0.8	36.3	306.9	21.1	0
वर्षों में	I																																			
NUMBER																																				
OF	II																																			
YEARS		30						25				25									25					25						25				

3.5.3 Wind Speed and Direction:

Analysis of wind records during 1981-2010 shows that the winds are generally light to moderate in this area. It can be seen that the monthly mean values of wind speed varies from 2.3 to 4.2 Km/h, with the mean value at 3.6 km/h. The higher wind speeds are observed during March and April. The dominant wind directions during the study period is East and the pre-dominent direction during the study period is West. Average wind speed during the study period was 2.56 m/s.

Rainfall:

Normal annual total rainfall reported for the station is 1436.7 mm. Approx. 75% of the total annual rain fall is received during the months of April to September being the wettest month of the year. On an average, there are 97.9 days in a year with rainfall.

3.5.4 Micrometeorology

Meteorological station was set-up at site to record surface meteorological parameter during winter season (December-2020 to February-2021).

Climatology during study period (December 2020 to February, 2021)

- Maximum Temperature : 27.7°C (April)
- Minimum Temperature: 0.9°C (January)

Table 3:9 Meteorological Data Recorded at Site

Month	Temperature (°C)			Relative Humidity (%		Rainfall (mm)		Wind Speed (km/hr)
	Min	Max	Monthly average	At 08:30	At 17:30	Rainy Days	Monthly Total, mm	Mean
Dec 2020	25.4	2.4	13.9	83	70	1	17.8	2.3
Jan 2021	25.5	0.9	13.2	76	60	1.1	11.5	2.7
Feb 2021	27.7	3.3	15.5	69	54	3.3	43.4	4.2

Source: Meteorological at station

3.5.5 Wind Rose Diagram/Wind Speed

Wind speed and wind direction data recorded during the study period is useful in identifying the influence of meteorology on the air quality of the area. Based on the collected meteorological data, relative percentage frequencies of different wind directions are calculated and plotted as wind roses of sixteen directions viz., N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW and NNW for twenty four hour duration respectively. Wind rose diagram from the monitored data shows that the predominant wind direction during the study period was mainly from West to East. The meteorological Condition of the study area has been tabulated in Table 3.12. The Wind rose diagram has been shown in Figure 3.7.

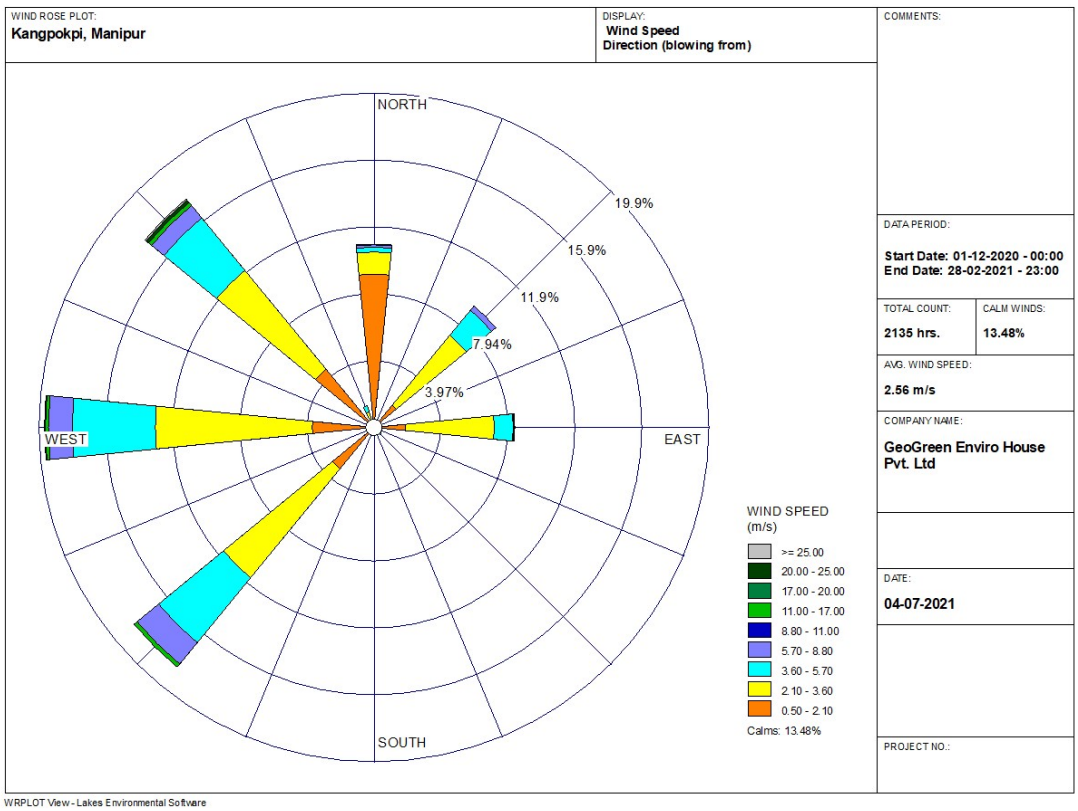


Figure 3-9: Wind Rose Diagram

3.6 Ambient Air Quality

The ambient air quality with respect to the study area of 10 Km radius around the lease area forms the baseline information. The various sources of air pollution in the region are dust

rising from unpaved roads, domestic fuel burning, vehicular traffic, agricultural activities, other industries, etc. The prime objective of baseline air quality monitoring is to assess existing air quality of the area. This will also be useful in assessing the conformity to standards of the ambient air quality during the operations. The results of monitoring during the study period (December-2020 to February-2021) are presented in the report.

The study area represents mostly rural environment. The sources of air pollution in the region are vehicular traffic, dust arising from unpaved village roads and domestic fuel burning.

3.6.1 Selection of Sampling Station

The baseline status of the ambient air quality has been assessed through scientifically designed Ambient Air Quality Network. The design of monitoring network in the air quality surveillance program has been based on the following considerations:

- Meteorological conditions (wind direction and wind speed)
- Representative of likely affected area
- Representative of regional background air quality for obtaining baseline status
- Accessibility and availability of the infrastructure
- Representative of sensitive receptor

Keeping in view above mentioned points, 08 Nos. of Ambient Air Quality Monitoring Stations were established with in the study area.

3.6.2 Methodology Adopted for the Study

Sampling Locations, Parameters and Frequency:

Calibrated Respirable Dust Samplers were used for the sampling of PM_{10}, SO_2 and NO_X. Ambient air sampling for PM_{10}, SO_2 and NO_X was performed continuously for 24 hours to determine 24-hour average concentrations. Ambient air quality monitoring was carried out with a frequency of two days per week at all nine locations. The sampling was performed at a height of 1.5m (approximately) from the ground level. Standard methods specified under "National Ambient Air Quality Standards" notification G.S.R.176(E) were adopted for sampling and analysis. Five locations within the study area were scientifically selected and are based on the following considerations:

1. Meteorological conditions;

2. Topography of the study area;
3. The direction of the wind;
4. Representation of the region for establishing baseline status; and
5. Representation with respect to likely impact areas.

The location of the monitoring stations with reference to the proposed site is given in Table 3-13 & shown in Figure 3.8 above.

Table 3-10: Ambient Air Monitoring Location

S. No.	Code	Location	Distance from Project Site (km)	Direction
1	AAQ1	Mine Site	--	--
2	AAQ2	Tamenglong	8.75	South-West
3	AAQ3	Maklang	8.30	East
4	AAQ4	Longa Koireng	4.15	East
5	AAQ5	NH-53	2.10	North-East
6	AAQ6	Sajirok	8.80	South-East
7	AAQ7	Senapati	6.60	South
8	AAQ8	Langdeibung	3.26	North-West

Figure 3-10: Ambient Air Monitoring Location Map

3.6.3 Sampling and Analytical Techniques:

Particulate Matter (PM10)

Calibrated 'Respirable Dust Samplers' with Whatman GF/A microfibre filter paper (size: 8" X 10") was used for the collection of PM(10) APM-151 air sampler of Latest Envirotech instrument. A known volume of ambient air is passed through the cyclone to the initially preprocessed filter paper. The centrifugal force in cyclone acts on particulate matter to separate them into two parts and collected as followings:-

i. Particles <10 µ size (Respirable) : GF/A Filter Paper

ii. Particles >10 µ size (Non Respirable) : Cyclone Cup

The differences in final and initial weight of filter paper and cyclone cup are used in estimation of particulate matter. The mass of particulates collected on the GF filter, divided by the volume of sampled air, gives the concentration of PM(10).

Sulphur Dioxide:

Sampling and analysis of ambient SO_2 was performed by adopting the 'Improved West and Gaeke Method'. The ambient air, drawn through the draft created by the RDS, is passed through an impinger, containing a known volume of absorbing solution of *sodium tetrachloromercurate,* at a pre-determined and measured flow rate of 1 liter/minute (L/min). SO_2 in ambient air reacts withthe *tetrachloromercurate* to form a stable complex, *dichloro-sulphito mercurate*. On reacting with *formaldehyde* and *p-rosaniline hydrochloride,* the sulphite ion forms an intensely coloured compound, p-*rosanilinemethyle sulphonic acid*. The intensity of the colour developed is estimated by spectrophotometer at 560 nm wave length. The measured Optical Density (OD) is used to determine the concentration of SO_2 from the calibration curve already prepared against known concentrations of sulphite ion. The mass of SO_2 in the absorbing reagent, divided by the volume of sampled air provides the concentration of SO_2, which is expressed as µg/m^3.

Nitrogen Oxides:

Sampling and analysis of ambient NOx was performed by adopting the 'Jacob Hochheiser Modified' (Na arsenite) method. Ambient air is drawn through an impinger at a pre-determined flow rate of 1 ppm. The impinger contains known volume of absorbing solution of *sodium*

arsenite and *sodium hydroxide*. Oxides of nitrogen react with the absorbing reagent to form a stable solution of *sodium nitrite*. The nitrate ion produced during the sampling is estimated calorimetrically, after reacting with *phosphoric acid*, *sulphanilamide* and *naphthyl ethylenediamine dihydrochloride* (NEDA), using spectrophotometer at 540 nm wavelength. The measured Optical Density is used to determine the concentration of NO_X from the calibration curve already prepared against known concentrations of nitrite ion. The mass of NO_X in the absorbing reagent, divided by the volume of sampled air provides the concentration of NO_X, which is expressed as µg/m^3.

Table 3:11 Techniques Used for Ambient Air Quality Monitoring

Parameters	Technique	Technical Protocol	Minimum Détectable Limit (µg/m^3)
$PM_{2.5}$	CPCB Guideline (Gravimetric method)	CPCB Volume – 1 / Gravimetric	-
PM_{10}	CPCB Guideline (Gravimetric method)	IS:5182(Part-23)	1.0
Sulphur Dioxide	West and Gaeke (Modified)	IS:5182(Part-2)	5.0
Nitrogen Oxide	Jacob & Hochheiser (Improved)	IS:5182(Part-6)	9.0

3.6.4 Air Quality Standards

National Ambient Air quality standards (June 18, 2009) along with the prescribed method of measurement is given in **Table 3-15**.

Table 3:12National Ambient Air Quality Standards

Pollutants	Time-weighted average	Concentration in Ambient Air		Method of measurement
		Industrial Areas, residential, rural and other	Ecologically Sensitive Areas (notified by Central	
Sulphur Dioxide (SO_2)	Annual Average*	50 µg/m^3	20 µg/m^3	- Improved West and Geake Method -Ultraviolet fluorescence

	24 hours**	80 µg/m^3	80 µg/m^3	
Oxides of Nitrogen as (NO_2)	Annual Average*	40 µg/m^3	30 µg/m^3	- Modified Jacob & Hochheiser (Na-Arsenite) Method - Gas Phase Chemiluminescence
	24 hours**	80 µg/m^3	80 µg/m^3	
Particulate Matter (Size less than 10µm) or PM_{10} µg/m^3	Annual Average*	60 µg/m^3	60 µg/m^3	- Gravimetric -TOEM -Beta attenuation
	24 hours**	100 µg/m^3	100 µg/m^3	
Particulate Matter 2.5 or $PM_{2.5}$ µg/m^3	Annual Average*	40 µg/m^3	40 µg/m^3	- Gravimetric -TOEM -Beta attenuation
	24 hours**	60 µg/m^3	60 µg/m^3	

*Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.
**24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

3.6.5 Ambient Air Quality Monitoring Results

Ambient air quality monitoring results are given from Table 3.16 to Table 3.23.3

Table 3:13 Ambient Air Quality at AAQ1- Mine Site

AAQ1	Mine Site					
MONTH	**DATE**	**PM2.5 (µg/m^3)**	**PM10 (µg/m^3)**	**SO_2 (µg/m^3)**	**CO(µg/m^3)**	**NO_2 (µg/m^3)**
Dec-20	12/4/2020	24.0	23.3	14.2	50.7	6.1
	12/8/2020	24.6	24.1	13.4	58.7	5.5
	12/12/2020	26.5	25.2	12.5	47.9	4.6
	12/16/2020	25.5	34.5	14.3	59.5	5.3
	12/23/2020	22.6	36.3	10.8	65.7	4.8
	12/26/2020	24.1	23.5	11.7	70.2	6.2

	12/29/2020	22.8	24.8	12.7	73.5	5.7
	1/1/2021	23.1	27.8	13.6	75.8	4.8
Jan-21	1/4/2021	24.5	31.3	12.9	74.6	7.1
	1/8/2021	26.8	24.5	13.5	69.6	6.3
	1/12/2021	25.7	23.4	11.9	72.2	7.3
	1/16/2021	27.1	31.6	12.6	49.3	5.5
	1/23/2021	26.7	27.6	13.3	48.4	3.8
	1/26/2021	23.7	29.5	15.4	53.5	5.5
	1/29/2021	26.9	31.2	11.8	47.3	6.4
	2/1/2021	25.5	28.3	11.6	53.6	4.7
Feb-21	2/4/2021	22.4	31.6	10.7	72.0	6.8
	2/8/2021	22.5	30.5	12.2	77.6	7.4
	2/12/2021	21.8	29.8	10.7	73.3	5.9
	2/16/2021	22.3	24.2	9.6	70.1	6.8
	2/23/2021	23.4	26.8	11.4	66.6	6.7
	2/26/2021	26.7	30.7	10.5	68.5	7.5
	2/29/2021	25.5	28.5	12.4	67.7	4.7
	3/1/2021	23.7	30.7	15.8	69.8	6.4
	Max	**27.10**	**36.30**	**15.80**	**77.60**	**7.50**
	Min	**21.80**	**23.30**	**9.60**	**47.30**	**3.80**
	Avg	**24.51**	**28.43**	**12.50**	**63.88**	**5.89**
	98 percentile	**27.01**	**35.47**	**15.62**	**76.77**	**7.45**

Table 3:14 Ambient Air Quality at AAQ2- Tamenglong

AAQ2	Tamenglong					
MONTH	**DATE**	**PM2.5 ($\mu g/m^3$)**	**PM10 ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**CO($\mu g/m^3$)**	**NO_2 ($\mu g/m^3$)**
Dec-20	12/4/2020	24.3	22.6	14.1	48.6	6.1
	12/8/2020	25.2	23.5	12.2	55.7	5.5
	12/12/2020	26.8	24.7	12.1	45.6	4.6
	12/16/2020	22.6	29.6	12.7	57.8	5.1
	12/23/2020	25.7	32.3	10.1	64.7	4.8
	12/26/2020	23.4	23.7	11.3	68.4	5.7
	12/29/2020	22.5	25.8	12.2	72.3	5.6
	1/1/2021	24.6	27.6	12.7	75.5	4.7
Jan-21	1/4/2021	25.4	30.2	12.4	72.4	6.8
	1/8/2021	23.5	23.0	12.5	67.7	6.3
	1/12/2021	26.2	23.3	11.3	70.6	7.2
	1/16/2021	22.3	32.8	12.2	48.5	5.4
	1/23/2021	24.8	26.4	12.5	47.3	3.6
	1/26/2021	22.7	24.5	14.6	52.2	5.5
	1/29/2021	25.4	23.6	12.4	46.8	6.2
	2/1/2021	23.6	34.5	11.6	52.5	4.3
Feb-21	2/4/2021	21.5	28.1	10.4	71.6	6.8
	2/8/2021	21.1	26.8	10.8	61.3	7.2
	2/12/2021	22.2	25.8	10.6	70.7	5.7
	2/16/2021	24.4	30.5	9.5	68.6	6.9
	2/23/2021	23.5	25.4	10.1	64.5	6.4
	2/26/2021	22.6	29.6	9.5	66.7	7.5
	2/29/2021	25.3	27.4	11.6	65.6	4.2
	3/1/2021	20.4	29.3	14.5	68.4	6.3
	Max	**26.80**	**34.50**	**14.60**	**75.50**	**7.50**
	Min	**20.40**	**22.60**	**9.50**	**45.60**	**3.60**
	Avg	**23.75**	**27.13**	**11.83**	**61.83**	**5.77**
	98 percentile	**26.52**	**33.72**	**14.55**	**74.07**	**7.36**

Table 3:15 Ambient Air Quality at AAQ3 Maklang

AAQ3	Maklang					
MONTH	**DATE**	**PM2.5 ($\mu g/m^3$)**	**PM10 ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**CO($\mu g/m^3$)**	**NO_2 ($\mu g/m^3$)**
Dec-20	12/4/2020	23.2	22.6	8.6	43.5	5.8
	12/8/2020	22.3	21.5	10.5	45.4	5.2
	12/12/2020	24.3	23.6	10.2	42.6	4.3
	12/16/2020	19.9	24.1	12.3	57.8	5.1
	12/23/2020	20.4	25.0	9.8	62.4	4.7
	12/26/2020	19.6	23.4	8.5	66.7	5.6
	12/29/2020	21.7	28.4	9.5	70.1	5.5
	1/1/2021	19.2	26.6	9.8	68.8	4.6
Jan-21	1/4/2021	22.9	30.4	11.5	42.6	6.8
	1/8/2021	25.5	18.3	10.3	59.5	5.9
	1/12/2021	23.4	24.5	12.5	75.3	7.0
	1/16/2021	21.6	32.7	10.7	43.6	5.1
	1/23/2021	18.8	23.6	12.5	55.8	3.7
	1/26/2021	19.5	20.1	14.2	45.9	5.2
	1/29/2021	19.7	26.1	10.6	45.7	6.0
	2/1/2021	19.6	33.3	9.7	43.1	4.0
Feb-21	2/4/2021	20.1	27.8	10.3	68.7	6.6
	2/8/2021	20.2	29.4	9.4	52.1	6.9
	2/12/2021	19.5	30.5	10.5	72.6	5.2
	2/16/2021	19.1	22.3	10.7	65.0	6.5
	2/23/2021	20.3	22.7	10.9	60.3	6.3
	2/26/2021	19.4	20.3	9.7	50.2	7.1
	2/29/2021	19.6	28.1	10.5	69.7	4.2
	3/1/2021	20.0	31.3	12.6	65.1	6.1
	Max	**25.50**	**33.30**	**14.20**	**75.30**	**7.10**
	Min	**18.80**	**18.30**	**8.50**	**42.60**	**3.70**
	Avg	**20.83**	**25.69**	**10.66**	**57.19**	**5.56**
	98 percentile	**24.95**	**33.02**	**13.46**	**74.06**	**7.05**

Table 3:16: Ambient Air Quality at AAQ4 Longa Koireng

AAQ4	Longa Koireng					
MONTH	**DATE**	**PM2.5 ($\mu g/m^3$)**	**PM10 ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**CO($\mu g/m^3$)**	**NO_2 ($\mu g/m^3$)**
Dec-20	12/4/2020	19.5	20.1	8.1	42.7	5.2
	12/8/2020	18.6	18.3	9.2	44.3	5.0
	12/12/2020	20.4	20.6	9.3	51.8	4.0
	12/16/2020	16.7	22.1	11.5	50.4	4.8
	12/23/2020	16.1	22.5	9.1	56.6	4.4
	12/26/2020	17.9	21.3	7.9	64.3	5.2
	12/29/2020	18.6	25.8	8.8	59.7	5.1
	1/1/2021	17.1	24.1	9.5	67.5	4.1
Jan-21	1/4/2021	18.0	28.3	11.1	41.3	6.3
	1/8/2021	12.9	17.2	9.8	57.7	5.5
	1/12/2021	20.8	22.5	11.7	72.9	6.5
	1/16/2021	18.7	29.7	10.2	41.7	4.6
	1/23/2021	16.2	22.4	11.3	52.7	3.5
	1/26/2021	17.8	18.9	8.1	44.5	5.0
	1/29/2021	16.7	24.7	10.2	41.8	5.8
	2/1/2021	17.8	29.8	9.1	42.6	3.8
Feb-21	2/4/2021	18.6	25.4	9.7	66.8	6.2
	2/8/2021	18.5	24.6	9.1	51.8	6.5
	2/12/2021	17.8	28.6	10.5	71.7	5.0
	2/16/2021	17.5	20.3	10.1	62.9	6.2
	2/23/2021	14.9	20.6	11.2	60.0	6.0
	2/26/2021	15.4	19.6	9.1	49.2	6.8
	2/29/2021	16.8	25.3	11.2	66.7	4.0
	3/1/2021	17.9	28.1	11.5	62.4	5.8
	Max	**20.80**	**29.80**	**11.70**	**72.90**	**6.80**
	Min	**12.90**	**17.20**	**7.90**	**41.30**	**3.50**
	Avg	**17.55**	**23.37**	**9.89**	**55.17**	**5.22**
	98 percentile	**20.62**	**29.75**	**11.61**	**72.35**	**6.66**

Table 3:17 Ambient Air Quality at AAQ5 NH-53

AAQ5	NH-53					
MONTH	**DATE**	**PM2.5 ($\mu g/m^3$)**	**PM10 ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**CO($\mu g/m^3$)**	**NO_2 ($\mu g/m^3$)**
Dec-20	12/4/2020	22.6	23.1	8.7	43.6	5.8
	12/8/2020	25.8	22.3	10.3	45.3	5.2
	12/12/2020	23.7	23.4	10.5	52.7	4.3
	12/16/2020	12.3	24.9	12.3	57.6	5.1
	12/23/2020	18.5	25.0	9.7	62.3	4.7
	12/26/2020	20.3	23.1	8.5	66.4	5.6
	12/29/2020	21.6	28.5	9.6	70.2	5.5
	1/1/2021	20.8	26.1	9.9	68.9	4.6
Jan-21	1/4/2021	13.1	30.8	11.2	42.5	6.8
	1/8/2021	22.4	18.9	10.4	59.7	5.9
	1/12/2021	25.2	24.2	12.6	75.6	7.0
	1/16/2021	19.7	32.4	10.8	42.1	5.1
	1/23/2021	20.8	23.1	12.4	55.3	3.6
	1/26/2021	21.3	20.4	14.3	45.1	5.2
	1/29/2021	21.2	26.9	10.7	45.2	6.0
	2/1/2021	18.4	32.8	9.8	43.4	4.0
Feb-21	2/4/2021	21.5	28.3	10.2	68.4	6.6
	2/8/2021	21.0	29.1	9.3	52.3	6.9
	2/12/2021	20.3	30.3	11.4	72.1	5.2
	2/16/2021	18.6	22.2	10.6	65.3	6.5
	2/23/2021	21.4	22.1	11.8	60.8	6.3
	2/26/2021	17.9	20.8	9.8	50.4	7.1
	2/29/2021	20.6	27.9	11.7	69.4	4.2
	3/1/2021	21.4	32.4	12.4	64.5	6.1
	Max	**25.80**	**32.80**	**14.30**	**75.60**	**7.10**
	Min	**12.30**	**18.90**	**8.50**	**42.10**	**3.60**
	Avg	**20.43**	**25.79**	**10.79**	**57.46**	**5.55**
	98 percentile	**25.52**	**32.62**	**13.52**	**73.99**	**7.05**

Table 3:19 Ambient Air Quality at AAQ6 Sajirok

AAQ6	Sajirok					
MONTH	**DATE**	**PM2.5 ($\mu g/m^3$)**	**PM10 ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**CO($\mu g/m^3$)**	**NO_2 ($\mu g/m^3$)**
Dec-20	12/4/2020	19.6	20.5	8.3	41.9	5.2
	12/8/2020	18.5	18.6	9.4	43.6	4.9
	12/12/2020	19.8	20.4	9.8	51.8	4.7
	12/16/2020	16.7	22.7	11.9	50.3	5.0
	12/23/2020	16.7	22.5	8.8	59.1	4.9
	12/26/2020	17.5	21.7	7.9	65.1	5.0
	12/29/2020	18.3	25.1	8.9	69.1	4.9
	1/1/2021	16.5	24.2	9.1	66.8	4.6
Jan-21	1/4/2021	18.9	28.5	11.7	40.7	6.5
	1/8/2021	12.1	17.6	9.2	56.9	6.1
	1/12/2021	20.5	22.8	11.3	71.6	6.1
	1/16/2021	19.8	30.2	11.2	41.8	5.1
	1/23/2021	15.3	22.9	10.8	53.2	3.9
	1/26/2021	17.7	18.8	9.1	44.3	3.8
	1/29/2021	16.6	24.0	10.9	40.9	6.9
	2/1/2021	17.3	29.1	7.8	42.1	3.4
Feb-21	2/4/2021	18.2	25.9	9.6	65.3	6.5
	2/8/2021	18.8	25.2	9.7	51.6	6.1
	2/12/2021	17.6	28.2	10.6	71.4	5.3
	2/16/2021	17.7	17.3	10.8	63.3	6.0
	2/23/2021	15.9	20.9	11.9	59.9	6.5
	2/26/2021	15.1	29.6	9.8	40.8	6.2
	2/29/2021	15.2	25.3	11.6	66.2	4.2
	3/1/2021	12.3	28.4	12.4	62.5	5.5
	Max	**20.50**	**30.20**	**12.40**	**71.60**	**6.90**
	Min	**12.10**	**17.30**	**7.80**	**40.70**	**3.40**
	Avg	**17.19**	**23.77**	**10.10**	**55.01**	**5.30**
	98 percentile	**20.18**	**29.92**	**12.17**	**71.51**	**6.72**

Table 3:18 Ambient Air Quality at AAQ7 Senapati

AAQ7	Senapati					
MONTH	**DATE**	**PM2.5 ($\mu g/m^3$)**	**PM10 ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**CO($\mu g/m^3$)**	**NO_2 ($\mu g/m^3$)**
Dec-20	12/4/2020	19.3	21.2	7.9	43.0	5.2
	12/8/2020	18.3	18.3	9.0	43.5	4.7
	12/12/2020	19.8	20.6	9.1	51.4	5.0
	12/16/2020	17.2	21.8	11.1	50.4	4.9
	12/23/2020	16.2	23.1	9.0	56.8	5.2
	12/26/2020	16.9	21.4	7.8	54.7	5.6
	12/29/2020	18.6	28.1	8.7	58.6	5.4
	1/1/2021	16.3	24.6	9.5	67.4	4.7
Jan-21	1/4/2021	19.2	28.6	11.1	41.5	6.2
	1/8/2021	12.8	18.6	9.4	56.8	5.7
	1/12/2021	20.3	22.8	7.7	71.6	7.0
	1/16/2021	18.2	29.6	10.2	41.5	4.5
	1/23/2021	16.2	22.6	11.3	52.8	4.2
	1/26/2021	16.8	18.6	8.0	43.6	5.1
	1/29/2021	15.9	24.9	10.0	41.5	6.8
	2/1/2021	17.3	29.2	9.8	42.6	3.4
Feb-21	2/4/2021	18.6	25.8	9.8	65.4	6.9
	2/8/2021	17.8	24.6	9.0	51.6	3.1
	2/12/2021	17.6	28.3	10.1	71.3	5.8
	2/16/2021	17.2	16.9	10.0	62.7	6.8
	2/23/2021	16.7	20.1	11.1	59.1	5.2
	2/26/2021	16.2	19.7	9.2	40.3	6.5
	2/29/2021	15.9	25.4	11.4	66.4	5.5
	3/1/2021	12.7	28.3	11.1	62.1	6.4
	Max	**20.30**	**29.60**	**11.40**	**71.60**	**7.00**
	Min	**12.70**	**16.90**	**7.70**	**40.30**	**3.10**
	Avg	**17.17**	**23.46**	**9.64**	**54.02**	**5.41**
	98 percentile	**20.07**	**29.42**	**11.35**	**71.46**	**6.95**

Table 3:19 Ambient Air Quality at AAQ8 Langdeibung

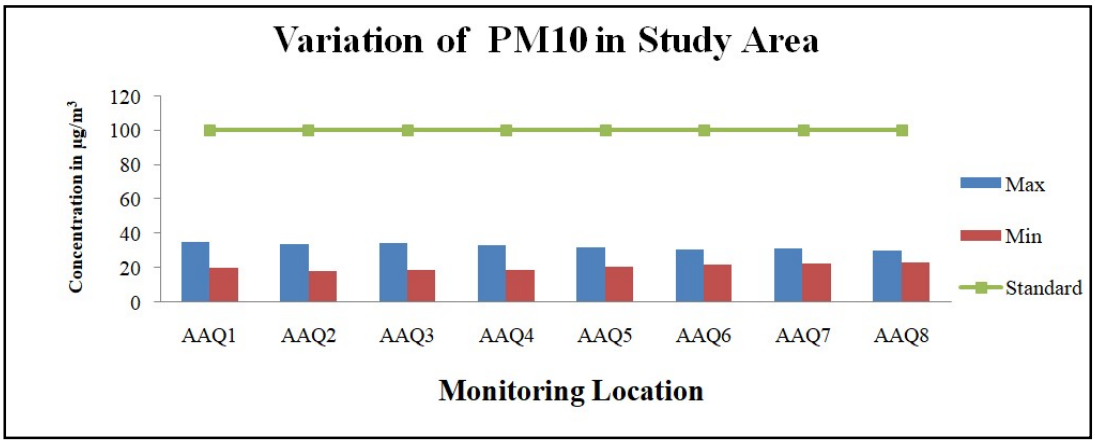
AAQ8	Langdeibung					
MONTH	**DATE**	**PM2.5 (µg/m^3)**	**PM10 (µg/m^3)**	**SO_2 (µg/m^3)**	**CO(µg/m^3)**	**NO_2 (µg/m^3)**
Dec-20	12/4/2020	19.2	21.1	7.5	42.8	5.5
	12/8/2020	18.5	17.3	9.6	43.4	4.7
	12/12/2020	19.6	21.2	9.4	51.3	4.1
	12/16/2020	16.7	22.6	11.2	50.3	5.0
	12/23/2020	16.9	25.6	9.2	55.8	5.4
	12/26/2020	17.5	21.3	7.9	54.6	5.2
	12/29/2020	18.9	28.6	8.8	58.7	7.1
	1/1/2021	16.8	24.5	9.6	68.4	4.9
Jan-21	1/4/2021	17.6	28.3	11.2	41.6	6.0
	1/8/2021	13.6	18.2	9.6	56.4	5.7
	1/12/2021	20.5	22.5	7.5	71.8	6.3
	1/16/2021	18.6	29.5	10.5	41.2	4.5
	1/23/2021	15.3	22.4	11.1	52.0	3.2
	1/26/2021	17.2	18.6	8.7	43.7	5.6
	1/29/2021	16.3	24.5	10.1	42.0	6.4
	2/1/2021	17.5	29.7	9.7	42.2	3.5
Feb-21	2/4/2021	18.6	25.5	9.8	65.1	6.8
	2/8/2021	18.8	24.8	9.3	51.6	6.2
	2/12/2021	17.6	28.5	10.0	71.3	5.4
	2/16/2021	17.1	16.6	10.2	62.0	6.6
	2/23/2021	16.1	20.8	11.2	60.0	6.3
	2/26/2021	15.6	19.6	9.5	41.0	6.5
	2/29/2021	15.7	25.5	10.8	65.8	5.9
	3/1/2021	12.3	28.5	10.6	32.7	5.2
	Max	**20.50**	**29.70**	**11.20**	**71.80**	**7.10**
	Min	**12.30**	**16.60**	**7.50**	**32.70**	**3.20**
	Avg	**17.19**	**23.57**	**9.71**	**52.74**	**5.50**
	98 percentile	**20.09**	**29.61**	**11.20**	**71.57**	**6.96**

3.6.6 Observations (PM_{10}, $PM_{2.5}$, So_2& No_2)

PARTICULATE MATTER (PM_{10}):

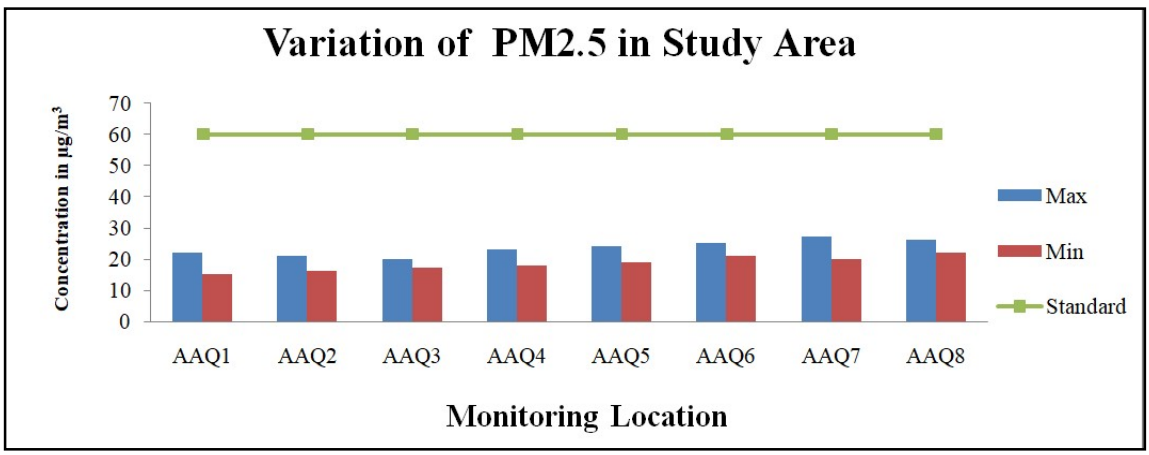
The maximum value for PM_{10} was observed as 36.30 µg/m^3 at AAQ1 while 24 hours applicable limit is 100 µg/m^3 for industrial and mixed use areas. The area observes average PM_{10} concentration in the range of 16.60 µg/m^3 – 36.30 µg/m^3 with the lowest concentration of 16.60 µg/m^3 recorded at AAQ8.

Figure3-11: Variation of PM10 in Study Area



PARTICULATE MATTER (PM2.5): The maximum value for PM2.5 was observed, as 27.10 µg/m^3 at AAQ1 while 24 hours applicable limit is 60µg/m^3 for industrial and mixed use areas. The area observes average $PM_{2.5}$ concentration in the range of 12.10 µg/m^3- 27.10 µg/m^3 with the lowest concentration of 12.10 µg/m^3 recorded at AAQ6.

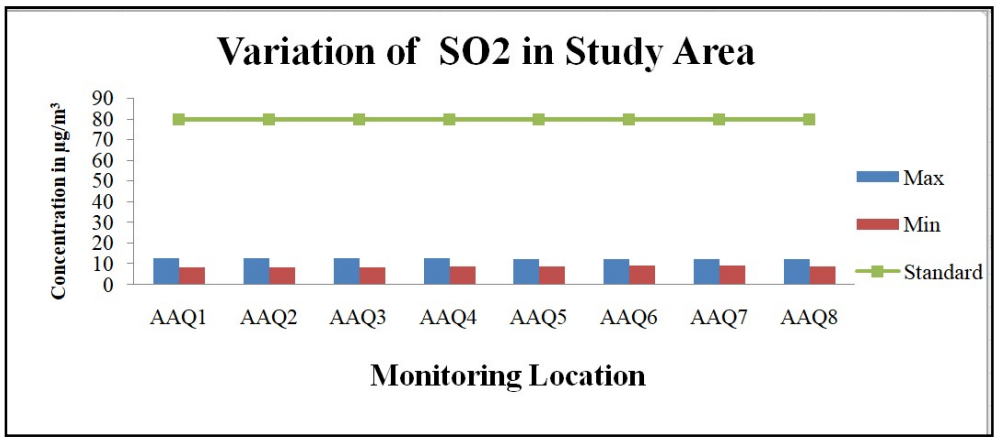
Figure 3-12: Variation of PM2.5 in Study Area



SULPHUR DIOXIDE (SO_2):

The maximum value for **SO_2** was observed, as 15.80 µg/m^3 at AAQ1 while 24 hours applicable limit is 80.00 µg/m^3 for industrial and mixed use areas. The area observes average **SO_2** concentration in the range of 7.50µg/m^3 – 15.80 µg/m^3 with the lowest concentration of 7.50 µg/m^3 recorded at AAQ8. All the villages have observed value well under the prescribed limit.

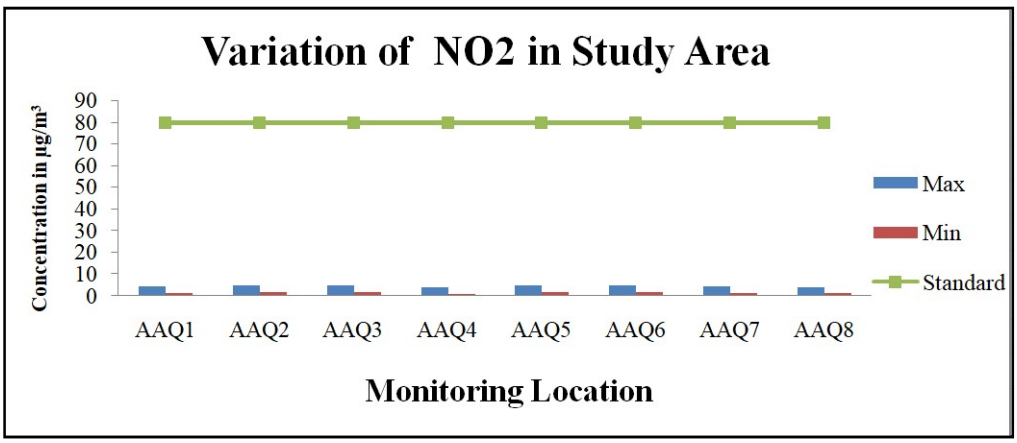
Figure 3-13: Variation of SO_2 in Study Area



NITROGEN OXIDES (NO_2):

The maximum value for **NO_2** was observed as 7.50 µg/m^3 at AAQ1&AAQ2 while 24 hours applicable limit is 80µg/m^3 for industrial and mixed use areas. The area observes average NO_2concentration in the range of 3.10 µg/m^3 – 7.50 µg/m^3 with the lowest concentration of 3.10 µg/m^3 recorded at AAQ7. All the villages have observed value well under the prescribed limit.

Figure 3-1: Variation of NO_2 in Study Area



3.7 Noise Environment:

Noise often defined as unwanted sound, interferes with speech communication, causes annoyance, distracts from work, disturb sleep, thus deteriorating quality of human environment. Noise Pollution survey has therefore been carried out.

Noise levels were measured in residential areas and other settlements located within 10 km radius around the site.

Types of Sound Fields:

Based on the distance from the source of sound generation, the types of sound field are identified. They are of three type's viz. (i) Free Field (ii) Near Field and (iii) Far Field.

i.Free Field

The sound waves that propagate without obstruction from source to the receiver are free field. The sound waves obey the inverse square law so that sound pressure level decreases by 6 dB (A) as the distance is doubled. Such a field is known as free field.

ii.Near Field

This field is located within a few wavelengths of the source and it is also influenced by the dimensions of the source. The inverse square law does not apply in this field.

iii.Far Field

The far field has two parts one is known as free part and the other as reverberation part. In the free part of the far field, the sound pressures level obeys the inverse square law and propagate without obstruction from source to the receiver. The reverberant part of the field exists for enclosed situation where the reflected sound waves are superimposed on the incident sound waves. If there are many reflected waves from all possible direction, a diffuse sound field exists.

The intensity of sound energy in the environment is measured in a logarithmic scale and is expressed in a decibel (dB) scale. Ordinary sound level meter measures the sound energy that reaches the microphone by converting it into electrical energy and then measures the magnitude in dB. In a sophisticated type of sound level meter, an additional circuit (filters) is

provided, which modifies the received signal in such a way that it replicates the sound signal as received by the human ear and the magnitude of sound level in this scale is denoted as dB (A). The sound levels are expressed in dB (A) scale for the purpose of comparison of noise levels, which is universally accepted by the international community.

Noise Level Survey:

A preliminary reconnaissance survey was undertaken to identify the major noise generating sources in the area. The noise survey was conducted in the month of December-2020 to February-2021 assess the background noise levels in different zones viz. industrial, commercial, residential and silence zones.

3.7.1 Ambient Noise Standards

Ministry of Environment & Forests (MoEF) has notified the noise standards vide gazette notification dated February 14, 2000 for different zones under the Environment Protection Act (1986). These standards are given in Table 3-24.

Table 3:20 Ambient Noise Quality Standards in respect of Noise

Area Code	Category of Area	Noise dB (A) L_{eq}	
		Daytime*	Night time*
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note:
Daytime from 6.00am to 10.00pm and Night time from 10.00pm to 6.00a m.
Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle hours, loud speakers and bursting of crackers are banned in these zones

3.7.2 Noise Analysis within the Study Area

Noise levels were measured using an Integrating sound level meter manufactured by Cygnet (Model No. 2031). It has an indicating mode of Lp and Leq. Keeping the mode in Lp for few minutes and setting the corresponding range and the weighting network in "A" weighting set the

sound level meter was run for one hour time and Leq was measured at all locations. The day noise levels have been monitored during 6.00am to 10.00pm and night noise levels, during 10.00pm to 6.00am at all the twelve locations covered in 10 km radius of the study area. The location of Noise level monitoring is presented in **Table 3.25** and the levels recorded are as stated in **Table 3.26.** **Figure 3.13** shows noise sampling location.

Table 3:21 Details of Noise Monitoring Location

S. No.	Code	Location	Distance (km)	Direction
1	ANQ1	Mine Site	-	-
2	ANQ2	Tamenglong	8.75	South-West
3	ANQ3	Maklang	8.30	East
4	ANQ4	Longa Koireng	4.15	East
5	ANQ5	NH-53	2.10	North-East
6	ANQ6	Sajirok	8.80	South-East
7	ANQ7	Senapati	6.60	South
8	ANQ8	Langdeibung	3.26	North-West

Figure 3-2: Noise Monitoring Location Map

Table 3:22 Noise Quality Results of the Study area

Noise		Standards of Noise Level			Noise Level db(A)	
Location	Date of Monitoring	Category of Area	Day dB (A)	Night dB (A)	Day (Ld)	Night (Ln)
Mine Site	12/4/2020	Commercial	65	55	50.2	39.8
Thangjing Khullen	12/8/2020	Residential	55	45	49.2	36.7
Maklang	12/12/2020	Residential	55	45	45.6	35.8
Longa Koireng	12/16/2020	Residential	55	45	44.5	32.1
Leimaram	12/23/2020	Residential	55	45	45.1	33
Sajirok	12/26/2020	Residential	55	45	42.7	29.3
Senapati	12/29/2020	Residential	55	45	42.3	29.6
Langdeibung	1/1/2021	Residential	55	45	42.4	29.4

3.7.3 Observations:

Ambient noise levels were measured at 08 locations around the proposed project site. Minimum and maximum noise levels recorded during the day time were from 42.3 Leq dB and 55.2 Leq dB respectively and minimum and maximum level of noise during night time were 29.3 Leq dB and 39.8 Leq dB respectively. Lab result is attached as ***Annexure-VI*** and noise levels at all locations were observed to be within the prescribed limits and Ambient Air Quality Standards in respect of Noise is available online at *http://cpcb.nic.in/divisionsofheadoffice/pci2/noise_rules_2000.pdf*. From the above study and discussions it can be concluded that noise levels in the study area are well within the prescribed limits as prescribed by the CPCB and State Pollution Control Board.

