Volume - I

DRAFT ENVIRONMENT IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PLAN

FOR

Limestone Mine (Area: 231.25 ha.) with Production Capacity of 4.5 Million TPA (Limestone, Shale & Quartzite) and Sub-grade Mineral Stacking 2,50,000 CuM Per Annum (Maximum) Having Two Nos. Crushers, Capacity Being 1000 TPH & 400 TPH

At
Villages: Nalag, Bhaterh Uprali, Barmana, Jamthal,
Dhawan Kothi, Baloh & Panjgain,
Tehsil: Sadar, District: Bilaspur,
State: Himachal Pradesh

Study Period: Post Monsoon Season (October to December, 2022)

APPLICANT

ACC

M/s. ACC Limited

(Unit: Gagal Cement Works)
Regd. Address: Cement House, 121,
Maharshi Karve Road,
District: Mumbai, State: Maharashtra,
Pin Code-400 020

EIA CONSULTANT

J.M. EnviroNet Pvt. Ltd.

(Registered EIA Consultant Organization from NABET-QCI)
Certificate No.: NABET/EIA/2023/SA 0172
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(Certificate No.:TC-6821)

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ABBREVIATIONS

AAQ	:	Ambient Air Quality
AAQM	:	Ambient Air Quality Monitoring
AAQS	:	Ambient Air Quality Standards
AIS & LUS	:	All India Soil and Land Use Survey
AMSL	:	Above Mean Sea Level
ANFO	:	Ammonium Nitrate Fuel Oil
bgl	:	Below Ground Level
CWC	:	Central Water Commission
CPP	:	Captive Power Plant
CPCB	:	Central Pollution Control Board
CSR	:	Corporate Social Responsibility
CEP	:	Corporate Environment Policy
CGWA	:	Central Ground Water Authority
DGMS	:	Directorate General Of Mines Safety
DMG	:	Department Of Mines And Geology
DTH	:	Down The Hole
DCF	:	Deputy Conservator Of Forest
DMF	:	District Mineral Fund
EMS	:	Environment Management System
ECO	:	Emergency Coordinating Officer
EAC	:	Expert Appraisal Committee
EC	:	Environmental Clearance
EIA	:	Environmental Impact Assessment
EMC	:	Environment Management Cell
EMP	:	Environmental Management Plan
ESE	:	East of South East
ENE	:	East of North East
EPA	:	Environmental Protection Act
EPO	:	Emergency planning officer
FMCG	:	Fast Moving Consumer Goods
FPS	:	Fine Particulate Sampler
FCC	:	False Color Composite
Govt.	:	Government
GCP	:	Ground Control Points
GLC	:	Ground Level Concentration
GOI	:	Government Of India
GPS	:	Global Positioning System
GSI	:	Geological Survey Of India
ha	:	Hectare
HEMM	:	Heavy Earth Moving Machinery
HFL	:	Highest Flood Level
HP	:	Horse Power
HOD	:	Head Of Department
IB	:	Inter Burden
IBM	:	Indian Bureau of Mines
IMD	:	India Meteorological Department
IS	:	Indian Standards

ISO	:	International Organization Of Standardization
KW	:	Kilo Watt
KLD	:	Kilo Litre Per Day
LU/LC	:	Land Use / Land Cover
ML	:	Local Magnitude
MT	:	Million Tonne
MOEFCC	:	Ministry Of Environment, Forest And Climate Change
M.M.R	:	Metalliferous Mines Regulation
mRL	:	Meter Reduced Level
MSL	:	Mean Sea Level
Mw	:	Moment Magnitude
MW	:	Mega Watt
N	:	North
NH	:	National Highway
NNW	:	North Of North East
NW	:	North West
NAAQS	:	National Ambient Air Quality Standards
NABET	:	National Accreditation Board for Education & Training
NATMO	:	National Atlas & Thematic Mapping Organization
NABL	:	National Accreditation Board for Testing and Calibration Laboratories
NOC	:	No Objection Certificate
NH	:	National Highway
NGO	:	Non-Governmental Organization
NONEL		Non-Electric
NRSA	:	National Remote Sensing Agency
NRSC	:	National Remote Sensing Centre
OB	:	Over Burden
OHS	:	Occupational Health and Safety
OSHA	:	Occupational Safety and Health Administration
PFR	:	Pre-Feasibility Report
pH	:	Potential of Hydrogen
PHCs	:	Public Health Centers
PM	:	Particulate Matter
PPE	:	Personal Protective Equipment
PESO	:	Petroleum and Explosives Safety Organization
PPV	:	Peak Particle Velocity
QCI	:	Quality Council of India
RSPM	:	Respirable Suspended Particulate Matter
ROM	:	Run Of Mine
HPSPCB	:	Himachal Pradesh State Pollution Control Board
HPSMM	:	Himachal Pradesh State Mines And Minerals
RCC	:	Reinforced Concrete Cement
RDS	:	Respirable Dust Sampler
SSE	:	South Of South East
SOB	:	Soft Over Burden
SW	:	South West
SC	:	Scheduled Caste
SHE	:	Safety, Health & Environment