3.8 Biological Environment

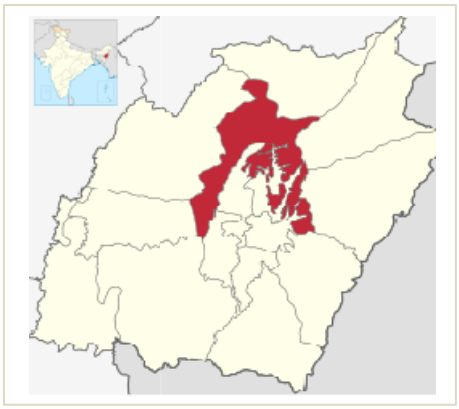
"Ecology" is the study of the relation and interactions between organisms and their environment. It comprises the biodiversity an area. With changes in environmental conditions, structure, density and composition of plants, animals also undergo changes.

"Biodiversity" as defined by the 11181 Convention on Biological Diversity, refers to the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.

3.8.1 Biological Environment Of The District Kangpokpi District.

Kangpokpi District also known as Sadar Hills district, is one of the 16 districts in the Indian state of Manipur. It was created in December 2016 from areas in the Sadar Hills region which were previously part of Senapati District.

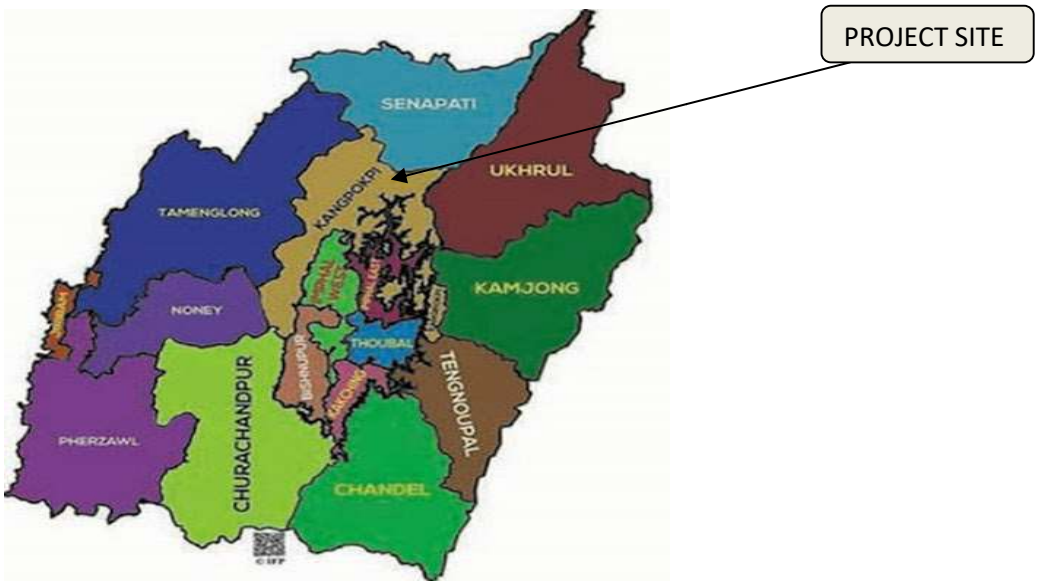
The district headquarters is located in Kangpokpi.



3.8.2 Climate And Vegetation

The climate of district is largely influenced by the topography of this hilly region. Lying 790 meters above sea level, Kangpokpi is wedged among hills on all sides. This northeastern corner of India enjoys a generally amiable climate, though the winters can be chilly. The maximum temperature in the summer months is 32 °C (90 °F). The coldest month is January, and the warmest July.

The climate of the district be described as humid subtropical climate. The soil is moderately fertile with clay loam soil. The temperature ranges from a minimum of 3.4°C(38.1°F) to a maximum of 34.1°C (93.4°F). The annual rainfall ranges from 670 to 1450 mm (26.4 to 57.1 in).



3.8.3 Ecological Quality Of The Study Area

Methodology for Baseline Data Generation

Ecological study has been made to know the forest types, flora and fauna composition of the study area which were computed and compared with the satellite and information from other sources like BSI, ZSI, relevant forest department (Wildlife Department) and local NGO's. Subsequently through extensive field survey, forest types, flora and fauna composition of the study areas were computed and compared.

Objective

The ecological study of the area has been conducted in order to understand the existing status of flora and fauna to generate baseline information and evaluate the possible impacts on biological environment. The present study highlights the various issues pertaining to floristic diversity and faunal wealth in the surrounding area upto 10 km radius of the proposed project site.

Methodology of the Study

The baseline study for existing ecological environment was carried out during Dec 2020. A participatory and consultative approach was followed. Field visits were undertaken for survey of the vegetation and animals in the study area. The study area has been divided in to two parts as core area consisting of project site and the buffer area as the 10 km radius of the project site.

For the purpose of surveying the vegetation quadrates were laid to record phyto-sociological features of the vegetation. Detailed notes on ecological features, including the habitat types were also taken along the selected locations. The flora and fauna in the study area were inventorised.

Besides measuring these parameters, other biodiversity aspects in the form of endemic status, conservation status and life form have been enumerated. For all the plant species found in the area during ecological survey, Red Data Books of the Botanical survey of India have been screened to verify their conservation status. For wild animal species schedule 1 of the Wildlife Protection Act (1972) has been screened. The information was also collected from secondary sources for authentication of the data from forest office, Manipur.

The various ecosystems, vegetation, communities, faunal habitats prevalent in the study area were identified though Quadrant method with Random Sampling Technique was adopted to know distribution pattern of the plant species and faunal characteristics. All the plant species in a quadrant of 10 x 10 size at an interval of 500 mtr from the core of the mine in all four directions were recorded. A line transect was laid for entire area of 10 Km to divide 500 mtr segments. Thus randomly distributed quadrants were laid for ecological assessment. The detailed species characteristics like frequency, abundance & density were computed.

Frequency*:*

The frequency of individual species is the number of times the species occurs in the sampling quadrant. It is actually represented as a percentage calculated as follows:

$$\text{Frequency} = \frac{\text{No. of quadrants in which the species occurred}}{\text{Total no. of quadrants studied}} \times 100$$

It reflects the probability of encountering the species within the sampled area.

Density:

Density is the measure of dense in the distribution of an individual species within a given area Density of a species is defined as the average number of the species per quadrant and calculated as follows:

$$\text{Density} = \frac{\text{Total no. of individuals of the species}}{\text{Total no. of quadrants used in sampling}}$$

Abundance:

It reflects how evenly one species is distributed within the sampling area. Abundance of a species is defined as the number of individuals per quadrant and calculated as follows:

Abundance = Total no. of individual of the species/ No. of quadrants in which the species occurred

Importance Value Index

Importance Value is a measure of how dominant a species is in a given forest area. It is a standard tool used by foresters to inventory a forest. Relative density, the number of individuals per area as a percent of the number of individuals of all species.

Importance value = Relative density + Relative dominance + Relative frequency

ECOLOGICAL PATTERN

The project site (core zone) as well the buffer zone area was surveyed to assess the ecological status.

Terrestrial Ecology

The terrestrial ecological study of the area can be categorized into two groups based on the ecological components i.e. Flora and Fauna. Therefore, to assess the exact ecological status of area inventory of flora & fauna is prepared during the study period on the basis of primary data as well as secondary data collected.

Result & Analysis

3.8.4 Flora in core Zone

Core zone has scanty vegetation with uneven distribution of grasses, few rare emergent/small tree, & shrubs, herbs and juvenile tree.

Table No.3.25 Phyto-sociological analysis of grasses:-

S.no.	Name of species	Density	% Frequency	Relative Density	Relative Dominance	Relative Frequency	IVI
1.	*Brachiaria mutica*	1.5	60	18.5	18.518	18	55.018
2.	*Calopogonium mucunoides*	1.2	30	15	14.814	9	38.814
3.	*Cynodon dactylon*	0.8	40	10	9.876	12	31.876
4.	*Melilotus alba*	0.9	60	11.1	11.111	18	40.211
5.	*Pennisetum purpureum*	1.4	50	17.3	17.283	15	49.583
6.	*Phalaris minor*	1.7	70	20.9	20.987	21	62.887
7.	*Sorghum halepense(L.)*	0.6	30	7.4	7.407	9	23.807

No. of quadrats used =10

Table No.3.26: Phyto-sociological analysis of shrubs, herbs and juvenile trees:-

S.no.	Name of species	Density	%Frequency	Relative Density	Relative Dominance	Relative Frequency	IVI
1.	*Castanopsis hystrix*	2.8	50	24	23.931	15	62.931
2.	*Aroides sp.*	0.6	60	5.1	5.128	18	28.228
3.	*Leea sp.*	2.4	40	20.5	20.512	12	53.012

4.	*Saurauia sp.*	1.8	70	15.3	15.384	21	51.684
5.	*Albizzia procera*	0.6	60	5.1	5.128	18	28.228
6.	*Cedrela toona*	1.7	50	24	23.931	14.70	62.631
7.	*Cordia fragrantissima*	0.3	20	2.5	2.564	6	11.064
8.	*Hardwikia binata*	1.2	30	10.2	10.256	9	29.456
9.	*Morus alba*	0.3	30	10.2	10.256	9	29.456

The number of shrubs, shrubby climbers and tree saplings together was total of 9 species found. The mining lease area was dominated by mainly some shrubs and weedy species. The density values for different species of shrubs varied from 2.8 to 0.3.

3.8.5 Fauna In Core Zone

During study period only birds and few mammals, were seen, however as per the discussion with local people fauna found in core zone are given below:

Table No.3.27 Fauna In Core Zone

S.N.	Zoological Name	Common Name	Schedule Status
1.	*Cannomys badius badius*	Bamboo Rat	US
2.	*Callosciurus erythraeus erythraeus*	Squirrel	US
3.	*Crocidura attenuata rubricosa*	Grey Shrew	US
4.	*Mus booduga*	Field Rat	Schedule V
5.	*Rattus rattus brunneusculus*	Black Rat	Schedule V
6.	*Suncus murinus Griffith*	House Shrew	US

BIRDS

S.N.	Zoological Name	Common Name	Schedule Status
1.	*Acridotheres tristis*	Indian Myna	IV
2.	*Scolopax rusticola*	Wood Cock	US

REPTILES

S.N.	Zoological Name	Common Name	Schedule Status
1.	*Calotes versicolor*	Garden Lizard	US
2.	*Chameleon sp*	Chameleon	Schedule II Part I

3.8.6 Flora In Buffer Zone

Table No.3.28 Flora In Buffer Zone

List of trees found in the study area

S.NO.	Scientific Name	Local name
1.	*Cassia fistula*	Chaohei, Chathui,sonnaru
2.	*Castanopsis hystrix*	Thangji
3.	*Cedrela serrata*	Chingtairel

4.	*Duabanga sonneratioides*	Tal, Tumdala
5.	*Ehretia acuminata*	Lamuk
6.	*Elaeocarpus florobundus*	Chorphon
7.	*Emblica officinalis*	Heikru
8.	*Ficus religiosa*	Sanakhongnang
9.	*Kydia calycina*	Khabi
10.	*Lannea grandis*	Akaman
11.	*Lantana camara*	Namthibi(Theerei)
12.	*Legerstroemia flosreginea*	Jarul, ajhar
13.	*Magnolia griffithii*	Utham-ban
14.	*Mallotus roxburghianus*	Khabi-lakoi
15.	*Mangifera indica*	Heinou
16.	*Mansonia dipikae*	Badam
17.	*Pyrus communis*	Naspati
18.	*Pyrus laevigata*	Bola
19.	*Quercus serratus*	Uyung
20.	*Stereospermum chelonoides*	Missi
21.	*Syzgium cuminii*	Jam
22.	*Talauma phellocarpa*	Khariasopa, talasuma
23.	*Stereospermum chelonoides*	Missi

List of generally cereals and pseudo cereals:

S. No	Scientific Name	Family	Common English Name	Local Name
1	*Avena sativa*L	Poaceace	Oat	Oat
2	*Fagopyrum esculentum*	Polygonacae	Buckwheat	Wakha Yendem
3	*Oryza sativa*L	Poaceae	Rice, Paddy	Phou
4	*Zea mays*L	Poaceae	Maize, Com	Chujak

List of plantation crops:

S.no	Scientific Name	Family	Common English Name	Local Name
1	*Camellia sinensis*L O.Kuntze	Theaceae	Tea	Cha
2	*Cinnamomum camphora*L Nees & Eberm	Lauraceae	Camphor	Karpur
3	*Coffea arabica*L	Rubiaceae	Arabian Coffee	Kophee
4	*Hevea brasiliensis*(H.B.&K.)	Euphorbiaceae	Para rubber	Rubber

List of vegetables and tuber crops

S. No	Scientific Name	Family	Common English Name	Local Name
1.	*Abelmoschus esculentus* (L) Moench	Malvaceae	Okra	Velandri
2.	*Allium cepa*L	Alliaceae	Multiplier onion	Tilhou
3.	*Allium cepa*L	Alliaceae	Onion	Tilhou
4.	*Allium fistulosum*L	Alliaceae	Welsh onion, Japanese bunching onion	--
5.	*Allium sativum*L	Alliaceae	Garlic	Chanam
6.	*Apium graveolens*L	Apiaceae	Celery	--
7.	*Benincasa hispida*(Thunb) Cong	Cucurbitaceae	Ash gourd	--
8.	*Beta vulgaris*L	Chenopodiaceae	Sugarbeet	Beet
9.	*Brassica caulorapa*Pasq	Brassicaceae	Knolkhol	Olkobi
10.	*Brassica chinensis*Juslen	Brassicaceae	Chineses cabbage	China kobi
11.	*Brassica napus*L	Brassicaceae	Swedish tumip	--
12.	*Brassica oleracea*L convar capitata	Brasicaceace	Cabbage	Kobiful
13.	*Brassica oleracea*L	Brasicaceace	Cauliflower	Kobilei
14.	*Brassica oleracea*L	Brasicaceace	Brussels sprout	--
15.	*Brassica rapa*L	Brassicaceae	Tumip	Salgum
16.	*Canavalia gladiata*(Jacq) DC.	Papilionaceae	Sword bean	--
17.	*Daucus carota*L	Apiaceae	Carrot	Ha

List of some bamboo species

Sl. No	Scientific Name	Local Name
1	*Arundinaria callosa* Munro.	(Laiwa)Shoidon
2	*Arundinaria clarkei*	Wa
3	*Arundinaria racemosa* Munro	Waak
4	*Arundinaria rolloana* Gamble	Tenwa
5	*Bambusa tulda* Roxb.	Saneibi

[NOTE:- The table include list of both NS & DS i.e. NS= Not sighted but included as per the information provided by villagers, DS = Direct Sighting]

3.8.7 Fauna of the Buffer Area

Table No.3.29: Fauna of the Buffer Area

List of Mammals

Sl. No	Scientific Name	Local Name	Schedule
1.	*Axis porcinus*	Kharsa	Schedule III(Part-1)
2.	*Cervus unicolor*	Sajan	Schedule III(Part-1)
3.	*Lutra lutra*	Sanamba	Schedule II(Part-1)
4.	*Macaca assamensis*	--	Schedule II(Part-1)
5.	*Viverricula indica*	Moirang Sathibi	Schedule II(Part-1)
6.	*Cannomys badius badius*	Bamboo Rat	US
7.	*Callosciurus erythraeus erythraeus*	Squirrel	US
8.	*Niviventer fulvescens fulvescens*	White bellied Rat	Schedule V
9.	*Mus booduga*	Field Rat	Schedule V
10.	*Rattus rattus brunneusculus*	Black Rat	Schedule V
11.	*Lutra lutra monticola*	Otter	US

List of Amphibians & Reptiles

Sl. No	*Scientific Name*	Local Name	Schedule
1.	*Bufo melanostictus Schneider*	Hangoi-borabi	Schedule III
2.	*Rana tigrina.*	Moreh Hangoi	Schedule V
3.	*Ahaetula prasina Boie*	Naril	Schedule IV
4.	*Ahaetulla subocularis Boulenger*	Naril	Schedule IV
5.	*Amphiesma stolata Linn*	Lilha	Schedule IV
6.	*Bioga multimaculata Boie*	Naril-arangba	Schedule IV
7.	*Bioga ochracea Gunther*	Naril-asungba	Schedule IV
8.	Travancore tortoise	--	Schedule IV

List of Birds

Sl. No	Scientific Name	Local Name	Schedule
1.	*Corvus macrohynchos*	Kwak	Schedule V
2.	*Acridotheres tristis tristis*	Indian Myna	Schedule IV
3.	*Alcedinidae*	Kingfisher	Schedule IV
4.	*Motacilla indica*	Forest Wagtail	US
5.	*Milvus migrans lineatus*	Large Indian Kite	US

6.	*Bubo flavipes*	Tawny Fish Owl	US

[NOTE :-The table include list of both NS & DS i.e. NS= Not sighted but included as per the information provided by villagers, DS = Direct Sighting ,US- Un-scheduled animals]

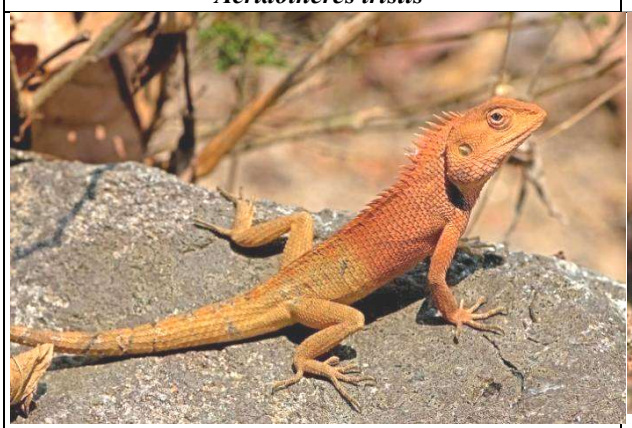
Fishes

Common fishes that are geneally found are Ukabi(*Anabas tesdudineus),* Ngamu(*Lata fis*h), Ngaton(*Labeo bata*), Ngakrijou(Lepidodephalichthys SPP), Sareng Khoibi(*Botia SPP)*, Nganap (Pengia *SPP),* Ngatin *(Labeo Pangusia*), Ngakra *(Barbus tor)*, Ngasang (*Esomus denricus*), Phabounga (*Puntius SPP),* Ngamhai *(Chanda SPP)*, Pengba *(Osteobrama belangeri)* etc.

Fish is the most important item and easily digestible protein food of the district. It is the only source of animal protein acceptable to all the people.

Acridotheres tristis

Paradoxurus hermaphroditus



Herpestes urva

Mus booduga

<u>Fauna found in the Study Area</u>

	
Pyrus Communis	***Syzgium cuminii***
	
Zea mays	***Bambusa tulda Roxb.***

Flora found in the Study Area

3.9 Socio-Economic Environment

3.9.1 Introduction

This chapter of the EIA report describes Socioeconomics (also known as social economics) is the social science that studies how economic activity affects and is shaped by social processes. In general it analyzes how modern societies progress, stagnate, or regress because of their local or regional economy, or the global economy. Societies are divided into three groups: social, cultural and economic. It also refers to the ways that social and economic factors influence the environment.

The proposed project is "Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth" Area: 5.16 Ha., Located at Longa Koireng, Tehsil- Kangchup Geljang, District- Kangpokpi, State- Manipur.

3.9.2 Description of the district

Kangpokpi District also known as Sadar Hills district, is one of the 16 districts in the Indian state of Manipur. It was created in December 2016 from areas in the Sadar Hills region which were previously part of Senapati District.

The district headquarters is located in Kangpokpi

Manipur has a population of 2,855,794 as per 2011 census. Of this total, 57.2% live in the valley districts and the remaining 42.8% in the hill districts. The hills are inhabited mainly by the Nagas, and Kukis, and smaller tribal communities and the valley (plains) mainly by the Meiteis, Manipuri Brahmins (Bamons) and Pangal (Manipuri Muslims). Bishnupriya Manipuri, Naga and Kuki settlements are also found in the valley region, though less in numbers.

The population of district Kangpokpi is around 334,896 as per 2011 census (out of which 96% of population live in Rural Area). The sex ratio of the district is 989 females per 1000 males.

3.9.3 Details of Area within the 10 km study area

We have taken 10km radius area for our project study of socio economy and with the help of Google earth, Google map and the data collected during the site visit we have made a list of villages around 10km radius of the study area for our socio economic study:-

Table: 3.30 Villages in 10 KM Study Area

S.No.	Village/Town	S.No.	Village/Town
1	Ireng Naga	17	S. Kajang
2	Molhoi	18	Kangchup Chingkhong
3	Ch. Ebenezer	19	Kangchup Patjang
4	Kotlen	20	Langdeibung
5	Kharam Vaiphei	21	Kangchup Makhong

6	Singda Kuki	22	Kangchup Chiru
7	Songjang Khullen	23	Natop Boljang
8	Songjang Waphong	24	Natop Kuki
9	Waphong Inthan	25	Khokhen
10	Kangchup Songlung	26	Natop Kabui
11	Songjang Khunou	27	Veitum Khullen
12	Kangchup Khomunnom	28	Kotlen
13	Kangchup Patbung	29	Lhongching
14	Kangchup Tuikon	30	S.Laijang
15	Kangchup Ponlen	31	Longjang
16	Ireng Naga		

Population:

The population of the district is 334,896 as per 2011 census (out of which 96% of population live in Rural Area). The sex ratio of the district is 989 females per 1000 males.

However, the total population of study area is 7183 the percentages of male & female population are 49.83% & 50.16% respectively. Breakup of the population for male and female is given in following Table 1.2 consisting of gender-wise details of population.

Social Structure:

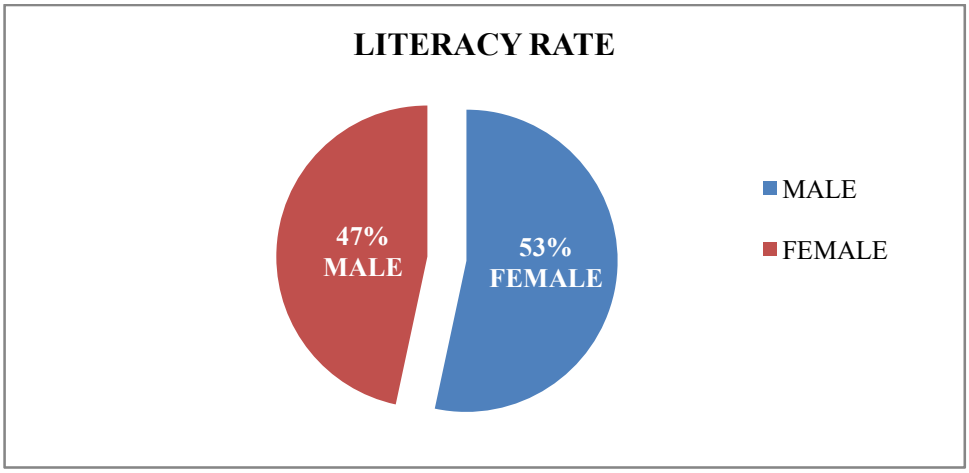
The Schedule Caste (SC) population within the study area is 15 with 40% Male and 60% are female. The Schedule Tribe (ST) population within the study is 7143 with 52.77% Male and 47.23% are female.

Literacy:

The literacy rate of the district is 85% [Male – 89%, Female – 80.34%] and is above state average of 76.94%.

However, the total number of literates within the study area is which are 65.12% of total population. Male literacy rate of the study area is 53.34% and female literacy rate is 46.65%.

Figure: 3.16 Literacy Rate in the Study Area



Occupation Pattern:

The occupational structure of the population in the study area has been studied with reference to the total workers and non-workers. Further total workers grouped into two categories main workers and marginal workers. Main workers have been grouped into four categories namely: Cultivators, agricultural laborers, household workers and other workers.

The details of these groups are discussed given below in Table 1.2.

Total workers

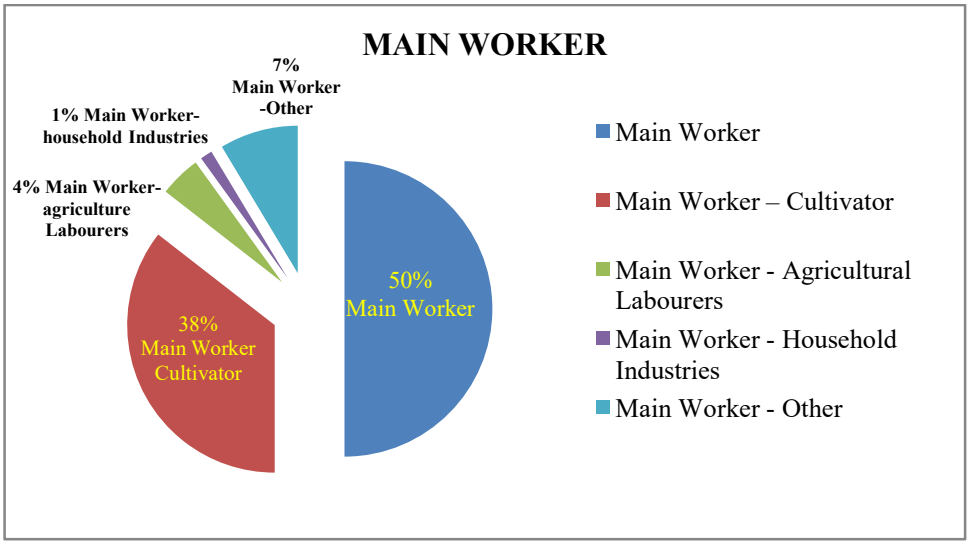
Work is defined as participation in any economically productive activity with or without compensation, wage. Such participation may be physical and/ or mental in nature. Work involves not only actual work but also include supervision and direction of work. It even includes part time help or unpaid work on farm, family enterprise or its economic activity. All persons engaged in 'work' as defined above are workers.

The number of total workers in the study area is 3769 which are 48.93% of total population. Out of which 1993 is male and only 1776 is female. Total workers further divided into main workers and marginal workers.

Main workers:

Those workers who had worked for the major part of the reference period (i.e. 6 months or more) are term main workers. Total number of main workers in the study area is 2881 which are 37.69% of total population. Out of which 1638 is male and only 1243 is female.

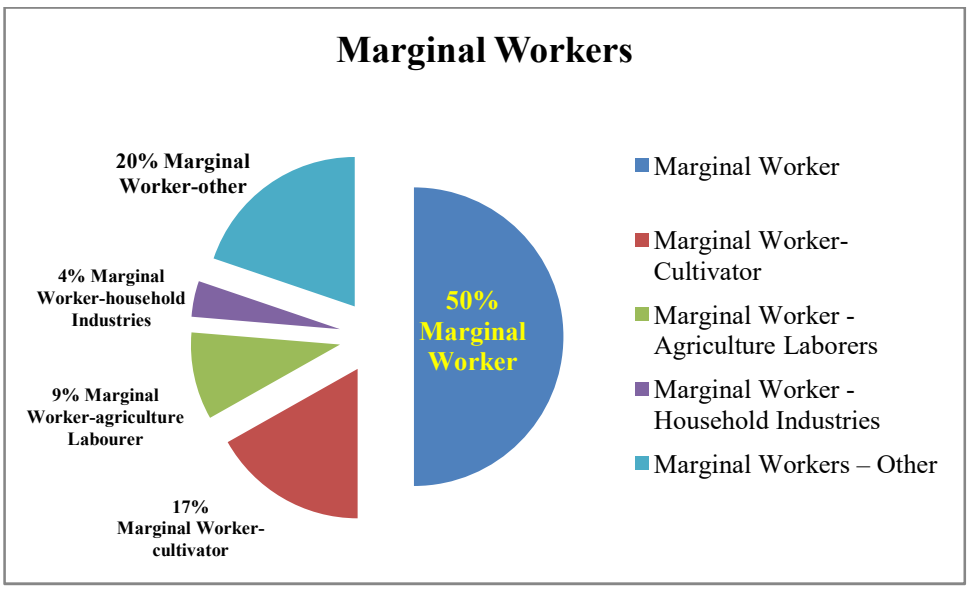
Figure: 3.17 Main Workers in the Study Area



Marginal Workers

The marginal workers are those workers, who are engaged in some work for a period of less than six months, during the reference year prior to the census survey. Total number of marginal workers in study 892 which are 11.56% of total population. Out of which 312 is male and only 580 is female.

Figure: 3.18: Marginal Workers in the Study Area



Cultivators

A person is classified as cultivator if he or she is engaged in cultivation of land own or from government or held from private persons or institutions for payment in money, kind or share.

Cultivation work includes effective supervision or direction in cultivation. A person who has given out her/his land to another person or institution(s) for cultivation for money, kind or share of crop and who does not even supervise or direct cultivation process is not treated as cultivator. Similarly, a person working on another person's land for wages in cash or kind or combination of both is not treated as cultivator.

Total main worker-cultivators in study area are 2187 and marginal worker cultivators are 301 which are 75.91% and 33.74% of the total main and marginal work force.

Household Worker:

Persons working in others household for wages are treated as household worker. The total main workers of this category are 71 about which is 2.46% of total main workers and total marginal workers of this category are 67 which is 7.51% of the total marginal work force.

Non Workers

The non-workers include those engaged in unpaid household duties, students, retired persons, dependents, beggars etc. The total number of non-workers population is 3869 which are 50.62% of the total population. Out of which 49.36% is male and 50.63% is female.

Agricultural Laborers

Persons working on the land of others for wages or share in the yield have been treated as agricultural laborers. The total main workers of this category are about 224 and marginal are 167 which are 7.77% and 18.72% of the total main and marginal workers respectively.

Other Workers

All workers, i.e., those who have been engaged in some economic activity during the last one-year are other workers. The type of workers that come under this category is government servants, municipal employees, teachers, factory workers, plantation workers, those engaged in trading, transport, banking, mining, construction, political or social work, priests, entertainment artist, etc. In effect, all workers except cultivators or agricultural laborers or household industry workers are other workers. The total main workers of this category are about 399(13.84% of total main workers) and total marginal workers of this category are 357(40.02% of the total marginal workers)

Table: 3.31 Demographic Profile of the Study Area

	Persons	Males	Females
Total Population	7642	3860	3782
In the age group 0-6 years	1025	552	473

Scheduled Castes (SC)	15	6	9
Scheduled Tribes (ST)	7183	3580	3603
Literates	4977	2655	2322
Illiterate	2665	1205	1460
Total Worker	3773	1950	1823
Main Worker	2881	1638	1243
Main Worker – Cultivator	2187	1213	974
Main Worker - Agricultural Labourers	224	120	104
Main Worker - Household Industries	71	26	45
Main Worker - Other	399	279	120
Marginal Worker	892	312	580
Marginal Worker- Cultivator	301	101	200
Marginal Worker - Agriculture Laborers	167	51	116
Marginal Worker - Household Industries	67	26	41
Marginal Workers – Other	357	134	223
Marginal Worker (3-6 Months)	630	220	410
Marginal Worker - Cultivator (3-6 Months)	160	63	97
Marginal Worker - Agriculture Laborers (3-6 Months)	137	40	97
Marginal Worker - Household Industries (3-6 Months)	27	6	21
Marginal Worker - Other (3-6 Months)	306	111	195
Marginal Worker (0-3 Months)	262	92	170
Marginal Worker - Cultivator (0-3 Months)	141	38	103
Marginal Worker - Agriculture Labourers (0-3 Months)	30	11	19
Marginal Worker - Household Industries (0-3 Months)	40	20	20
Marginal Worker - Other Workers (0-3 Months)	51	23	28
Non Worker	3869	1910	1959
Total Number of Household : 1499			

(Source: Census 2011)

Chapter 4. ANTICIPATED ENVIRONMENT IMPACTS AND MITIGATION MEASURES

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 phases.

The occurrence of mineral deposits, being site specific, their exploitation, often, does not allow for any choice except adoption of eco-friendly operation. The methods are required to be selected in such a manner, so as to maintain environmental equilibrium ensuring sustainable development.

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.

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans sustainable resource extraction.

Several scientific techniques and methodologies are available to predict impacts of physical environment. Mathematical models are the best tools to quantitatively describe the cause and effect relationships between sources of pollution and different components of environment. In cases where it is not possible to identify and validate a model for a particular situation, predictions have been arrived at based on logical reasoning / consultation / extrapolation.

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

4.1 Description of mitigation measures incorporated into the project to meet environmental standards, environmental operating conditions, or other EIA requirements

4.1.1 Anticipated Impact associated with any Commercial Activity

- Increase in traffic density will lead to air pollution.
- Movement of vehicles will cause noise pollution.
- Increased traffic may cause accidental incidences.

Mitigation Measures:

- Vehicles with PUC Certificate will be hired. Regular maintenance of vehicles will be done to ensure smooth running of vehicle.
- Un- necessary blowing of horn will be avoided.
- To avoid accidents the speed of vehicles will be low near habitation areas.

4.1.2 Top soil

The sandstone, murrum ands shale quarry has considerable quantity of overburden mainly as top soil and waste rocks. The top soil should be removed and stored separately, while the solid wastes should be stored in the external dumps keeping the area to be backfilled free. These external dumps should be stored in benches, which come up during the mining operations. With the progress of the mine face and availability of space for backfilling.

4.2 Impacts on Land Environment

Mining is essentially an excavation of mineral. The land environment is greatly affected by it. Specially, in case of mining which is being carried out by opencast method with semi-mechanized, it is expected to affect the land environment essentially. Impact assessment study on land environment can be done by considering land use pattern/ land cover, Topography, Drainage pattern and geological features of the mine site as well as the study area.

In present case, extraction of Sandstone, Murrum and Shaly Earth is proposed from the Leinganglok of Longa Koireng village, P.O. Langjing, P.S. New Keithelmanbi, Tehsil: Gamphazol, District: Kangpokpi, State- Manipur. Mining activity will be carried out by opencast. The proposed volume of Sandstone, Murrum and Shaly Earth excavation is 1,65,619.5 Cu.m per annum.

Anticipated Impacts:

Land Use /Land Cover

The land is totally stony and has Sandstone, Murrum and Shaly Earth in large amount. This land is good for mining. There is no forest land or agriculture in the mine lease area.

The existing land use / land cover pattern within the study area (10 Km, Buffer including core Area) as studied through Site survey & satellite imagery is given as follows.

Table 4-1: Existing Land use of the 10 KM Study Area

S. No.	Category	Area in Sq.m	Percentage
1	Built-Up	146836399.25	4.32
2	Agricultural land/ Fallow Land	72635386.16	21.12
3	River	2525872.23	0.73
4	Barren Rocky	7223203.89	2.10
5	Barren Land- Scrub/ Gullied/ Ravious land	13853192.97	4.50
6	Scrub Forest/ Forest Plantation	84307566.17	24.52
7	Evergreen-Semi-Deciduous Forest	146836399.25	42.70
Total Area		**343857593.78**	**100.00**

As per the mine plan 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.

4.3 Impacts on Water Environment

The mining process will not divert and utilize the surface & ground water. Quantity of water will remain the same. The existing background level of water quality as indicated by the baseline data revealed that impact on water environment will be insignificant in this project.

4.3.1 Anticipated Impacts

Sandstone, Murrum and Shaly Earth mining will be carried out by opencast semi-mechanized method. The air borne particulate matter generated by ore and handling operations, and transportation of ore is the main source of air pollutant. The dumpers and HEMM will emit smoke and noxious gases and un-burnt hydrocarbons.

The emissions of Sulphur dioxide (SO_2), Oxides of Nitrogen (NO2) contributed by diesel operated excavation/loading equipment and vehicles plying on haul roads are marginal. Prediction of impacts on air environment has been carried out taking into consideration proposed production and net increase in emissions.

Air pollution sources in the proposed mine have been classified into two categories:

i. Loading and unloading of OB and ore
ii. Transportation of ore on the haul road

Water tankers with spraying arrangement will be used for regular water sprinkling on the haul roads to ensure effective dust suppression. The tippers will be well maintained so that exhaust smoke does not contribute abnormal values of noxious gases and un-burnt hydrocarbons. In order to assess the impact due to Sandstone, Murrum and Shaly Earth production of 614 TPD on air environment, prediction has been carried out.

The prediction of Ground level concentrations (GLC) of pollutants emitted from the mining activities will be carried out using ISCST-3 Air Quality simulation model released by USEPA. This model is basically a Gaussian dispersion model, which considers multiple sources. The model accepts hourly meteorological data records, to define the conditions of plume rise for each source and receptor combination for each hour of input meteorological data sequentially calculates short term averages up to 24 hours.

The impact has been predicted over a 10 km radius area with mining area as the centre. To obtain greater resolution, the receptors are defined with respect to 500 x 500 m grid point to have better results. GLC have been calculated at every 500 m grid point to have better results.

Air Pollution Impact Prediction through Dispersion Modeling:

Prediction of impacts on air environment has been carried out by employing **Industrial Source Complex Short Term (ISCST3)** dispersion model.

The ISC area source model is used to simulate the effects of fugitive emissions from sources such as storage piles and dumps. The ISC models use a numerical integration approach for modeling impacts from area sources. The ISC models accept rectangular areas that may also have a rotation angle specified relative to a north-south orientation.

The dust dispersion modeling requires the following data:

- Micro - meteorological data

- Mining data
- Dust concentration data
- Micro - meteorological data

Meteorological parameters

The hourly meteorological data recorded at site for the period from Dec'20 to Feb'21 covering winter season, is converted to the mean meteorological hourly data as specified by CPCB and the same has been used in the model. The mean meteorological data recorded at the site has been used for the modelling. In absence of site specific mixing heights, mixing heights published in IMD Publication "Atlas of Hourly Mixing Height and Assimilative Capacity of Atmosphere in India" by S.D. Attri, Siddhartha Singh, B. Mukhopadhyay, and A.K. Bhatnagar (2008) has been used.

The open pit mining involves the following general processes:

• Removal of the vegetable layer (top soil)

• Removal of overburden

• Removal of the useful geological material

Each one of these mining operations is, in turn, divided into various different activities, that depend on the technologies used. Each activity is an emission source.

Emission was calculated with the help of emission factor calculated by formula given below

E=TP X EF

Where E= Emissions (tons/year)

TP= Annual Throughput

EF= Emission Factor

After processing of area source data in ISCST3, isopleths for fugitive dusts (Line Source + Area Source) is generated, this is presented in Plate No.4.

Domestic Effluent

No domestic effluent is generated at the mine site due to absence of any colony in the mining area. Hence the question of contamination of ground water does not arise. Any adverse impact on the ground water regime is not expected from the domestic effluent.

Surface Run-Off

The land of the study area is hilly and stony. The threat of pollution of due to surface run-off is also not possible as because entire study area does have any natural surface water course.

Mitigation Measures

There is a sufficient gap between proposed workings up to conceptual and level of ground water table, thus ground water will not be encountered in the workings at any stage.

4.4 Impacts on Air Environment

Air quality modeling has been carried out using ISCST3 Software and isopleths are made. The Industrial Source Complex (ISC) Short Term model provides options to model emissions from a wide range of sources that might be present at a typical industrial source complex. ISCST3 is US-EPA approved model to predict the air quality. The model uses urban dispersion and regulatory defaults options as per guidelines on air quality models (PROBES/70/1997-1998). The model assumes receptors on flat terrain.

4.4.1 Model Options Used For Computations

- Buoyancy Induced Dispersion is used to describe the increase in plume dispersion during the ascension phase;
- The plume rise is estimated by Briggs formulae, but the final rise is always limited to that of the mixing layer;
- Stack tip down-wash is not considered;
- Calms processing routine is used by default;
- Washout by rain is not considered;
- It is assumed that the pollutants do not undergo any physio-chemical transformation and that there is no pollutant removal by dry deposition;
- Cartesian co-ordinate system has been used for computations.

4.4.2 Modeling Methodology

The ISCST3 model was used to predict the ground level concentration (GLC) of PM_{10} and $PM_{2.5}$ due to loading activity at mine site. Point source resembling loading activity at mine site and having equivalent emission rates were setup in mining lease to predict the maximum incremental concentration of PM_{10} and $PM_{2.5}$ at the air monitoring location.

4.4.3 Modeling Results

PM10

The maximum predicted incremental concentration of PM10 is 7.0 $\mu g/m^3$ which is inside the core zone near mining area.

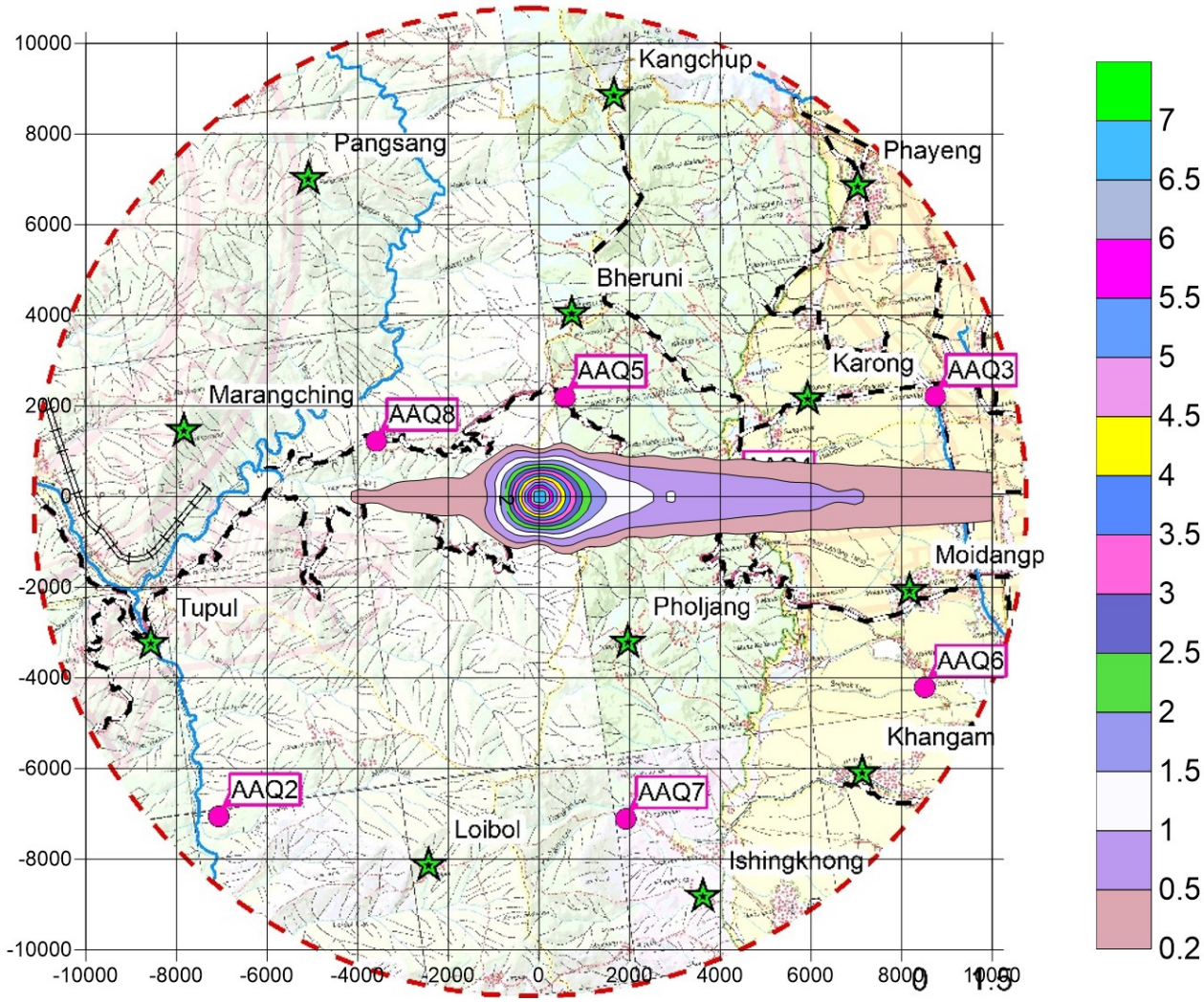


Plate 2: Isopleth of PM10

Table 4-2: PM_{10} Contribution at the Nearby Locations

Locations	Background value (98 percentile) in µg/m^3	Incremental GLC in µg/m^3	Total Predicted GLC in µg/m^3
Mine Site	35.47	7.0	42.47
Tamenglong	33.72	<0.01	33.72
Maklang	33.02	<0.01	33.02
Longa Koireng	29.75	1.5	31.25
NH-53	32.62	<0.01	32.62
Sajirok	29.92	<0.01	29.92
Senapati	29.42	<0.01	29.42
Langdeibung	29.61	<0.01	29.61

Mining Operation carried out by opencast with semi mechanized method generate dust particles due to various activities like Loading & Unloading of Sandstone, Murrum and Shaly Earth, and Transportation. The impact on ambient air quality in the area surrounding the mining area depends upon the pollutant emission rate and prevailing meteorological conditions. As it is an open cast semi-mechanized mine, particulate Matter (Dust) of various sizes is the only pollutant of any significance.

4.4.4 Anticipated impacts

The major sources of air pollution in the proposed mine is dust generation due to extraction, loading and haulage of mineral (Sandstone, Murrum and Shaly Earth) and wind erosion of exposed material. In this present study, United States Environmental Protection Agency (USEPA–42 series) approved mathematical equations have been used to predict concentrations for different operations in mining including the mineral transportation. The operations considered for determining source strength for dispersion modeling are as follows:

- Excavation,
- Loading, and
- Haulage.

Mitigation Measures:

A. Haul Road: The long life WBM (Water Bound Macadam) haul roads will be constructed and maintained for traffic movement.

B. Transport:- The speed of dumpers/ trucks on haul road will be controlled as increased speed increases dust emissions. Overloading of transport vehicles will be avoided. The trucks/ tippers will have sufficient free board. Spillage of ore on public roads will be cleared immediately and vehicles will play in safe speed.

C. Green Belt: Planting of trees all along main mine haul road and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of dumpers/ trucks.

Other Mitigation Measures:

- Water sprinkling will be done on the roads regularly.
- Care will be taken to prevent spillage by covering the carrying vehicles with tarpaulin and sprinkling of water, if dry.
- Fortnightly scraping of road in order to keep the roads almost leveled. This will ensure smooth flow of vehicles and also prevent spillage.

- Proper tuning of vehicles to keep the gas emissions under check.
- Plantation of trees along the roads to help reduce the impact of dust in the nearby villages.

4.5 Impacts on Noise Environment

The area general represents calm surroundings. There is no heavy traffic, industry or noisy habitation in the area except the existing mine as the project is proposed for open cast semi-mechanized mining method.

4.5.1 Anticipated Impact

- The source of Noise pollution will be the vehicular movements.
- Noise will be generated by the digging of mine area using blasting and drilling etc.

Mitigation Measures:

Proper maintenance of all transportation vehicles will be carried out which help in reducing noise during operations Mitigation measures due to other source of noise will be mitigated as follows:

S. No.	Measures
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.
6	Drilling with sharp bits and control blasting will minimize the noise pollution.

4.6 Impacts on Biological Environment

There is no forest area diversion required for the project. No plant will be cut during operational phase of the mine. The nearby area of project is moderately populated with a number of villages. The fauna in the vicinity of the mine is restricted to few common small species. There will be no impact on fauna due to this mining project.

4.6.1 Anticipated Impact

Flora:-

Impact: No tree cutting is proposed in the project. Transportation of mined Sandstone, Murrum and Shaly Earth will also cause dust deposition on the agricultural fields and vegetation along the transportation routes.

***Mitigation Measures*:** Plantation proposed along approach roads and other areas in the vicinity will improve the vegetation cover of the study area over a period of time. At the start of mining, the topsoil shall be stripped and stored. The trucks carrying stones shall be covered with tarpaulin to avoid dust generation during transportation.

Fauna:-

Impact: The project site is essentially a barren land with forest area involved. Very few animals are spotted in the project site. It is further proposed to restrict mining to small identified areas at a time to minimize disturbance to any incidental fauna. No specific habitat of any fauna gets affected. The fauna found as livestock and the rarely appearance of wild animals like fox, jackal, etc, which will be not affected by mining activities.

- ***Mitigation measures:*** All workers and drivers involved in the project will be trained to avoid harming any animal spotted. No mining activity shall be carried out at night.
- No discard of food, polythene waste etc will be allowed in the lease area which would distract/attract the wildlife.
- No night time mining will be allowed which may catch the attention of wild life.
- Workers will be made aware of the importance of the wildlife and signage will be displayed at the sensitive areas to caution the workers & other passerby.
- Access roads will not encroach into the riparian zones and if any riparian vegetation cleared off for the mining activity will be restored at the end of closure of mine

4.7 Impacts on Aquatic Ecology

Since it is a Sandstone, Murrum and Shaly Earth mining and does not involves any water body in the core zone no such impact anticipated.

4.8 Impacts on Socio-Economic Environment

The implementation of the "Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth" will generate both direct and indirect employment. Besides, it will provide a check on existing system of mining operation.

The project will also provide impetus to industrialization of the area. With the implementation of the proposed mining project the occupational pattern of the people in the area will change making more people engaged in industrial and business activities. Further, the mining and industrial activities in the area may lead to rapid increase in population and thereby urbanization. Due to urbanization of the area, employment opportunities will further increase.

Anticipated Impacts:

There is no habitation in the mining lease area. Therefore, neither villages nor any part of villages will be disturbed during the entire life of the mine.

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

Villagers have been provided with either direct employment or indirect employment such as business, contract works and development work like roads etc. Villagers also get access to the other welfare amenities such as drinking water, foods and provisions, shed.

Mitigation Measures:

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4.9 Solid Waste

In Sandstone, Murrum and Shaly Earth mine the maximum quantity of excavated rock is saleable in the form of lump, grit and powder.

Waste dump and stabilization:

The waste comprises mainly shale occurring in parting into sandstone, broken rocks and some quantity of murrum. These materials shall be preserved separately for use in the reclamation purposes. The waste dump will be stabilized by retaining walls of rubble stone. Each terrace will be stabilized by retaining wall of rubble stone. The stone wall will also check the rolling downs from the dumps. A drain will be provided towards sides and lower altitude side of the dump with a siltation tank to arrest the silt during monsoon.

4.9.1 Anticipated Impact

This project does not involve any solid waste generation. However, there will be some waste generated through mining activity. Some waste will be dumped outside the area in own land of lessee. The rubble stone walls will be provided around the dump to arrest the rolling downs. The drain with siltation pond will be provided along the lower altitude side of the dump to arrest the silt during monsoon. Parapet wall and drain will also be constructed towards lower altitude side to check the wash off during monsoon. 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. The villagers may use the waste free of cost. 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 waste will be dumped at proposed site as per the planning. While cooking on site will not be allowed, some food wastes are expected to be generated which if not disposed appropriately will render the site dirty.

Mitigation measure:

The villagers may use the waste free of cost. 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 waste will be dumped at proposed site as per the planning. The waste dump will be stabilized by retaining walls of rubble stones. The drain with parapet wall will be provided towards lower side of the dumps to check the wash off during the monsoon. The waste will also be lifted by local habitants for constructing the walls along the agriculture field.

4.10 Mine closure:

No mining operation is proposed to temporary discontinuance 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-open of the mine the maintenance will be provided to all the machineries deployed at mine. Before entering the laborers into mine the workings are proposed to inspect by manager for safety purpose as per Mines Act.

4.10.1 Anticipated Impact:

- Increase in traffic density will lead to air pollution.
- Movement of vehicles will cause noise pollution.
- Increase traffic may cause accidental incidences.

Mitigation measure:

- Vehicles with PUC Certificate will be hired. Regular maintenance of vehicles will be done to ensure smooth running of vehicle.
- Un-necessary blowing horn will be avoided.
- To avoided accident the speed of vehicles will be low near habitation areas.

4.11 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 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).

Traffic study measurements were performed locations of these stations is marked on the map below. The monitoring was performed in December-2020 to February-2021. The Typical Haul Road which is connected to NH-37 which is 0.28 km towards west direction for Transportation of Mineral is shown in the Fig.1-2. Traffic data collected continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station during each shift- one person on each of the two directions for counting the traffic. At the end of each hour, fresh counting and recording was undertaken. Total numbers of vehicles per hour under the three categories were determined.

Table 4-3: Existing PCU/Hour of NH-37

S. No.	Vehicles Distribution	Number of Vehicles Distribution/Day	Passenger Car Unit (PCU)	Total Number of Vehicle (PCU)/Hour
1.	Car	315	1.0	292
2.	Buses	42	3.0	126
3.	Trucks	254	3.0	762
4.	Two Wheelers	697	0.5	348.5
5.	Three Wheelers	56	1.5	84
6.	Tractors	63	1.5	94.5
	Total	**1421**		**1707/24 = 71.12 say 72**

Table 4-4: Existing Traffic Scenario

Road	V (Volume in PCU/hr)	C (Capacity in PCU/hr)	Existing V/C Ratio	LoS
NH-37	72	1500 (as per IRC guidelines)	72/1500 =0.048	A

Note: V= Volume in PCU's/hr & C= Capacity in PCU's/ hr

The existing Level of Service near NH-37 is "A" i.e. excellent.

V/C	LOS	Performance
0.0-0.2	A	Excellent
0.2-0.4	B	Very Good
0.4-0.7	C	Good/ Average/ Fair
0.7-0.8	D	Poor
0.8-1.0	E	Very Poor
>1.0	F	Worst

Table 4-5: Incremental traffic after mining operation

Proposed Production per Year	1,65,619.5 Cu.m (ROM)
Number of Working Days	270
Extraction and Transportation of Mineral per day	614 Cu.m
Working Hours	8 hours per day
Truck Capacity	10 cum
Number of trucks required	61.4 or say 62
No. of Trucks on road due to the mine (To & Fro)	124
No. of PCU deployed per day	124 x 3 = 384
No. of PCU deployed per Hour	384/8 = 48

Table 4-6: Incremental traffic Scenario in mining operation

ROAD	Increased PCU on the Road	V	C	Modified V/C Ratio	LoS
NH-37	48	72 + 48 = 120	1500	120/1500	0.08

Conclusion:

The LOS value from the proposed mine may be "Excellent". So the additional load on the carrying capacity of the concern roads is not likely to have any significant adverse effect.

Chapter 5. ANALYSIS OF ALTERNATIVES

Consideration of alternatives to a project proposal is a requirement of EIA process. During the scoping process, alternatives to a proposal can be considered or refined, either directly or by reference to the key issues identified. A comparison of alternatives help to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environmentally friendly and cost effective options.

5.1 Alternative for Mine Lease

The proponent has been granted the LoI by government of Manipur. The land is a degraded forest land devoid of dense vegetation. Hence no alternative sites are envisaged. Lime stone mine is a site-specific project spread in 5.16 ha. Copy of mine lease order no. D(5)-94/IND/2019 dated Imphal, the 2nd December, 2019 is given in the EIA report as **Annexure-I.** Mining activities shall be carried out based on local geology and availability of the mineral. Mining shall be done by open cast mechanized method as the mineral is in the form of hard consolidated deposits.

5.2 Alternative for Technology and other Parameters

Some alternatives considered during EIA study are discussed below:

S. No.	Particular	Alternative Option 1	Alternative Option 2	Remarks
1	Technology	Open-cast with Semi mechanized mining	Open-cast mechanized mining	Opencast with Semi-mechanized Mining is preferred. **Benefits** No electrical power requirement; Minimal noise will be generated; Minimal air pollution will be generated; Overburden will not be

S. No.	Particular	Alternative Option 1	Alternative Option 2	Remarks
				generated. It is compliance with MMMG 2016 issued by MoEF&CC New Delhi.
2	Employment	Local Employment	Outsource Employment	Local Employment is preferred. **Benefits:** Provides employment to local people along with Financial **Benefits**: No residential building/housing is required
3	Laborer Transportation	Public Transport	Private Transport	Local labours will be deployed so they will either reach mine site by bicycle or by foot. **Benefits** Cost of transportation of men will be negligible.
4	Material Transportation	Public Transport	Private Transport	Material will be transported through truck/trolley on the contract basis **Benefits** It will give indirect employment
5	Water Requirement	Tanker Supply	Groundwater/Surface water supply	Tanker supply will be preferred **Benefits** No change in the surface water or ground water quality
6	Road	Haul Road	Metallic Road	Haul road will be considered for linking mine site from metallic road for transportation

S. No.	Particular	Alternative Option 1	Alternative Option 2	Remarks
				purpose. Minimum distance will be measured along with less number of trees for considering optimum haul road route. **Benefits** Less distance; less fuel used Minimum or negligible number of trees will be cut in best opted haul road route

*****

Chapter 6. ENVIRONMENT MONITORING PROGRAM

Regular monitoring of environmental parameters is of immense importance to assess the status of environment during project operation. With the knowledge of baseline conditions, the monitoring programme will serve as an indicator for any deterioration in environmental conditions due to operation of the project, to enable taking up suitable mitigatory steps in time to safeguard the environment. Monitoring is important to measure the efficiency of control measures. An environmental impact assessment study is carried over for a specified period of time and the data cannot bring out all variations induced by the natural or human activities. Therefore, regular monitoring programme of the environmental parameters is essential to take into account the changes in the environmental quality. The objectives of monitoring are to:-

- Verify effectiveness of planning decisions;
- Measure effectiveness of operational procedures;
- Conform statutory and corporate compliance; and
- Identify unexpected changes;

6.1 Environmental Monitoring & Reporting Procedure;

Monitoring will conform that commitments are being met with. This will take the form of direct measurement and recording of quantitative information, such as quantity and concentrations of discharges, emissions and wastes, for measurement against corporate or statutory standards, consent limits or targets. It may also require measurement of ambient environmental quality in the vicinity of a site using ecological/ biological, physical and chemical indicators. Monitoring may include socioeconomic interaction, through local liaison activities or even assessment of complaints.

The preventive approach by management may also require monitoring of process inputs, for example, type and method used, resource consumption, equipment and pollution control performance etc. The key aims of monitoring are, first to ensure that results/conditions are as per prediction during the planning stage and where they are or not, to pinpoint the cause and implement action to remedy the situation. A second objective is to verify the evaluations made during the planning process, in particular with risk and impact assessments and standard & target setting and to measure operational and process efficiency. Monitoring will

also be required to meet compliance with statutory and corporate requirements. Finally, monitoring results provide the basis for auditing.

6.1.1 Monitoring Schedule

Details of the Environmental Monitoring schedule, which will be undertaken for various environmental components, are detailed below in Table 6-1.

Table 6-1: Environment Monitoring Schedule

S.No.	Activity	Schedule
Air Pollution Monitoring:		
1.	Ambient air monitoring of parameters specified by MoEF (PM_{10}, SO_2& NO_2).	Twice in a year per station except monsoon
Water Quality Monitoring:		
2.	Monitoring water quality surface water from the river	Twice in a year per station except monsoon
3.	Monitoring of one sample of tube well and open well at mine / nearby location. Parameters are essential parameters as per IS 10500:2012.	Twice in a year per station except monsoon
4.	Monitoring of water spray requirements	Log-sheet of water spray will be maintained on daily basis
Noise Quality Monitoring:		
5.	Noise in the ambient atmosphere in mining lease	Twice in a year per station except monsoon
Greenbelt Maintenance:		
6.	Monitoring schedule for Greenbelt development as per mining plan	Yearly
Soil Quality Monitoring:		
7.	Soil at six locations	Twice in every year

6.2 Environmental Management Cell

In order to maintain the environmental quality within the standards, regular monitoring of various environmental components is necessary. The company will have a full-fledged environmental management cell (EMC) which will report directly to Functional Head for environmental monitoring and control. The EMC team will take care of pollution monitoring aspects and implementation of control measures.

A group of qualified and efficient engineers with technicians will be deputed for maintenance, up keep and monitoring the pollution control equipment to keep them in working at the best of their efficiencies.

Responsibilities of EMC-

The generalized resp*onsibilities of the EMC will be as follows:*

1. Conducting Environmental monitoring of the surrounding area.
2. Carrying out the Environmental Management Plan.
3. Organizing meetings of the Environmental Management Committee and reporting to the committee.
4. Ensuring that prescribed environmental standards are maintained.
5. Ensure that all different types of statutory returns / compliance report to be submitted to relevant regulatory bodies.
6. Commissioning of pollution control equipment/ measures**.**
7. Specification and regulation of maintenance schedules for pollution control equipment.
8. Developing the green belt.
9. Ensuring water use is minimized.

The composition of the Environment Management Cell along with the responsibilities of respective members is given as follows:

Table 6-2: Environmental Management Cell

S. No.	Designation	Proposed responsibility
1	Management	Overall in-charge of operation of environment management facilities; Ensuring legal compliance by properly undertaking activities as laid down by various regulatory agencies from time to time and interacting with the same
2	General Manager – Environnent Management System	Secondary responsibility for environment management and decision making for all environmental issues & ensure environmental monitoring as per appropriate procedures.
3	Assistant Manager– Environnent	• Implementation of EMP • Allotment of daily job • Field visit • Liaison with MOEF/SPCB

6.3 Activities to be monitored

Post project monitoring will be carried out as per conditions stipulated in Environmental Clearance Letter issued by MoEF&CC/SEIAA, Consent issued by SPCB as well as according to CPCB guidelines. The Mine site is considered as core zone and the area lying within 10 km radius from the mine site is considered as buffer zone.

Slope Failure:

Mining will be carried out by opencast method with semi-mechanize as per mine plan. Drilling/ blasting will be done in order to achieve the target production. The proposed volume of excavation of Sandstone, Murrum and Shaly Earth is 1,65,619.5 Cu.m per annum up to the maximum bench depth of 5 m, the ultimate depth of mining will be upto the 95 m (1191m AMSL). The mining method will be done by drilling and blasting.

6.3.1 Afforestation & Green Belt Development

During first five years, about 340 per year saplings of local varieties of trees will be planted along the roads, in schools and public building, near mine site and other social forestry programme. Plant species act as bio-monitoring agent to monitor the air environment as well as to keep and maintain the project environ healthy. Trees have

substantial inter-specific as well as intra-specific variation in air pollution tolerance. Green Belt development/tree plantation in organized manner will be carried out around the existing mine site by the end of the mining activity. The species suggested are Local tree species in the mine area and nearby villages, to reduce the impact of expansion activities in the surroundings of the existing mine site. The suggested plants are suitable for green belt development have characteristics like, fast growing, thick canopy cover, perennial and evergreen large leaf area, naturally growing, efficient in absorbing pollutants without major effects on natural growth.

On the basis of the general principles mentioned and as per the CPCB guidelines for the development of Greenbelts following species are recommended:

S.No.	Scientific Name	Height	Duct collection Index	Air Pollution tolerant
1.	*Polyalthia longifolia*	Tall	Moderate	Medium
2.	*Pithecolobium dulce*	Tall	Moderate	High
3.	*Ficus glomerata*	Tall	Moderate	High
4.	*Albizzia lebbeck*	Tall	Moderate	High
5.	*Saraca indica*	Medium	Fair	Fair
6.	*Azadirachta indica*	Tall	Fair	Medium
7.	*Ficus infectoria*	Tall	Moderate	High
8.	*Cassia fistula*	Medium	Fair	High
9.	*Bauhinalia purpurea*	Medium	Good	Low
10.	*Tectona grandis*	Tall	Moderate	Medium
11.	*Lagerstroemia flosreginae*	Medium	Fair	High
12.	*Parkinson aculeter*	Dwarf	Good	low
13.	*Thesperia populrea*	Medium	Moderate	Fair
14.	*Acacia Arabica*	Dwarf	Good	High
15.	*Diospyros embryopteris*	Dwarf	Moderate	High
16.	*Terminalia arjuna*	Tall	Moderate	Medium

The year-wise afforestation programme under the green belt (safety zone) and non-mineralized area for five years will be as under:-

Table 6-3: Greenbelt Development Program

Year	Saplings to be planted	Survival 80 %	Place of Plantation
I	340	272	Along the approach roads, near mine site.
II	340+ Maintain	272	
III	340+ Maintain	272	
IV	340+ Maintain	272	
V	340+ Maintain	272	
Total	**1700**	**1360**	

6.3.2 Air quality Monitoring

The concentration of air borne pollutants in the workspace/work zone environment will be monitored periodically as per Table 6-1. If concentration is higher than threshold limit values are observed, the source of fugitive emissions will be identified and necessary measures taken. If the levels are high, suitable measures as detailed in Environment Management Plan will be taken. The ambient air concentrations of PM_{10}, SO_2 and NO_X will be monitored as per frequency given in Table 6-4. Any abnormal rise will be investigated to identify the causes and appropriate action will be initiated. Greenbelt will be developed for minimizing dust propagation**.**

Table 6-4: Air Quality Monitoring

Potential Impact	Action	Parameters for Monitoring	Timing
Air Emissions	All equipments will be operated within specified design parameters.	Random checks of equipment logs/ manuals	During site clearing
	Vehicle trips to be minimized to the extent possible	Vehicle logs/Increase the capacity of vehicle	During site clearing, transportation of minerals

Potential Impact	Action	Parameters for Monitoring	Timing
	Topsoil must be removed from the entire area to be mined and stored from where it can be recovered and utilized immediately after mining for reclamation	Absence of stockpiles	During site clearing
	Regular water spraying shall be done	Quantity of water requirement shall be monitored	During site clearing, transportation etc.
	Ambient air quality within the premises of the proposed unit to be monitored.	The ambient air quality will conform to the standards for PM_{10}, SO_2 and NO_2	As per SPCB, Manipur requirement.

6.3.3 Water Quality Monitoring

Surface water quality of the river will be monitored regularly basis as per the scheduled given in Table 6-5. Analysis will be carried out as per CPCB guideline. Record of analysis shall be maintained.

Table 6-5: Water Quality Monitoring

Potential Impact	Action	Parameters for Monitoring	Timing
Water Quality	During extraction of mineral proper care should be taken such that it does not disturb the ground water table.	No discharge of waste water from mining operation	During mining operation
	After extraction of mineral, river water will be maintained their natural course.	No exploitation of the river water	During mining operation.

6.3.4 Noise level Monitoring

Noise levels will be monitored in the mine area as per the frequency given in Table 6-6.

Table 6-6: Noise Monitoring Program

Potential Impact	Action	Parameters for Monitoring	Timing
Noise	List of all noise generating machinery onsite along with age to be prepared. Equipment to be maintained in good working order.	Equipment logs, noise reading	During mining operation.
	Generation of vehicular noise	Maintenance records of vehicles	During trans-portation.
	The Noise level should not exceed the permissible limit both during day and night times.	Noise reading	As per SPCB, Manipur requirement or quarterly which-ever is lesser.
	All equipment operated within specified design parameters.	Random checks of equipment logs/ manuals	During mining operation
	Vehicle trips to be mini-mized to the extent possible	Vehicle logs	During mining operation
	Plantation of dense hedges on the boundary of lease area, these will reduce dust and noise in the vicinity.	Adhere to mine closure plan	

6.3.5 Occupational Health & Safety

The working conditions in the mines are governed by the enactments of the as per the guidelines of the Mines Act, the management will take all necessary precautions. Normal sanitary facilities (Mobile toilet) will be provided within the lease area. The management will carry out periodic health check-up of workers.

Occupational hazards involved in mines are related to dust pollution, concern officer given necessary guidelines for safety against these occupational hazards. The management will strictly follow these guidelines.

All necessary first aid and medical facilities will be provided to the workers. The mine will be well equipped with proper fire protection and firefighting equipment. All operators and mechanics will be trained to handle fire-fighting equipments. Further all the necessary protective equipments such as helmets, safety goggles, earplugs, earmuffs, etc. will be provided to persons working in mines as per Mines Rules, 1955.

Reporting schedule of monitored data:

It is proposed that voluntary reporting of environmental performance with reference to the EMP. The Environmental Monitoring Cell will co-ordinate all monitoring programmes at site and data thus generated will be furnished as per statutory requirements.

The frequency of reporting will be on six monthly bases to the State PCB and to Regional Office of MoEF&CC, New Delhi. The Environmental statement will be prepared for the entire year of operations and will be regularly submitted to regulatory authorities.

Chapter 7. ADDITIONAL STUDIES

7.1 Public Consultation

"Public Consultation" or "Public Hearing" refers to the process by which the concerns of local affected persons and others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate.

In view of the above and as compliance to TOR issued by SEAC, Imphal, Manipur, the Public hearing/ consultation will be conducted as per the dates given by Manipur Pollution Control Board. Proceedings of Public hearing will be enclosed once it is done.

7.2 Rehabilitation and Resettlement Plan

The R&R plan is not required because during the 5 years Plan period, the reserve remains alive.

7.2.1 Corporate Environmental Responsibility

In order to improve the quality of life of nearby villagers of the proposed project area, amount of Rs.5,00,000 which is 2% of the total cost (Rs. 250.0 Lac) of project shall be spent under the guidance of District/Local authorities. (MoEF&CC Notification for CER activity dated 01.05.2018 and 30.09.2020)

As a corporate responsibility following measures along with budget provision is proposed for improving the conditions of persons in and around the project area:

Table 7-1: CER provision of the project

CER Budget				
S. No.	**Activity**	**Per Unit Cost**	**No.**	**Total Cost INR**
1	Provisions for Imparting vocational training at near village for technical skills, self employment training for women and youngsters.	--	--	20,000
2	Energy Conservation i.e. Distribution of LED Bulbs	100.00	1000	1,00,000
3	Organization of Health Camps Provisions for Health Check-up camps (Eye & General Health Check-up) at			10,000

	Gram Panchayat of Near village.			
4	Distribution of Sanitary Napkins, Contraceptives etc.	-	-	20,000
5	Contribution towards construction and maintenance of Kachha road from the mine lease area to the nearest road.	-	-	70,000
6	Donation of need based things etc. to govt. educational institution after consultation with the concerned administration of the school.	-	-	1,00,000
7	Distribution of Computers in the nearby school, after discussion with school administrative.	30,000	6	1,80,000
Total				**5,00,000**

7.3 Risk Assessment

The risk assessment portion of the process involves three levels of site evaluation:

(a) Initial Site Evaluation,

(b) Detailed Site Evaluation,

Ist Priority Site Investigations and Recommendations.

The risk assessment criteria used for all levels of site evaluation take into account two basic factors:

- The existing site conditions
- The level of the travelling public's exposure to those conditions.

The Initial Site Evaluation and Detailed Site Evaluation both apply weighted criteria to the existing information and information obtained from one site visit. The Initial Site Evaluation subdivides the initial inventory listing of sites into 5 risk assessment site groups.

The Detailed Site Evaluation risk assessment is then performed on each of the three highest risk site groups in order of the group priority level of risk. The result of the Detailed Site Evaluation process is a prioritized listing of the sites within each of the three highest risk site groups.

Risk analysis is done for:

- Forecasting any unwanted situation
- Estimating damage potential of such situation
- Decision making to control such situation
- Evaluating effectiveness of control measures

Acceptable Risk:

Risk that is acceptable to regulatory agency and also to the public is called acceptable risk. There are no formally recognized regulatory criteria for risk to personnel in the mining industry. Individual organizations have developed criteria for employee risk and the concepts originally arising from chemical process industries and oil and gas industries. Because of the uncertainties linked with probabilistic risk analysis used for quantification of the risk levels the general guiding principle is that the risk be reduced to a level considered As Low as Reasonably Practicable (ALARP). The risk acceptability criteria are given in following Table. It can be seen that there are three tiers:

a. A tolerable region where risk has been shown to be negligible and comparable with everyday risks such as travel to work.

b. A middle level where it is shown the risk has been reduced to As Low As Reasonably Practicable level and that further risk reduction is either impracticable or the cost is grossly disproportionate to the improvement gained. This is referred as the ALARP region.

c. An intolerable region where risk cannot be justified on any grounds. The ALARP region is kept sufficiently extensive to allow for flexibility in decision making and allow for the positive management initiatives which may not be quantifiable in terms of risk reduction.

There are various factors, which can create unsafe working conditions/hazards in mining of minor minerals from river bed.

Accident Due To Vehicular Movement:

The risk rating assigned to this activity is assigned as '13' i.e. it is possible event with moderate consequences as frequency of this operation is more but the predicted/assumed intensity is less like minor cuts, bodily injury. The possibilities of road accidents are due to reckless or untrained driver or overloading of trucks or in case pathway is not compacted suitably, etc.

Measures to Prevent Accidents during Transportation:

1. All transportation within the main working should be carried out directly under the supervision and control of the management.

2. The Vehicles will be maintained/ repaired and checked thoroughly by the competent person.

3. A statutory provision of constant education, training etc. will go a long way in reducing the incidents of such accidents.

4. Overloading will not be permitted and will be covered with tarpaulin.

5. The maximum permissible speed limit will be ensured.

6. The truck drivers will have valid driving license.

Accident during Material Handling & Loading:

The risk rating assigned to this activity is assigned as '18' i.e. it is possible event with minor consequences", as frequency of this operation is more but the predicted/assumed intensity is less like minor cuts, abrasion, etc. may be due to river bank collapse, over thrown boulder/pebbles, injuries due to carelessness use of hand tools, etc.

Measures to Prevent Accidents during material handling & loading:

The truck should be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.

1. The loading should be done from one side of the truck only to avoid over throw of materials.

2. The workers should be provided with gloves and safety shoes during loading.

All the activities will be done under strict supervision/control to avoid anticipated accidents so that the risk is reduced to a level considered As Low as Reasonably Practicable (ALARP) conditions which are adequately safe and healthy.

Disaster and its Management:

Anticipated Disasters & its Mitigation Measures

1. **Floods:** The area is prone to floods. However bank protection has been taken care by the govt. by constructing of flood embankments/retaining walls/check dams, etc. Precautionary measures will be taken to avoid the effects on the workers at the site if the disaster occurs.

2. **Earth Quake:** The lease area falls in **Seismic Zone-V** which is very severe intensity zone. However there will be no impact as there is no built-in structure at the site.

Few safety measures are outlined below:

a) **Safe Working Environment:** The project proponent shall ensure health and safety of all the employees at work. Efforts will be made to provide and maintain a safe work environment

and ensure that the machinery and equipment in use is safe for employees. Further, it will be ensured that working arrangements are not hazardous to employees.

b) **Provision of First Aid:** The first aid treatment reflects the hazards associated with the mining of Sandstone, Murrum and Shaly Earth. The first-aiders will be well trained in handling patients working in the above Mining Project.

c) **Regular Health Examination:** For all mine workers regular health examination will be made compulsory. Treatment for respiratory diseases or asthma, skin diseases, lung function test (pre and postventolin), Audiograms, Chest X- ray etc., as required will be given.

d) **No work for Temporal Disabilities:** The workers having temporary disability will be asked to stop doing the job till he/she recovers from disabilities.

e) **Health Education:** Adequate health education and information related to the job will be provided to the workers. Baseline health information will be recorded for future references.

f) **Tie-up with the Nearest Hospital for Medical Assistance:** To meet the medical needs of the mine workers tie-up with nearest hospitals will be made. Efforts will be made to reserve few beds in the above hospitals for the workers of the mining project. This will ensure timely medical aid to the affected persons.

g) **Supply of Mask and Gloves:** The workers in the project are subject to respiratory diseases. For protection from dust it will be made compulsory for all workers to wear masks and gloves, while working in the mine.

h) **Special Telephone Number:** A special telephone number will be made available to the workers in case of emergency so that they can dial the same for–medical assistances. Further, efforts will be made to provide vehicles to the patients in short duration for shifting to a hospital.

7.4 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 benching. The proposed workings will be by opencast semi-mechanized method of mining. Underground mining is not proposed. Face height will maintain 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 explosive and accident and fall of face

like disaster may come across. A fire fighting 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 to site and will remove men and machineries from the site. Magazine approved 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. Fire fighting arrangements should be provided at all the prone sites. All the safety equipments should be available at mine site. A vehicle should always remain at site (vehicles remain available on road passes through the area. The lessee is capable to meet any type of risk. The fire stations are available. Dispensary is available at all prominent villages.

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Chapter 8. PROJECT BENEFITS

This chapter gives a comprehensive description of various advantages and benefits anticipated from the proposed project to the locality, neighborhood, region and nation as a whole.

Sandstone, Murrum and Shaly Earth has become a very important mineral for our society due to its many uses. It can be used for making concrete, filling roads, building sites etc. The role Sandstone, Murrum and Shaly Earth of is very vital with regards to the protection of the coastal environment. It acts as a buffer against strong tidal waves and storm surges by reducing their impacts as they reach the shoreline. Sandstone, Murrum and Shaly Earth is also a habitat for reptilian species and other related organisms. On average, people 'use' over 500 kg of stone per person per year. This Sandstone, Murrum and Shaly Earth is taken from what are essentially non-renewable resources.

The mined out material from this mine can be good source of construction material to nearby market. Provide gainful employment generation through development of the associated down-stream industry i.e. stone-crushers, screening plants, washeries, transport services etc. Serve as source of revenue for the State.

8.1 Improvements in Physical Infrastructure

This project will provide various improvements in the physical infrastructure of adjoining area such as:-

- Improved road communication system in villages in adjoining area.
- Strengthening of existing community facilities through the existing Community Development Programme;
- Awareness program and community activities, like health camps, medical aids, family welfare programs, immunization camp sports & cultural activities, plantation etc.

8.2 Improvements in Social Infrastructure

The proposed project is expected to provide employment to local people in different activities such as mining, sizing, transportation and plantation activities. The project activity will not have any major impact on the environment. At Post mining stage of proposed project, the existing waste land shall be converted to water harvesting bodies and green belts.

Also, the project proponents have Corporate Environmental Responsibility initiatives which will have a positive impact on socio economic fabric of the region.

Employment Potential:

The local labour shall be engaged for the purpose of mining of mineral, loading & unloading of mineral besides, watch and ward and plantation activity with proper maintenance On assumption that one man on and average can extract load & unload 5 to 6 tonnes of material per man-day and the same amount will be handled through machines. The total manpower required for mining works out to 10. This will help in the improvement of financial condition of the area.

Tangible social benefits:

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:

Company will undertake awareness program and community activities like health, camps, medical aids, family welfare camps, AIDS awareness program etc.

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

Plantation:

Plantation will be done near mine surrounding area so far and lot many are proposed to mitigate the ill-effects of mining and to improve the vicinity and environment of mine and it surrounding area. The management will give emphasis on plantation and will also motivate local persons for plantation during rainy season. This will also increase the consciousness in workers and nearby villagers for greenery. Fruit trees can contribute towards their financial gains.

Other Benefits:

Apart from all the above-mentioned benefits there will be other benefits to the region in terms of upgradation of lifestyle, overall area development etc.

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Chapter 9. ENVIRONMENTAL COST BENEFIT ANALYSIS

As per EIA Notification vide Gazette Notification No. S.O. 1533 Dtd: 14th Sept., 2006 and amendments thereof, Appendix III, Generic Structure of EIA, SL.No. 9, "Environmental Cost Benefit Analysis" is applicable only, if the same is recommended at the Scoping stage.

As per the ToR points issued by SEAC/SEIAA, Imphal, Manipur for the proposed project, the Environmental Cost Benefit Analysis is not mentioned.

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Chapter 10. ENVIRONMENTAL MANAGEMENT PLAN

10.1 Introduction

The above said mining lease for Sandstone, Murrum and Shaly Earth, the area being 5.16 hectares is located in Longa Koireng, Tehsil- Kangchup Geljang, District- Kangpokpi, State- Manipurwill start in the mining lease as per the approved mining plan after environmental clearance and grant of the mining lease. The workings are simple, by making approach roads and formation of benches by hydraulic machinery. The drilling and blasting for extraction of the mineral, loading and transportation of mineral will be the major activities.

Mining activities in the areas involve excavation of over burden, transportation of Mineral etc. These activities lead to generation of air borne dust, which can cause air pollution in and around the area; if appropriate control measures are not taken. Similarly mining causes land degradation, noise and water pollution etc.

In order to minimize impacts of mining on different environmental parameters and to keep air and water quality within prescribed limits, a comprehensive environmental management plan has to be prepared. Any effort to control adverse impacts will be incomplete without appropriate control measures for reclamation of land affected due to mining and dumping. One of the balanced approached for development of mineral resources is total utilization of all the products. It aims at making use of all the products generated during mining including overburden as well as pits and voids, so that no working is left out either as pollutants or as scars on earth surface. Usually the environmental management plan is prepared for site development and for development stage, during operation phase and for post operation phase. This area is being worked for the last many years. Therefore, management plan operation phase and post operation phase is discussed.

10.2 Impact on Environment

The following impact will be observed on Environment:

- The soil if located on the deposit will be disturbed.
- The topography of the land will be disturbed by proposed excavation and dumping activities.
- Drainage patter i.e. Nalah etc may be disturbed by waste if dumped on the nalahs.

Water resources may be disturbed if workings go beyond the water table.

- Air quality will be disturbed by proposed mining activities like drilling, blasting, transportation etc.
- Socio economic status of the habitants not affected by mining.
- The health of the habitants may be affected by pollution of air and water.

Thus, the Environment Management is proposed in environmentally sustainable manner to protect the environment by proposed mining.

10.3 The Purpose of the EMP

The purpose of the EMP (Environment Management Plan) is to suggest the mining activities in such a manner that the mining will be eco-friendly and by reducing all the impacts which may be caused by proposed mining activities.

Environmental Management Plan (EMP) is defined as "a systematic identification & evaluation of the potential impacts of the proposed project, plan program, or legislative actions related to the physical-chemical, biological, cultural and socio-economic components of the total environment." It is the evaluation of various impacts and the resultant natural and induced changes, as simply and precisely as possible, for optimizing the development to the environment. By virtue of EMP, the patterns, direction, strengths and lags of the casual relationships existing among all the relevant variables are studied.

It also helps in the determination of additional project components that may be required to restore, maintain or extend the resources. EMP isuseful for decision making, as it is based on understanding the environmental implications including social, cultural and aesthetic concerns, which could be integrated with the analysis of the project costs and benefits.

The Environment Management Plan (EMP) provides guidance for mine owner to take the lead in best environmental practice in all aspects of the mining industry. This environmental management plan (EMP) aims to take a pro-active route by addressing air, noise and groundwater and surface water problems before they occur.

10.4 The Design of EMP

This Environment Management Plan is prepared considering the best affordable technological environmental control measures with proper implementation and effectiveness of migratory measures in mitigation of impacts. Considering the impact of pollution in

surroundings and monitoring this EMP is prepared considering the effectiveness of steps for implementation of proper EMP.

10.5 Land Use Pattern

The land will be affected by excavation of mineral and dumping of waste.

Land use planning is suggested for minimizing the adverse impact of mining activities on environment and also helps in economy of the project as well as effective restoration and enhancement of land surface with the help of plantation through proper and planned green belt development around the area and upper benches. The waste will be sold out and thus no impact will be anticipated by dumping of waste.

The excavated land will be used as water reservoir and this reservoir will great helpful for future plantation, livestock and for irrigation of crops etc.

The excavated land i.e. water reservoir will be properly fenced.

10.6 Air Environment Management

The main pollutant in airs suspended particulate matter (SPM), which is generated during various activities of mining such as, removal of overburden, drilling, blasting and movement of transport vehicles.

The ambient air quality with respect to the study zone of 10km radius around the mine site forms the baseline information. The various sources of air pollution in the region are dust rising from unpaved roads, domestic fuel burning and vehicular traffic. The prime objective of baseline air quality monitoring is to assess existing air quality of the area. This will also be useful in assessing the conformity to standards of the ambient air quality during the mining operations.

The air quality which got adverse impact by transportation will be minimized by water spray on the approach roads twice in a day during summer and once in winter.

The drilling will also generate dust and this dust will be checked by adopting wet drilling or by using hydraulic rock breakers.

The pollution created by diesel operated machinery will be minimized by adopting good quality silencers and proper maintenance of vehicles.

The air quality monitoring has been conducted and the air pollution found in limits. Periodical monitoring will be carried out.

10.7 Control of Gaseous Pollution

In mining activities, the sources of gaseous emissions are from blasting and emissions from diesel engines of from machinery. The blasting in the area will be done on smalls scale and gases produced by blasting will be diluted by wind. The emissions from machinery can be controlled by proper maintenance of mine machinery and other transport vehicles used in mining operations. The gaseous pollution in the mining area is within permissible limits.

10.8 Control of Dust Pollution

Dust will generate due to vehicular movement and drilling, blasting. Water sprinkling will be done in the mine lease area and haul road to prevent the dust emission. Greenbelt around the site will be developed and trees will be planted. The protective measures are as follows for minimizing the impact on air pollution.

10.8.1 During Drilling

(i) Sharp drill bits are used for drilling.

(ii) The drill machine is operated with dust extractor arrangement.

(iii) Drill operators and helpers are provided with personal protective appliances.

10.9 Blasting

10.9.1 Blasting Notification

- All owners of non-vacant property within ¼ mile of the blast location will be notified prior to blasting activities. The Local Police Department will be notified prior to blasting.
- Owners and the Police Department will be notified at least 24 hours in advance of blasting activities. A record of notifications will be maintained and will be available for inspection by the District Police Chief.