SIA	:	Social Impact Assessment
SOI	:	Survey of India
SPCB	:	State Pollution Control Board
SPM	:	Suspended Particulate Matter
ST	:	Scheduled Tribe
STP	:	Sewage Treatment Plant
TDS	:	Total Dissolved Solids
TAMRA	:	Transparency Auction Monitoring and Resource Augmentation
ToR	:	Terms of Reference
TPA	:	Tones Per Annum
TPD	:	Tones Per Day
TW	:	Tube Well
UNFC	:	United Nations Framework Classification
VT	:	Vocational Training
RF	:	Reserve Forest
PF	:	Protected Forest
$\mu g/m^3$	:	Micro gram per meter cube
µm	:	Micro Meter
dia.	:	diameter
CuM	:	Cubic meter
dB	:	Decibel
gm/sec	:	Gram per second
gm/cc	:	Gram per cubic meter
hr/day	:	Hour per day
kg	:	Kilogram
Kg/hr	:	Kilogram per hour
Kg/ha	:	Kilogram per hectare
km	:	Kilometer
m	:	Meter
mg/l	:	Milligram per Litre
mm	:	Millimeter
Sq.km	:	Square Kilometer
t/hr	:	Tonnes per hour

F.No. J11015/130/2003-IA.II(M)
Government of India
Ministry of Environment, Forest and Climate Change
Impact Assessment Division
***

Indira Paryavaran Bhavan,
Prithvi Wing, 2ndFloor, Aliganj,
JorBagh Road, New Delhi-110 003

Dated: 25th January, 2021

To,

M/s ACC Limited
Gagal Limestone Mine,
P.O Barmana,Tehsil Bilaspur Sadar,
Himachal Pradesh-174013.

Subject: Proposal under the provision of Notification S.O. 1530 dated 06.04.2018 for Gagal Limestone mine of with Production Capacity 4.5 Million TPA (Limestone) and sub-grade mineral stacking 2,50,000 CuM per annum (Maximum) with two nos. of existing Crushers having capacity 1000 TPH & 400 TPH from the mine lease area of 231.25 ha located at Villages Nalag, BhaterhUprali, Barmana, Jamthal, DhawanKothi, Baloh&Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh by M/s. ACC Limited- ToR reg.

Sir,

This has reference to online proposal no. IA/KA/MIN/81200/2018of M/s ACC Limited is for Terms of Reference for Existing Limestone Mine (ML Area: 231.25 ha) Limestone Production Capacity of 4.5 Million TPA subgrade mineral stacking 2,50,000CuM per annum (Maximum) (0.51 Million tonnes) and two existing Crushers having capacity 1000 TPH & 400 TPH respectively. The mining lease is located Near Villages- Villages Nalag, BhaterhUprali, Barmana, Jamthal, DhawanKothi, Baloh&Panjgain at Tehsil Sadar, District Bilaspur, Himachal Pradesh. Study area falls within the Survey of India Toposheet No. 53 A/15. The Project is located in Seismic zone-V. The Latitude and Longitude of the mine site falls between 31° 23' 30.3" to 31° 24' 57.50" N and 76° 50' 15.5" to 76° 51' 8" E respectively.

2. Project Proponent submitted that the Project is Category A project as the mining lease area is more than 100 Ha as per S.O. dated 14.08.2018.

3. Project Proponent submitted that Environmental Clearance for the existing mine was obtained on 21st April, 2005 under the EIA notification 1994. Pursuant to the MoEF&CC circular 6th April 2018, Present EC application is submitted under EIA notification 2006 for revalidation of Environmental Clearance. There is no increase in the production capacity or increase of mining lease area of the project.

4. Project proponent submitted that the application was made within the provision of Ministry's Notification S.O.1530(E) dated 6.04.2018 as per the notification the Project Proponent applied for ToR on 4th October 2018 i.e. well within the due date as per above notification and submitted the Form-1 & Pre-Feasibility Report. The proposal was placed in the EAC meeting held during December 19-20, 2019 wherein the committee observed that PP has not submitted the complete information, and further examination of the submitted information is required for assessment of compliance of the various provisions of ministry notifications, OM and Hon'ble Court judgements. The Committee, therefore, deferred the proposal and additional details was sought by the Ministry vide letter dated 07.02.2020.

5. Project Proponent submitted that the reply of Additional Details Sought to MoEFCC on 11.05.2020. Based on information submitted, the project was again considered in 18th EAC meeting held on 23.06.2020 wherein the Committee was of the opinion that the instant Proposal attracts the Violation of EIA Notification, 2006. PP again submitted the *application for grant of ToR within the provision of Ministry's Notification S.O.1530(E) dated 6.04.2018 requesting to exempt public hearing as there is no change in mining lease area, production capacity & mining methodology and Process for EC accordingly* and the proposal was placed in the 25th EAC (Non-coal Mining) held during 22-24 December, 2020.

6. Project Proponent submitted that initially mining lease was granted in favor of M/s. ACC Limited vide order no.5-205 / 77– Ind (Glg) -6253 dated 11.08.1978 by Director of Industries, Shimla, Government of Himachal Pradesh. Mining Lease deed was executed in favor of M/s ACC Limited for an area of 265.97 ha with effect from 10.02.1979 for 20 years. Further lease area of 231.25 hectares was renewed vide letter no. Udyog-Bhu (Khani-4) Major-47 / 98-I-7556 dated 29.01.2003 for further terms of 20 years w.e.f. 19.02.1999 to 18.02.2019. Further as per provision of section 8A(5) of Mines & Minerals (Development & Regulation) Amendment Act, 2015, the period of above mentioned lease has been extended and executed upto 31.03.2030 vide letter no. Udyog-Bhu (Khani-4) Major 47/98–I-2540 dated 09.06.2015 and Udyog – Bhu (Khani-4) Major – 47 / 98 – I -5133 dated 12.08.2015.

7. Project Proponent reported that there is no schedule -1 species available in the core zone of the project, however Indian Peafowl, Cheer Pheasant, Leopard, Leopard cat, Monitor Lizard, White bucked vulture, Khalij pheasant etc are found in the buffer zone of the project. Wild life conservation plan is made and approved by Chief Wild Life Warden (HP) vide their letter Nil dated 31.10.2015.PP submitted that Bandli Sanctuary at an aerial distance of 4.1 kms for which company have clearance from National Board for Wildlife vide letter # 6-147/2015 WL (36th Meeting) dated 9th November 2015.

8. Project Proponent reported Mining plan was approved by IBM vide their letter # 614(2)/MS-A-138/2003-DDN dated 09.02.2018. PP submitted that Gagal Limestone Mine is fully mechanized hilly open cast mine. Limestone deposit at Gagal is reclined flooded and the overall strike of the deposit is NE-SW of the mining lease. Mines working have been opened from the top of the hill. The mining extends over a dimension of 660 Meters X 800 Meters. This Mine lies at a distance of 1.6 kilometer from Gagal Cement Plant. The integrated cement plant is situated at the foot hill of the Gagal Mine. Present mining lay out is divided into two

hills i.e. South-East and North-West. South east hill comprised of high magnesia limestone benches from mRL 860 to mRL 825 and limestone benches from mRL 830 to mRL 710 and the working extend upto 621 mRl in North west side hill comprise of High magnesia limestone, Grey shale and Medium to high grade limestone benches. The working will extend from mRL 856 to mRL 680. Top high magnesia limestone capping is removed by shovel and dumper combination. Two crushers are located within Mining Lease Area. Since generation of overburden in Gagal Limestone Mine is Zero but the top capping of high magnesia Limestone which is a subgrade mineral is removed for exposing the High grade limestone and the mineral is stacked over the non -mineralized zone which is outside of the Ultimate Pit Limit.The mine is being worked by mechanized system of opencast method. Blast holes of 115 mm & 150 mm dia. are drilled of depth 10 meters with the help of drilling machines with no sub grade drilling. The complete drilling operation is carried out by wet drilling/ dry drilling (with cyclone dust collectors) method and no dust is allowed to be air borne while drilling. The blasted stone is then loaded into 60 T dumpers with the help of shovels. These dumpers unload the blasted material into the crusher. The hauling of the material from excavated locations to the stacking location is done by Dumpers. After Dumping in the stacking location, Compaction is done forthwith by deploying Dozers. Excavated limestone is being transported to crusher, by dumpers and from crusher to cement plant entire material of 4.5MTPA is transferred by covered belt conveyor.

9. Project Proponent submitted that the total water requirement is 120 KLD which is being sourced from River Sutlej. PP submitted that for withdrawal of water, company have water deed agreement with Bhakra Beas Management Board and is valid till 16th March 2020. PP also submitted that renewal of water deed agreement is under progress with BBMB for further three years. PP reported that as on date 114 ha area is covered under greenbelt and plantation which will be 128.86 ha upto conceptual stage.