Before each blast the blaster shall follow this procedure:

- 5 minutes before the blast the area will be cleared and secured.
- 2 minutes before the blast the blaster will blow 3 short blows from a horn to warn of the blast.
- 1 minute after the blast the blaster will blow 1 long blow from a horn to signal the all clear.

10.9.2 Protective Management Practice

- In general, blasting is required as the mineral is hard. The rock breakers will also be used time to time. The blasting is required in overburden and to excavate the mineral etc. It will be done between 1 PM to 2 PM during this period movement of men and animals is less. Proper warning signals will be given before blasting.
- All explosives shall be stored in an approved tamper-proof explosive storage unit. If vehicle storage is utilized, the vehicle storing the explosives shall not be left unattended at any time while on site nor shall the vehicle remain on site overnight.
- Blasting will be done by licensed/authorized persons and all the precautions laid down in MMR, 1961 are to be followed.
- Secondary blasting will be not done in the mine.
- The proper charge per hole will minimize dust and fly rocks.
- Spraying of water will be done on the blast site during the blast.
- Blasting will not occur during adverse weather conditions, such as high winds, unless a loaded charge must be detonated before the end of the day for safety reasons.
- Two to four feet of rip able material will be left over the solid material to be blasted to serve as a cover to prevent excessive fly rock. Blasting mats may be used if overburden is not available. The blasting mats must be of suitable size and material to dampen noise and cseontain blasted materials.
- The size of the shot will be limited by sound and vibration control levels and amount of area that can be blasted with good results.
- Small diameter drilling with high speed equipment will be used to reduce the amount of explosives used in each hole.
- The use of delay blasting techniques will be used to reduce vibrations associated with the blast.
- Material stockpiles will be placed to help block blasting and material processing noise transmission off-site.
- Blasting shots will be designed to minimize ground vibration and air blast.

10.9.3 During Transport operations

- All the haul roads are kept leveled, wide and compacted.
- Regular water spraying will be done on haul roads in the mining area.

- In order to reduce dust pollution, green belt will be developed around the dumps, mining boundary and roads etc.
- Slope of the dumps will be vegetated with shrubs to minimize generation of dust with the wind.

10.9.4 During loading operations

The dust which may be created during loading of mineral and waste will be minimized by spraying water on them before loading.

10.9.5 Plantation work in the area

The proposed plantation around the workings, along kacha rasta from tar road will minimize the dust which may spread in nearby area. Plantation will be done in each monsoon.

10.9.6 Monitoring

The periodic monitoring will be provided for air and dust to know the quality of air. The protective measures will be adopted if pollution crosses the limit.

10.10 Noise Pollution

The following measures are proposed to control noise pollution

- All the machinery including transport vehicles are properly maintained to minimize generation of noise.
- Adequate silencers in the machinery are to be provided to reduce generation of noise.
- Drilling with sharp bits will minimize generation of noise.
- Control blasting will be being done with proper charge of explosive to minimize noise during blasting.
- Secondary blasting will not be done.
- Dense plantation in mining area will also reduce propagation of noise outside the core zone.
- Ear plugs will be provided to the workers who will be engaged near the noise creating machinery.

10.11 Vibration Abatement (If Blasting is Done)

- The ground vibration may be created, during blasting. The blasting will be towards lower side and the rock breakers will be deployed for excavation of rocks. The following

precaution are being taken to minimize ground vibration and fly rocks though there is no permanent structure which may be damaged due to vibrations.

- Blasting is being done by competent persons in the supervision of Mine's Manager.
- Not more than 10 short holes or 4 long holes will be blasted at a time and thus vibration due to blasting will not be significant.
- Stemming length is kept more than one third of the hole, it helps in reduction of ground vibrations.
- Before drilling and blasting, the face is cleared with loose rock which may be source of fly rock.
- The blast holes are drilled slightly inclined towards the free face. This reduces noise, vibration and fly rocks.

10.12 Water Management

- No surface water encountered in and near the lease area in 500 meters periphery. In absence of surface water body in nearby the area no impact will be anticipated on surface water.
- Garland drains with parapet walls will be provided around the excavation and towards lower altitude side of dump to check the silt spread in nearby area during monsoon.

Ground Water Management:

- The non-working pits will be used for rainwater harvesting and conservation. The pit after exhaustion of mineral will also be used for rainwater harvesting and conservation. Thus, by using the old pit and mineral, exhausted pit as water reservoir the water table will be recharged.
- The excavated pit is proposed as water reservoir at the end of the mine after securing the side walls.
- No toxic mineral substance is present in the area thus ground water quality will not be disturbed.

Water Conservation:

It is a mining project and the water will be only used for drinking purpose, for dust suppression and for plantation. The trees will be planted along the roads, in schools and

public building, near mine site and other social forestry programme. The monsoon water will be filled in old pits or non-working pits for rain water harvesting.

10.13 Solid Waste and Top Soil Management

It is Sandstone, Murrum and Shaly Earth mine and most of the excavated material will be sold out. The mineral rejects will be stored in the waste dump at site. In case over burden have to be dumped in the area it will be stabilized by retaining walls of rubble stone to arrest the rolling downs. The drain with parapet wall will also provide to check the dust during monsoon.

Top Soil Management:

This sandstone, murum and shale quarry has considerable quantity of overburden mainly as top soil and waste rocks. The top soil should be removed and stored separately, while the solid wastes should be stored in the external dumps keeping the area to be back filling free. The soil which may come across is scraped and stacked separately to be used for plantation during monsoon.

10.14 Occupational Safety and Health

The occupational hazards are related to dust pollution, noise and blasting. The persons may get injuries from moving machinery, fall from high places, fly rocks during blasting etc. DGMS has given necessary guidelines for safety against these accidents. The following precautions are being taken to protect the workers from these hazards.

i. The sample of the mineral will be analyzed to know any occupational ill effects.
ii. Dust may create the health hazard and proper management will be adopted.
iii. Dust respirators will be provided to the labourers and staff.
iv. Awareness programme against dust will be conducted.
v. The health problem of the labourer, if found, will be properly addressed.
vi. Periodic medical checkup will be conducted.
vii. Unsafe workings will be checked time to time.
viii. The proper training camps will be conducted time to time for health and safety practice.
ix. The emergency and fire-fighting services will be provided.
x. All the safety equipment such as hard boots, helmets, masks, ear plugs and safety belts are provided to workers working in hazardous areas.
xi. All the persons are instructed not to go near the machinery during operations.
xii. Separate foot paths will be made for mine workers.

xiii. A well-equipped first aid station will be maintained at the mine.

xiv. Blasting will be done with all precaution laid down in MMR, 1961. Proper warnings being given before blasting.

xv. Regular water spraying will be done on haul roads to suppress the dust.

xvi. Medical checkup of the employed persons will be got done on a regular basis**.**

Table 10-1: Budget for Occupational Health and Safety

S. No.	Items	Capital cost INR	Recurring cost INR
1.	Measures prevent accidents during mining	30,000.00	6,000.00
2.	Measures prevent accidents during mineral transportation	20,000.00	4,000.00
3.	Measures prevent accidents during trucks/Dumpers	10,000.00	2,000.00
4.	Measures prevent dangerous incident during inundations	10,000.00	2,000.00
5.	Medical examination schedule	30,000.00	6,000.00
	Total	**1,00,000.00**	**20,000.00**

**the certified and qualified staff engaged at mine wills daily check the workings are for entering the laborers in the mine.*
*** Proper sign boards will be provided with siren arrangements*
**** The workings are on higher side*

10.15 Budget allocation for EMP implementation

Annual budget for EMP is very essential for successful implementation of EMP. As there are no pollution control systems, no capital cost of Pollution Control systems are envisaged. Costs will be annual operating costs as given below. The fund allocated will not be diverted for any other purposes and the top management will be responsible for this. The budget will take into consideration the following expenses:

- Field cost for monitoring of parameters.
- Cost of any defined outsourcing
- Cost of chemicals, consumables and transport for data generation

- Man power cost for environmental cell
- Any other cost as per EC condition

Following provisions are proposed to be taken for improving, control and monitoring of environment protection measures.

Table 10-2: Project Cost Estimate

S.No.	Particulars	Capital Cost (Lac)
1	Machinery	200
2	Infrastructure	5
3	Employment	12
4	EMP	4.23
5	Other	28.77
Total Cost		**250.00**

4	**Occupational Health & Safety**	Health Camps	1	25000	3	75,000	One Health Camp in every six months
Sub Total (B)						**3,05,000**	
Grand Total (A+B)						**4,23,000**	

10.16 Environment Policy

The environment policy right from mine preparation to its operations will be based on:

- Compliance of applicable regulatory requirements;
- Conservation of natural resources;
- Maintaining a safe working environment;
- Providing high environmental expertise and know-how; and
- Regular training and refresher courses so as to achieve continuous improvement of environment.

In fulfillment of this commitment, they shall maintain continuing efforts to:

- Comply with all applicable safety, health and environment laws and regulations.
- Enhance Safety, Health and Environment (SHE) awareness among employees and associated stakeholders through effective communication and training
- Investigate all workplace incidents and illness in order to promptly correct any unsafe conditions or practices
- Integrate SHE considerations into business planning and decision making
- SHE responsibility among our employees in their practices, and promote and value their involvement in achieving the goals of this policy
- Increase shareholder value through SHE excellence

10.17 Environmental Safeguards (Summary)

The 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. The safe blasting as per Mines Act will be conducted by certified blaster by implementing all measures to arrest of Fly rock and minimize the ground vibrations. The nearby structures should not be disturbed by blasting. Drilling will be either 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 maintain 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, ESR, CSR etc.

*****

Chapter 11. EXECUTIVE SUMMARY

The Environmental Impact Assessment report has been prepared in terms of EIA notification of the MoEF dated 14-9-2006 & its subsequent amendments, the EIA guideline Manual for mining of Minerals (Feb, 2010) of MoEF, Govt. of India for seeking environmental clearance for "Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth", mine Area: 5.16 Ha., Located at Longa Koireng, Tehsil- Kangchup Geljang, District- Kangpokpi, State- Manipur, falling under Category B1.

The mining lease has been granted in favor of "Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth" Area: 5.16 Ha., Located at Longa Koireng, Tehsil- Kangchup Geljang, District- Kangpokpi, State- Manipur.

The estimated project cost is Rs. 250.0 Lac/-. As per the approved mining plan the proposed rate of production is 1,65,619.5 Cu.m per year of Sandstone, Murrum and Shaly Earth. The of Sandstone, Murrum and Shaly Earth are 22,25,207.95 Cu.m. The production of Sandstone, Murrum and Shaly Earth in the mining plan period will be 8,30,520 Cu.m in 5 years. As per approved mining plan the total life of mine is 10 years.

Protection of Environment and safety of human and machinery.

No natural water courses are observed in and near the lease area and no such thing will be obstructed by proposed mining activities. The workings will be far above the level of ground water table and thus ground water will not intersect at any stage in workings. Although no separate soil observed at proposed mining site, however any soil come across in thin layer or in cavities 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 waste will be dumped at proposed site as per the planning.

The proposed project is an opencast mining project, where mining of Sandstone, Murrum and Shaly Earth will be done. Excavator shall be deployed for the removal of overburden & inter

burden but its deployment will be rarely & occasionally for 4-5 days in a month. Methods of mining will be open cast. Mining will be confined to the allotted lease area from which maximum (peak) 1,65,619.5 Cu.m per annum of Sandstone, Murrum and Shaly Earth will be excavated every year and. Drilling and Blasting is proposed in this mining activity.

The water for drinking and sprinkling purposes will be supplied from the nearby area through tankers. Total water requirement for the project is 3.0 KLD which can further be divided in to drinking water requirement (0.50 KLD), water for dust suppression (1.0 KLD) and water for plantation purpose (1.5 KLD).

The baseline data was collected from Dec.-2020 to Feb.-2021 for winter season. Results of the baseline data show that the area is free from any form of pollution and this activity will not create any negative impact on the existing environment.

The proposed project is involving opencast semi-mechanized method of mining, where mining of Sandstone, Murrum and Shaly Earth will be done. Excavators shall be deployed for the removal of overburden & inter burden. Methods of mining will be open cast semi-mechanized with drilling and blasting. Mining will be confined to the allotted lease area located in Leinganglok of Longa Koireng village, P.O. Langjing, P.S. New Keithelmanbi, Tehsil: Gamphazol, District: Kangpokpi, State: Manipur from which a maximum of 1,65,619.5 Cu.m per annum of Sandstone, Murrum and Shaly Earth will be excavated. Drilling and Blasting is proposed in this mining activity. Terms of Reference (ToR) for the proposed project has been granted by the Directorate of Environment & Climate Change, Manipur vide its letter no.1/92/2020(EIA)DoE&CC dated, Imphal, the 5th March, 2021.

Table No.11.1: Salient Features of the Project

1.	Name of Proponent	Shri Huidrom Vikramjit Singh, Managing Director of M/s. HVS Construction Materials Pvt. Ltd.
2.	Full Correspondence Address Of Proponent And Mobile Number	Patsoi Lamkhai, New Cachar Road, NH-7, District- Imphal West, State- Manipur

<table>
<tr><td>3.</td><td>Name of Project</td><td>"Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth"</td></tr>
<tr><td>4.</td><td>Project Location (Plot/Khasra/Gata No.)</td><td>Longa Koireng, Tehsil- Kangchup Geljang, District- Kangpokpi, State- Manipur</td></tr>
<tr><td>5.</td><td>Name Of Minor Mineral</td><td>Sandstone, Murrum and Shaly Earth</td></tr>
<tr><td>6.</td><td>Sanctioned Lease Area In Ha</td><td>5.16 ha</td></tr>
<tr><td>7.</td><td>Max. & Min mRL Within Lease Area</td><td>1286 m AMSL to 1181 m AMSL</td></tr>
<tr><td>8.</td><td>Pillar Coordinates</td><td><table><tr><th>Boundary Pillar</th><th>Latitude (N)</th><th>Longitude (E)</th></tr><tr><td>B1</td><td>24° 47' 48.11"</td><td>93° 44' 24.72"</td></tr><tr><td>B2</td><td>24° 47' 51.25"</td><td>93° 44' 27.13"</td></tr><tr><td>B3</td><td>24° 47' 53.48"</td><td>93° 44' 29.71"</td></tr><tr><td>B4</td><td>24° 47' 53.30"</td><td>93° 44' 32.65"</td></tr><tr><td>B5</td><td>24° 47' 50.38"</td><td>93° 44' 35.60"</td></tr><tr><td>B6</td><td>24° 47' 46.93"</td><td>93° 44' 33.03"</td></tr><tr><td>B7</td><td>24° 47' 44.31"</td><td>93° 44' 30.59"</td></tr></table></td></tr>
<tr><td>9.</td><td>Total Mineable Reserve</td><td>22,25,207.95 Cu.m</td></tr>
<tr><td>10.</td><td>Proposed Production / Year</td><td>1,65,619.5 Cu.m</td></tr>
<tr><td>11.</td><td>Sanctioned Period of Mine Lease</td><td>10 years</td></tr>
<tr><td>12.</td><td>Production of Mine/Day</td><td>614 Cu.m</td></tr>
<tr><td>13.</td><td>Method of Mining</td><td>Open Cast Semi Mechanized with Drilling and Blasting</td></tr>
<tr><td>14.</td><td>No. of Working Days</td><td>270</td></tr>
<tr><td>15.</td><td>Working Hours/Day</td><td>08 hrs max, Day Time</td></tr>
<tr><td>16.</td><td>No. of Workers</td><td>10</td></tr>
<tr><td>17.</td><td>No. of Vehicles Movement/Day</td><td>124</td></tr>
<tr><td>18.</td><td>Type Of Land</td><td>Govt. degraded forest land</td></tr>
<tr><td>19.</td><td>Nearest Metalled Road From Site</td><td>NH-37 is 0.28 km towards west direction from the mine site.</td></tr>
<tr><td>20.</td><td>Name of the QCI Accredited</td><td>Geogreen Enviro House Pvt. Ltd., Lucknow</td></tr>
</table>

	Consultant With QCI No. And Period Of Validity	NABET/EIA/1720/IA0023 Validity: 5th October, 2021
21.	Any Litigation Pending Against The Project Or Land In Any Court.	No
22.	Proposed CER Cost	5,00,000/-
23.	Propose EMP Cost	4,23,000/-
24.	No. of trees to be planted	340 Saplings per year

AMBIENT AIR QUALITY:

PARTICULATE MATTER (PM10):

The maximum value for PM10 was observed as 36.30 µg/m3 at AAQ1 while 24 hours applicable limit is 100 µg/m3 for industrial and mixed use areas. The area observes average PM10 concentration in the range of 16.60 µg/m3 – 36.30 µg/m3 with the lowest concentration of 16.60 µg/m3 recorded at AAQ8.

PARTICULATE MATTER (PM2.5):

The maximum value for PM2.5 was observed, as 27.10 µg/m3 at AAQ1 while 24 hours applicable limit is 60µg/m3 for industrial and mixed use areas. The area observes average PM2.5 concentration in the range of 12.10 µg/m3- 27.10 µg/m3 with the lowest concentration of 12.10 µg/m3 recorded at AAQ6.

SULPHUR DIOXIDE (SO2):

The maximum value for SO2 was observed, as 15.80 µg/m^3 at AAQ1 while 24 hours applicable limit is 80.00 µg/m3 for industrial and mixed use areas. The area observes average SO2 concentration in the range of 7.50µg/m^3 – 15.80 µg/m^3 with the lowest concentration of 7.50 µg/m^3 recorded at AAQ8. All the villages have observed value well under the prescribed limit.

NITROGEN OXIDES (NO2):

The maximum value for NO_2 was observed as 7.50 µg/m^3 at AAQ1&AAQ2 while 24 hours applicable limit is 80µg/m^3 for industrial and mixed use areas. The area observes average NO_2

concentration in the range of 3.10 $\mu g/m^3$ – 7.50 $\mu g/m^3$ with the lowest concentration of 3.10 $\mu g/m^3$ recorded at AAQ7. All the villages have observed value well under the prescribed limit.

Noise Quality:

Ambient noise levels were measured at 08 locations around the proposed project site. Minimum and maximum noise levels recorded during the day time were from 42.3 Leq dB and 55.2 Leq dB respectively and minimum and maximum level of noise during night time were 29.3 Leq dB and 39.8 Leq dB respectively.

Ecology and Biodiversity:

There are no Ecologically Sensitive Areas present in the study area but some Reserved Forests are present in the buffer area of the project site.

Socio-Economy:

The implementation of the "Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth" having Area: 5.16 Ha., Located at Longa Koireng, Tehsil- Kangchup Geljang, District- Kangpokpi, State- Manipur by Shri Huidrom Vikramjit Singh, Managing Director of M/s. HVS Construction Materials Pvt. Ltd. will throw opportunities to local people for both direct and indirect employment. The study area is slightly lacking in housing, water, electricity etc. It is expected that same will improve to a great extent due to proposed mining project and associated activities.

Impacts on Land Environment:

Mining is essentially an excavation of mineral. The land environment is greatly affected by it. Specially, in case of mining which is being carried out by opencast semi-mechanized method, it is expected to affect the land environment essentially.

Anticipated Impacts:

Land Use /Land Cover

The land is totally stony and has Sandstone, Murrum and Shaly Earth in large amount. This land is good for mining. There is no forest land or agriculture in the mine lease area. Land use pattern for preoperational, operational & conceptual stage of the mining as per mine plan for the proposed mine site is given below in Table 4-1: Present land use Pattern. The existing land use /

land cover pattern within the study area (10 Km, Buffer including core Area) as studied through Site survey & satellite imagery is given as follows. As per the mine plan 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.

Impacts on Water Environment:

The mining process will not divert and utilize the surface & ground water. Quantity of water will remain the same. The existing background level of water quality as indicated by the baseline data revealed that impact on water environment will be insignificant in this project.

Anticipated Impacts:

Because of the open cast semi mechanization method in the mining activity, the impact of mining operations on water quality is also expected to be insignificant. There would be no impact on the quality/quantity of ground water as existing ground water level in study area is deep. Surface water is also not diverted or disturbed. Therefore, there would not be any impact on surface water and ground water quality. The lease area is Hilly and Stony where only direct precipitation flows down the slope during rains. The water comes across in the workings during monsoon. The water will fill in the working pits. Some water will flow by joints and cracks and rest water has to dewater during and after the monsoon. The monsoon water which directly precipitates over the working will fill in the pit and rest water which precipitates outside the pit will flow down towards lower altitude side by slope of the area.

The rainfall remains around 2500 mm to 3000 mm per year towards maximum. The water accumulate in the working pit is being dewatered by 10 HP diesel operated pumps and this practice will be continued in future. The water will fill in the non-working pits for use for plantation and also dewatered in nearby nalahs. The rubble stone walls are constructed towards lower side of the dumps to check the wash off during monsoon. During rains the rainwater flow on natural slope of the surface, which flows during rains only in north-west direction.

Since the mining process is totally dry, no effluent will be generated hence no adverse impact on water is anticipated. Mining activity will be done by opencast semi mechanized method. The deposit will be worked from the top surface to above ground water table. No water table (aquifer) will be intersected by the mining activities. Hence there will not be any adverse impact

either on the quality or quantity of ground water. There is a sufficient gap between proposed workings up to conceptual and level of ground water table, thus ground water will not be encountered in the workings at any stage.

Domestic Effluent

No domestic effluent is generated at the mine site due to absence of any colony in the mining area. Hence the question of contamination of ground water does not arise. Any adverse impact on the ground water regime is not expected from the domestic effluent.

Surface Run-Off

The land of the study area is semi-arid and the Landscape is hilly and stony. The threat of pollution of due to surface run-off is also not possible as because entire study area does have any natural surface water course.

Mitigation Measures

There is a sufficient gap between proposed workings up to conceptual and level of ground water table, thus ground water will not be encountered in the workings at any stage.

Impacts on Air Environment:

Mining Operation carried out by opencast semi mechanized method generate dust particles due to various activities like Loading & Unloading of Sandstone, Murrum and Shaly Earth, and Transportation. The impact on ambient air quality in the area surrounding the mining area depends upon the pollutant emission rate and prevailing meteorological conditions. As it is an open cast semi-mechanized mine, particulate Matter (Dust) of various sizes is the only pollutant of any significance.

Anticipated Impacts:

The major sources of air pollution in the proposed mine is dust generation due to extraction, loading and haulage of mineral and wind erosion of exposed material. In this present study, United States Environmental Protection Agency (USEPA–42 series) approved mathematical equations have been used to predict concentrations for different operations in mining including the mineral transportation. The operations considered for determining source strength for dispersion modeling are as follows:

- Excavation,

- Loading, and
- Haulage.

Mitigation Measures:

Haul Road: The long life WBM (Water Bound Macadam) haul roads will be constructed and maintained for traffic movement.

Transport: The speed of dumpers/ trucks on haul road will be controlled as increased speed increases dust emissions. Overloading of transport vehicles will be avoided. The trucks/ tippers will have sufficient free board. Spillage of ore on public roads will be cleared immediately and vehicles will play in safe speed.

Green Belt: Planting of trees all along main mine haul road and regular grading of haul roads will be practiced to prevent the generation of dust due to movement of dumpers/trucks.

Other Mitigation Measures:

- Water sprinkling will be done on the roads regularly.
- Care will be taken to prevent spillage by covering the carrying vehicles with tarpaulin and sprinkling of water, if dry.
- Fortnightly scraping of road in order to keep the roads almost leveled. This will ensure smooth flow of vehicles and also prevent spillage.
- Proper tuning of vehicles to keep the gas emissions under check.
- Plantation of trees along the roads to help reduce the impact of dust in the nearby villages.

Impacts on Noise Environment

The area general represents calm surroundings. There is no heavy traffic, industry or noisy habitation in the area except the existing mine as the project is proposed for open cast semi-mechanized mining method.

Anticipated Impact

The area general represents calm surroundings. There is no heavy traffic, industry or noisy habitation in the area except the existing mine as the project is proposed for open cast semi-mechanized mining method.

Mitigation Measures

Proper maintenance of all transportation vehicles will be carried out which help in reducing noise during operations Mitigation measures due to other source of noise will be mitigated as follows:

S. No.	Measures
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.
6.	Drilling with sharp bits and control blasting will minimize the noise pollution.

Environmental Management Plan (EMP):

Proper environmental management plan is proposed for "Sandstone, Murrum and Shaly Earth" mining project to mitigate the impact during the mining operation.

- No labour camps will be established on site.
- No cooking, or burning of woods will be allowed in the nearby area.
- Prior to commencement of mining, a short awareness program will be conducted for labours to make them aware of way of working and various precautions to be taken while at work. Such program will be repeated occasionally.
- In the event of any some causality or injury to any animal occurs, proper treatment will be given.
- No tree cutting, chopping, lumbering, uprooting of shrubs and herbs will be allowed.
- Corridor movement of wild animals, if exists mining operations will be avoided in the area.
- It will be ensured that noise produced due to vehicles movement while carrying Sandstone, Murrum and Shaly Earth is within the permissible noise level.

- No piling of Sandstone, Murrum and Shaly Earth will be done in adjoining area.
- If wild animals are noticed crossing the area, they will not be disturbed or chased away, instead the labors will move away from their path.

Environment Monitoring Program:

S.No.	Activity	Schedule
Air Pollution Monitoring		
1.	Ambient air monitoring of parameters specified by MoEF (PM_{10}, SO_2& No_2).	Twice in a Year except monsoon
Water Quality Monitoring		
2.	Monitoring water quality surface water from the river	Twice in a Year except monsoon
3.	Monitoring of one sample of tube well and open well at mine / nearby location. Parameters are essential parameters as per IS: 10500:2012.	Twice in a Year except monsoon
4.	Monitoring of water spray requirements	Log-sheet of water spray will be maintained on daily basis
Noise Quality Monitoring		
5.	Noise in the ambient atmosphere in mining lease	Twice in a Year except monsoon
Greenbelt Maintenance		
6.	Monitoring schedule for Greenbelt development as per mining plan	Yearly
Soil Quality Monitoring		
7.	Soil at six locations	Twice in a Year except monsoon

The proposed project is expected to provide employment to local people in different activities such as mining, sizing (sieving) transportation and plantation activities. The revenue generated

from the production and sale of mineral will also add to the exchequer of government, which in turn will help in the growth of state economy. Excavated material will cater the huge increasing demand of mineral in the fast-growing construction industry of Manipur and nearby states etc. The project is not expected to have any major adverse impact on the environment and whatever impacts are anticipated during the EIA study will be minimized with the help of suitable mitigation measures.

Chapter 12. DISCLOSURE OF THE CONSULTANT

Declaration by Experts contributing to the EIA Report for "Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth" having Area: 5.16 Ha., Located at Longa Koireng, Tehsil- Kangchup Geljang, District- Kangpokpi, State- Manipur by Shri Huidrom Vikramjit Singh, Managing Director of M/s. HVS Construction Materials Pvt. Ltd..

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

EIA coordinator: Dr. Vijay Kumar Mishra

Name: Dr. Vijay Kumar Mishra

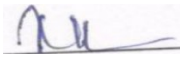
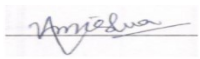
Signature and Date: July 20th, 2021

Period of involvement: October, 2020 - Present

Contact information: 0522-2339000, 09415215163

Table No.12.1: Functional Area Experts

S. No.	Functional areas	Name of the expert/s	Involvement (period and task**)	Signature and date
1	AP*	Mr. Pawan Sut Sharma	October, 2020 - Present	
2	WP*	Saroj Singh	October, 2020 - Present	
3	SHW*	Partho S. Mukherjee	October, 2020 - Present	
4	SE*	Dr. V.K.Mishra	October, 2020 - Present	
5	EB*	Dr. Fauzia Siddiqui	October, 2020 - Present	
6	HG*	Dr. V.K.Mishra	October, 2020 - Present	

7	GEO*	Dr. V.K.Mishra	October, 2020 - Present	
8	SC*	Dr. Tulsi Ram Rathore	October, 2020 - Present	
9	AQ*	Partho S. Mukherjee	October, 2020 - Present	
10	NV*	Pawan Sut Sharma	October, 2020 - Present	
11	LU*	Dr. Ajay Mishra	October, 2020 - Present	
12	RH*	Pawan Sut Sharma	October, 2020 - Present	

**One TM against each FAE may be shown*
***Please attach additional sheet if required*

Declaration by the Head of the accredited consultant organization/ authorized person:

I, Dr. Vijay Kumar Mishra, hereby, confirm that the above mentioned experts prepared the EIA of "Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth" having Area: 5.16 Ha., Located at Longa Koireng, Tehsil- Kangchup Geljang, District- Kangpokpi, State- Manipur by Shri Huidrom Vikramjit Singh, Managing Director of M/s. HVS Construction Materials Pvt. Ltd.

I also confirm that EIA Coordinator (EC) has gone through the report, and the consultant organization shall be fully accountable for any misleading information.

It is certified that no unethical practices, plagiarism involved in carrying out the work and external data / text has not been used without proper acknowledgement while preparing this EIA report.

Signature: 

Name: Dr. Vijay Kumar Mishra

Designation: Director

Name of the EIA consultant organization: Geogreen Enviro House Pvt Ltd, Lucknow

NABET Certificate No.& Issue Date: NABET/EIA/1720/IA0023 dated May 31st, 2017 (attached as **Annexure-X**).

Date ...
Directorate of Trade &
Commerce, Industries, Manipur

GOVERNMENT OF MANIPUR
DIRECTORATE OF TRADE, COMMERCE & INDUSTRIES

RECEIPT OF APPLICATION FOR MINING LEASE

Imphal, the 2nd December, 2019

No. D(5)-94/IND/2019: In exercise of the power conferred by Rule 4(2) and Rule 5(1) of the Manipur Minor Mineral Concession Rules, 2012 and in consideration of the application No. "nil" dated 28/08/2019 and 28/11/2019 submitted by Shri Huidrom Vikramjit Singh, Managing Director, M/s. HVS Construction Materials, Patsoi, Imphal West District for the grant of quarrying lease of sandstone/Road metal, the Director of Trade, Commerce & Industries, Govt. of Manipur is pleased to convey its approval to the grant of **Quarrying Lease** to Shri Huidrom Vikramjit Singh, for quarrying of sandstone/road metal over an area of 5.16 Hectares in Kotlen, Longa Koireng village, Kangpokpi District, Manipur for a period of 10(ten) years commencing on the date of execution of Quarrying Lease Deed within the area bounded by the geographical limits as below:

Location	Co-ordinates of Boundary Points of Proposed Quarry area (WGS-84)		Area (in Hectare)
	Latitude : Longitude	Latitude : Longitude	
Kotlen, Longa Koireng village, Kangpokpi District, Manipur	B1:N24°47'48.11" : E93°44' 24.72" B2:N24°47'51.25" : E93°44' 27.13" B3:N24°47'53.48" : E93°44' 29.71" B4:N24°47'53.30" : E93°44' 32.65"	B5:N24°47'50.38" : E93°44' 35.60" B6:N24°47'46.93" : E93°44' 33.03" B7:N24°47'44.31" : E93°44' 30.59"	5.16

2. The grant of this lease shall be subject to the following terms and condition:

(i) Payment of fee, security deposit and financial assurance will be made as per Rule 34, Rule 35 and Rule 40 of the Manipur Minor Mineral Concession Rules, 2012.

(ii) The lessee is required to submit Mining Plan along with requisite fee under Rule 49C of the Manipur Minor Mineral Concession (Amendment) Rules, 2018 as provided under Rule 39(4) and 49 A of the Manipur Minor Mineral Concession Rules, 2012 and as amended.

(iii) The lessee shall strictly adhere to the conditions laid down in Rule 39 of the Manipur Minor Mineral Concession Rules, 2012.

(iv) The lessee shall comply with the related provisions of Environment (Protection) Act, 1986 and Forest (Conservation) Act, 1980 and rules and Notifications issued from time to time.

3. The Quarrying Lease Deed shall be executed in prescribed Form-H after fulfilling the conditions required in Sl.No. 2(i),2(iii) above and after obtaining of Environmental Clearance and Forest Clearance. ***The quarrying operation shall be permitted only after execution of Quarrying Lease Deed.***

(**C. Arthur Worchuiyo**)
Director of Trade, Commerce & Industries,
Manipur.

APPROVED

Copy to:

1. PPS to Hon'ble Minister (Textiles, Commerce & Industry), Manipur.
2. The Principal Secretary (Textiles, Commerce & Industry), Govt. of Manipur.
3. The Principal Chief Conservator of Forests & Head of Forest Force, Govt. of Manipur.
4. The Director of Environment, Govt. of Manipur.
5. The Deputy Commissioner, Kangpokpi District, Manipur.
6. The Divisional Forest Officer, Kangpokpi Forest Division, Forest Dept., Manipur
7. Shri Huidrom Vikramjit Singh, Managing Director, M/s. HVS Construction Materials, Patsoi, Imphal West District, Manipur.

Director
Dept. of Trade, Commerce & Industries
Govt. of Manipur

31/12/19
L. Raghumani Sharma
Asstt. Geologist/ROP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

DIRECTORATE OF TRADE COMMERCE & INDUSTRIES
GOVT. OF MANIPUR

CERTIFICATE

This is to certify that the Mining Plan in respect of the "Longa Koireng village sandstone, murum and shale quarrying Lease Area" for extraction of sandstone, murum and shale for various construction and processing purposes located at Kotlen of Longa Koireng village, P.O. Langjing & P.S. New Keithelmanbi, District: Kangpokpi, Manipur for extraction of sandstone, murum and shale located under Noney Forest Division, for an area of 5.16 Hectares, has been prepared in favour of the applicant Shri Huidrom Vikramjit Singh , Managing Director, M/s. HVS Construction Materials Pvt. Ltd. , Patsoi, Imphal West District under the relevant provisions of the Manipur Minor Mineral Concession Rules,2012 and subsequent amendment.

The Applicant/Mining Lease Holder shall approach authorities concerned for any other permission, if required, during the process of the Mining Operation.

It is further certified that the information furnished in the Mining Plan is true and correct to the best of my knowledge.

Place: Imphal

Date: 31/12/2019

(L. Raghumani Sharma)

L. Raghumani Sharma
Asstt. Geologist/RQP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

APPROVED

Director
Dept of Trade, Commerce & Industries
Govt. of Manipur

No. D(5)-94/IND/2019
GOVERNMENT OF MANIPUR
DIRECTORATE OF TRADE, COMMERCE & INDUSTRIES

Imphal, the 7th March, 2020

To

The Managing Director,
M/s. HVS construction Materials Pvt. Ltd.,
Patsoi Lamkhai, New Cachar Road,
Imphal West District Manipur.

Sub: Mining Plan with progressive mine closer plan for Sandstone/Road Metal, Murum and Shale at Kotlen, Longa Koireng village, Kangpokpi District, Manipur in favour of M/s HVS construction Materials Pvt. Ltd. for a period of five years - approval reg.

Ref:
1. Your application dated 29-08-2019 in Form-C for grant of Mining Lease over an area of 5.16 Hect. at Kotlen, Longa Koireng Village, Kangpokpi District, Manipur for mining of Sandstone/Road Metal, Murum and Shale;
2. LoI No. D(5)-94/IND/2019 dated 07-03-2020 issued by the Director of Trade, Commerce & Industries, Manipur; and
3. Your letter dated Nil submitting six sets of mining plan duly prepared by RQP under Rule 49C(1) of the Manipur Minor Mineral Concession Rules, 2012 for approval for the proposed mining under reference.

Dear Sir,

In exercise of the power conferred by Rule 49C(2) of the Manipur Minor Mineral Concession Rules, 2012 and amendments thereof, your Mining Plan prepared by RQP for Sandstone/ Road Metal, Murum and Shale over an area of 5.16 hectares at Kotlen, Longa Koireng Village, Kangpokpi District, Manipur has been approved for a period of 5(five) years by the Competent Authority subject to the following conditions:

1. This Mining Plan with progressive mine closer plan is approved without prejudice to any other laws applicable to the quarry area from time to time whether made by Central Government, state Government or any other authority.
2. It is clarified that the approval of the aforesaid Mining Plan with progressive mine closer plan does not in any way imply the approval of the Government in terms of any other provisions of the Mines and Minerals (Development and Regulation)Act,1957 or rules framed there under any other laws.
3. It is further clarified that the approval of the Mining Plan with progressive mine closer plan is subject to the provisions of the Forest (Conservation) Act,1980, the Forest (Conservation) Rules, 2003 and any other relevant statues, others and guidelines as may be applicable to the lease from time to time.

Contd....2/-

4. The Mining Plan with progressive mine closer plan is approved without prejudice to any order or direction from any court of the competent jurisdiction.

5. The Mining Plan with progressive mine closer plan is approved subject to strictly adhering to the Manipur Minor Mineral Concession Rules, 2012, relevant regulations and rules of Metalliferous Mine Regulations,1961, provisions of the Mines Act,1952 and other Rules and Regulations made thereunder.

6. Prior permission from the Director General, Mine Safety shall be obtained whenever and whereever it is required.

7. Clearance/Consent/No objection from Ministry of Environment and Forest, Central Pollution Control Board, State Pollution Control Board, if applicable, should be obtained.

8. The Mining Plan with progressive mine closer plan approval is for proposals contained therein and as applicable for the mining activities to be carried out or the quarry lease to be granted and the mining plan will come into force for a period of 5 years from the date of execution of lease deed.

9. If anything found concealed as required in Mines Act, the content of the Mining Plan with progressive mine closer plan and the proposal of the rectification has not been made, or if at later stage the information furnished in the document is found to be incorrect or misrepresentation of facts, the approval shall be deemed to have been withdrawn with immediate effect.

10. The lessee will also follow the provisions provided in the Environment Management Plan.

Yours faithfully,

Encl: Approved Mining Plan

(Kh. Dilip Singh)
Joint Director (G)
for Directorate of Trade, Commerce & Industries,
Manipur

Copy to:

1. The Principal Chief Conservator of Forest, Manipur.
2. The Director of Environment & Climate Change, Manipur.

MINING PLAN

LONGA KOIRENG VILLAGE QUARRYING LEASE OF SANDSTONE, MURUM AND SHALE

DISTRICT: KANGPOKPI, MANIPUR

Area Allotted : 5.16 Hectares

Period of quarrying Lease: 10 years

Period of Mining Plan:- 5 years

Approval from

THE DIRECTORATE OF TRADE, COMMERCE & INDUSTRIES

MANIPUR

SUBMITTED

UNDER RULE-39 (4) AND RULE 49 C

MANIPUR MINOR MINERAL CONCESSION RULES, 2012

Th. Sanjay Singh

8/11/19

L. Raghumani Sharma
Asstt. Geologist/RQP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

HVS Construction Materials Pvt. Ltd.

Managing Director

SUBMITTED BY:
Shri Huidrom Vikramjit Singh,
Managing Director,
M/s. HVS Construction Material Pvt. Ltd.
Imphal West District

APPROVED

Director
Dept. of Trade, Commerce & Industries
Govt. of Manipur

Shri Huidrom Vikramjit Singh,
Managing Director,
M/s. HVS Construction Material Pvt. Ltd,
Imphal West District.

DIRECTORATE OF TRADE COMMERCE & INDUSTRIES ★ GOVT OF MANIPUR ★

Date: 21/12/2019

DECLARATION BY THE APPLICANT

This Mining Plan is prepared under the provision of Rule 39(4) & 49 A (1) (a) of the Manipur Minor Mineral Concession Rules, 2012 in respect of the Longa Koireng village Lease area "measuring 5.16 Hectares for ten years located at Kotlen of Longa Koireng village, P.O. Langjing, P.S. New Keithelmanbi, District: Kangpokpi (Manipur) under Noney Forest Division, Kangpokpi District, Manipur for extraction of Sandstone/Road Metal, murum and shale in consultation with me. I understand its content and hereby agree to implement the collection work of the sandstone , murum and shale in accordance with the prevailing provisions of law. If any other permission is needed, I shall approach the appropriate authority, before commencement of the extraction work.

Th. Sanjoy Singh

HVS Construction Materials Pvt. Ltd.
Managing Director

(Huidrom Vikramjit Singh)
Managing Director,
M/s. HVS Construction Materials (P) Ltd,

APPROVED

Director
Dept of Trade, Commerce & Industries
Govt of Manipur

21/12/19
L. Raghumani Sharma
Asstt. Geologist/RQP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

Shri Huidrom Vikramjit Singh,
Managing Director,
M/s. HVS Construction Material Pvt. Ltd,
Imphal West District.

DIRECTORATE OF TRADE COMMERCE & INDUSTRIES
GOVT. OF MANIPUR

Date 31/12/2019

CONSENT LETTER FROM THE APPLICANT

The Mining Plan in respect of the Longa Koireng village sandstone/road metal, murum and shale quarrying lease area measuring 5.16 Hectares under Noney Forest Division, Kangpokpi District, Manipur for extraction of sandstone, murum and shale for construction and processing purposes within the State of Manipur has been prepared by Shri L. Raghumani Sharma, Asstt. Geologist and RQP, Trade, Commerce & Industries Department, Government of Manipur.

I hereby undertake that the Mining Plan so prepared by the said RQP has been made with my knowledge and consent and shall be acceptable and binding on me in all respect.

Th. Sanjoy Singh

HVS Construction Materials Pvt. Ltd.
Managing Director
(Huidrom Vikramjit Singh)
Managing Director
M/s. HVS Construction Materials Pvt. Ltd.

Director
Dept of Trade, Commerce & Industries
Govt of Manipur

31/12/19
L. Raghumani Sharma
Asstt. Geologist/RQP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

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DIRECTORATE OF TRADE COMMERCE & INDUSTRIES
GOVT. OF MANIPUR

CERTIFICATE

This is to certify that the Mining Plan in respect of the "Longa Koireng village sandstone, murum and shale quarrying Lease Area" for extraction of sandstone, murum and shale for various construction and processing purposes located at Kotlen of Longa Koireng village, P.O. Langjing & P.S. New Keithelmanbi, District: Kangpokpi, Manipur for extraction of sandstone, murum and shale located under Noney Forest Division, for an area of 5.16 Hectares, has been prepared in favour of the applicant Shri Huidrom Vikramjit Singh , Managing Director, M/s. HVS Construction Materials Pvt. Ltd. , Patsoi, Imphal West District under the relevant provisions of the Manipur Minor Mineral Concession Rules,2012 and subsequent amendment.

The Applicant/Mining Lease Holder shall approach authorities concerned for any other permission, if required, during the process of the Mining Operation.

It is further certified that the information furnished in the Mining Plan is true and correct to the best of my knowledge.

Place: Imphal

Date: 31/12/2019

(L. Raghumani Sharma)

L. Raghumani Sharma
Asstt. Geologist/RQP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

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Director
Dept of Trade, Commerce & Industries
Govt of Manipur

Th. Sanjay Singh

DIRECTORATE OF TRADE COMMERCE & INDUSTRIES ★ GOVT OF MANIPUR ★

MINING PLAN OF LONGA KOIRENG VILLAGE SANDSTONE, MURUM AND SHALE QUARRYING LEASE AREA

DISTRICT: KANGPOKPI, MANIPUR

Area Allotted : 5.16 Hectares

Period of quarrying Lease: 10 years

CONTENT

Director
Dept of Trade, Commerce & Industries
Govt of Manipur

21/12/19
L. Raghumani Sharma
Asstt. Geologist/ROP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

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H. Sanjay Kumar

DIRECTORATE OF TRADE COMMERCE & INDUSTRIES ★ GOVT. OF MANIPUR ★

Director
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Asstt. Geologist/RQP
Directorate of Trade, Comm. & Industries
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MINING PLAN

LONGA KOIRENG VILLAGE SANDSTONE, MURUM AND SHALE QUARRYING LEASE AREA

DISTRICT: KANGPOKPI, MANIPUR
Area Allotted : 5.16 Hectares
Period of quarrying Lease: 10 years
Period of Mining Plan: 5 years

CHAPTER-I

1. INTRODUCTION:

Shri Huidrom Vikramjit Singh, Managing Director, M/S. HVS Construction Materials Pvt. Ltd., Patsoi village, Imphal West District with their office at Patsoi Lamkhai, New Cachar Road NH-37, Imphal West District, propose to open a Sandstone, murum and shale in the village of Kotlen of Longa Koireng village of Kangpokpi District under Noney Range of Noney Forest Division for production of sandstone, murum and shale to meet the local demand of stones for Stone Crusher Units as well as to supply to various government, semi-government and private agencies for civil construction purposes. There is a demand of stone products and murum like road metals, stone chips of different sizes in the Imphal valley and adjoining hill areas and this sandstone, murum and shale quarry will meet up the requirement of such minerals to some extent.

This is a Mining Lease proposed to be awarded to Shri Huidrom Vikramjit Singh, Managing Director, M/s. HVS Construction Materials Pvt. Ltd. for ten years, as proposed by the competent authority, Directorate of Trade, Commerce & Industries, Government of Manipur vide orders No. D(5)-94/IND/2019 dated 2/12/2019 and Office Corrigendum of even number dated 23/12/2019.

. The location of the quarry site is within the forest area, necessary permission/clearance from concerned authority has to be taken before commencement of the production. The location of the quarry site as has been recommended by the Directorate of Trade, Commerce & Industries, Government

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of Manipur to issue the Quarrying lease near Koten of Longa Koireng village for collection of sandstone, murum and shale.

In this connection, Shri Huidrom Vikramjit Singh, Managing Director, M/s. HVS Construction Materials Pvt. Ltd. has approached Shri L. Raghumani Sharma, Assistant Geologist and RQP to prepared the Quarry/Mining Plan following the prescribed guidelines under Manipur Minor Mineral Concession Rules, 2012. The proposed Mining Plan covers a scientific and systematic assessment of the deposit which indicates the details of conservation of the deposit and protection of environment in and around the quarrying area.

The proposed quarry area is at a distance of about 19.7 km (aerial distance) west of State Capital, Imphal. It can be approachable by kuchha road (0.23km) from Imphal-Jiribam Road (NH-37). The nearest railway station is located at Jiribam which is 190 km away from the quarry site.

Electric line is available within 500 m of lease area for obtaining connection. The Sinam village is located at 2.9 km away from the lease area in the south west direction.

The proposed lease area is under the jurisdiction of Longa Koireng village under Noney Forest Division, Kangpokpi District. The area is 5.16 Hectares (including area of approach road of 230m length from NH-37) and is a unclassified degraded forest land. The area is covered by small vegetation like grasses, shrubs and small trees. There is no growth of valuable big trees. The proposed site is not within any protected area under Archeological, Religious, Cultural heritage or Defense establishments. By opening a sandstone, murum and shale quarry as proposed, this area will be benefitted by generation of employment opportunities to the local people as well as growth of economic activities.

This Mining Plan is prepared for first Five Years Periods.

Th. Sanjoy Singh

L. Raghumani Sharma, Asstt. Geologist & RQP, Directorate of Trade, Commerce & Industries, Manipur

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CHAPTER-II

2. GENERAL INFORMATION:

The Applicant:

1	Name	:	Huidrom Vikramjit Singh, Managing Director, M/s. HVS Construction Materials Pvt. Ltd.
2	Office Address	:	Patsoi Lamkhai, New Cachar Road, NH-37, Imphal West District
3	Site Address	:	Kotlen of Longa Koireng village P.O. Langjing P.S. New Keithelmanbi Sub-Division: Gamphazol District: Kangpokpi, Manipur
4	Status of the Applicant	:	Managing Director
5	Mineral Occurring in the area and its use	:	Sandstone, murum and shale and can be used as construction materials in embankment, road, foundations, railway line, and road metals etc.
6	Name of the Quarry	:	Longa Koireng Sandstone, Murum and Shale Quarrying Lease Area
7	Quantity recommended for extraction per year	:	**1,65,619.5 CuM (average)**
8	Lease period	:	Ten years
9	Forest Range & Division	:	Noney
10	Coordinates of quarrying Lease boundary	:	B1:N24°47'48.11" : E93°44' 24.72" B2:N24°47'51.25" : E93°44' 27.13" B3:N24°47'53.48" : E93°44' 29.71" B4:N24°47'53.30" : E93°44' 32.65" B5:N24°47'50.38" : E93°44' 35.60" B6:N24°47'46.93" : E93°44' 33.03" B7:N24°47'44.31" : E93°44' 30.59"
11	Nearest Railway Station	:	Dimapur, Nagaland
12	Nearest Airport	:	Imphal
13	Nearest Highway	:	NH 37 (Imphal-Jiribam Road)

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PARTICULRS OF THE RQP PREPARING THE MINING PLAN:

1	Name of the RQP	:	L. Raghumani Sharma, Asstt. Geologist
2	Address	:	Geology & Mining Division, Directorate of Trade, Commerce & Industries, Govt. of Manipur
3	Appointment Order No. and date.	:	Order No. 43/5/2018-C&I (Pt.II)(A) dated 21/08/2019
4	Phone No.	:	9862028405/8794143206

CHAPTER-III

3. LOCATION AND ACCESSIBILITY OF THE PROPOSED QUARRY AREA:

3.1. Location

The location of the proposed quarry site is closed to National Highway 37 which is nearly 230m away from the NH-37. The road connected with quarry area from NH-37 is motorable. The proposed site is a forest land under Noney Range of Noney Forest Division. The other details of the proposed quarrying lease area are as follows:

1	Village	Longa Koireng village
2	P.O.	Langjing
3	Police Station	New Keithelmanbi
4	District	Kangpokpi
5	State	Manipur
6	Period of Quarrying Lease	10(ten) years
7	Total area	5.16 Hectares
8	Ownership/Occupancy	Longa Koireng village Authority, Under Noney Forest Range of Noney Forest Division
9	Land Use Pattern	The core zone consists of degraded forest area mainly covered with grasses, shrubs and exposed rock outcrop.

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3.2. Accessibility:

The quarry site is very close to the NH-37(Imphal-Jiribam Road). A fair weather road connects the NH-37.

3.3. **Key Map**: The Key Map in Figure -1 indicate the quarry site and surrounding feature like human settlement, river, nala, pond, roads, hill, etc.

3.4. **Surface Plan**: The topography, approach road, other prevailing status of the leasehold have been shown in Figure-2.

4. PHYSIOGRAPHY AND DRAINAGE:-

The proposed Lease area allotted "Longa Koireng Sandstone, Murum and Shale Quarrying Lease Area" is of more or less square shaped. The total area available for mining is about 5.16 Hectares including 0.16 Hectares of approach road. The general slope of the area is towards northwest/west direction. The topography of the area is undulating one with hill and valley. The altitude ranges from 1181 at the bottom of the hill to 1286 m at the top above mean sea level. The area is drained by a small nala and flowing down towards Westerly direction.

5. CLIMATE AND RAINFALL:

The district is under humid subtropical climate. The soil is moderately fertile with clay loam soil with little patches of clay and loam. The temperature ranges from a minimum of 3.4^0 C to a maximum of 34.1^0 C. The annual rainfall ranges from 670 to 1450 mm.

Highest temperate-: 34.1^0 C

Lowest temperature: 3.4^{0}C

Average Annual Relative Humidity: 75%

Average Annual Rainfall: 1581 mm.

Th. Sanjoy Singh

CHAPTER-IV

6. GEOLOGY:

6.1. REGIONAL GEOLOGY:

The Geology of Manipur is of recent origin. The State is a part of Trans Himalayan geological formation. Tectonically, the whole Manipur forms a part of great geosyncline having basin topography of furrows and ridges. Sediments

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deposited in geosyncline were argillaceous deposited in furrows and arenaceous and calcareous sediments in the ridges.

The rock formation occurring in the State are Cretaceous limestone, the Disang Group with Serpentinite, the Barail Group, the Surma Group and the Tipam Group.

The hill ranges of Manipur are dominantly consists of Tertiary sediments with minor amount of igneous and metamorphics. The Tertiaries are generally flysch sediment and constitutes nearly 70% of the State area. The rest 30% includes ophiolite mélange and associated pelagic sediments, metamorphics and cretaceous limestone occurring only in the eastern part of the State.

The Manipur –Nagaland hills belongs to Indo-Burmese range, divided into three metamorphic divisions:

1. The Naga Patkai Hills,
2. The Chin Hills and
3. Arakan Yoma Hills.

The aforesaid Manipur-Nagaland hills have an arcuate trend with convex side pointing towards India. Its southern part is known as the Manipur hills.

General lithological trend are NNE-SSW. A generalized geological sucession of Manipur as detailed below:

Litho Units and Age	Description of Rocks
Alluvium(Quaternary)	Dark grey to black clay, silt and sandy deposits of fluvio lacustrine origin. Mainly alluvium is in the Barak valley area. Clay, sand, gravel, boulder deposits of foot hills and old river terraces.
Stratigraphic Break	
Tipam Group (Miocene)	Mottled clay, mottled sandy clay, sandy shale, clay shale and sandstone. Greenish to blue medium to coarse ferruginous sandstone with sand shale and clay.
Surma Group (Upper Oligocene to Miocene)	Shale, sandy shale, siltstone, ferruginous sandstone. Alternation of sandstone and shale with argillaceous horizons in the middle and minor conglomerate.
Unconformity	
Barail Group (Upper Eocene)	Massive to thickly bedded sandstones. Alternation of shale and stone.
Disang Group (Upper Cretaceous)	Dark grey to black splintery and earthy coloured shale and silt stone and sandstone.
Unconformity	
Ophiolite Melange Zone	Basic, ultrabasic (both intrusive and extrusive) peridotite, gabbro, serpentinite, etc.
Unconformity	
Metamorphic Complex	Low to medium grade metamorphic rocks such as phyllite

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	schist, quartzite, marble, quartz-chlorite-mica schist, etc.
Unconformity	
Basement Complex	

6.2. **GENERAL GEOLOGY OF THE LEASED AREA :**

The area allotted to M/s. HVS Construction Materials Ltd. Ltd. lies within Kangpokpi District. The geology of the Quarrying Lease area is a massive body sandstone. The rock is fine grained dark grey in colour, very hard and compact. Thin shale (0.20m) parting of grey shales are associated with sandstone. Exposed rock formation shows that the area is little bit effected by weathering. The maximum thickness of sandstone beds is 1.5 m to 2.0 m. The dip and strike of the sandstone beds is N32^0 E-S32^0 W, amount of dip 42^0 and dipping toward north west. The exposed thickness is 25m (Refer Geological Plan in Figure-3 and Figure-4).

The thickness of murum at the bottom is 7m and 2.0m at the top in the western part whereas in other area is about 2m.

6.3. PROPERTIES OF THE SANSTONE:

The sandstone is hard, compact, fine grained and grey in colour.

6.4. USE:

The minerals so available are suitable for use in construction works as well as road metals.

6.5. **Geological Plan and Sections**: The geology and structural features are shown in Figure-3.

CHAPTER-V

7. **ESTIMATION OF RESERVE OF SANDSTONE AND MURUM**:

The detailed exploration of the mineral in the area has not been carried out. Therefore, the estimation of the mineable reserve has been made considering the deposit to be massive and continuous. The period of Quarrying lease is ten years. The lease area is marked as B1, B2, B3, B4, B5, B6 & B7 for mining of mineral as may be seen in the Surface Plan (Fig.2). The Mineable Reserve of the total area calculated roughly up to lowest level/bottom level is 22,25,207.95 CuM.

As the Quarrying Lease period is for 10 (ten) years and , the **Extractable reserve for the first 5 (five) years** will be **8,30,520 CuM**.

Director
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7.1. Method of reserve estimation:

(i) **Cross Sectional Method:**

The in situ reserve is calculated by using geological cross section line viz. A-B, considering the cross sectional area and length influence. The area of cross section is creating a profile.

A geological section line A-B is shown in the Geological Plan (Figure-3). The profiles of this section line is drawn and shown in Figure-3. The length of the base and height are estimated for this profile and cross sectional areas are calculated by area triangle method as given below.

(a) Cross Sectional Area:

Cross-Section Line	Length of Base Line	Height	Area
A-B	188.32m	95 m	8,945.2 m^2

a) Average length influence on either side of the section line A-B of quarrying lease area: 248.76 m.

b) Volume of minerals : Cross Sectional area x length influence= 8945.2 sq.m x 248.76 m= 22,25,207.95 CuM

7.2. ESTIMATION OF IN SITU RESERVE FOR FIRST FIVE YEARS PERIOD:

The reserve is estimated for the predetermined mining block for first five years mining bounded by P, Q, R and S in the western side of the proposed quarry area. The cross sectional area method is applied for calculation of area along A-B section line. The length influence between PS and QR is 123.53 m. The Cross Section area is constant as 8945.2 sq.m.
Volume of Mineral: 8945.2 sq,m x 123.53 m= **11,05,000.55 CuM**.

7.3. CALCULATION OF VOLUME TO BE RETAINED FOR SLOPE STABILITY:

Area: 2231.55 sq.m
Length: 123 m
Volume: 274480.65 CuM

Th. Sanjoy Kr

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7.4. MINEABLE RESERVE FOR FIVE YEARS"
11,05,000.55 CuM.- 274480.65 CuM = 8,30,519.9 say **8,30,520 CuM.**

7.5. MINEABLE RESERVE FOR ONE YEAR:

8,30,520 CuM./ 5 years = **1,66,104 CuM.**

7.6. DAILY PRODUCTION TARGET:
Assuming 270 days is working days in a year, the daily production target is calculated as 1,66,104 CuM/270 days= **615.2 CuM.**

7.7. RESERVE OF MURUM:

Cross Section area: 423.72 sq.m, length: 61.5
Volume: **26,058.78 CuM.**

7.8. RESERVE OF STONE:

8,30,520 CuM.- 26,058.78 CuM. = **804,461.22 CuM.**

Th. Vijay Lein

CHAPTER-VI

8.0 MINING:

In order to ensure mineral conservation, systematic mining and protection of environment, the Manipur Minor Mineral Concession Rules (MMMCR), 2012 and subsequent amendment, it has been made mandatory to prepare Mining Plan and Progressive Mine Closure Plan for grant of any mineral concessions like Quarrying Lease, Quarrying Contract and Quarrying Permit in respect of minor minerals for systematic and scientific development of all mines, quarries as well as river bed mining. The responsibility of preparation of "Mining Plan" in respect of any mine applied for mineral concession has been entrusted to technical experts known as "Recognised Qualified Person" (RQP) and this has been made mandatory for all mines and quarries.

In the present case, it is proposed to extract rock boulder and overlying murum from the forest land. The proposed area is moderately steep toward north west/westerly direction and quarrying shall have to be carried out by making benches at suitable levels between the contours almost in the NE-SW direction as

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shown in Surface Plan, Geological Plan, Five Years Development Plan. As per the contour lines drawn in respect of the area, the hauling road to reach the possible top level of the proposed area shall be constructed from south western side towards north eastern side of the deposit.

For facilitating mining in this area and for transportation of the quarry products, the existing approach road from NH-37 shall be used.

There is a top soil cover with thickness ranging from 2.0 m (on the upper part) to 7.0 m on the lower part. These soil cover is designated as "Murum". Some portion of these murum and rock waste may be used for backfilling after the end of 5 years period.

Open cast semi-mechanised mining method shall be adopted for extraction of sandstone and murum and shale. It is proposed to work with 5.0 m bench height and 6m bench width. The excavators like proclaim will be used for excavation of hard sandstone. The whole excavated materials shall be deposited in the space available on the same bench for loading on trucks/tippers and transported to the reach of Stone Crusher. The chipping and grinding, will be done at the Stone Crusher site located at Patsoi village.

8.1. Pit Geometry:-

Height and width of mining benches depends upon whether the working will be manual, semi-mechanised or fully mechanized. These in turn dependent on targeted production level.

Geology and geo-technical characteristics also have bearing on bench dimension particularly height. Width of bench should be sufficient for movement of loading equipment and transport vehicles.

This deposit is proposed to be worked by mechanized method. The bench height will be maintained at 5m while the width of bench will be minimum 6m to facilitate tipper trucks movement.

The individual bench slope will be kept at 70^0. The ultimate pit slope will be 45^0. The loading of excavated mass will be carried out partly by manual and mostly be done with machine.

8.2. Regime of Mine Operations:-

No. of working days in a year	: 270
No. of working shifts in a day	: one
Duration of shift	: 8 Hrs

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8.3. Safety Barrier:-

The mine working boundary has been fixed after leaving a safety barrier of 7.5m wide all around the lease boundary. The total area locked due to Mandatory safety barrier will be 0.62 Hectares.

8.4. YEARWISE DEVELOPMENT PLAN:

Proposed yearly production is in the range of **1,65,619.5 CuM say 1,65,620 CuM (average)**. The production wise mineable reserves per year for five years are worked as follows:

I. FIRST YEAR PRODUCTION:

Bench No.	Level (m)	Area (sq.m)	Volume of murum	Volume of stone (CuM)	Total volume (CuM)
Bench1(B1)	1281 1276	491.07	982.14	1473.21	2455.35
Bench2(B2)	1276 1271	1066.33	2132.66	3198.99	5331.65
Bench3(B3)	1271 1266	1568.67	3137.34	4706.01	7843.35
Bench4(B4)	1266 1261	1426	2852	4278	7130
Bench 5 (B5)	1261 1256	1297	2594	3891	6485
Bench 6 (B6)	1256 1251	1499	2998	4497	7495
Bench 7 (B7)	1251 1246	1328.32	3320.8	3320.8	6641.6
Bench 8 (B8)	1246 1241	1204	3010	3010	6020
Bench 9 (B9)	1241 1236	1395	4185	2790	6975
Bench10 (B10)	1236 1231	1296	3888	2592	6480
Bench 11(B11)	1231 1226	1267.24	3801.72	2534.48	6336.2
Bench12 (B12)	1226 1221	1128.06	4512.24	1128.06	5640.3
Bench13 (B13)	1221 1216	1289.58	6447.9	-	6447.9

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Bench 14(B14)	1216 1211	1117	5585		5585
Bench 15(B15)	1211 1206	1133.33	5666.65	0	5666.65
Bench 16(B16)	1206 1201	1385.79	6928.95	0	6928.95
Bench17(B17)	1201 1196	1195	5975	0	5975
Bench 18(B18)	1196 1191	1214.41	6572.05	0	6572.05
Re-mining B2/B21	1271 1266	1066.33	0	5331.65	5331.65
Re-mining B3/B22	1266 1261	1568.67	0	7843.35	7843.35
Re-mining B4/B23	1261 1256	1426	0	7130	7130
Re-mining B5/B24	1256 1251	1297	0	6485	6485
Re-mining B6/B25	1251 1246	1499	0	7495	7495
Re-mining B7/B26	1246 1241	1328.32	0	6641.6	6641.6
Re-mining B8/B27	1241 1236	1204	0	6020	6020
Re-mining B9/B28	1236 1231	1395	0	6975	6975
Total					**1,65,930.6 CuM**

II. SECOND YEAR PRODUCTION:

Bench No.	Level (m)	Area (sq.m)	Volume of murum	Volume of stone (CuM)	Total volume (CuM)	Cumulative volume
Re-mining B10/B29	1231 1226	1296.4	0	6482	6482	6482
Re-mining B11/B30	1226 1221	1267.24	0	6336.2	6336.2	12818.2
Re-mining B12/B31	1221 1216	1128.06	0	5640.3	5640.3	18,458.5
Re-mining B13/B32	1216 1211	1289.58	0	6447.9	6447.9	24,906.4

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Re-minig B14/B33	1211 1206	1117	0	5585	5585	30,491.4
Re-mining B15/B34	1206 1201	1133.33	1133.33	4533.32	5666.65	36,158.05
Re-mining B16/B35	1201 1196	1385.79	1385.79	5543.16	6928.95	43,087
Re-mining B17/B36	1196 1191	1195	2390	3585	5975	49,062
Re-mining B2/B21/B37	1266 1261	1066.33	0	5331.65	5331.65	54,393.65
Re-mining B3/B22/B38	1261 1256	1568.67	0	7843.35	7843.35	62,237
Re-mining B4/B23/B39	1256 1251	1426	0	7130	7130	69,367
Re-mining B5/B24/B40	1251 1246	1297	0	6485	6485	75,852
Re-mining B6/B25/B41	1246 1241	1499	0	7495	7495	83,347
Re-mining B7/B26/B42	1241 1236	1328.32	0	6641.6	6641.6	89,988.6
Re-mining B8/B27/B43	1236 1231	1204	0	6020	6020	96,008.6
RE-mining B9/B28/B44	1231 1226	1395	0	6975	6975	1,02,983.6
Re-mining B10/B29/B45	1226 1221	1296.4	0	6482	6482	1,09,465.6
Re-mining B11/B30/B46	1221 1216	1267.24	0	6336.2	6336.2	1,15,801.8
Re- mining B12/B31/B47	1216 1211	1128.06	0	5640.3	5640.3	1,21,442.1
Re-mining B13/B32/B48	1211 1206	1289.58	0	6447.9	6447.9	1,27,890
Re-mining B14/B33/B49	1206 1201	1117	0	5585	5585	1,33,475
Re-mining B15/B34/B50	1201 1196	1133.33	1133.33	4533.32	5666.65	1,39,141.65
Re-mining B16/B35/B51	1196 1191	1385.79	1385.79	5543.16	6928.95	1,46,070.6
Re-mining B3/B22/B38/B52	1256 1251	1568.67	0	7843.35	7843.35	1,53,913.95
Re-mining B4/B23/B39/B53	1251 1246	1426	0	7130	7130	1,61,043.95
Re-mining B5/B24/B40/B54	1246 1241	1297	0	6485	6485	**1,67,528.95 CuM**

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III. THIRD YEAR PRODUCTION:

Bench No.	Level (m)	Area (sq.m)	Volume of murum	Volume of stone (CuM)	Total volume (CuM)	Cumulative volume
Re-mining B6/B25/B41/B55	1241 1236	1499	0	7495	7495	7495
Re-mining B7/B26/B42/B56	1236 1231	1328.32	0	6641.6	6641.6	14,136.6
Re-mining B8/B27/B43/B57	1231 1226	1204	0	6020	6020	20,156.6
Re-mining B9/B28/B44/B58	1226 1221	1395	0	6975	6975	27,131.6
Re-mining B10/B29/B45/B59	1221 1216	1296.4	0	6482	6482	33,613.6
Re-mining B11/B30/B46/B60	1216 1211	1267.24	0	6336.2	6336.2	39,949.8
Re-mining B12/B31/B47/B61	1211 1206	1128.06	0	5640.3	5640.3	45,590.1
Re-mining B13/B32/B48/B62	1206 1201	1289.58	0	6447.9	6447.9	52,038
Re-mining B14/B33/B49/B63	1201 1196	1117	0	5585	5585	57,623
Re-mining B3/B22/B38/ B52/B64	1251 1246	1568.67	0	7843.35	7843.35	65,466.35
Re-mining B4/B23/B39/B53/ B65	1246 1241	1426	0	7130	7130	72,596.35
Re mining B5/B24/B40/ B54/B66	1241 1236	1297	0	6485	6485	79,081.35
Re mining B6/B25/B41/ B55/B67	1236 1231	1499	0	7495	7495	86,576.35
Re mining B7/B26/B42/ B56/B68	1231 1226	1328.32	0	6641.6	6641.6	93,217.95
Re mining B8/B27/B43/ B57/B69	1226 1221	1204	0	6020	6020	99,237.95
Re mining B9/B28/B44/	1221 1216	1395	0	6975	6975	1,06,212.95

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B58/B70						
Re mining B10/B29/B45 /B59/B71	1216 1211	1296.4	0	6482	6482	1,12,694.95
Re mining B11/B30/B46/ B60/B72	1211 1206	1267.24	0	6336.2	6336.2	1,19,031.15
Re mining B12/B31/B47/ B61/B73	1206 1201	1128.06	0	5640.3	5640.3	1,24,671.45
Re mining B13/B32/B48/ B62/B74	1201 1196	1117	0	5585	5585	1,30,256.45
Re mining B4/B23/B39/B53/ B65/B75	1241 1236	1426	0	7130	7130	1,37,386.45
Re mining B5/B24/B40/B54/ B66/B76	1236 1231	1297	0	6485	6485	1,43,871.45
Re mining B6/B25/B41/B55/ B67/B77	1231 1226	1499	0	7495	7495	1,51,366.45
Re mining B7/B26/B42/B56/ B68/B78	1226 1221	1328.32	0	6641.6	6641.6	1,58,008.05
Re mining B8/B27/B43/B57/B69/ B79	1221 1216	1204	0	6020	6020	**1,64,028.05 CuM**

IV. FOURTH YEAR PRODUCTION:

Bench No.	Level (m)	Area (sq.m)	Volume of murum	Volume of stone (CuM)	Total volume (CuM)	Cumulative Volume (CuM)
Re mining B9/B28/B44/B58/ B70/B80	1216 1211	1395	0	6975	6875	6975
Re mining B10/B29/B45/B59/ B71/B81	1211 1206	1296.4	0	6482	6482	13,457
Re mining B11/B30/B46/B60/ B72/B82	1206 1201	1267.24	0	6336.2	6336.2	19,793.2

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Re mining B12/B31/B47/B61/ B73/B83	1201 1196	1128.06		5640.3	5640.3	25,433.5
Re-mining B4/B23/B39/ B53/B65/B75/ B84	1236 1231	1426	0	7130	7130	32,563.5
Re mining B5/B24/B40/B54/ B66/B76/ B85	1231 1226	1297	0	6485	6485	39048.5
Re mining B6/B25/B41/B55/ B67/B77/B86	1226 1221	1499	0	7495	7495	46543.5
Re mining B7/B26/B42/B56/ B68/B78/b87	1221 1216	1328.32	0	6641.6	6641.6	53,185.1
Re mining B8/B27/B43/B57 B69/B79/B88	1216 1211	1204	0	6020	6020	59205.1
Re mining B9/B28/B44/B58/ B70/B80/B89	1211 1206	1395	0	6975	6975	66180.1
Re mining B10/B29/B45/B59/ B71/B81/B90	1206 1201	1296.4	0	6482	6482	72,662.2
Re mining B11/B30/B46/B60/ B72/B82/B91	1201 1196	1267.24	0	6336.2	6336.2	78,998.3
Re mining B4/B23/B39/B53/B65 B75/B84/B92	1231 1226	1426	0	7130	7130	86,128.3
Re mining b5/B24/B40/ B54/B66/B76/ B85/B93	1226 1221	1297	0	6485	6485	92,613.3
Re mining B6/B25/B41/B55/ B67/B77/B86/B94	1221 1216	1499	0	7495	7495	1,00,108.3
Re mining B7/B26/B42/B56/B68/ B78/B87/B95	1216 1211	1328.32	0	6641.6	6641.6	1,06,749.9
Re mining B8/B27/B43/B57/B69/	1211 1206	1204	0	6020	6020	1,12,769.9

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B95/B102/B107						
Re mining B8/B27/B43/B57/ B69/B79/B88/ B96/B103/B108	1201 1196	1204	0	6020	6020	26,641.6
Re mining B4/B23/B39/B53/ B65/B75/B84/ B92/B99/B109	1221 1216	1426	0	7130	7130	33,771.6
Re mining B5/B24/B40/B54/B66/ B76/B85/B93/B100/ B110	1216 1211	1297	0	6485	6485	40,256.6
Re mining B6/B25/B41/B55/B67/ B77/B86/B94/B101/ B111	1211 1206	1499	0	7495	7495	47,751.6
Re mining B7/B26/B42/B56/B68/ B78/B87/B95/ B102/B112	1206 1201	1328.32	0	6641.6	6641.6	54,393.2
Re mining B8/B27/B43/B57/B69/ B79/B88/B96/ B103/B113	1201 1196	1204	0	6020	6020	60,413.2
Re mining B4/B23/B39/B53/ B65/B75/B84/B92/ B99/B109/B114	1216 1211	1426	0	7130	7130	67,543.2
Re mining B5/B24/B40/B54/ B66/B76/B85/B93/ B100/B110/B115	1211 1206	1297	0	6485	6485	74,028.2
Re mining B6/B25/B41/B55/B67/ B77/B86/B94/B101/ B111/B116	1206 1201	1499	0	7495	7495	81,523.2
Re mining B7/B26/B42/B56/B68/ B78/B87/B95/B102/ B112/B117	1201 1196	1328.32	0	6641.6	6641.6	88,164.8
Re mining B4/B23/B39/B53/B65/ B75/B84/B92/B99/	1211 1206	1426	0	7130	7130	95,294.8

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B109/B114/B118						
Re mining B5/B24/B40/B54/B66/ B76/B85/B93/B100/ B110/B115/B119	1206 1201	1297	0	6485	6485	1,01,779.8
Re mining B6/B25/B41/B55/B67/ B77/B86/B94/B101/ B111/B116/B120	1201 1196	1499	0	7495	7495	1,09,274.8
Re mining B4/B23/B39/B53/B65/ B75/B84/B92/B99/ B109/B114/B118/B121	1206 1201	1426	0	7130	7130	1,16,404.8
Re mining B5/B24/B40/B54/B66/ B76/B85/B93/B100/ B110/B115/B119/B122	1201 1196	1297	0	6485	6485	1,22,889.8
Re mining B4/B23/B39/B53/B65/ B75/B84/B92/B99/B109/ B114/B118/B123	1201 1196	1426	0	7130	7130	1,30,019.8
Re mining B5/B24/B40/B54/B66/ B76/B85/B93/B100/ B110/B115/B119/B124	1196 1191	1297	0	6485	6485	1,36,504.8
Re mining B6/B25/B41/B55/B67/B77/ B86/B94/B101/B111/B116/ B120/B125	1196 1191	1499	0	7495	7495	1,43,999.9
Re mining B7/B26/B42/B56/B68/B78/ B87/B95/B102/B112/B117/ B126	1196 1191	1328.32	0	6641.6	6641.6	1,50,641.4
Re mining B8/B27/B43/B57/B69/B79/ B88/B96/B103/B113/B127	1196 1191	1204	0	6020	6020	1,56,661.4
`re mining B9/B28/B44/B58/B70/B80/ B89/B97/B104/B128	1196 1191	1395	0	6975	6975	**1,63,636.4 CuM**

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8.5. YEAR-WISE MINE WORKING OPERATION:-

I. **First Year Working (Fig.6):**

1. Construction of quarry haul road from the datum level at 1176 m to a maximum level of RL at 1281m level approximately.
2. Development of the first overburden and mineral bench 1 (B1) at 1281m level following the surface contour.
3. The next Bench 2(B2) at 1276 m to Bench-18(B18) at 1191 m level shall be developed at the same time following the respective surface contour.
4. At this stage stipulated target could not be achieved within the benches mentioned above, re-mining from Bench 2 (B2) to Bench 9 (B) shall have to be carried out to achieve the stipulated target. The Re-mining of Bench 2 to Bench 9 shall be re-designated as Bench 2/B21, Bench3/B22, Bench4/B23, Bench 5/B24, Bench 6/B25, Bench 7/B26, Bench 8/B27, and Bench 9/B28.
5. During this year the Bench 1(B1) to Bench 9(B9)/B28 will be exhausted.

The synopsis of the parameters of the first year operation is given in the chapter of 8.4.(I) **(Year-wise development plan).**

II. Second Year working (Figure -7)

1) The second year operation shall be started from the re-mining of Bench10(B10)/B29 to Bench 17 (B17)/B36 in the level of 1231m and 1191m.

To Achieve the stipulated target, next re-mining will be taken up from Bench 2 to Bench 16 and again re-mining of Bench 3 to Bench 5.

Re-designated benches of this year are given below:

i) Bench 10(B10)/B29/, ii) Bench-11 (B11/B30), iii) Bench-12(B12/B31), iv) Bench-13(B13/B32), v) Bench-14(B14/B33), ... to Bench-17(B17/B36) & Bench-2 (B2/B21/B37) ..... to Bench-16 (B16/B35/B51) and Bench3 (B3/B22/B38/B52) ..... to Bench-5 (B5/B24/B40/B54).

2) During this year the above mentioned benches will be exhausted.

The synopsis of the parameters of the second year operation is given in the chapter of 8.4.(II) **(Yearwise development plan).**

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III. **Third Year working (Figure-8)**

The Third year operation shall be started from the re-mining of Bench6 upto Bench-14, and again start re-mining from Bench-3 to Bench 13. The repeated re-mining is required to achieve the target. Therefore, re-mining of Bench 4 to Bench-8 will also carried out.

The synopsis of the parameters of the second year operation is given in the chapter of 8.4.(III) **(Yearwise development plan).**

IV. **Fourth Year (Figure-9).**

As above, quarry operation shall be started re-mining of Bench -9 in the level of 1216m & 1211 m to Bench-12 in the level of 1201m & 1196m and followed by re-mining of Bench-4 in the level of 1236 m & 1231m to Bench-8 in the level of 1221 m & 1216m. To achieve the stipulated target of production re-mining will be continued from Bench 9 (in the level of 1211 m & 1206m) to Bench 11(in the level of 1206m & 1201 m). Not only these, re-mining of Bench 4 to Bench 10 will be carried out.

The synopsis of the parameters of the second year operation is given in the chapter of 8.4.(IV) **(Yearwise development plan).**

V. **Fifth Year working (Figure-10)**

1. The 5th year quarry operation shall be started from the re-mining of Bench 5 to Bench 9 with repeated re-mining in different level.

The synopsis of the parameters of the second year operation is given in the chapter of 8.4.(V) **(Yearwise development plan).**

The year wise production is proposed as follows:-

Sl.No.	Year	Cubic Metre
1	I	**1,65,930.6**
2	II	**1,67,528.95**
3	III	**1,64,028.05**
4	IV	**1,66,973.5**
5	V	**1,63,636.4**
Average		**1,65,619.5 CuM**

The working plans for first five years are shown in Figure-7 to 11.

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8.6. USE OF EXPLOSIVE:

The stipulated target of production and hardness and nature of the rock deposits, use of explosive is suggested as and when required. For this applicant is suggested to approach the competent authority to take permission to use of explosive in a proper way.

(i) DRILLING:

Different parameters considered for drilling are as follow:-

Parameters	Amount
Mineral to be extracted	8,30,520 CuM
No. of working days per year	270 days
Minerals to be handled per day	613.41 CuM
No. of shift per day	1
Depth of hole	1.5m
Spacing of holes	2.0 m 2.5m
Burden of each hole	1.0 m – 1.5 m
Pattern of holes	Staggered
Inclination of hole	Vertical
Yield per hole	3.0 CuM
No. of holes per day	22-23
Type of drill machine to be used	Handheld Jack Hammer Drill
Diameter of hole	25mm
No. of drill machine to be used	20 Nos.
BLASTING	
Parameters	Quantity
Yield per hole	3 CuM
Powder factor	5.50 MT/Kg
Charge per hole	1.50 kg
Explosive to be used	Geletin & ANFO
Detonators	Electric
Dalay detonators	25ms.

(ii) EXPLOSIVE AND BLASTING PARAMETERS:

Primary blasting parameters:

1. Type of explosive	High explosive
2. Yield per hole	3 CuM
3. Diameter of hole	25 mm
4. Charging pattern	
i) Bottom charge	i) High explosive
ii) Column charge	iii) ANFO
5. Minimum No. of hole per day	8-10
6. Manner of blasting	Electrical

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7. sequence of blasting	Multiholes
8. charge per hole	1.5 kg
9. cartridge	0.50 kg
10. ANFO	2.40 kg
11. Detonators	Short delay-Electric

(iii) TYPE OF EXPLOSIVE:

As available in the local market it is suggested to use 25 mm Slurry explosives (Class-II) in the proposed quarry. The available brands are Powergel, Superdyne, Dynex-90, etc.

In addition to above, ANFO (Ammonium Nitrate Fuel Oil Mixture) may be used to reduce the cost of explosive. It is prepared by mixing Prilled Ammonium Nitrate with HSD oil in the proportion of 94.5 : 5.5. The ration of both the explosives will be as below:-

Slurry explosives: ANFO = 37.5 :62.5

(iv) BLASTING OPERATION:

The blasting operation shall be undertaken by competent persons as per Mining Rules & Regulations in force with maximum precautions to make the blasting operation safe.

Frequency of blasting can be optimized by use of delay detonators to reduce the noise and ground vibration within the threshold limit. Blasting pattern, stemming, charge per hole should be designed on the basis of field trials to control the flying rocks. Adequate sirens, signals, posting of guards at strategic points before blasting shall have to be provided.

(v) STORAGE OF EXPLOSIVES:

In view of the existing law and order situation of the State frequent transportation of explosives from Imphal to quarry site is a risk. Therefore, it is suggested to obtain help of CRPF, Langjing to procure explosives for 5 to 6 days and store in their custody in an explosive van. the stored explosives may be used for blasting in the quarry as and when required.

8.7. CONCEPTUAL PLAN FOR LEASE PERIOD:-

The recoverable reserve of 8,30,520 CuM.which will sustain the mine production at the rate of **1,65,620 CuM** per year for five years. Mining will be carried out by open cast method as mechanized system. The mining will be carried out by regular benching, bench dimensions being 5 m x 6m. The backfilling operations and plantation can be planned towards the end of 5 years mine life in those parts of the mined out areas. From environmental point of view, proposed

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activity of mining will not create much environmental problem associated with air, water and noise as steps will be taken for water sprinkling, good machinery maintenance, etc. The measures suggested in the plan will prevent environmental related problems. However, the existing topography of lease area will undergo further change gradually. The impact on land due to mining and associated activities has been given in the following paras.

Land Use Pattern at the End of Five Years:-

Sl.No.	Activity/utilisation	Area Involved (Ha)		
		Existing	During Ten Years	Total
1.	Mining	-	4.38	4.38
2	Top soil dump	-	-	-
3	Dumping	-	-	-
4	Mineral/sub-grade storage	-	-	-
5	Approach Road	-	0.16	0.16
6	Office/Site service	-	-	-
7	Safety Barrier zone/Green zone	-	0.62	0.62
	Total			5.16

8.8. LOADING AND TRANSPORTATION:

The excavated materials will be loaded by excavator. For the daily production target of 615.2 Cum, one excavator will be deployed for loading 16 CuM capacity tipper trucks. For transport of mined out mass 38 numbers of 16 CuM will be kept in the fleet.

8.9. MINE DRAINAGE:

The source of water will be rainwater during monsoon. To take care of monsoon run-off, slope will be provided towards suitable contour on the working benches. Any accumulation in mine workings will be pumped away by portable diesel pumps. The general slope is toward westerly direction.

When the working reaches bottom level, garland drain will be constructed so that rain water does not get into working from adjoining level,. However, pumping arrangement has to be made to pump out water directly falling into the working after collecting it in settling pond/sump. There will be provision of arresting any silt and rock fragment by installing settling tanks during rainy days to prevent contamination to the natural streams located around the quarry area.

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8.10. SOIL EROSION:-

There will not be any soil erosion during rainy season as the rocks and its geological structures are in stable situation. The sandstone exposed in the area are quite touch and hard and their bedding planes are dipping along the hill slope direction. The general slope of the hill is less than 43^0 dipping toward westerly direction.

8.11. DISPOSAL OF MINERAL:

There will be stockyard in the working bench itself. The large rock boulders produced while quarrying will be broken manually and by using machine to a desired size and will be loaded to the Dumpers/Tippers/Trucks for dispatch to the desired locations.

8.12. DISPOSAL OF WASTE:

The waste comprises mainly shale occurring in parting into sandstone, brocken rocks and some quantity of murum. These materials shall be preserved separately for use in the reclamation purposes.

8.13. END USE OF THE MINERAL:

The mineral especially sandstone/stone and murum to be quarried will be utilized mainly for supply to the own Stone Crushers to manuafacture road and building stones. The murum will be used as filling materials/foundation materials for road, railway, engineering structures.

8.14. SERVICE FACILITIES:-

Mining Lease holder will keep all the basic amenities, office and other requirements as per Mining rules and regulations at the base camp near the proposed quarry area. The following facilities are to be provided for smooth running of the mine.

1. Rest shelter for the quarry workers
2. First Aid room
3. Site Office and store
4. Arrangement for drinking water and sanitation.
5. portable blasting shelters at suitable points for use by the blaster.

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CHAPTER-VII

9. ENVIRONMENTAL MANAGEMENT PLAN:

A) Base Line Information:

Sl.No.	Particulars	Description
1	Type of Land	Degraded forest land with grasses, shrubs and small trees.
2	Whether clearance under Environmental Act, 1986 Required?	Yes
3	Existing land use pattern	Unclassified forest land
4	Present land occupation	Settlement-0% Agriculture- 0% Grass-60% Shrubs-39% Small trees-1%
5	Area already degraded	100%
6	Flora and fauna	Nil
7	Water regime	There is small nala near the lease area which is active during rainy season.
8	Human settlement	Only one human settlement called Sinam village in 2.8 km away in the SW disrection.
9	Public building, place of worship, Monument and Cremation Ground	Nil
10	Does the area fall under notified area under Water (prevention & Control of pollution) Act,1974	No
11	Quality of air	Not assessed. but it is pleasant.
12	Climatic condition	Humid, sub-tropical and heavy rainfall during rainy season, Temperature ranges between 34^{0}C to 2^0 C.

ENVIRONMENTAL IMPACT ASSESSMENT:

As per as order of Hon'ble Supreme Court dated 27/02/2012, it has been decided that all mining projects of minor minerals including their renewal irrespective of the size of the licence/lease/permit area would require prior

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environmental clearance. therefore, proposed mining lease area also attracts prior environmental clearance.

The mining operation in the proposed quarry will have some impact on the environment. However, considering the nature and scale of operation the impact on physical environment from this quarrying operation in this area will be less. The broad outlines of probable impacts on environment from this quarrying operation in the area are detailed below:-

LAND AND AREA:

After the mining operation to be carried out in the proposed area measuring 5.16 hectares, the landscape of the quarrying area will be changed. Presently, the area is covered with grasses and some shrubs. After completion of mining operation there is no scope for agriculture activity in this area. but reclamation of this area with plantation of trees shall have to be undertaken by the lease holder at his own cost under a "Mine Closure Plan" as described.