10. Project Proponent reported that no displacement of Project affected persons is involved hence, no resettlement. PP reported that to control the emissions regular preventive maintenance of Equipment/ Transportation Vehicles is being/ will be carried out which also helps in reducing noise. Drilling machines are being equipped with wet drilling arrangements. Controlled Blasting is adopted with proper spacing, burden and stemming. Blasting is done during day hours only. Secondary blasting is totally avoided. The blasting is carried out during favorable atmospheric condition and low human activity timings. All mines employees will be provided with earplugs/earmuffs. Crusher will be covered with Noise Acoustic Panels to absorb/mitigate the noise generated during crushing operations. Dust Suppression System (water spraying) shall be adopted at Quarry Haul Road. Reduction of Dust generation by using sharp teeth of shovels.Water spraying system at the crusher hoppers.Development of green belt and plantation.Monitoring of air quality and noise level monitoring the mine and surrounding villages. Foot hill of mining area is covered with soil/Earthern bunds to arrest soil erosion. A parapet wall had also been constructed, which arrests soil & water. Garland drainage system has been provided. Waste water from workshop is treated using Oil – Water separator and treated water is being re circulated & used in HEMMs washing etc. Domestic waste water generated from mines office & canteen is disposed of in soak pit via septic tank. Periodical monitoring of Ground water level & quality is being carried out.

11. Project Proponent reported that initial & periodical medical check-up of all the employees will be carried out. The main factors of occupational health are fugitive dust & noise. Safety of employee during blasting operation and maintenance of mining equipment and handling of explosive materials will be taken care of as per Mine Regulations, 1961. To avoid any adverse effects on the health of workers due to dust, heat, noise and vibration; sufficient measures have been /are being proposed in the mining project are as Relevant company health and safety policy and safety management systems, Relevant standard work procedures, Assessment of hazardous in the field, use of all types of PPE's, safe use of hand & power tools, safe practices around drill rigs & heavy equipment, Housekeeping & basic hygiene while camping, Advising companions of allergies, afflictions, Reporting safety incidents, emergency procedures, Dust suppression of haul road, First-aid facilities in the mining area etc.

12. Project Proponent reported that one case has been filed by M/s ArchanaDutt. The case filed by M/s Archana Dutt is not a specific case under Environment (Protection) Act, Air (P & CP) Act & Water (P & CP) Act. It is filed in general under Article 226 of Constitution of India, by M/s Archana Dutt against the Union of India through the Ministry of Commerce & Industries, and made State of Himachal Pradesh, State agencies like HPSPCB and all the cement companies in the State of Himachal Pradesh as a respondent. 1) Union of India and others) 2) The State of Himachal Pradesh through its Chief Secretary, Civil, Secretariat, Chotta Shimla, Shimla 171002 (H.P) (3) The Himachal Pradesh Pollution Control Board, Him Parvesh , Phase-III,New Shimla, Shimla 171009 (H.P) (4) M/s ACC limited, Gagal Cement works , Barmana, District Bilaspur -174013 (H.P.) (5) Ambuja Cement Darlaghat , District - Solan (H.P) (6) Ultra tech cement limited, Bagga, District Solan (HP) (7) Cement corporation of India, Rajban, district, Sirmoue (HP). Last Hearing was on 29.08.2019, with an order as "Adjourned by four weeks." and no further hearing was held as on date. It is still pending.

13. Project Proponent submitted Authenticated year wise production details since year 1993-94 to 2019-20 has been obtained from office of the Mining Officer, District Bilaspur vide letter no Udyog-Bhu/BLP/ACC Report/1065 dated 29.02.2020. PP has also submitted an affidavit to MoEF&CC in accordance with the statutory requirement & judgment of Hon'ble Supreme Court dated 2nd August 2017 in writ Petition (civil) No. 114 of 2014 in the matter of common cause versus Union of India & Ores before grant of ToR/EC.

14. Project Proponent submitted that project capital cost is Rs. 78.98 Croresand the total manpower requirement for the mine shall be 78 Persons.

15. Based on the information submitted and presentation made by the PP and the Consultant during the 25th EAC meeting held during 22-24th December, 2020, Committee noted noted that the proposal attracts the violation and with this background EAC decided to appraise the proposal and after detailed deliberations the committee **recommended** the proposal for grant of standard Terms of Reference under Notification S.O. 1530(E) dated 6th April 2018 and additional TOR in view of the violation for undertaking detailed EIA/EMP study for Gagal Limestone mine of with Production Capacity 4.5 Million TPA (Limestone) and sub-grade mineral stacking 2,50,000 CuM per annum (Maximum) with two nos. of existing

Crushers having capacity 1000 TPH & 400 TPH from the mine lease area of 231.25 ha of M/s ACC Limited located at Villages Nalag, BhaterhUprali, Barmana, Jamthal, DhawanKothi, Baloh&Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh along with specific conditions.

16. The Ministry of Environment, Forest and Climate Change has examined the proposal in accordance with the Environmental Impact Assessment Notification, 2006 and further amendments thereto and hereby accords the above mentioned Terms of Reference (ToR) as recommended by EAC during its 25th EAC meeting held during 22-24th December, 2020 and corrigendum minutes for grant of standard Terms of Reference under Notification S.O. 1530(E) dated 6th April 2018 and additional TOR in view of the violation for undertaking detailed EIA/EMP study for Gagal Limestone mine of with Production Capacity 4.5 Million TPA (Limestone) and sub-grade mineral stacking 2,50,000 CuM per annum (Maximum) with two nos. of existing Crushers having capacity 1000 TPH & 400 TPH from the mine lease area of 231.25 ha of M/s ACC Limited located at Villages Nalag, BhaterhUprali, Barmana, Jamthal, DhawanKothi, Baloh&Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh along with followingspecific conditions in addition to addition to the Standard ToR applicable to Non-Coal Mining Sector:

Specific Term of Reference

I. The State Government/SPCB to take action against the project proponent under the provisions of the Environment (Protection) Act, 1986.
II. The project proponent shall be required to submit a bank guarantee equivalent to the amount of remediation plan and natural and community resource augmentation plan with the SPCB prior to the grant of EC. The quantum shall be recommended by the EAC and finalized by the regulatory authority. The bank guarantee shall be released after successful implementation of the EMP, followed by recommendations of the EAC and approval of the regulatory authority.
III. Assessment of ecological damage with respect to air, water, land and other environmental attributes. The collection and analysis of data shall be done by an environmental laboratory duly notified under the Environment (Protection) Act, 1986, or an environmental laboratory accredited by NABL, or a laboratory of a Council of Scientific and Industrial Research (CSIR) institution working in the field of environment.
IV. Preparation of EMP comprising remediation plan and natural and community resource augmentation plan corresponding to the ecological damage assessed and economic benefits derived due to violation.
V. The remediation plan and the natural and community resource augmentation plan to be prepared as an independent chapter in the EIA report by the accredited consultants.
VI. PP needs to carry out the Public Hearing as the proposal attracts the violation and the PH cannot be exempted.
VII. PP should submit the note on the improvement in the EMP during last six months.

VIII. PP should provide in the EIA Report details of all the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline after grant of EC.

Additional TOR's:

I. PP should provide in the EIA Report details of all the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline after grant of EC.

II. PP should submit the revenue plan for mining lease, revenue plan should be superimposed on the satellite imaginary clearly demarcate the Govt. land, private land, agricultural land etc.

III. PP should submit the real-time aerial footage & video of the mining lease area and of the transportation route. PP should submit the detailed plan in tabular format (year-wise for life of mine) for afforestation and green belt development in and around the mining lease. The PP should submit the number of saplings to be planted, area to be covered under afforestation & green belt, location of plantation, target for survival rate and budget earmarked for the afforestation & green belt development. In addition to this PP should show on a surface plan (5-year interval for life of mine) of suitable scale the area to be covered under afforestation & green belt clearly mentioning the latitude and longitude of the area to be covered during each 5 years. The capital and recurring expenditure to be incurred needs to be submitted. Presently in India there are many agencies which are developing forest in short interval of time. Thus, for the plantation activities details of the experts/agencies to be engaged needs to be provided with budgetary provisions.

IV. PP should submit the quantity of surface or ground water to be used for this project. The complete water balance cycle need to be submitted. In addition to this PP should submit a detailed plan for rain water harvesting measures to be taken. PP should submit the year wise target for reduction in consumption of the ground/surface water by developing alternative source of water through rain water harvesting measures. The capital and recurring expenditure to be incurred needs to be submitted.

V. PP should clearly bring out the details of the manpower to be engaged for this project with their roles /responsibilities/designations. In addition to this PP should mention the number and designation of person to be engaged for implementation of environmental management plan (EMP). The capital and recurring expenditure to be incurred needs to be submitted.

VI. PP should submit the year-wise, activity wise and time bound budget earmarked for EMP, occupational health surveillance & Corporate Environmental Responsibility. The capital and recurring expenditure to be incurred needs to be submitted.

VII. PP should submit the measures/technology to be adopted for prevention of illegal mining and pilferage of mineral. PP should submit the detailed mineralogical and chemical composition of the mineral and percentage of free silica from a NABL/MoEF&CC accredited laboratory.

VIII. PP should clearly show the transport route of the mineral and protection and mitigative measure to be adopted while transportation of the mineral. The impact from the center line of the road on either side should be clearly brought out supported with the line source modelling and isopleth. Further, frequency of testing of Poly Achromatic Hydrocarbon needs to be submitted along with budget. Based on the above study the compensation to be paid in the event of damage to the crop and land on the either side of the road needs to be mentioned. The PP should provide the source of equations used and complete calculations for computing the emission rate from the various sources.

IX. PP should clearly bring out that what is the specific diesel consumption and steps to be taken for reduction of the same. Year-wise target for reduction in the specific diesel consumption needs to be submitted.

X. PP should bring out the awareness campaign to be carried out on various environmental issues, practical training facility to be provided to the environmental engineer/diploma holders, mining engineer/diploma holders, geologists, and other trades related to mining operations. Target for the same needs to be submitted.