AIR QUALITY:

The air quality will get affected in and around the area due to mining activity like blasting, movement of trucks, etc. Since only manual mining will be carried out in the quarry, the impact on environment will be very less due to the mining activities. However, measures like water spraying and use of delay detonators needs to be applied to reduce the impact on the local environment.

WATER QUALITY:

In the rainy season, the water flows down the hill slope directly from east to west and goes downwards. All measures to arrest the silt and the rock fragments produced due to mining activity in the quarry including construction of settling tanks. Further it is suggested to analyse water samples at regular intervals to ascertain the quality of water.

NOISE AND VIBRATION:

The noise and vibration along with dust are generated due to the following activities while mining:-

1. Operation of mining equipment like drills, compressrs, etc.
2. Blasting
3. Movements of transport vehicles.

It is suggested to take following measures to control it by

1. Periodic blasting using delay detonators.
2. Arrangement for spray of water in the dust generating areas to suppress the dust.

SOCIO-ECONOMIC ENVIRONMENT:

The socio-economic environment of the locality will improve with upliftment of the economic scenario due to the flowing reasons:

1. Generation of direct and indirect employment
2. Development of infrastructure
3. Growth of business and other economic activities.

PUBLIC BUILDINGS, MONUMENTS, CREMATION GROUND ETC:-

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The proposed mining site is free from the above mentioned items.

CHAPTER-VIII

10. PROGRESSIVE MINE CLOSURE PLAN:

The Manipur Minor Mineral Concession Rules, 2012 has made it mandatory to incorporate a "Progressive Mine Closure Plan" and a "Final Mine Closure Plan" in the Mining Plan vide Rule 49 (B)(6) of the said Rule. But as per the rule, only the "Progressive Mine Closure Plan" is to be incorporated in the Mining Plan and accordingly the same shall have to be submitted and obtain approval one year prior to the date of proposed closure of the mine.

MINE CLOSING OPERATIONS:-

The proposed sandstone, murum and shale quarry located in the hilly area will have to be operated by "Opencast method of Mining". The details of all the workings of the mine for a period of 5 years have been explained in the year wise extraction of sandstone, murum and shale with detailed plans and maps.

Mine closure plan encompasses rehabilitation process as an ongoing programme designed to restore physical, chemical and biological quality disturbed by the mining activity to a level acceptable to all concerned. It must aim at leaving the area on completion in such a way that rehabilitation does not become a burden to the society after the mining operation is over.

Therefore, progressive mine closure operation is a continuous series of activities staring from the day one of the initiation of the mining project. Here in this present case of sandstone, murum and shale quarrying, opencast mining shall be carried out with preparation of benches from top of the hill terrain downwards to the bottom level. As described in this mining plan earlier and considering the production schedule, 20 numbers of benches from B1 to B20 shall have to be prepared along with re-mining benches from B21 to B128 while mining the sandstone, murum and shale within the period of 5 years. (See Plate of Mine closure plan in Figure-11). So from the first year onwards while preparing the Bench B1 itself the lease holder shall have to be cautious enough and keep in mind about the activities to be carried out for reclamation of the mined out areas.

This sandstone, murum and shale quarry has considerable quantity of overburden mainly as top soil and waste rocks. The top soil should be removed and stored separately, while the solid wastes should be stored in the external dumps keeping the area to be backfilled free. These external dumps should be stored in benches, which come up during the mining operations. With the progress of the mine face and availability of space for backfilling, the waste rocks are first utilized to fill the voids up to a planned level. The top soil stored separately should then be laid over it to sustain plant growth.

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It may be seen in the plate of the Mine closure plan that there are in total 128 numbers of benches proposed to be created during the mining operation for 5 years. The benches have been marked from B1 to B128 in the plate accordingly. As per the process described above, the reclamation work in the Mine Closure Plan in respect of the mine may be programmed as below:-

5th Year: Backfilling of benches with solid waste and plantation with suitable kind of plants at bench after completion of mining operation. Plantation with suitable kind of plants at last re-mining Bench along with the surrounding safety zone. The above schedule of reclamation work may however be altered as per requirement and its suitability.

CHAPTER-IX

11. CONCLUSION:

After detailed analysis of the base line data available on the present environment scenario of the proposed area, its impact on the present area for production of sandstone, murum and shale and different measures suggested against adverse impact brings out of following facts:-

1. The proposed area is a degraded forest land having soil (murum) cover with grass, shrubs, small trees and exposed rock surface.
2. The area is not suitable for agricultural activities.
3. There is no rare and endangered or unique species of flora and fauna found in the area.
4. There is no protected Archeological heritage site, Historical monument, Defense establishment in and around the lease area. Place of Worship, cremation ground are not found within 500 m radius.
5. There are least chances of contamination of the general air due to this mining operation.
6. There will not be any adverse impact on hydrology and water quality of the locality due to mining operation.
7. A detailed programme for reclamation of the area has been described in the "Progressive Mine Closure Plan" to combat ecology of the area.
8. There will be significant upliftment of socio-economic scenario of the area due to this mining operation.

Considering all the parameters mentioned above, and the fact that the materials produced through this mining project will be utilized for the development of infrastructure of the state.

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Date ...
Directorate of Trade & Commerce & Industries, Manipur

GOVERNMENT OF MANIPUR
DIRECTORATE OF TRADE, COMMERCE & INDUSTRIES

RECEIPT OF APPLICATION FOR MINING LEASE

Imphal, the 2nd December, 2019

No. D(5)-94/IND/2019: In exercise of the power conferred by Rule 4(2) and Rule 5(1) of the Manipur Minor Mineral Concession Rules, 2012 and in consideration of the application No. "nil" dated 28/08/2019 and 28/11/2019 submitted by Shri Huidrom Vikramjit Singh, Managing Director, M/s. HVS Construction Materials, Patsoi, Imphal West District for the grant of quarrying lease of sandstone/Road metal, the Director of Trade, Commerce & Industries, Govt. of Manipur is pleased to convey its approval to the grant of **Quarrying Lease** to Shri Huidrom Vikramjit Singh, for quarrying of sandstone/road metal over an area of 5.16 Hectares in Kotlen, Longa Koireng village, Kangpokpi District, Manipur for a period of 10(ten) years commencing on the date of execution of Quarrying Lease Deed within the area bounded by the geographical limits as below:

Location	Co-ordinates of Boundary Points of Proposed Quarry area (WGS-84)		Area (in Hectare)
	Latitude : Longitude	Latitude : Longitude	
Kotlen, Longa Koireng village, Kangpokpi District, Manipur	B1:N24°47'48.11" : E93°44' 24.72" B2:N24°47'51.25" : E93°44' 27.13" B3:N24°47'53.48" : E93°44' 29.71" B4:N24°47'53.30" : E93°44' 32.65"	B5:N24°47'50.38" : E93°44' 35.60" B6:N24°47'46.93" : E93°44' 33.03" B7:N24°47'44.31" : E93°44' 30.59"	5.16

2. The grant of this lease shall be subject to the following terms and condition:

(i) Payment of fee, security deposit and financial assurance will be made as per Rule 34, Rule 35 and Rule 40 of the Manipur Minor Mineral Concession Rules, 2012.

(ii) The lessee is required to submit Mining Plan along with requisite fee under Rule 49C of the Manipur Minor Mineral Concession (Amendment) Rules, 2018 as provided under Rule 39(4) and 49 A of the Manipur Minor Mineral Concession Rules, 2012 and as amended.

(iii) The lessee shall strictly adhere to the conditions laid down in Rule 39 of the Manipur Minor Mineral Concession Rules, 2012.

(iv) The lessee shall comply with the related provisions of Environment (Protection) Act, 1986 and Forest (Conservation) Act, 1980 and rules and Notifications issued from time to time.

3. The Quarrying Lease Deed shall be executed in prescribed Form-H after fulfilling the conditions required in Sl.No. 2(i),2(iii) above and after obtaining of Environmental Clearance and Forest Clearance. ***The quarrying operation shall be permitted only after execution of Quarrying Lease Deed.***

Th. Sanjoy Singh

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(C. Arthur Worchuiyo)
Director of Trade, Commerce & Industries,
Manipur.

Copy to:

1. PPS to Hon'ble Minister (Textiles, Commerce & Industry), Manipur.
2. The Principal Secretary (Textiles, Commerce & Industry), Govt. of Manipur.
3. The Principal Chief Conservator of Forests & Head of Forest Force, Govt. of Manipur.
4. The Director of Environment, Govt. of Manipur.
5. The Deputy Commissioner, Kangpokpi District, Manipur.
6. The Divisional Forest Officer, Kangpokpi Forest Division, Forest Dept., Manipur
7. Shri Huidrom Vikramjit Singh, Managing Director, M/s. HVS Construction Materials, Patsoi, Imphal West District, Manipur.

Director
Dept of Trade, Commerce & Industries
Govt of Manipur

31/12/19
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Asstt. Geologist/ROP
Directorate of Trade, Comm. & Industries
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GOVERNMENT OF MANIPUR
DIRECTORATE OF TRADE, COMMERCE & INDUSTRIES

OFFICE CORRIGENDUM

Imphal, the 23rd December, 2019.

No. D(5)-94/IND/2019: In partial modification of previous order of even number dated 02/12/2019 regarding the grant of Quarrying Lease of sandstone/road metal over an area of 5.16 Hectares for quarrying of Sandstone/Road metal in Kotlen, Longa Koireng village, Kangpokpi District in favour of Shri Huidrom Vikramjit Singh, Managing Director ,M/s. HVS Construction Materials, Patsoi, Imphal West District, the mineral "sandstone/road metal" of the quarrying lease area shall be read as "Sandstone/road metal, murum and shale".

2. The required conditions for the grant of quarrying lease shall remain unchanged.

(C. Arthur Worchuiyo)
Director of Trade, Commerce & Industries,
Manipur.

Copy to:

1. PPS to Hon'ble Minister (Textiles, Commerce & Industry), Manipur.
2. The Principal Secretary (Textiles, Commerce & Industry), Govt. of Manipur.
3. The Principal Chief Conservator of Forests & Head of Forest Force, Govt. of Manipur.
4. The Director of Environment, Govt. of Manipur.
5. The Deputy Commissioner, Kangpokpi District, Manipur.
6. The Divisional Forest Officer, Kangpokpi Forest Division, Forest Dept., Manipur
7. Shri Huidrom Vikramjit Singh, Managing Director ,M/s. HVS Construction Materials, Patsoi, Imphal West District

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Director
Dept of Trade, Commerce & Industries
Govt of Manipur

27/08/19

GOVERNMENT OF MANIPUR
DEPARTMENT OF TEXTILES, COMMERCE & INDUSTRY

DIRECTORATE OF TRADE COMMERCE & INDUSTRIES GOVT OF MANIPUR

ORDERS BY THE GOVERNOR OF MANIPUR
Imphal, the 21st August, 2019

No.43/5/2018-C&I(Pt.II)(A)/1712 The Governor of Manipur is pleased to designate the following officers of the Directorate of Trade, Commerce & Industries, Manipur as Qualified Mine Planners (QMP) under Rule 49B of the Manipur Minor Concession (Amendment) Rules, 2018 to facilitate applicants who are applying for sand/gravel etc. in the mining in the State :-

1. Shri L.Ratankumar Singh, Assistant Geologist,
2. Shri Th.Khogendro Singh, Assistant Geologist
3. Shri L.Raghumani ~~Singh~~ Sharma, Assistant Geologist

By orders & in the name of Governor,

(N.Sanatomba Singh)
Deputy Secretary (T, C&I), Govt. of Manipur

Copy to:-

1. PPS to the Hon'ble Minister(Tex., Com. & Ind), Manipur.
2. PPS to the Principal Secretary(Tex., Com. & Ind), Manipur
3. The Director(Trade ,Commerce & Industries), Manipur.
4. The Joint Director(Geology & Mining), Dte. of T,C&I, Manipur.
5. Person concerned. Shri L. Raghumani Sharma, Asstt. Geologist
6. Guard File Director T. C&I. Mpl.

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31/12/19

L Raghumani Sharma
Asstt. Geologist/ROP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

Director
Dept of Trade, Commerce & Industries
Govt of Manipur

Th. Sanjay Singh

0 170 340 680 1,020 1,360 Meters

SCALE 1:10,000

Dept. of Tra

COORDINATES OF BOUNDARY POINTS:

B1: 24° 47′ 48.11″N: 93° 44′ 24.72″E, B2: 24° 47′ 51.25″N: 93° 44′ 27.13″E,
B3: 24° 47′ 53.48″N: 93° 44′ 29.71″E, B4: 24° 47′ 53.30″N: 93° 44′ 32.65″E,
B5: 24° 47′ 50.38″N: 93° 44′ 35.60″E, B6: 24° 47′ 46.93″N: 93° 44′ 33.03″E,
B7: 24° 47′ 44.31″N: 93° 44′ 30.59″E,

APPLICANT:
M/S. HVS CONSTRUCTION MATERIALS PVT. LTD
AREA: 5.0 HA (QUARRY AREA + 0.16 HA (APPROACH RD)

DIRECTORATE OF TRADE COMMERCE & INDUSTRIES

VILLAGE AUTHORITY KOIRENG Date .....

NO OBJECTION CERTIFICATE

I have no objection for using my land as quarry at Santhabam Chingmai Koireng, Kangpokpi District, P.O Langjing, B.P.O New Keithelmanbi, Pin No- 795113, Manipur for 5 (five) years by HVS Construction Materials Pvt. Ltd. of Patsoi Part-I, P.O Langjing, P.S Patsoi, Imphal West District, Manipur.

He is not related to me.

Letneh Haokip
Chairman
Koireng Village Authority

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Director
Dept of Trade, Commerce & Industries
Govt of Manipur

31/12/19

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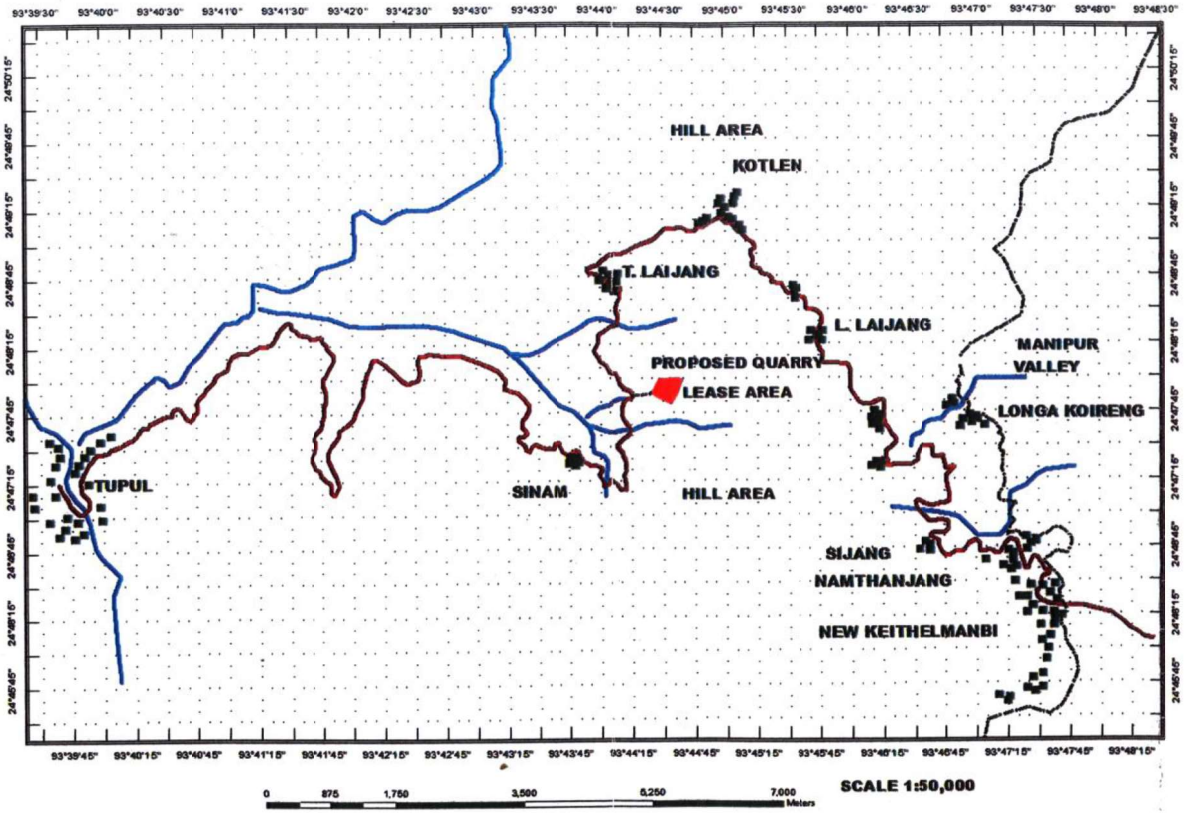
Asstt. Geologist/ROP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

FIGURE-1

KEY MAP



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GOVT. OF MANIPUR

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31/12/19
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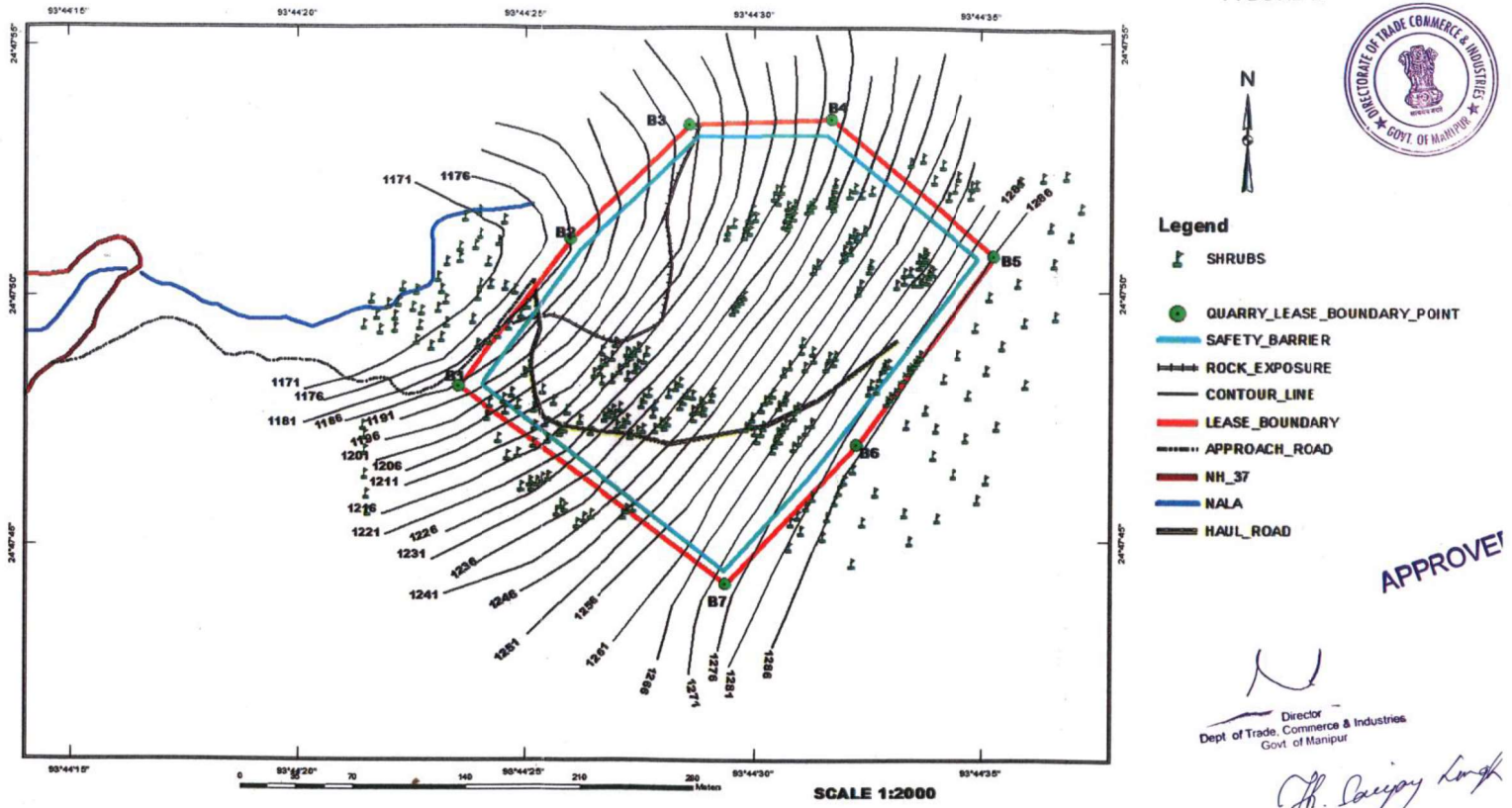
Asstt. Geologist/ROP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

LONGA KOIRENG QUARRYING LEASE OF
SANDSTONE/ROAD METAL, MURUM AND SHALE
AREA: 5.16 HECTARES

APPLICANT: HUIDROM VIKRAMJIT SINGH
MANAGING DIRECTOR
M/S. HVS CONSTRUCTION MATERIALS PVT. LTD.

SURFACE PLAN

FIGURE-2



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Director
Dept of Trade, Commerce & Industries
Govt of Manipur

COORDINATES OF QUARRYING LEASE BOUNDARY POINTS(WGS-84):

B1: 24° 47′ 48.11″ N : 93° 44′ 24.72″ E, B2: 24° 47′ 51.25″ N : 93° 44′ 27.13″ E,
B3: 24° 47′ 53.48″ N : 93° 44′ 29.71″ E, B4: 24° 47′ 53.30″ N : 93° 44′ 32.65″ E,
B5: 24° 47′ 50.38″ N : 93° 44′ 35.60″ E, B6: 24° 47′ 46.93″ N : 93° 44′ 33.03″ E
B7: 24° 47′ 44.31″ N : 93° 44′ 30.59″ E, ,

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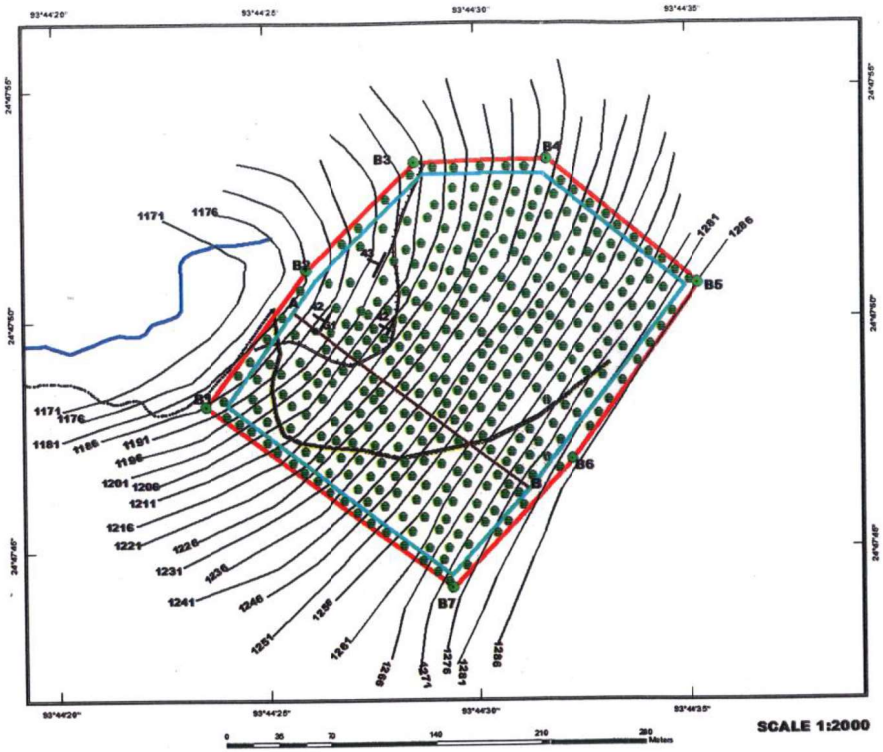
L. Raghumani Sharma
Asstt. Geologist/ROP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

LONGA KOIRENG QUARRYING LEASE OF
SANDSTONE/ROAD METAL, MURUM AND SHALE
AREA:5.16 HECTARES
APPLICANT: HUIDROM VIKRAMJIT SINGH, MD,
M/S. HVS CONSTRUCTION MATERIALS P. LTD.

FIGURE-3

GEOLOGICAL PLAN

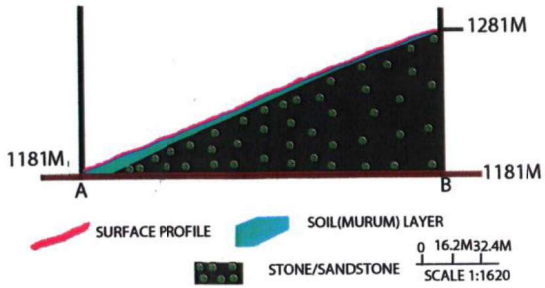


N

Legend

- SANDSTONE_FORMATION
- GEOLOGY
- QUARRY_LEASE_BOUNDARY_POINT
- SAFETY_BARRIER
- ROCK_EXPOSURE
- CROSS_SECTION_LINE
- CONTOUR_LINE
- STRIKE_AND_DIP
- LEASE_BOUNDARY
- APPROACH_ROAD
- NALA
- HAUL_ROAD

GEOLOGICAL CROSS SECTION ALONG A-B



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COORDINATES OF QUARRYING LEASE BOUNDARY POINTS (WGS-84):
B1: 24° 47′ 48.11″ N: 93° 44′ 24.72″ E, B2: 24° 47′ 51.25″ N: 93° 44′ 27.13″ E,
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B5: 24° 47′ 50.38″ N: 93° 44′ 35.60″ E, B6: 24° 47′ 46.93″ N: 93° 44′ 33.03″ E,
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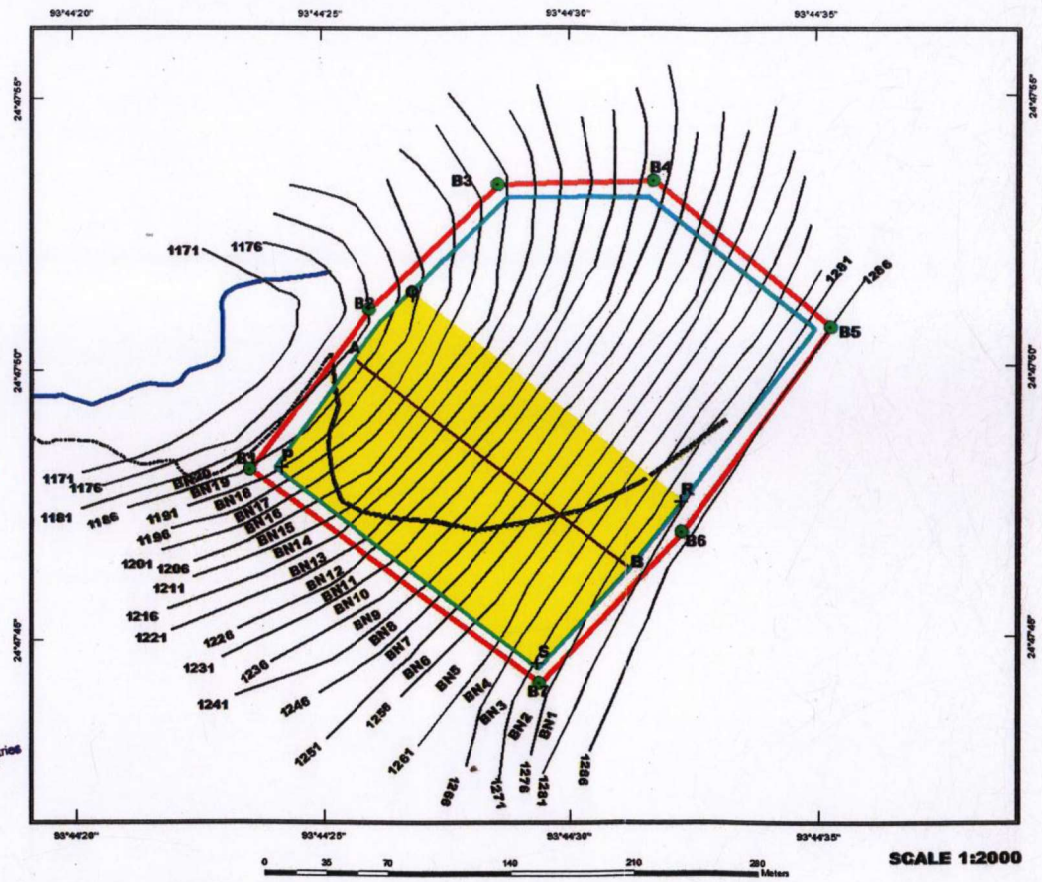
LONGA KOIRENG QUARRYING LEASE AREA OF
SANDSTONE/ROAD METAL, MURUM AND SHALE
AREA:5.16 HECTARES
APPLICANT: HUIDROM VIKRAMJIT SINGH, MD,
M/S HVS CONSTRUCTION MATERIALS (P) LTD.

Th. Sanjay

FIVE YEAR DEVELOPMENT PLAN

FIGURE-4



SCALE 1:2000

N

Legend

- BLOCK_BOUNDARY
- QUARRY_LEASE_BOUNDARY_POINT
- SAFETY_BARRIER
- CROSS_SECTION_LINE
- CONTOUR_LINE
- LEASE_BOUNDARY
- FIRST FIVE YEARS QUARRY BLOCK BOUNDED BY "P,Q,R & S"
- APPROACH_ROAD
- NALA
- HAUL_ROAD

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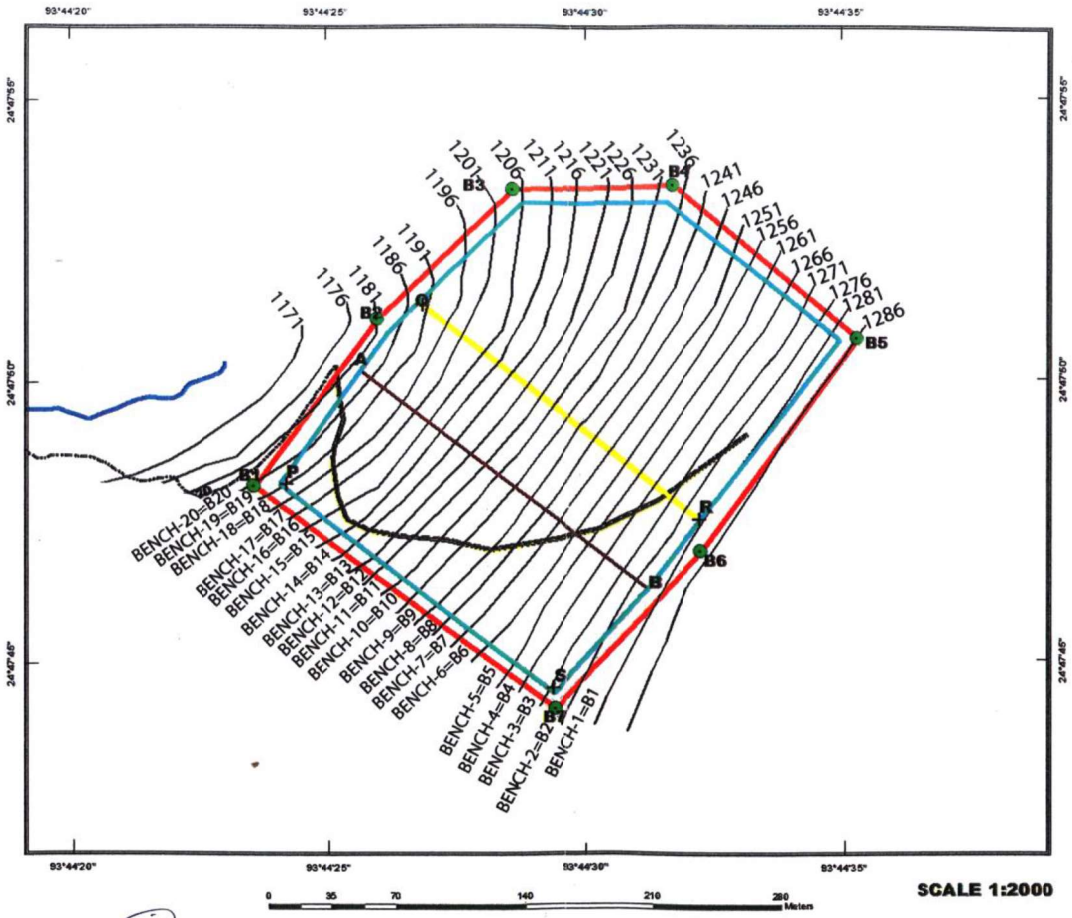
31/12/19
L. Raghumani Sharma
Asstt. Geologist/ROP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

APPLICANT:
HUIDROM VIKRAMJIT SINGH
MANAGING DIRECTOR
M/S. HVS CONSTRUCTION MATERIAL PVT. LTD.

BENCH PLAN

FIGURE-5



SCALE 1:2000

1286 CONTOUR LINE

BOUNDARY POINT OF QUARRYING LEASE AREA

APPROVED

Director
Dte of Trade, Commerce & Industries
Govt. of Manipur

21/12/19
L. Raghumani Sharma
Asstt. Geologist/RQP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

LONGA KOIRENG QUARRYING LEASE AREA OF
SANDSTONE, MURUM AND SHALE
AREA:5.16 HECTARES
APPLICANT: HUIDROM VIKRANJIT SINGH

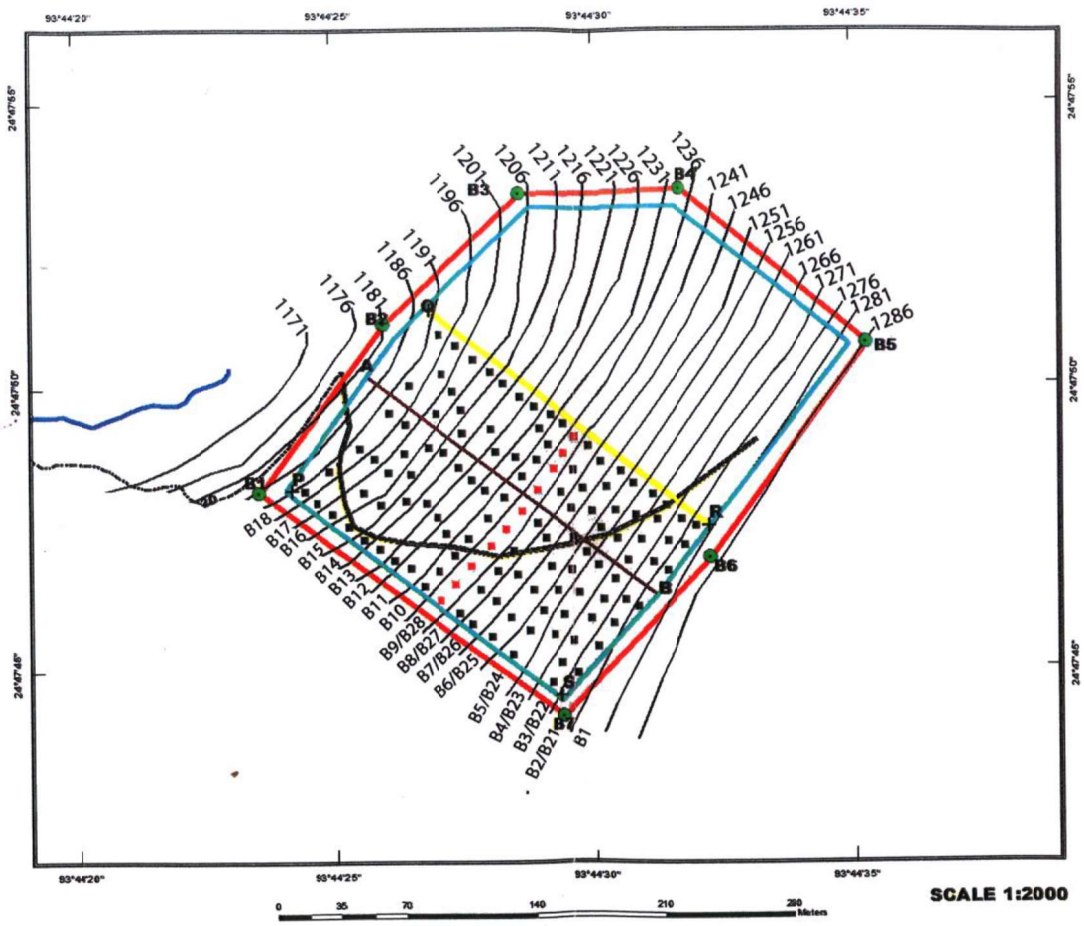
FIRST YEAR OPERATION PLAN

FIGURE-6

DIRECTORATE OF TRADE COMMERCE & INDUSTRIES ★ GOVT OF MANIPUR ★

APPROVED

Director
Dept. of Trade, Commerce & Industries
Govt. of Manipur



SCALE 1:2000

QUARRY BENCH B1 TO B28

L. Reghumani Sharma
Asstt. Geologist/ROP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

WORKING BENCH

EXHAUSTED BENCH

1286 CONTOUR LINE

P,Q,R,S= FIRST FIVE YEARS DEVELOPMENT BLOCK

PQ=RS=123.53 M LENGTH

LONGA KOIRENG QUARRYING LEASE AREA OF
SANDSTONE, MURUM AND SHALE
AREA = 5.16 HECTARES

APPLICANT: HUIDROM VIKRAMJIT SINGH

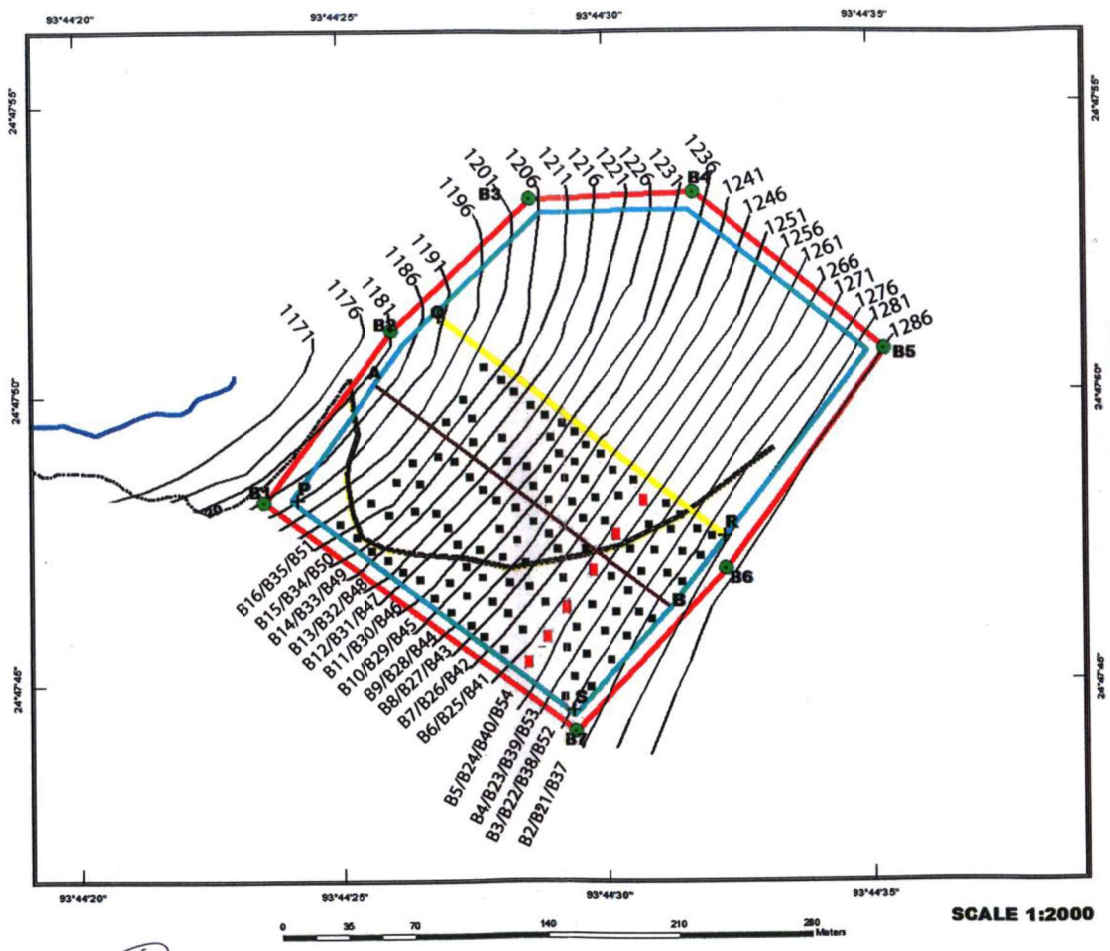
FIGURE-7

SECOND YEAR OPERATION PLAN

DIRECTORATE OF TRADE COMMERCE & INDUSTRIES ★ GOVT. OF MANIPUR ★

APPROVED

Director
Dept of Trade, Commerce & Industries
Govt of Manipur



SCALE 1:2000

WORKING BENCH

EXHAUSTED BENCH

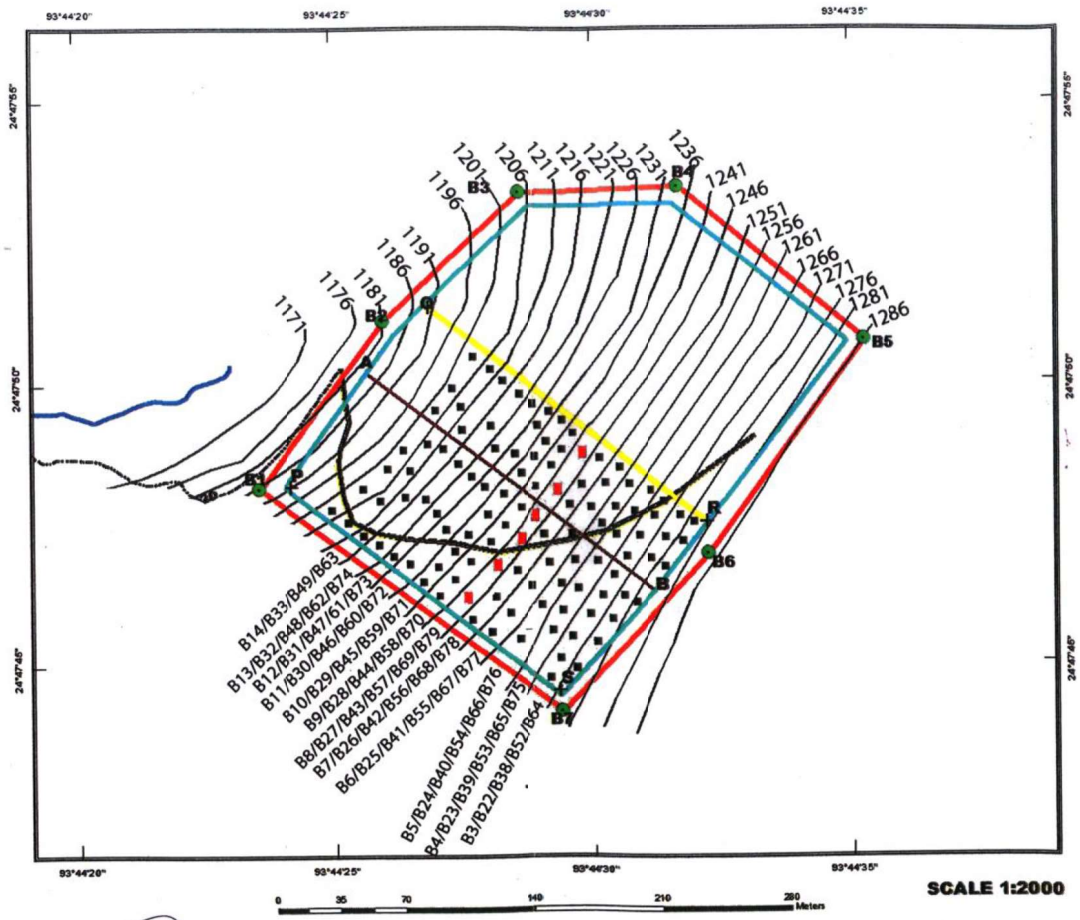
Th. Sanjoy Singh

31/12/19
L. Raghumani Sharma
Asstt. Geologist/RQP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