XI. The budget to be earmarked for the various activities shall be decided after perusal of the Standard EC Conditions published by the Ministry. After perusal of Standard EC conditions if agreed PP should also submit an undertaking by the way of affidavit for Compliance of Standard EC conditions already prescribed by the Ministry vide O.M. No and Specific condition if prescribed by the EAC/MoEF&CC.

XII. The PP should ensure that only NABET accredited consultant shall be engaged for the preparation of EIA/EMP Reports. PP shall ensure that accreditation of consultant shall be valid during the collection of baseline date, preparation of EIA/EMP report and during the appraisal process. The PP and consultant should submit an undertaking the information and data provided in the EIA Report and submitted to the Ministry are factually correct and PP and consultant are fully accountable for the same.

XIII. The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyze the samples.

Standard Terms of Reference (TOR) for Mining Project

1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to1994.

2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.

3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.

4) All corner coordinates of the mine lease area, superimposed on a High Resolution

Imagery/toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).

5) Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.

6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.

7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the proposed safeguard measures in each case should also be provided.

8) 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.

9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.

10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.

12) A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.

13) Status of forestry clearance for the broken up area and virgin forestland involved in

the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.

14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.

15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.

17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.

18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.

20) Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).

21) 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.

22) One season (non-monsoon) [i.e. March - May (Summer Season); October - December (post monsoon season); December - February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.

23) Air quality modelling 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.

24) 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.

25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

26) 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.

27) 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.

28) 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 furnished.

29) 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.

30) 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.

31) 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.

32) 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.

33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.

34) 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 EIAreport.

35) 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.

36) 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.

37) 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.

38) Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.

39) 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.

40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

42) A Disaster Management Plan shall be prepared and included in the EIA/EMP Report.

43) 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.

44) Activity-wise time-bound action plan on the issues raised and commitment made during public hearing to be submitted as part of the final EMP Report in compliance of the Ministry's OM F.No.22-65/2017-IA.III dated 30th September, 2020.

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

a) All documents to be properly referenced with index and continuous page numbering.
b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
d) Where the documents provided are in a language other than English, an English translation should be provided.
e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attentionof MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structureand content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
h) As per the circular no. J-11011/618/2010-IA.II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.

18. The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

19. The prescribed TOR would be valid for a period of four years for submission of the EIA/EMP report, as per the O.M. No. J-11013/41/2006-IA. II (I) dated 29.08.2017 and as per the notification S.O. 751(E) 17th February, 2020. The instant TOR is valid up to four years from the date of issue of the ToR.

20. The PP should submit the EIA/EMP report as per the generic structure prescribed in Appendix- III of the EIA Notification, 2006, after incorporating the details of public hearing already conducted and covering the above mentioned issues, to take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006 and S.O. 804 (E) dated 14.03.2017.

21. This issues with the approval of Competent Authority.

Yours faithfully,

Pankaj Verma

(PankajVerma)
Scientist 'E'
Email- pankaj.verma@nic.in
Tel./Fax- 011-24695264

Copy to:

I. **The Secretary**, Ministry of Mines, Government of India, ShastriBhawan, New Delhi.
II. **The Commissioner and Secretary**, Department of Mines & Geology, Government of Himachal Pradesh, Himachal Pradesh Secretariat, Shimla-171 002.
III. **The Commissioner and Secretary**, Department of Environment, Government of Himachal Pradesh, Himachal Pradesh Secretariat, Shimla-171 002.
IV. **Additional Principal Chief Conservator of Forests (C)**, Ministry of Environment, Forest and Climate Change, Regional Office (NCZ), Pearson Road, P.O. New Forest, Forest Research Institute (FRI) campus, Dehradun - 248006.
V. **The Chief Wildlife Warden**, Government of Himachal Pradesh, Mist Chamber, 1st Floor, Khalini, Shimla - 171 002.
VI. **The Chairman**, Central Pollution Control Board, PariveshBhavan, CBD-cum-Office complex, East Arjun Nagar, New Delhi-1100032.
VII. **The Member Secretary**, Central Ground Water Authority, 18/11, Jam Nagar House, Man Singh Road, New Delhi-110011.
VIII. **The Chairman**, Himachal Pradesh State Pollution Control Board, Paryavaran Bhavan, Phase-III, New Shimla - 171 009.
IX. **The Controller General**, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.
X. **The District Collector**,BilaspurDistrict, Himachal Pradesh.
XI. **Guard File**.
XII. **PARIVESH Portal**

Pankaj Verma

(PankajVerma)
Scientist 'E'

No. J-11015/130/2003-IA.II (M)
Government of India
Ministry of Environment, Forest and Climate Change
(Impact Assessment Division)
***

2nd Floor, Prithvi Wing,
Indira Paryavaran Bhavan,
Jor Bagh Road, Aliganj,
New Delhi-110 003

Dated: 27th June, 2022

To

M/s ACC Limited,
Gagal Cement Works,
PO Barmana, District Bilaspur,
Himachal Pradesh – 174 013.

Subject: - Amendment in Terms of Reference dated 25.01.2021 of M/s ACC Limited for mining of Limestone in Gagal Limestone mine with production capacity of 4.50 MTPA (Limestone 3.78 MTPA, Shale 0.64 MTPA & Quartzite 0.072 MTPA) subgrade mineral stacking 2,50,000 CuM per annum (maximum) (0.51 million tons) [Total Excavation: 5.01 MTPA] with two no.s of existing crushers having capacity of 1000 TPH & 400 TPH from the mine lease area of 231.25 ha, located at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh- reg.

Sir,

This has reference to the online proposal no. IA/HP/MIN/267826/2022 of M/s ACC Limited for amendment in Terms of Reference dated 25.01.2021 for mining of Limestone in Gagal Limestone mine with production capacity of 4.50 MTPA (Limestone 3.78 MTPA, Shale 0.64 MTPA & Quartzite 0.072 MTPA) subgrade mineral stacking 2,50,000 CuM per annum (maximum) (0.51 million tons) [Total Excavation: 5.01 MTPA] with two no.s of existing crushers having capacity of 1000 TPH & 400 TPH from the mine lease area of 231.25 ha, located at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh. The mine lease area is located between Latitude: 31°23'30.3"N to 31°24'57.50"N and Longitude: 76°50'15.5"E to 76°51'8" E. The mine lease area falls under the Survey of India Toposheet No: 53A/15 and falls in Seismic Zone-V.

2. The proposal was earlier considered in the 39th EAC (Non-Coal Mining) held during 11th - 12th October, 2021. During the meeting, the Committee noted that the ToR dated 29.01.2021 was granted under violation. Further the SOP dated 07.07.2021 issued by the Ministry for identification and handling of violation cases under EIA, 2006 has been stayed by the Madurai bench of Hon'ble High Court of Madras vide order dated 15.07.2021. Therefore, the Committee returned the proposal in present form and was of the view that PP should approach Ministry after the final adjudication of the Hon'ble High Court.

3. The instant proposal was considered in the 52nd EAC (Non-Coal Mining) meeting held during 14th - 15th June, 2022 based on the MoEF&CC Office Memorandum F.No. 22-21/2020-IA.III [E 138949] dated 28.01.2022 w.r.t observation of Hon'ble Supreme Court in the matter of Civil Appeal Nos. 7576-7577 of 2021 in Electrosteel Steels Limited Vs Union of India and Ors.,

with reference to the SOP dated 7th July, 2021 for identification and handling of violation cases under EIA Notification, 2006. The Hon'ble Supreme Court of India has inter-alia observed the following:

> *"93. The interim order passed by the Madras High Court appears to be misconceived. However, this court is not hearing an appeal from that interim order. The interim stay passed by the Madras High Court can have no application to operation of the Standard Operating Procedure to projects in territories beyond the territorial jurisdiction of Madras High Court. Moreover, final decision may have been taken in accordance with the Orders/Rules prevailing prior to 7th July, 2021".*

4. In view of the above, the Project Proponent has submitted an online application vide proposal no: IA/HP/MIN/267826/2022 dated 26.05.2022 and submitted Form-3 under the provisions of EIA Notification, 2006. The proposed project activity is listed at schedule no. 1(a) Mining of Minerals under Category "A" of the schedule of the EIA Notification, 2006 as the mining lease area attracts the general conditions as the Bandli Sanctuary is located at a distance of 4.1 km from the mine lease area and appraised at Central level.

5. The Project Proponent obtained Terms of Reference (ToR) vide letter dated 25.01.2021 under violation of EIA Notification, 2006 for mining of Limestone in Gagal Limestone mine with production capacity of 4.5 MTPA (Limestone) and subgrade mineral stacking 2,50,000 cu.m per annum (max) with two nos of existing crushers having capacity of 1000 TPH & 400 TPH from the mine lease area of 231.25 ha, located at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh. The Ministry vide Lr No. J11015/130/2003-IA.II (M) dated 25.01.2021 requested the Secretary, Dept. of Environment, Science and Technology, Govt., of Himachal Pradesh to initiate the action under the provisions of section 19 of the Environment (Protection) Act, 1986 against the project.