LONGA KOIRENG QUARRYING LEASE AREA OF
SANDSTONE, MURUM AND SHALE
AREA:5.16 HECTARES

THIRD YEAR OPERATION PLAN

FIGURE-8



SCALE 1:2000

WORKING BENCH

EXHAUSTED BENCH

APPROVED

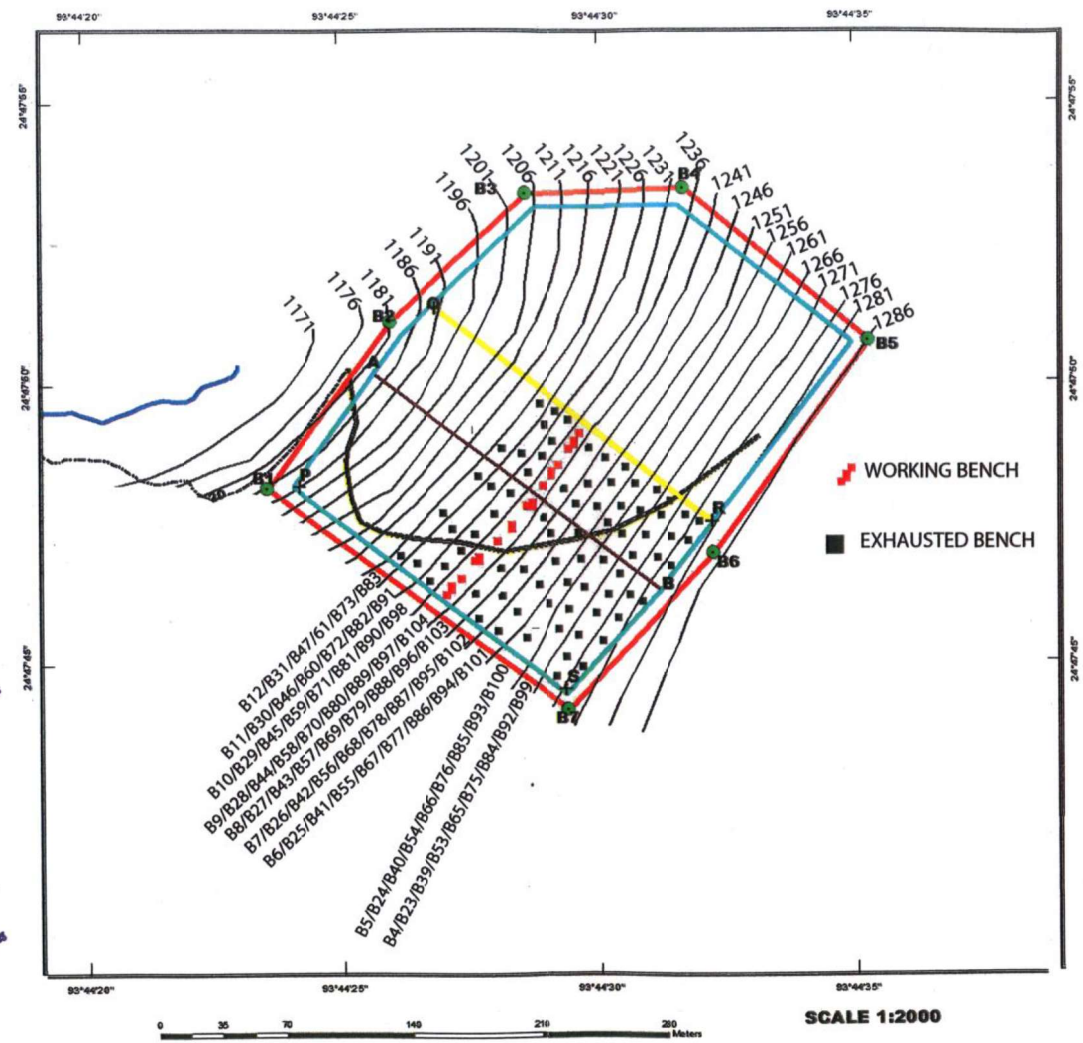
Director
Dept of Trade, Commerce & Industries
Govt. of Manipur

L. Raghumani Sharma
Asstt. Geologist/MDP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

LONGA KOIRENG QUARRYING LEASE AREA OF
SANDSTONE, MURUM AND SHALE
AREA:5.16 HECTARES
APPLICANT: HUIDROM VIKRAMJIT SINGH

FOURTH YEAR OPERATION PLAN

FIGURE-9



APPROVED

Director
Dept. of Trade, Commerce & Industries
Govt. of Manipur

L. Raghumani Sharma
Asstt. Geologist/ROP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

Th. Sanjay Singh

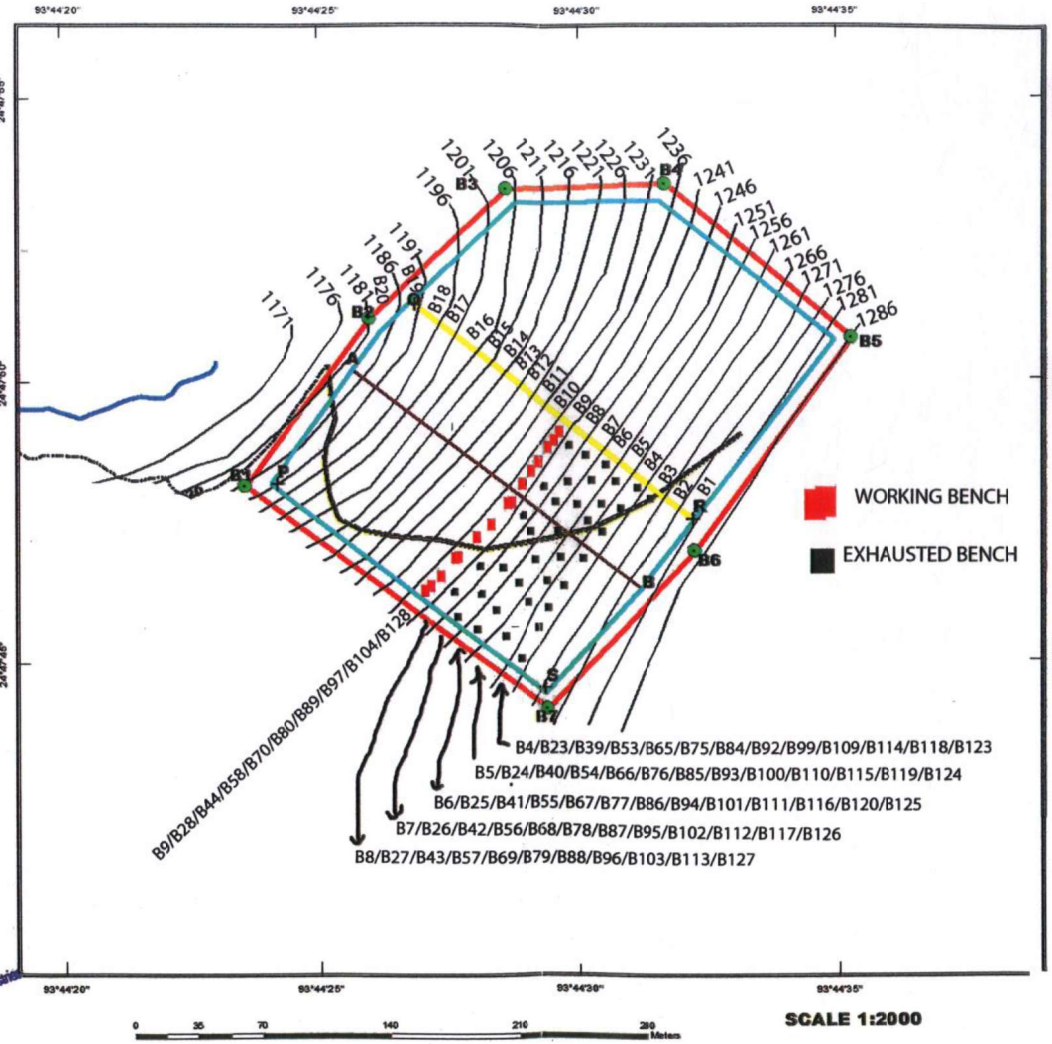
LONGA KOIRENG
QUARRYING LEASE AREA OF SANDSTONE
MURUM AND SHALE

AREA:5.16 HECTARES

APPLICANT:
HUIDROM VIKRAMJIT SINGH

FIFTH YEAR OPERATION PLAN

FIGURE-10



APPROVED

Director
Dept of Trade, Commerce & Industries
Govt. of Manipur

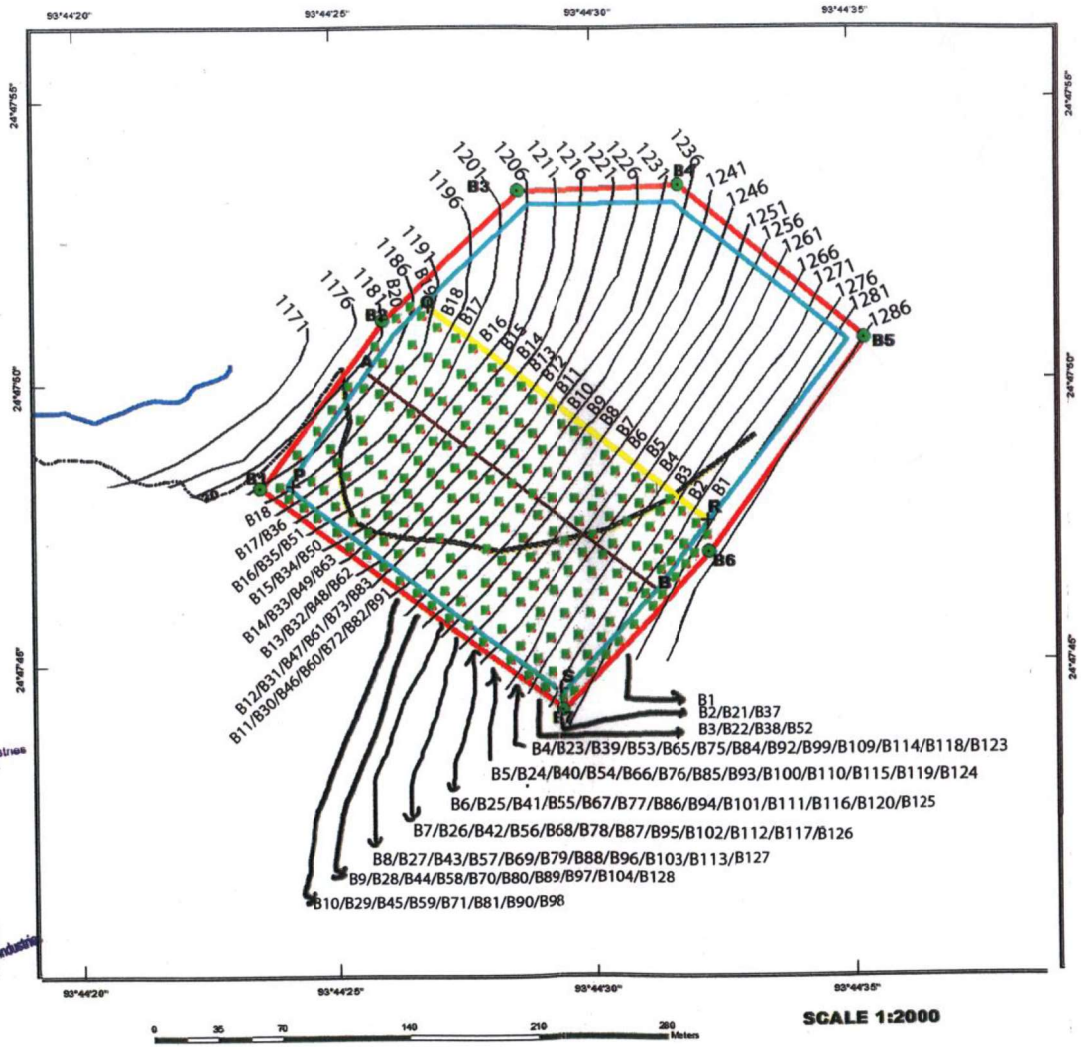
L. Raghumani Sharma
Asstt. Geologist/RQP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

LONGA KOIRENG QUARRYING
LEASE AREA OF SANDSTONE, MURUM AND SHALE
AREA:5.16 HECTARES

APPLICANT:
HUIDROM VIKRAMJIT SINGH, MD
M/S. HVS CONSTRUCTION MATERIAL

PROGRESSIVE MINE CLOSURE PLAN

FIGURE-11



SCALE 1:2000

PLANTATION

LONGA KOIRENG QUARRYING LEASE
AREA OF SANDSTONE, MURUM AND SHALE
AREA:5.16 HECTARES

APPLICANT:

HUIDROM VIKRAMJIT SINGH, MD
M/S. HVS CONSTRUCTION MATERIAL

APPROVED

Director
Dept. of Trade, Commerce & Industries
Govt. of Manipur

L. Raghumani Sharma
Asstt. Geologist/RQP
Directorate of Trade, Comm. & Industries
Govt. of Manipur

Government of Manipur
Directorate of Environment & Climate Change
Porompat, Imphal – 05

No. 1/92/2020(EIA)/DoE&CC **Imphal, the 5th March, 2021**

To,

M/s. HVS Construction Material Pvt. Ltd
Patsoi Lamkhai, NH-37

Sub.: Longa Koireng Village Quarrying Lease of Sandstone, Murum and Shaly Earth at Longa Koireng, Kangpokpi.

Sir,

I have the honour to refer your online application proposal No. SIA/MN/MIN/60721/2021, dated 12th February 2021, regarding Term of Reference (ToR) for minor mineral mining project having an area of about 5.16 Ha. located at Longa Koireng village in kangpokpi district of Manipur and to state that the project falls under Schedule 1(a) and in project category B1 as per EIA Notification of Ministry of Environment, Forest & Climate Change, Govt. of India, S.O. 1533(E), dated 14th September 2006.

The State Level Expert Appraisal Committee (SEAC), Manipur in its meeting held on 3rd March, 2021, appraised all the documents submitted by the project proponent and recommended to the State Level Environment Impact Assessment Authority (SEIAA), Manipur for its approval. Accordingly, the SEIAA, Manipur in its meeting held on 5th March, 2021, has approved ToR with the **General Conditions and ToR for preparation of EIA** as enclosed at annexure.

The ToR shall have the validity for a period of 4 (four) years from the date of issue of ToR for submission of the Environment Impact Assessment (EIA)/ Environment Management Plan (EMP) reports, as per EIA Notification of Ministry of Environment, Forest & Climate Change, Govt. of India vide S.O. 751(E), dated 17.02.2020.

Yours faithfully,

Enclosed : As above

(**Dr. Y. Nabachandra Singh**)
Director
&
Member Secretary, SEIAA, Manipur

Copy to:

1. The Additional Chief Secretary, (Forest, Environment & Climate Change) Govt. of Manipur
2. The Chairman, SEIAA Manipur.
3. The Chairman, SEAC, Manipur.
4. Members, SEIAA and SEAC, Manipur.

Annexure

General Conditions and ToR for preparation of EIA:

1. A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.

2. 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 also should be in the name of the lessee.

3. 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).

4. 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.

5. 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.

6. 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 proposed safeguard measures in each case should also be provided.

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.

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.

9. 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.

10. 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, Rehabilitation and Resettlement (R&R) issues, if any, should be given.

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 of Environment, Forest & Climate Change, Government of India 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.

12. Status of forest 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 forest clearance should also be furnished.

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.

14. The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

15. A study shall be 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 the same is to be submitted.

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 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 be furnished.

17. A detail 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 Rare Endangered and Threatened (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 to be furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

18. Rehabilitation and Resettlement (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.

19. Season wise (non-monsoon / Summer Season /post monsoon season / 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 Ambient Air Quality (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.

20. 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

modelling 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.

21. 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.

22. Necessary clearance from the Competent Authority for drawal of requisite quantity of water for the Project should be provided.

23. 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.

24. 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.

25. 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 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 be furnished.

26. 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 provided.

27. 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.

28. 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.

29. 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.

30. Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.

31. 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.

32. 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.

33. 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.

34. 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.

35. Detail 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 should be provided.

36. 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.

37. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

38. The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

39. A Disaster Management Plan shall be prepared and included in the EIA/EMP Report.

40. 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.

41. The activities and budget earmarked for Corporate Environmental Responsibility (CER) shall be as per EIA Notification of Ministry of Environment, Forest & Climate Change (MoEF&CC), Government of India's O.M No 22-65/2017-IA. III, dated 01.05.2018 and the action plan on the activities proposed under CER shall be submitted at the time of appraisal of the project included in the EIA/EMP Report.

42. The Action Plan on the compliance of the recommendations of the CAG as per EIA Notification of MoEF&CC, Government of India's Circular No. J-11013/71/2016-IA.I (M), dated 25.10.2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.

43. Compliance of the EIA Notification of MoEF&CC, Government of India's Office Memorandum No. F: 3-50/2017-IA.III (Pt.), dated 30.05.2018 on the judgment of Hon'ble Supreme Court, dated the 2nd August, 2017 in Writ Petition (Civil) No. 114 of 2014 in the matter of Common Cause versus Union of India needs to be submitted and included in the EIA/EMP Report.

No.27/53/2021-For & Envt
GOVERNMENT OF MANIPUR
FOREST AND ENVIRONMENT DEPARTMENT

To,

Imphal, the 17th June,2021

The Addl. Principal Chief Conservator of Forests (Central)
North East Regional Office, Law-U-Sib, Lumbatngen,
Near M.T.C.Workshop, Shillong-793 021(Meghalaya).

Subject: Submission of Proposal for diversion of *5.345 ha of forest land for Quarrying of Sandstone/road metal, Murum and Shaly Earth in favour of the HVS Construction materials Pvt. Ltd.*

State serial no. of proposal - **FP/MN/QRY/44562/2020**

Sir/Madam,

I am directed to send herewith a proposal submitted by the Pr. Chief Conservator of Forests, Government of Manipur for diversion of *5.345 ha of forest land for Quarrying of Sandstone/road metal, Murum and Shaly Earth in favour of the HVS Construction materials Pvt. Ltd.* Manipur seeking diversion of forest land under Section-2(ii) of Forest Conservation Act 1980, for obtaining the approval of the Ministry of Environment & Forests, Government of India under section 2 of Forest (Conservation) Act, 1980.

The details are as follows:-

1. **Brief Description:**

The proposed project seeks diversion of forest land of Quarrying of Sandstone/road metal, Murum and Shaly Earth at Longa Koireng, Kangpokpi District, Manipur in favour of the HVS Construction materials Pvt.Ltd. Manipur. As there are many development projects targeted to be implemental in the local demand of roads, railway-line fillings as well as to supply to various government, semi- government and private agencies for construction of civil works, play-ground fillings, embankment for roads etc.

2. **Details of forest land proposed for diversion:**

The total land involved in the Project proposal is 5.0 ha against a total of **95684.17 ha** forest land in the Kangpokpi District. This extent of 5.5 ha is the minimum requirement for the Project.The following Table shows the details of forest land of Kangpoki District:-

21/6/21

Classes	Total Forest Area (ha.)	Forest area to be diverted (ha.)
Geographical area of Bishnupur Division	113411.28	
Forest area of the District	95684.17	
(a) Reserved Forests		
(b) Proposed RF/Sanctuary		
(c) Protected Forests	11.58	
(d) Unclassed Forests	33,68.42	5.345
(e) Village Forests	0.00	
(f) Private Forests	0.00	
(g) National Park/Wildlife Sanctuary	0.00	
Total	95684.17	5.345

Total Forest area diverted since 1980 with number of cases:

Sl. No.	Name of project	Stage-I approval	Stage-II approval	Area (in ha)
1.	Diversion of 9.00 ha of forest land for widening and up-gradation of Tupul-Bishnupur Road	04/12/2014	30/09/2016	9.00

3. **Maps**

The User Agency has furnished the relevant Survey of India Topo map showing proposed Project Area in the scale of 1:50,000 and duly signed by the User Agency and the Divisional Forest Officer, Noney Forest Division, Noney.

4. **Assessment of forest stock-**

The proposed forest land for diversion falls in the Sub-Tropical Semi-Evergreen Forest and will affect 45 Nos. of trees. The Divisional Forest Officer, Noney Forest Division has submitted species-wise and diameter-class-wise enumeration report of the affected trees and the same is enclosed. The ruling crown density of the proposed forest land for diversion varies from 0% to 40% and assessed as Eco-**class-1.**

5. **Flora and Fauna and Archaeological importance-**

The forest under consideration for diversion belongs to the Sub-Tropical Semi-Evergreen Forest. The main floral species found in the forest land for diversion are *Schima wallichii, Quercus serreta, Pinus kesiya, Ficus cunea* etc. Moreover, the area is not important from archaeological view point.

6. **Compensatory Afforestation-**

The forest land to be diverted for the above project is **5.345 ha** and is unavoidable and barest minimum for the project. Since no non-forest lands are available, an area double to the area to be diverted in the degraded forest land has been identified for Compensatory Afforestation (CA) in one patch of unclassed forest of as follows:-

Table showing Forest land identified for Compensatory Afforestation

District in Manipur	Forest Division	Range	Block	Compt. No	Area for CA & ANR (in ha)	Working Circle of approved WP
Kangpokpi	Noney	Noney	Marangching	40	10.69	Pln. W/Circle

The area is proposed to be reforested under plantation through CA. The Divisional Forest Officer, Noney Forest Division, Noney has drawn-up the CA & ANR Scheme with a financial outlay of **₹ 22.159 lakh** (Rupees twenty two lakh fifteen thousand and nine hundred) and the same is indicated in **Annexure-XVIII.** The CA Scheme envisages plantation over 10.69 ha in a single patch. The Divisional Forest Officer, Noney Forest Division, Noney has certified that the area is degraded and suitable for Compensatory Afforestation and the required certificate is furnished herewith as **Annexure-XV.**

The User Agency has furnished Certificate/Undertaking to provide fund for Compensatory Afforestation, Penal Compensatory Afforestation and also to provide fund for Net Present Value (NPV), Addl. Net Present Value (Addl. NPV)

7. **Displacement of human population-**

As per the Project Proposal submitted, no households are likely to be affected directly or indirectly.

8. **Environmental clearance-**

Environmental Clearance will not be required as such Project involving diversion of forest land is not listed in the Schedule of Projects/activities requiring prior environmental clearance vide Ministry of Environment & Forests, Government of India Notification S.O. 1533 dated 14th September, 2006. The User Agency has furnished regarding the Environment Management Plan and the same is enclosed.

9. **Cost-benefit analysis-**

The cost benefit analysis has been undertaken for Proposed Quarrying of sandstone/ road metal, Murum and Shaly Earth at Longa Koireng Village, Kangpokpi District, Manipur.

10. **Violation of Forest Conservation Act/Indian Forest Act-**

There has been no violation of the Forest (Conservation) Act, 1980 and Indian Forest Act. Therefore, Penal Compensatory Afforestation is not proposed.

11. **Recommendation of the State Government-**

The Divisional Forest Officer, Noney Forest Division and other senior officers have recommended the proposal. No adverse comments on the proposal have been furnished by the officers. The proposed forest-land diversion site is not a part of National Park, Wildlife Sanctuary, Biosphere Reserve, Sample Plot, Preservation Plot, Ecologically Fragile Zone. The diversion is not likely to affect habitat of any endemic, threatened species of flora and fauna. The project is not likely to adversely affect the supply of timber, fuel wood, MFP to rural masses. The project will definitely enhance livelihood and socio-economic status of the people fulfilment in the local demand of roads, railway-line fillings as well as to supply to various government, semi- government and private agencies for construction of civil works, play-ground fillings, embankment for roads/rivers etc.

I, would, therefore, request you to kindly convey the approval of the Ministry of Environment, Forest and Climate Change, Government of India under Section 2(ii) of the Forest (Conservation) Act, 1980 for diversion of *5.345 ha of forest land for Quarrying of Sandstone/road metal, Murum and Shaly Earth in favour of the HVS Construction materials Pvt. Ltd.*

Encl:- 1. FORM- A (duly filled in PART-I to V) along with Enclosures

Yours faithfully,

17/06/2021

(A.Heera Singh)
Under Secretary (For & Envt)
Government of Manipur

Copy to:-

1) PPS to Minister (Forest & Environment), Manipur
2) Staff Officer to Chief Secretary, Govt. of Manipur
3) Addl. Chief Secretary (For & Envt), Govt. of Manipur
4) Pr. Chief Conservator of Forests, Government of Manipur, Imphal
5) USER Agency/HVS Construction materials Pvt. Ltd.
6) Guard file

DIRECTORATE OF TRADE COMMERCE & INDUSTRIES

VILLAGE AUTHORITY
Date .....
KOIRENG

NO OBJECTION CERTIFICATE

I have no objection for using my land as quarry at Santhabam Chingmai Koireng, Kangpokpi District, P.O Langjing, B.P.O New Keithelmanbi, Pin No- 795113, Manipur for 5 (five) years by HVS Construction Materials Pvt. Ltd. of Patsoi Part-I, P.O Langjing, P.S Patsoi, Imphal West District, Manipur.

He is not related to me.

Letneh Haokip
Chairman
Koireng Village Authority

APPROVED

Director
Dept of Trade, Commerce & Industries
Govt of Manipur

31/12/19

L. Raghumani Sharma
Asstt. Geologist/ROP
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Ambient Air Quality at AAQ1- Mine Site

AAQ1	Mine Site					
MONTH	**DATE**	**PM2.5 ($\mu g/m^3$)**	**PM10 ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**CO($\mu g/m^3$)**	**NO_2 ($\mu g/m^3$)**
Dec-20	12/4/2020	24.0	23.3	14.2	50.7	6.1
	12/8/2020	24.6	24.1	13.4	58.7	5.5
	12/12/2020	26.5	25.2	12.5	47.9	4.6
	12/16/2020	25.5	34.5	14.3	59.5	5.3
	12/23/2020	22.6	36.3	10.8	65.7	4.8
	12/26/2020	24.1	23.5	11.7	70.2	6.2
	12/29/2020	22.8	24.8	12.7	73.5	5.7
	1/1/2021	23.1	27.8	13.6	75.8	4.8
Jan-21	1/4/2021	24.5	31.3	12.9	74.6	7.1
	1/8/2021	26.8	24.5	13.5	69.6	6.3
	1/12/2021	25.7	23.4	11.9	72.2	7.3
	1/16/2021	27.1	31.6	12.6	49.3	5.5
	1/23/2021	26.7	27.6	13.3	48.4	3.8
	1/26/2021	23.7	29.5	15.4	53.5	5.5
	1/29/2021	26.9	31.2	11.8	47.3	6.4
	2/1/2021	25.5	28.3	11.6	53.6	4.7
Feb-21	2/4/2021	22.4	31.6	10.7	72.0	6.8
	2/8/2021	22.5	30.5	12.2	77.6	7.4
	2/12/2021	21.8	29.8	10.7	73.3	5.9
	2/16/2021	22.3	24.2	9.6	70.1	6.8
	2/23/2021	23.4	26.8	11.4	66.6	6.7
	2/26/2021	26.7	30.7	10.5	68.5	7.5
	2/29/2021	25.5	28.5	12.4	67.7	4.7
	3/1/2021	23.7	30.7	15.8	69.8	6.4
	Max	**27.10**	**36.30**	**15.80**	**77.60**	**7.50**
	Min	**21.80**	**23.30**	**9.60**	**47.30**	**3.80**
	Avg	**24.51**	**28.43**	**12.50**	**63.88**	**5.89**
	98 percentile	**27.01**	**35.47**	**15.62**	**76.77**	**7.45**

Ambient Air Quality at AAQ2- Tamenglong

AAQ2	Tamenglong					
MONTH	**DATE**	**PM2.5 (µg/m^3)**	**PM10 (µg/m^3)**	**SO_2 (µg/m^3)**	**CO(µg/m^3)**	**NO_2 (µg/m^3)**
Dec-20	12/4/2020	24.3	22.6	14.1	48.6	6.1
	12/8/2020	25.2	23.5	12.2	55.7	5.5
	12/12/2020	26.8	24.7	12.1	45.6	4.6
	12/16/2020	22.6	29.6	12.7	57.8	5.1
	12/23/2020	25.7	32.3	10.1	64.7	4.8
	12/26/2020	23.4	23.7	11.3	68.4	5.7
	12/29/2020	22.5	25.8	12.2	72.3	5.6
	1/1/2021	24.6	27.6	12.7	75.5	4.7
Jan-21	1/4/2021	25.4	30.2	12.4	72.4	6.8
	1/8/2021	23.5	23.0	12.5	67.7	6.3
	1/12/2021	26.2	23.3	11.3	70.6	7.2
	1/16/2021	22.3	32.8	12.2	48.5	5.4
	1/23/2021	24.8	26.4	12.5	47.3	3.6
	1/26/2021	22.7	24.5	14.6	52.2	5.5
	1/29/2021	25.4	23.6	12.4	46.8	6.2
	2/1/2021	23.6	34.5	11.6	52.5	4.3
Feb-21	2/4/2021	21.5	28.1	10.4	71.6	6.8
	2/8/2021	21.1	26.8	10.8	61.3	7.2
	2/12/2021	22.2	25.8	10.6	70.7	5.7
	2/16/2021	24.4	30.5	9.5	68.6	6.9
	2/23/2021	23.5	25.4	10.1	64.5	6.4
	2/26/2021	22.6	29.6	9.5	66.7	7.5
	2/29/2021	25.3	27.4	11.6	65.6	4.2
	3/1/2021	20.4	29.3	14.5	68.4	6.3
	Max	**26.80**	**34.50**	**14.60**	**75.50**	**7.50**
	Min	**20.40**	**22.60**	**9.50**	**45.60**	**3.60**
	Avg	**23.75**	**27.13**	**11.83**	**61.83**	**5.77**
	98 percentile	**26.52**	**33.72**	**14.55**	**74.07**	**7.36**

Ambient Air Quality at AAQ3 Maklang

AAQ3	Maklang					
MONTH	**DATE**	**PM2.5 ($\mu g/m^3$)**	**PM10 ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**CO($\mu g/m^3$)**	**NO_2 ($\mu g/m^3$)**
Dec-20	12/4/2020	23.2	22.6	8.6	43.5	5.8
	12/8/2020	22.3	21.5	10.5	45.4	5.2
	12/12/2020	24.3	23.6	10.2	42.6	4.3
	12/16/2020	19.9	24.1	12.3	57.8	5.1
	12/23/2020	20.4	25.0	9.8	62.4	4.7
	12/26/2020	19.6	23.4	8.5	66.7	5.6
	12/29/2020	21.7	28.4	9.5	70.1	5.5
	1/1/2021	19.2	26.6	9.8	68.8	4.6
Jan-21	1/4/2021	22.9	30.4	11.5	42.6	6.8
	1/8/2021	25.5	18.3	10.3	59.5	5.9
	1/12/2021	23.4	24.5	12.5	75.3	7.0
	1/16/2021	21.6	32.7	10.7	43.6	5.1
	1/23/2021	18.8	23.6	12.5	55.8	3.7
	1/26/2021	19.5	20.1	14.2	45.9	5.2
	1/29/2021	19.7	26.1	10.6	45.7	6.0
	2/1/2021	19.6	33.3	9.7	43.1	4.0
Feb-21	2/4/2021	20.1	27.8	10.3	68.7	6.6
	2/8/2021	20.2	29.4	9.4	52.1	6.9
	2/12/2021	19.5	30.5	10.5	72.6	5.2
	2/16/2021	19.1	22.3	10.7	65.0	6.5
	2/23/2021	20.3	22.7	10.9	60.3	6.3
	2/26/2021	19.4	20.3	9.7	50.2	7.1
	2/29/2021	19.6	28.1	10.5	69.7	4.2
	3/1/2021	20.0	31.3	12.6	65.1	6.1
	Max	**25.50**	**33.30**	**14.20**	**75.30**	**7.10**
	Min	**18.80**	**18.30**	**8.50**	**42.60**	**3.70**
	Avg	**20.83**	**25.69**	**10.66**	**57.19**	**5.56**
	98 percentile	**24.95**	**33.02**	**13.46**	**74.06**	**7.05**

Ambient Air Quality at AAQ4 Longa Koireng

AAQ4	Longa Koireng					
MONTH	**DATE**	**PM2.5 ($\mu g/m^3$)**	**PM10 ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**CO($\mu g/m^3$)**	**NO_2 ($\mu g/m^3$)**
Dec-20	12/4/2020	19.5	20.1	8.1	42.7	5.2
	12/8/2020	18.6	18.3	9.2	44.3	5.0
	12/12/2020	20.4	20.6	9.3	51.8	4.0
	12/16/2020	16.7	22.1	11.5	50.4	4.8
	12/23/2020	16.1	22.5	9.1	56.6	4.4
	12/26/2020	17.9	21.3	7.9	64.3	5.2
	12/29/2020	18.6	25.8	8.8	59.7	5.1
	1/1/2021	17.1	24.1	9.5	67.5	4.1
Jan-21	1/4/2021	18.0	28.3	11.1	41.3	6.3
	1/8/2021	12.9	17.2	9.8	57.7	5.5
	1/12/2021	20.8	22.5	11.7	72.9	6.5
	1/16/2021	18.7	29.7	10.2	41.7	4.6
	1/23/2021	16.2	22.4	11.3	52.7	3.5
	1/26/2021	17.8	18.9	8.1	44.5	5.0
	1/29/2021	16.7	24.7	10.2	41.8	5.8
	2/1/2021	17.8	29.8	9.1	42.6	3.8
Feb-21	2/4/2021	18.6	25.4	9.7	66.8	6.2
	2/8/2021	18.5	24.6	9.1	51.8	6.5
	2/12/2021	17.8	28.6	10.5	71.7	5.0
	2/16/2021	17.5	20.3	10.1	62.9	6.2
	2/23/2021	14.9	20.6	11.2	60.0	6.0
	2/26/2021	15.4	19.6	9.1	49.2	6.8
	2/29/2021	16.8	25.3	11.2	66.7	4.0
	3/1/2021	17.9	28.1	11.5	62.4	5.8
	Max	**20.80**	**29.80**	**11.70**	**72.90**	**6.80**
	Min	**12.90**	**17.20**	**7.90**	**41.30**	**3.50**
	Avg	**17.55**	**23.37**	**9.89**	**55.17**	**5.22**
	98 percentile	**20.62**	**29.75**	**11.61**	**72.35**	**6.66**

Ambient Air Quality at AAQ5 NH-53

AAQ5	NH-53					
MONTH	**DATE**	**PM2.5 ($\mu g/m^3$)**	**PM10 ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**CO($\mu g/m^3$)**	**NO_2 ($\mu g/m^3$)**
Dec-20	12/4/2020	22.6	23.1	8.7	43.6	5.8
	12/8/2020	25.8	22.3	10.3	45.3	5.2
	12/12/2020	23.7	23.4	10.5	52.7	4.3
	12/16/2020	12.3	24.9	12.3	57.6	5.1
	12/23/2020	18.5	25.0	9.7	62.3	4.7
	12/26/2020	20.3	23.1	8.5	66.4	5.6
	12/29/2020	21.6	28.5	9.6	70.2	5.5
	1/1/2021	20.8	26.1	9.9	68.9	4.6
Jan-21	1/4/2021	13.1	30.8	11.2	42.5	6.8
	1/8/2021	22.4	18.9	10.4	59.7	5.9
	1/12/2021	25.2	24.2	12.6	75.6	7.0
	1/16/2021	19.7	32.4	10.8	42.1	5.1
	1/23/2021	20.8	23.1	12.4	55.3	3.6
	1/26/2021	21.3	20.4	14.3	45.1	5.2
	1/29/2021	21.2	26.9	10.7	45.2	6.0
	2/1/2021	18.4	32.8	9.8	43.4	4.0
Feb-21	2/4/2021	21.5	28.3	10.2	68.4	6.6
	2/8/2021	21.0	29.1	9.3	52.3	6.9
	2/12/2021	20.3	30.3	11.4	72.1	5.2
	2/16/2021	18.6	22.2	10.6	65.3	6.5
	2/23/2021	21.4	22.1	11.8	60.8	6.3
	2/26/2021	17.9	20.8	9.8	50.4	7.1
	2/29/2021	20.6	27.9	11.7	69.4	4.2
	3/1/2021	21.4	32.4	12.4	64.5	6.1
	Max	**25.80**	**32.80**	**14.30**	**75.60**	**7.10**
	Min	**12.30**	**18.90**	**8.50**	**42.10**	**3.60**
	Avg	**20.43**	**25.79**	**10.79**	**57.46**	**5.55**
	98 percentile	**25.52**	**32.62**	**13.52**	**73.99**	**7.05**

Ambient Air Quality at AAQ6 Sajirok

AAQ6	Sajirok					
MONTH	**DATE**	**PM2.5 ($\mu g/m^3$)**	**PM10 ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**CO($\mu g/m^3$)**	**NO_2 ($\mu g/m^3$)**
Dec-20	12/4/2020	19.6	20.5	8.3	41.9	5.2
	12/8/2020	18.5	18.6	9.4	43.6	4.9
	12/12/2020	19.8	20.4	9.8	51.8	4.7
	12/16/2020	16.7	22.7	11.9	50.3	5.0
	12/23/2020	16.7	22.5	8.8	59.1	4.9
	12/26/2020	17.5	21.7	7.9	65.1	5.0
	12/29/2020	18.3	25.1	8.9	69.1	4.9
	1/1/2021	16.5	24.2	9.1	66.8	4.6
Jan-21	1/4/2021	18.9	28.5	11.7	40.7	6.5
	1/8/2021	12.1	17.6	9.2	56.9	6.1
	1/12/2021	20.5	22.8	11.3	71.6	6.1
	1/16/2021	19.8	30.2	11.2	41.8	5.1
	1/23/2021	15.3	22.9	10.8	53.2	3.9
	1/26/2021	17.7	18.8	9.1	44.3	3.8
	1/29/2021	16.6	24.0	10.9	40.9	6.9
	2/1/2021	17.3	29.1	7.8	42.1	3.4
Feb-21	2/4/2021	18.2	25.9	9.6	65.3	6.5
	2/8/2021	18.8	25.2	9.7	51.6	6.1
	2/12/2021	17.6	28.2	10.6	71.4	5.3
	2/16/2021	17.7	17.3	10.8	63.3	6.0
	2/23/2021	15.9	20.9	11.9	59.9	6.5
	2/26/2021	15.1	29.6	9.8	40.8	6.2
	2/29/2021	15.2	25.3	11.6	66.2	4.2
	3/1/2021	12.3	28.4	12.4	62.5	5.5
	Max	**20.50**	**30.20**	**12.40**	**71.60**	**6.90**
	Min	**12.10**	**17.30**	**7.80**	**40.70**	**3.40**
	Avg	**17.19**	**23.77**	**10.10**	**55.01**	**5.30**
	98 percentile	**20.18**	**29.92**	**12.17**	**71.51**	**6.72**

Ambient Air Quality at AAQ7 Senapati

AAQ7	Senapati					
MONTH	**DATE**	**PM2.5 ($\mu g/m^3$)**	**PM10 ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**CO($\mu g/m^3$)**	**NO_2 ($\mu g/m^3$)**
Dec-20	12/4/2020	19.3	21.2	7.9	43.0	5.2
	12/8/2020	18.3	18.3	9.0	43.5	4.7
	12/12/2020	19.8	20.6	9.1	51.4	5.0
	12/16/2020	17.2	21.8	11.1	50.4	4.9
	12/23/2020	16.2	23.1	9.0	56.8	5.2
	12/26/2020	16.9	21.4	7.8	54.7	5.6
	12/29/2020	18.6	28.1	8.7	58.6	5.4
	1/1/2021	16.3	24.6	9.5	67.4	4.7
Jan-21	1/4/2021	19.2	28.6	11.1	41.5	6.2
	1/8/2021	12.8	18.6	9.4	56.8	5.7
	1/12/2021	20.3	22.8	7.7	71.6	7.0
	1/16/2021	18.2	29.6	10.2	41.5	4.5
	1/23/2021	16.2	22.6	11.3	52.8	4.2
	1/26/2021	16.8	18.6	8.0	43.6	5.1
	1/29/2021	15.9	24.9	10.0	41.5	6.8
	2/1/2021	17.3	29.2	9.8	42.6	3.4
Feb-21	2/4/2021	18.6	25.8	9.8	65.4	6.9
	2/8/2021	17.8	24.6	9.0	51.6	3.1
	2/12/2021	17.6	28.3	10.1	71.3	5.8
	2/16/2021	17.2	16.9	10.0	62.7	6.8
	2/23/2021	16.7	20.1	11.1	59.1	5.2
	2/26/2021	16.2	19.7	9.2	40.3	6.5
	2/29/2021	15.9	25.4	11.4	66.4	5.5
	3/1/2021	12.7	28.3	11.1	62.1	6.4
	Max	**20.30**	**29.60**	**11.40**	**71.60**	**7.00**
	Min	**12.70**	**16.90**	**7.70**	**40.30**	**3.10**
	Avg	**17.17**	**23.46**	**9.64**	**54.02**	**5.41**
	98 percentile	**20.07**	**29.42**	**11.35**	**71.46**	**6.95**

Ambient Air Quality at AAQ8 Langdeibung

AAQ8	Langdeibung					
MONTH	**DATE**	**PM2.5 ($\mu g/m^3$)**	**PM10 ($\mu g/m^3$)**	**SO_2 ($\mu g/m^3$)**	**CO($\mu g/m^3$)**	**NO_2 ($\mu g/m^3$)**
Dec-20	12/4/2020	19.2	21.1	7.5	42.8	5.5
	12/8/2020	18.5	17.3	9.6	43.4	4.7
	12/12/2020	19.6	21.2	9.4	51.3	4.1
	12/16/2020	16.7	22.6	11.2	50.3	5.0
	12/23/2020	16.9	25.6	9.2	55.8	5.4
	12/26/2020	17.5	21.3	7.9	54.6	5.2
	12/29/2020	18.9	28.6	8.8	58.7	7.1
	1/1/2021	16.8	24.5	9.6	68.4	4.9
Jan-21	1/4/2021	17.6	28.3	11.2	41.6	6.0
	1/8/2021	13.6	18.2	9.6	56.4	5.7
	1/12/2021	20.5	22.5	7.5	71.8	6.3
	1/16/2021	18.6	29.5	10.5	41.2	4.5
	1/23/2021	15.3	22.4	11.1	52.0	3.2
	1/26/2021	17.2	18.6	8.7	43.7	5.6
	1/29/2021	16.3	24.5	10.1	42.0	6.4
	2/1/2021	17.5	29.7	9.7	42.2	3.5
Feb-21	2/4/2021	18.6	25.5	9.8	65.1	6.8
	2/8/2021	18.8	24.8	9.3	51.6	6.2
	2/12/2021	17.6	28.5	10.0	71.3	5.4
	2/16/2021	17.1	16.6	10.2	62.0	6.6
	2/23/2021	16.1	20.8	11.2	60.0	6.3
	2/26/2021	15.6	19.6	9.5	41.0	6.5
	2/29/2021	15.7	25.5	10.8	65.8	5.9
	3/1/2021	12.3	28.5	10.6	32.7	5.2
	Max	**20.50**	**29.70**	**11.20**	**71.80**	**7.10**
	Min	**12.30**	**16.60**	**7.50**	**32.70**	**3.20**
	Avg	**17.19**	**23.57**	**9.71**	**52.74**	**5.50**
	98 percentile	**20.09**	**29.61**	**11.20**	**71.57**	**6.96**

Noise Quality Results of the Study area

Noise		Standards of Noise Level			Noise Level db(A)	
Location	**Date of Monitoring**	**Category of Area**	**Day dB (A)**	**Night dB (A)**	**Day (Ld)**	**Night (Ln)**
Mine Site	12/4/2020	Commercial	65	55	50.2	39.8
Thangjing Khullen	12/8/2020	Residential	55	45	49.2	36.7
Maklang	12/12/2020	Residential	55	45	45.6	35.8
Longa Koireng	12/16/2020	Residential	55	45	44.5	32.1
Leimaram	12/23/2020	Residential	55	45	45.1	33
Sajirok	12/26/2020	Residential	55	45	42.7	29.3
Senapati	12/29/2020	Residential	55	45	42.3	29.6
Langdeibung	1/1/2021	Residential	55	45	42.4	29.4

	Matter							
14	Phosphorous	mg/100gm	2.5	2.8	2.4	2.9	2.6	2.7
15	Ca	meq /100gm	2.2	2.4	2.2	2.4	2.3	1.8
16	SAR	meq /100gm	0.62	0.72	0.81	0.86	0.72	0.78
17	Mg	meq /100gm	1.1	1.2	1.1	1.3	1.2	1

9	Total Hardness as CaCO3	mg/L	72	70	62	69.00	73.00	76.00	70.00	80.00	64.00	71.00	68.00	76.00	83.00	74	87.00	69.00	78	82.00
10	Calcium as Ca	mg/L	16.83	15.46	14.48	17.86	16.42	15.98	15.46	20.29	14.40	15.72	16.81	18.74	14.56	16.77	20.24	15.58	17.46	18.43
11	Chloride as Cl	mg/L	8	10	6	9.00	4.00	8.00	7.00	5.00	8.00	7.00	5.00	10.00	7.00	8	5.00	10.00	7	9.00
12	Copper as Cu	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
13	Fluoride (as F)	mg/L	0.32	0.38	0.28	BDL	BDL	BDL	0.42	0.38	0.44	38.00	34.00	49.00	0.42	0.27	0.41	0.37	0.29	0.38
14	Free Residual	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
28	Mercury as Hg	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
29	Chromium as Cr^{+6}	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
30	Zinc as Zn, Max	mg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
31	Nickel(as Ni)	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
32	Total Arsenic as As	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
33	E.Coli	MPN	Abs	Abs	Abs	Abs	Abs	Abs	Abs	Abs	Abs	Abs	Abs	Abs	Abs	Abs	Abs	Abs	Abs	Abs

8	Dissolved Oxygen	mg/L	6.5	5.2	5.7
9	BOD	mg/L	4.8	4.7	3.6
10	COD	mg/L	5.8	6.3	5.2
11	Chloride as Cl	mg/L	18	24	22
12	Sulphate as SO_4	mg/L	10.87	12.4	12.9
13	Nitrate as NO_3	mg/L	0.04	0.06	0.09
14	Ammonical Nitrogen	mg/L	< 1.0	< 1.0	< 1.0
15	Phosphate as PO_4	mg/L	< 1.0	< 1.0	< 1.0
16	Sodium as Na	mg/L	5	9	8
17	Potassium as K	mg/L	2.6	3.8	3.4

35	Magnesium as $CaCO_3$	mg/L	6.86	7.38	7.42
36	Total Arsenic as As	mg/L	<0.01	<0.01	<0.01
37	Copper (as Cu)	mg/L	<0.1	<0.1	<0.1
38	Total Coliform	MPN/100ml	260.00	280	240
39	Faecal Coliform	MPN/100ml	68.00	75	78

PART – V

(To be filled in by the Secretary in charge of Forest Department or by any other authorized officer of the State Government not below the rank of an Under Secretary)

18. Recommendation of the State Government

(Adverse comments made by any officer or authority in Part B or Part C or Part D above should be specifically commented upon)

Signature: M.H. Khan. 16/6/21

Name and Designation: Addl. Chief Secy (FE)

(Official Seal) Manipur.

Date: 16/6/21

Place: Imphal.

Addl. Chief Secy. (FE)
Government of Manipur

C E R T I F I C A T E

Certified that the State Government has considered all other alternatives and that no other alternatives in the circumstances are feasible and that the proposed area of **5.345 ha** forest land to be diverted is the minimum required for Quarrying of Sandstone/road metal, Murum and Shaly in Kangpokpi District, Manipur in favour of the HVS Construction materials Pvt. Ltd.

It is also certified that no suitable Non-Forest land is available in Manipur for taking up Compensatory Afforestation.

Certified that this certificate is issued on the basis of the joint certificate to this effect from the concerned District Collector and Divisional Forest Officer in respect of areas under their jurisdictions.

16/06/2021

Chief Secretary,

Government of Manipur

Chief Secretary
Government of Manipur

Dated: Imphal

The 16th June, 2021

Certificate for Non-availability of Non Forest Land for Compensatory Afforestation (CA)

In connection with the proposal for Diversion of 5.345 Ha of Forest land for Quarrying of Sand, Stone/ Road metal, Marum & Shaly Earth by HVS Construction materials Pvt. Ltd.

We, Shri Somorjit Salam, IAS, Deputy Commissioner, Kangpokpi District, Manipur and Shri Napolean Rongmei, MFS, Divisional Forest Officer, Noney Forest Division, Noney, Manipur, do hereby certify that:

(i) Relevant records pertaining to non-forest land, revenue land, zudpi jungle, chhotejharka jungle, bade jharka jungle, jungle-jhari, civil-soyam lands and all other such categories of forest land (except the forest land under management and administrative control of the Forest Department) on which the provision of Forest (Conservator) Act, 1980 are applicable, available in Kangpokpi District, Manipur have been examined; and

(ii) We have also conducted such further enquiry as is required to satisfy ourselves for issue of this certificate.

On the basis of examination of all relevant records and such further enquiry, as was required for issue of this Certificate, we do hereby certify that non-forest land , revenue land, zudpi jungle, chhotejharka jungle, bade jharka jungle, jungle-jhari, civil-soyam lands and all other such categories of forest lands (except the forest land under management and administrative control of the Forest Department) on which the provision of Forest (Conservator) Act, 1980 are applicable, which as per the extant guidelines of the Central Government may be utilized for creation of Compensatory Afforestation in lieu of forest land diverted for non-forest purpose, are not available in the entire Kangpokpi District, Manipur.

Issued under our hand and seal on this **6th** day of **July, 2020**.

(Napolean Rongmei)
Divisional Forest Officer
Noney Forest Division

Divisional Forest Officer
Noney Forest Division
Government of Manipur

DEPUTY COMMISSIONER OFFICE KANGPOKPI MANIPUR

(Somorjit Salam, IAS)
Deputy Commissioner
Kangpokpi District,

Deputy Commissioner
Kangpokpi District
Manipur

GOVERNMENT OF MANIPUR

OFFICE OF THE DEPUTY COMMISSIONER: KANGPOKPI DISTRICT

TO WHOM IT MAY CONCERN

Kangpokpi, 24th August, 2020

No. DC(KPI)12/2/99: 124 In compliance of Ministry of Environment & Forest (MoEF), Govt. of India's letter No. 11-9/98 dated 05.03.2013, wherein the MoEF issued Guidelines on submission of evidences for having initiated and completed the process of settlement of rights under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest rights) Act, 2006 (FRA) on the forest land proposed to be diverted in favour of the M/S H.V.S. Construction Materials Pvt. Ltd., Longa Koireng Village, Kangpokpi District, Manipur for quarrying.

It is certified that:

1. The complete process for Identification and Settlement of Rights under the FRA has been carried out for the entire 5.345 hectares of forest land proposed for diversion.
2. There is no forest dwelling Scheduled Tribes and Other Traditional Forest Dwellers in the entire 5.345 hectares of forest land at Longa Koireng Village within Noney Protected Forest, Kangpokpi District proposed for diversion in favour of M/S H.V.S. Construction Materials Pvt. Ltd., Longa Koireng Village, Kangpokpi District.
3. The proposed diversion does not affect the recognized right of Forest Dwelling Scheduled Tribes, Other Traditional Forest Dwellers, Primitive Tribal Groups and Pre-agricultural Communities as the proposed area is not inhabited.
4. The forest land proposed for diversion in favour of M/S H.V.S. Construction Materials Pvt. Ltd. is located at Kotlen, P.O.- Langjing, P.S.- New Keithelmanbi, Kangpokpi District, Manipur.
5. The General Body Meeting of Longa Koireng Village Authority has given its formal consent to the proposal for diversion of forest land for quarrying by taking a resolution to that effect in its meeting held on 31st July, 2020.

A copy of the resolution of the general body in its meeting dated 31st July, 2020 is enclosed for reference. This certificate has been issued with appropriate modification to the format prescribed by the Ministry of Environment & Forest (MoEF), Govt. of India's vide letter No. 11-9/98-FC(Pt) dated 05.03.2013 in view of the non-existence of habitation and interests in the area proposed to be diverted.

Encl: As stated above.

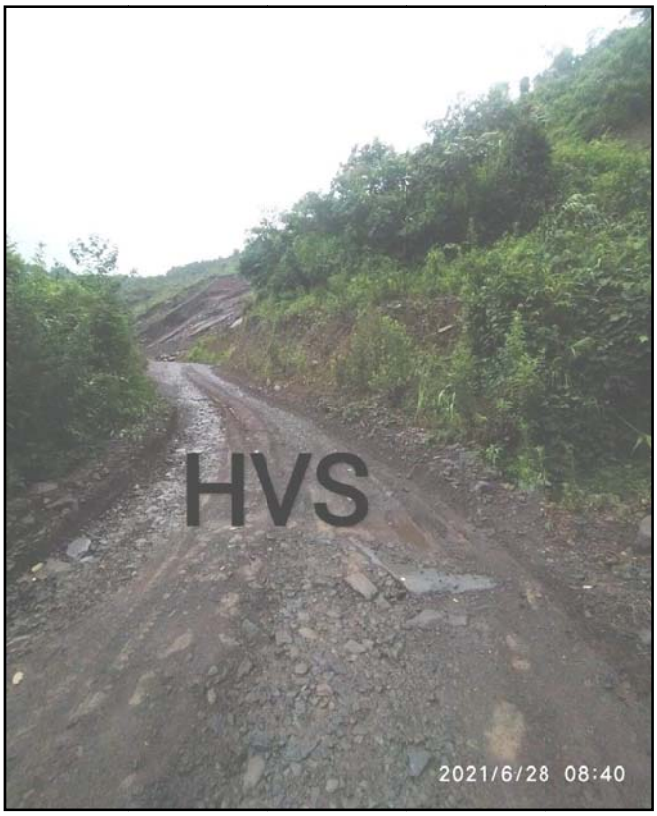
(Somorjit Salam, IAS)
Deputy Commissioner, Kangpokpi Dist.

Deputy Commissioner
Kangpokpi District
Manipur

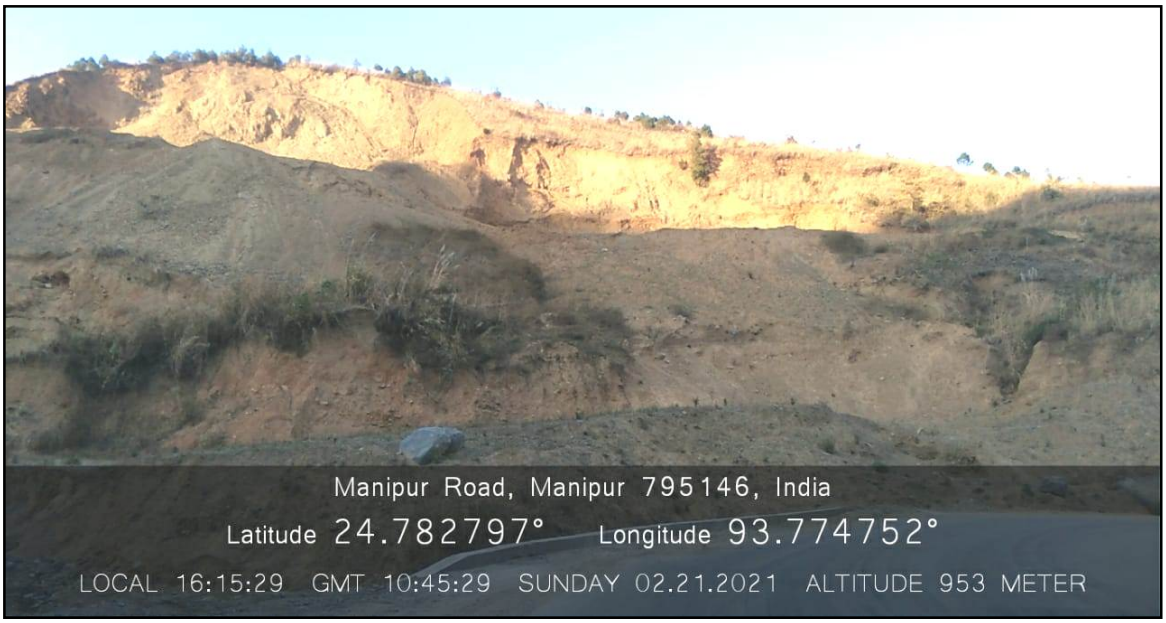
Copy to:

1. Sub-Divisional officer, Kangchup Geljang.
2. Divisional Forest Officer, Noney.
3. Guard file.

SITE PHTOGRAPHS



SITE PHTOGRAPHS



Form-2

APPLICATION FOR PRIOR ENVIRONMENTAL CLEARANCE

S. No.	Item	Details
1.	**Details of Project:**	
	(a) Name of the project(s)	"Longa Koireng Village Quarrying Lease of Sandstone, Murrum and Shaly Earth"
	(b) Name of the Company / Organization	M/s. HVS Construction Materials Pvt. Ltd.
	(c) Registered Address	Patsoi Lamkhai, New Cachar Road, NH-7, District- Imphal West, State-Manipur
	(d)Legal Status of the Company	Private
2.	**Address for the correspondence:**	
	(a)Name of the Applicant	Huidrom Vikramjit Singh
	(b)Designation (Owner/ Partner/ CEO)	Managing Director
	(c)Address	Patsoi Lamkhai, New Cachar Road, NH-7, District- Imphal West, State-Manipur
	(d)Pin code	795113
	(e)E-mail	geo.vkm2@gmail.com
	(f)Telephone No.	-
	(g)Fax No.	-
	(h)Copy of documents in support of the competence/authority of the person making this application to make application on behalf of the User Agency .	Annexure-Uploaded Copy of documents in support of the competence/authority
3.	**Category of the Project/Activity as per Schedule of EIA Notification,2006:**	
	(a) Major Project/Activity	**1(a) Mining of minerals**
	(b) Minor Project/Activity	**1(a) Mining of minerals**
	(c) Category	**B1**
	(d) Proposal Number	**NA**
	(e) Master Proposal Number(Single Window)	**NA**
	(f) (f)EAC concerned (for category A Projects only)	**Non-Coal Mining**
	(g)Project Type	**Fresh EC**
4.	**Location of the Project:**	
	(a)Plot/Survey/Khasra No.	N/A
	(b) Pincode	795129
	(c)Bounded Latitudes (North)	FROM 24° 47' 44.31" To 24° 47' 53.48"
	(d)Bounded Longitudes (East)	FROM 93° 44' 24.72" To 93° 44' 35.60"
	(e) Survey of India Topo Sheet No.	83H/9
	(f) Uploaded Topo Sheet File	Copy of Topo Sheet File
	(g)Maximum Elevation Above Means Sea Level(AMSL)	1191
	(h)Uploaded (kml) File	Copy of Kml File
	(i)Distance of Nearest HFL from the project boundary within the study area	NA
	(j)Seismic Zone	5
5.	(a)Number of States in which Project will be Executed	1
	(b)Main State of the project	Manipur

Details of State(s) of the project

S. No.	State Name	District Name	Tehsil Name	Village Name
(1.)	Manipur	Kangpokpi	Kangchup Geljang	Longa Koireng

6.	**Details of Terms of Reference (ToR)**:	
	(a)MoEF&CC / SEIAA File Number	SIA/MN/MIN/60721/2021
	(b)Date of Apply of TOR	12th February, 2021
	(c)Date of Issue of TOR / Standard ToR	5th March, 2021
	(d)Previous TOR Letter	Copy of Previous TOR letter
7.	**Details of Public Consultation**:	
	(a)Whether the Project Exempted from Public Hearing?	NA
	(b)Whether details of Public Hearing available?	NA
	(c)Whether Public hearing was presided over by an officer of the rank of Additional District Magistrate or above	NA

7.1. **Details of Public Hearing**

S. No.	Details of Advertisement	Details of Public Hearing	Venue	Location Details	No. of People	Issues Raised	Designation of Presiding	Other Designation

					Attended		Officer	of Presiding Officer
(1.)	Date of : NA Copy of advertisement : Copy of Advertisement	Copy of Public Hearing : NA Date : NA Distance of Public Hearing Venue from the Proposed Project : NA	NA	NA	NA	NA	Others	NA

8. **Details of Project Configuration / Product**:

8.1. **Project Configuration**

S. No.	Plant / Equipment / Facility	Configuration	Remarks
(1.)	Compressor of 120 psi	--	Quantity- One mobile/ tractor mounted or stable
(2.)	Jack hammer and other Pneumatic	--	Quantity- Two Jack hammers, Two Pneumatic Breakers
(3.)	Hydraulic excavator with rock breaker arrangements	--	Quantity- Two
(4.)	Long hole drill machine	-	Quantity- One

8.2. **Product**

S. No.	Product / Activity (Capacity / Area)	Quantity	Unit	Other Unit	Mode of Transport / Transmission of Product	Other Mode of Transport / Transmission of Product
(1.)	Murum and Shaly/Slaty Earth	1,65,619.5	Cu.m per Annum	NA	Road	NA

9. **In case of Expansion / Modernisation / One Time Capacity Expansion (only for Coal Mining) / Expansion under Clause 7(ii) / Modernisation under Clause 7(ii) / Change of Product Mix under Clause 7(ii)**:

Details Not Applicable

9.1. **Details of Consent to Operate**

(i) Whether Consent to operate obtained?	NA
(ii) Copies of all Consent to operate obtained since inception	NA
(iii) Date of Issue	N/A
(iv)Valid Upto	N/A
(v)File No.	NA
(vi)Application No.	NA
(vii)Copy of Consent to operate valid as on date	NA

10. **Project Cost:**

(a) Total Cost of the Project at current price level (in crores)	2.50
(b) Funds Allocated for Environment Management (Capital) (in crores)	0.0
(c) Funds Allocated Towards ESC (Entrepreneur Social Responsibility) (in crores)	0.05
(d) Funds Allocated for Environment Management Plan (EMP) (Recurring per Annum) (in crores)	0. 0423
(e) Funds Allocated for Environment Management Recurring (%)	1.70

11. **Whether project attracts the General Condition specified in the Schedule of EIA Notification?** No

12. **Whether project attract the Specific Condition** No

	specified in the Schedule of EIA Notification ?	
13.	**Raw Material / Fuel Requirement:** (a) Proposed quantity of raw material/fuel (b) Existing quantity of raw material/fuel (c) Total quantity of raw material/fuel	 NA N/A NA

13.1. **Raw Material / Fuel Profile**

S. No.	Raw Material / Fuel	Quantity	Unit	Other Unit	Source (incase of Import. please specify country and Name of the port from which Raw Material / Fuel is received)	Mode of Transport	Other Mode of Transport	Distance of Source from Project Site (in Kilometres) (In case of import, distance from the port from which the raw material / fuel is received)	Type of Linkage	Other Type of Linkage	Uploaded Copy of Linkage
(1.)	Diesel	As per required	Litre	-	-	Road		-	Linkage		Copy of Linkage

14.	**Baseline Data :** (a)Period of Base Line Data Collection (b)Season	 FROM 01 Dec 2019 To 01 Mar 2020 Winter

14.1. **No. of ambient Air Quality (AAQ) Monitoring Locations : 8**

S. No.	Criteria Pollutants	Other Criteria Pollutants	Unit	Maximum Value	Minimum Value	98 Percentile Value	Prescribed Standard
(1.)	PM2.5		Micro Gram per Meter Cube	27.10	12.10	26.56	60
(2.)	SO2		Micro Gram per Meter Cube	15.80	7.50	15.48	80
(3.)	NOx		Micro Gram per Meter Cube	7.50	3.10	7.35	80
(4.)	PM10		Micro Gram per Meter Cube	36.30	16.60	35.57	100

14.2. **No. of Ground Water Monitoring Locations : 6**

S. No.	Criteria Pollutants	Other Criteria Pollutants	Heavy Metal	Unit	Other Unit	Maximum Value	Minimum Value	Desirable Limit	Maximum Permissible Limit
(1.)	pH			NA		6.96	6.12	6.5	8.5
(2.)	TSS			Others	Data U/A	0	0	0	0
(3.)	Total Hardness			mg/l		87	62	300	600
(4.)	TDS			mg/l		257	228	500	2000
(5.)	Chlorides			mg/l		10	5	250	1000
(6.)	Fluoride			mg/l		0.49	0.27	1	1.5

14.3. **No. of Surface Water Monitoring Locations : 1**

S. No.	Criteria Pollutants	Other Criteria Pollutants	Unit	Other Unit	Maximum Value	Minimum Value	Classification of inland water body
(1.)	pH		NA		7.58	7.43	B
(2.)	BOD		mg/l		4.8	3.6	B
(3.)	DO		mg/l		6.5	5.2	B
(4.)	COD		mg/l		6.3	5.2	B

14.4. **No. of Ambient Noise Monitoring Locations : 8**

S.	Parameter	Unit	Maximum Value	Minimum Value	Prescribed

No.					Standard
(1.)	Leq (Night)	A-weighted decibels(dB(A))	39.8	29.3	55
(2.)	Leq (Day)	A-weighted decibels(dB(A))	55.2	42.3	65

14.5. **No. of Soil Sample Monitored Locations : 6**

S. No.	Parameter	Unit	Other Unit	Maximum Value	Minimum Value
(1.)	P(Phosphorus)	Others	mg/100gm	2.90	2.40
(2.)	K(Potassium)	Others	mg/100gm	0.74	0.52
(3.)	pH		NA	5.98	5.09
(4.)	N(Nitrogen)	Others	mg/100gm	28.6	24.7
(5.)	Electric Conductivity	Others	µmhos/cm	280	180

14.6.	**Details of Ground Water Table:**	
	(a) Range of Water Table Pre-Monsoon Season (Meters Below Ground Level (m bgl))	From 35 To 40
	(b) Range of Water Table Post-Monsoon Season (Meters Below Ground Level (m bgl))	From 30 To 35
	(c) Whether Ground Water Intersection will be there ?	NA

15. **Details of Water Requirement (During Operation)**

S. No.	Source	Source Other	Required Quantity	Distance from Source	Copy of Permission from Competent Authority	Mode of Transport	Other Mode of Transport	Method of Water Withdrawal	Other Method of Water Withdrawal	Letter No.	Date of Issue	Permitted Quantity
(1.)	Others	Public water supply	3.0 KLD	NA	Not Applicable	Mode Others	Water tanker	Others	Taps	NA	NA	3.0 KLD

15.1.	(a) Whether Desalination is proposed	No

16. **Waste Water Management(During Operation)**

S. No.	Type/Source	Quantity of Waste Water Generated (Kilolitre per Day)	Treatment Capacity (Kilolitre per Day)	Treatment Method	Mode of Disposal	Other Mode of Disposal	Quantity of Treated Water Used in Recycling/Reuse (Kilolitre per Day)	Quantity of Discharged Water (Kilolitre per Day)
(1.)	Domestic Sewage	0.40	0	NA	Discharge into Surface Water Body	Disposed through septic tank followed by soak pit.		0.40

16.1.	(a)Total Waste Water Generation	0
	(b)Total Discharged Water	0
	(c)Total Reused Water	0

17. **Solid Waste Generation/Management**

S. No.	Name of Waste	Item	Other Item	Quantity per Annum	Unit	Distance from Site(KM)	Mode of Transport	Other Mode of Transport	Mode of Disposal	Other Mode of Disposal
(1.)	Mineral reject	NA	NA	NA	NA	NA	NA	NA	Others	NA

18.	

18.1. **Air Quality Impact Prediction**

S. No.	Criteria Pollutants	Other Criteria Pollutants	Unit	Baseline Concentration	Distance GLC	Incremental Concentration	Total GLC	Prescribed Standard
(1.)	SO2		Microgram per Meter Cube	-	-	-	-	80
(2.)	NOx		Microgram per Meter Cube	-	-	-	-	80
(3.)	PM2.5		Microgram per Meter Cube	-	-	-	-	60
(4.)	PM10		Microgram per Meter Cube	35.47	-	7.0	42.47	100

18.2. **Stack Details**

S. No.	Source	Fuel	Stack Height(m)	Stack Diameter(m)	Pollutants	Other Pollutants	Emission (GLS)
(1.)	None	None	0	0	PM10		0

19.	**Power Requirement:**	
	(a) Quantity (Kilo Volt Amps (kVA))	0
	(b) Source	No power will be required as mining will be done in day time only.
	(c) Uploaded Copy of Agreement	Not Applicable
	(d) Standby Arrangement (Details of DG Sets)	0
	(e) Stack Height (in m)	0
20.	**Land Ownership Pattern:**	
	(a) Forest Land	5.16
	(b) Private Land	0
	(c) Government Land	0
	(d) Revenue Land	0
	(e) Other Land	0
	Total Land	**5.16**
21.	**Present Land Use Breakup of the Study Area in Ha:**	
	(a)Agriculture Area	0
	(b)Waste/Barren Land	0
	(c)Grazing/ Community Land	0
	(d)Surface Water Bodies	0
	(e)Settlements	0
	(f)Industrial	0
	(g)Forest	5.16
	(h)Mangroves	0
	(i)Marine Area	0
	(j)Others : None	0
	Total	**5.16**

22. **Land Requirement for Various Activities**

S. No.	Description of Activity / Facility / Plant / Others	Others	Land Requirement	Remarks
(1.)	Quarry Area		5.16	
	Total		5.16	

23.	**Ecological and Environmental Sensitivity (Within 10 Km):- WLS-Wild Life Species; NPA-Notified Protected Area; ESAs-Eco Sensitive Areas; ESZs-Eco Sensitive Zones :**

23.1. **Details of Ecological Sensitivity :**

S. No.	Details of Ecological Sensitivity	Name	Distance from the Project (Km)	Remarks
(1.)	WLS	None within 10 kms	0	NA
(2.)	NPA	None within 10 kms	0	NA
(3.)	ESAs	None within 10 kms	0	NA
(4.)	Corridors	None within 10 kms	0	NA
(5.)	Wildlife Corridors	None within 10 kms	0	NA
(6.)	Critically Polluted Area	None within 10 kms	0	NA
(7.)	ESZs	None within 10 kms	0	NA

23.2. **Details of Environmental Sensitivity :**

S. No.	Details of Environmental Sensitivity	Other Details of Environmental Sensitivity	Name	Distance from the Project (Km)	Remarks
(1.)	Archaeological Sites		None within 10 km	0	NA

(2.)	Forest		None within 10 km	0	NA
(3.)	Defense Installations		None within 10 km	0	NA

23.3.	(a) Whether NOC / Permission from the competentauthority is required?	No
	(b) Whether NBWL recommendation is required?	No
24.	**Forest Land**:	
	Whether any Forest Land involved?	Yes (Forest Clearance has been taken)
25.	**Tree Cutting:**	
	(a) No. of Trees Cut for the Project (if Forest Land not Involved)	Not Applicable
	(b) Details of Tree Cutting and Planting of Trees	Not Applicable
26.	**Land Acquisition Status**:	
	(a) Acquired Land (Ha)	0
	(b) Land yet to be acquired (Ha)	0
	(c) Status of Land acquisition if not acquired	0
27.	**Rehabilitation and Resettlement (R&R):**	
	(a) No. of Villages	0
	(b) No. of Households	0
	(c)No. of PDFs (Project Displaced Families)	0
	(d) No. of PAFs (Project Affected Families)	0
	(e) Funds Allocated for R&R(in Rs)	0
	(f) Status of R&R	Yet To Start
28.	**Details of Presence of Schedule-I Species:**	
	(a)Whether there is Presence of Schedule-I Species ?	No
	(b) Whether conservation plan for Schedule-I Species has been prepared ?	No
	(c) Whether conservation plan for Schedule-I Species has been approved by competent authority ?	No
29.	**Details of Presence of Water Bodies in Core Area:**	
	(a) Whether there is Presence of Water Bodies in Core Area ?	No
	(b) Whether there is Diversion Required ?	No
	(c) Whether permission has been obtained from competent authority ?	No
30.	**Details of Presence of Water Bodies in Buffer Area:**	
	(a)Whether there is Presence of Water Bodies in Buffer Area ?	NA
	(i) Details of Water Bodies in Buffer Area	NA
	(ii) Direction of Water Bodies in Buffer Area	NA
	(iii)Distance of Water Bodies in Buffer Area	NA
31.	**Manpower Requirement:**	
	(a) Permanent Employment-During Construction	0
	(b) Permanent Employment-During Operation	10
	(c)Temporary Employment- During Construction	0
	(d) Temporary Employment- During Operation	0
	(e) No. of working days	270
	(f) Total Manpower	10
32.	**Green Belt in Ha**:	
	(a) Total Area of Green Belt (in hectare)	1.70
	(b) Percentage of Total Project Area	33%
	(c) No. of Plants to be Planted	340
	(d) Funds Allocated for Plantation	1,18,000
	(e) Uploaded Green Belt plan	Copy of Green Belt Plan

33. Project Benefits

S. No.	Type of Project Benefits	Details of Project Benefits

(1.)	Financial	Direct and indirect employment opportunities

34. CRZ Specific Details: Not Applicable

35. Sector Specific Details For Non-Coal Mining

S. No.	Item	Details
1.	**No. of Mineral(s) to be Mined : 1**	
S. No.	**Mineral(s) to be Mined**	**Major or Minor Mineral**
(1.)	Limestone	Minor
2.	Mine Capacity in ROM (Run of Mine)	1,65,619.5
3.	Uploaded 500 meters Cluster Certificate from State Mines and Geology in case of minor minerals	Copy of 500 meters Cluster Certificate from State Mines and Geology
4.	**Mining Plan:**	
	(a)Approval Letter No.	D(5)-94/IND/2019
	(b)Date of Approval	07th March, 2020
	(c)Approved Letter	Copy of Approved Letter
	(d)Approved By State Mining and Geology Department	State
	(e)Approved Mining Lease Area	5.16
	(f)Approved Capacity	1,65,619.5 Cu.m per year
5.	**Technical Details:**	
	(a) Total Geological Reserves (Million Ton)	--
	(b) Mineable Reserves (Million Ton)	2.22520795
	(c) Extractable Reserves(Million Ton)	2.22520795
	(d) Percent(%) of Extraction	100
	(e) Grade of Coal /Ore /Mineral	1
	(f) Stripping Ratio	1 : 0
	(g) Category of Gaseousness (Only for Coal Mining, Others may Write NA)	0
	(h) Average Gradient(Degree)	60
	(i) Mining Method	Opencast
	(j) Life of Mine (Years)	10
6.	**Details of Beneficiations:**	
	(a) Whether it is proposed to install beneficiation plant/Coal washery within the mining lease area	No
	(b) Whether it is proposed to install crusher within the mining lease area	No
7.	**Details of Seams:**	
	(a)Whether details of seam applicable	No
8.	**Details of Mining Lease:**	
	(a)Mining Lease Area (in Hectare)	5.16
	(b)Whether obtained Letter of Intent (LOI) from the state government ?	Yes
	(i)Copy of Letter of Intent	Copy of Letter of Intent
	(ii) Date of issue of LOI	2nd Dec., 2019
	(iii) Validity of LOI	--
	(iv)Reference No. of LOI	D(5)-94/IND/2019
	(c)Whether Lease Deed Executed ?	No
	(i)Reason thereof	After fulfillment of all condition of LOI
	(d)Whether Lease Deed Renewed ?	No
	(i)Reason thereof	Mining Lease not yet granted
9.	**OB (Over Burden) Management:**	
	(a) Details of External Dumps:	
	(i)No. of OB Dumps	0
	(ii)Total Area (in Hectare)	0
	(iii)Height (in meter)	0
	(iv)Quantity (in Million Cubic meter)	0
	(v)No. of year back fill up	0
	(b) Details of Internal Dumps:	
	(i)No. of Internal Dumps	0
	(ii)Total Area (in Hectare)	0

	(iii)Height (in meter)	0
	(iv)Quantity (in Million Cubic meter)	0
10.	**Details of Topsoil Management:**	
	(a)Quantity of Topsoil excavated during the entire life of the mine (in Million Cubic metre)	0
	(b)Quantity of Topsoil proposed for utilization for reclamation during the entire life of the mine (in Million Cubic metre)	0
	(c)Quantity of Topsoil proposed for utilization for other activities during the entire life of the mine (in Million Cubic metre)	0
11.	**Details of Final Mine Void**:	
	(a) Area (in Hectare)	4.38
	(b) Depth (in meter)	95
	(c)Volume (in Million Cubic meter)	4.161
12.	**Details of Quarry**:	
	(a)Final Void of 4.38 (hectare) at a Depth of 95 meter which is Proposed to be Converted into a Water Body.	
	(b)Total Quarry Area (ha)	5.16
13.	**Details of Transportation:**	
	(a)In Pit/Underground to Surface	Tipper
	(b)Surface to Siding/Loading	Tipper
	(c)Transportation / Conveyor Details	Transportation by Tipper/Dumper

14. Details of Land Usage (Pre-Mining)

S. No.	LAND USE	Other LAND USE	WITHIN ML AREA (Hectare)	OUTSIDE ML AREA (Hectare)	TOTAL (Hectare)
(1.)	AGRICULTURE LAND		0	0	0
(2.)	SURFACE WATER BODIES		0	0	0
(3.)	GRAZING LAND		0	0	0
(4.)	SETTLEMENTS		0	0	0
(5.)	FOREST LAND		5.16	0	5.16
(6.)	WASTE LAND		0	0	0
TOTAL			**5.16**	**0**	**5.16**

15. **Details of Land Usage (Post-Mining)**

S. No.	LAND USE	Other LAND USE	Plantation (ha)	Water Body (ha)	Public Use (ha)	Undisturbed (ha)	Total
(1.)	TOP SOIL STORAGE		0	0	0		0
(2.)	BUILT UP AREA (COLONY/OFFICE)		0	0	0	0	0
(3.)	GREEN BELT		0	0	0		0
(4.)	EXCAVATION/QUARRY		0	4.38	0		4.38
(5.)	INTERNAL OB DUMPS		0	0	0		0
(6.)	ROADS		0	0	0		0
(7.)	EXTERNAL OB DUMPS		0	0	0		0
(8.)	VIRGIN AREA		0	0	0.78		0.78
TOTAL			**0**	**4.38**	**0.78**	**0**	**5.16**

16.	**Details of Reclamation**:	
	Total Afforestation Plan shall be Implemented Covering of Mining.	
	This will Include:	
	(a) External OB Dump (in hectare)	0
	(b) Internal Dump (in hectare)	0
	(c) Quarry (in hectare)	5.16
	(d) Safety Zone (in hectare)	0.78
	(e) Final Void of 4.38 (hectare) at a Depth of 95 meter which is Proposed to be Converted into a Water Body.	
	(f)Density of Tree Plantation per ha (in no.)	1000
	(g) Others in ha (such as Excavation Area along ML Boundary, along Roads and Infrastructure, Embankment Area and in Township Located Outside the Lease etc)	0
	(h) Total afforestation plant (in hectare)	1.70
17.	**Status of progressive Mining Closure Plan:**	

Details Not Applicable

18. **Details of Actual Coal / ORE Production vis-a-vis Sanctioned Capacity since the Inception:**

S. No.	Financial Year	Sanctioned Capacity as per EC (MTPA)	Sanctioned Capacity as per CTO	Sanctioned Capacity as per approved mining plan	Actual Production	Excess Production Beyond the EC / CTO / Mining Plan Sanctioned Capacity (MTPA)
(1.)	0	0	0	0	0	0

S. No.	Item	Details
36.	**Details of Court Cases:** (a)Whether there is any Court Cases pending against the project and/or land in which the project is proposed to be set up ?	No
37.	**Details of Direction Issued under Environment (Protection) Act / Air (Prevention & Control of Pollution)) Act / Water (Prevention & Control of Pollution) Act:** (a) Whether any Direction issued under EPA Act/Air Act/Water Act ?	No
38.	**Details of EIA Consultant:**	
	(a) Have you hired Consultant for preparing document?	Yes
	(i) Accreditation No.	NABET/EIA/1720/IA0023
	(ii) Name of the EIA Consultant	Geogreen Enviro House Pvt. Ltd
	(iii) Address	C 1/20, Viraj Khand, Gomati Nagar, Lucknow-226010
	(iv) Mobile No.	6391808080
	(v)Landline No.	0
	(vi) Email Id	vkm.geo@gmail.com
	(vii) Category of Accreditation	B
	(viii) Sector of Accreditation	Non-Coal Mining
	(ix) Validity of Accreditation	05 Oct 2021
	(x) Uploaded Certificate of Accreditation certified by QCI/NABET	Copy of Certificate of Accreditation
39.	**Documents to be Attached:**	
	(a)Upload Copy of EIA/EMP(Text)	Copy of EIA/EMP(Text)
	(b)Upload Copy of EIA/EMP(Annexures) Report	Copy of EIA/EMP(Annexures)
	(c)Upload Copy of EIA/EMP(Maps/Plans/Figures only)	Copy of EIA/EMP(Maps/Plans/Figures only)
	(b)Uploaded Copy of Risk Assessment Report	Copy of Risk Assessment
	(c)Uploaded Copy of Feasibility Report/ Detailed Project Report(DPR) /Detailed Engineering Report /Detailed Conceptual Plan /Approved Mining Plan	Copy of Feasibility Report/ Detailed Project Report(DPR) /Detailed Engineering Report /Detailed Conceptual Plan /Approved Mining Plan
	(d)Uploaded Copy of Final Layout Plan	Copy of Final Layout Plan
	(e)Uploaded Cover Letter	Copy of Cover Letter
	(f) Uploaded Copy of documents in support of the competence/authority of the person making this application to make application on behalf of the User Agency	Copy of documents in support of the competence/authority of the person making this application to make application on behalf of the User Agency
	(g) Uploaded Copy of District Survey Report	NA
	(h) Uploaded Copy of Replenishment Study Report & Baseline Survey Data	NA
	(i) Uploaded Additional File	Copy of Additional File
	(f)Uploaded Updated Form1	NA

Essential Details Sought

S. No.	EDS Sought Date	EDS Sought	Letter
NO Record			

Addtional Details Sought

S. No.	ADS Sought Date	ADS Sought	Letter
NO Record			

Undertaking

I hereby give undertaking that the data and information given in the application and enclosures are true to be best of my knowledge and belief. And I am aware that if any part of the data and information found to be false or misleading at any stage, the project will be rejected and clearance given, if any to the project will be revoked at our risk and cost. In addition to above, I hereby give undertaking that no activity / construction / expansion has since been taken up.

Name of Applicant	Huidrom Vikramjit Singh
Designation	Managing Director
Name of Company (Applicant Name should not be given here)	M/s. HVS Construction Materials Pvt. Ltd.

	Address	Patsoi Lamkhai, New Cachar Road, NH-7, District- Imphal West, State- Manipur.

Quality Council of India

National Accreditation Board for Education & Training

CERTIFICATE OF ACCREDITATION

Geogreen Enviro house Pvt. Ltd, Lucknow
29, Chandraloke colony, Aliganje, Lucknow, U.P.-226024

are accredited as Category – A organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA/EMP reports in the following sectors:

Sl. No.	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals open cast only	1	1 (a) (i)	B
2	Building and construction projects	38	8 (a)	B

Note: Name of approved EIA Coordinators and Functional Area Experts are mentioned in IAAC minutes dated April 21, 2017 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/17/0327 dated 31 May 2017. The accreditation need to be renewed before the expiry date by Geogreen Enviro house Pvt. Ltd, following due process of assessment.

C.E.O
NABET

Certificate No.	*Issue date*	*Expiry Date*
NABET/EIA/1720/IA0023	*May 31, 2017*	*April 02, 2020*

For the updated List of Accredited Consultants with approved sectors please refer QCI-NABET website.

National Accreditation Board
for Education and Training
(Member - International Accreditation Forum & Pacific Accreditation Cooperation)

QCI/NABET/ENV/ACO/21/1790 July 06, 2021

To

Geogreen Enviro house Pvt. Ltd
403, Aimen Apartment, 29 Chandraloke colony,
Aliganj, Lucknow, U.P.226024

Sub.: Extension of Validity of Accreditation till Oct 05, 2021– regarding
Ref.. Certificate no NABET/EIA/1720/IA0023

Dear Sir/Madam

In view of the outbreak of Corona Virus (COVID-19) and subsequent lockdown declared for its control vide order dated 24th March 2020, issued by Ministry of Home Affairs, Govt. of India, NABET hereby extends the Validity of your Accreditation till Oct 05, 2021.

Meanwhile, you may enclose this with your EIA reports along with the certificate/validity letter. The EAC/SEIAA/SEAC/Other are hereby requested to consider the same as a valid document for the preparation of EIA/EMP report.

With best regards.

(A K Jha)
Sr. Director, NABET