6. Now, the Project Proponent requested for amendment in TOR dated 25.01.2021 for (1) inclusion of Inclusion of Shale and Quartzite, (2) Not to consider the project under violation and (3) Exemption of public hearing as per MoEF&CC OM No. 22-4/2020-IA.III dated 16.02.2021 as mentioned below: -

S. No	Reference of TOR dated 25.01.2021	Clause as per ToR dated 25.01.2021	Amendment Sought by PP
1	Inclusion of Shale & Quartzite in ToR letter dated 25.01.2021		
	Clause 1, Line 2, Page no:1 Point no:1, Line 3, Page no:1, Point no:15, Line 7, Page no:4, Point no:16, Line 7, Page no:5,	Limestone Production Capacity of **4.50 MTPA** subgrade mineral stacking 2,50,000 CuM per annum (maximum) (0.51 million tons)" and two existing Crushers of capacity 1000 TPH & 400 TPH	**Production Capacity of 4.50 MTPA (Limestone 3.78 MTPA, Shale 0.64 MTPA & Quartzite 0.072 MTPA) subgrade mineral stacking 2,50,000 CuM per annum (maximum) (0.51 million tons) [Total Excavation: 5.01 MTPA]** two existing Crushers of capacity 1000 TPH & 400 TPH
2	Project not to be considered under Violation		
	Clause 15 & 16, Page 4 & 5	MoEFCC accorded standard terms of Reference under Notification	Project not to be considered under Violation

		S.O.1530(E) dated 6th April 2018 and additional TOR in view of the violation for undertaking detailed EIA / EMP Study	
3	Public consultation in place of Public hearing as per MoEFCC OM dated 16.02.2021		
	Specific Condition no vi	PP needs to carry out the Public Hearing as the proposal attracts the violation and PH cannot be exempted	Request to amend the clause as "Public consultation in place of Public hearing as per MoEF&CC OM dated 16.02.2021"

7. Point-Wise Compliance to SoP dated 7th July, 2021

Step	SOP dated 07.07.2021			Compliance of SOP dated 07.07.2021
1	S. No	Status of EC	Actions	Order to revert the activity/ production to permissible limits
	1	If no prior EC has been taken	Order to close its operation	
	2	If prior EC is available for existing/old unit	Order to revert the activity/ production to permissible limits	
	3	If prior EC was not required for earlier production level but is now required	Restrict the activity/production to the extent to which prior EC was not required	
2	Action under Environment (Protection), Act 1986			The Ministry vide letter dated 25.01.2021 requested the Secretary, Department of Environment, Science and Technology, Govt. of Himachal Pradesh to initiate action under the provisions of section 19 of the Environment (Protection) Act, 1986 against the project proponent.
3	Appraisal under EIA Notification, 2006			As per SOP, specific conditions already prescribed in the TOR letter dated 25.01.2021.
4	Penalty Provisions for Violation Cases and applications a. For new projects i. Where operation has not commenced:			The instant proposal was found as violation by EAC in its meeting held during 22nd – 24th June, 2020 and 22nd – 24th December, 2020. The provisions and percentage of penalty shall be decided during the time of PP submitting its proposal for appraisal of EC.

		1% of the total project cost incurred up to the date of filing of application along with EIA/EMP report; [Ex: Rs. 1 lakh for project cost of Rs 1 Cr]	
		ii. Where operations have commenced without EC: 1% of the total project cost incurred up to the date of filing of application along with EIA/EMP report PLUS 0.25% of the total annual turnover during the period of violation. [Ex: For Rs. 100 Cr project cost and Rs.100 Cr total turnover, the penalty shall be Rs. 1 Cr + Rs 0.25 Cr = Rs 1.25 Cr].	
		b. For expansion projects:	
		i. Where operation/ production with expanded capacity has not commenced: 1% of the total project cost attributable to the expansion, incurred up to the date of filing of application along with EIA/EMP report.	
		ii. Where operation/ production with expanded capacity have commenced: 1% of the total project cost (attributable to the expansion activity), incurred up to the date of filing of application along with EIA/EMP report PLUS 0.25% of the total annual turnover (attributable to the expanded activity/capacity) involved during the period of violation.	

8. The Project Proponent reported that one case has been filed by M/s Archana Dutt. The case filed by M/s Archana Dutt is not a specific case under Environment (Protection) Act, Air (P& CP) Act & Water (P & CP) Act. It is filed in general under Article 226 of Constitution of India by M/s Archana Dutt against the Union of India through the Ministry of Commerce & Industries, and made State of Himachal Pradesh, State agencies like HPSPCB and all the

cement companies in the State of Himachal Pradesh as a respondent. 1) Union of India and others) 2) The State of Himachal Pradesh through its Chief Secretary, Civil, Secretariat, Chotta Shimla, Shimla 171002 (H.P) (3) The Himachal Pradesh Pollution Control Board, Him Parvesh, Phase-III, New Shimla, Shimla 171009 (H.P) (4) M/s ACC limited, Gagal Cement works, Barmana, District Bilaspur - 174013 (H.P.) (5) Ambuja Cement Darlaghat , District - Solan (H.P) (6) Ultra tech cement limited, Bagga, District Solan (HP) (7) Cement corporation of India, Rajban, District, Sirmoue (HP). Last Hearing was on 29.08.2019, with an order as "Adjourned by four weeks" and no further hearing was held as on date and it is still pending.

9. The EAC after detailed deliberations made by the Project Proponent and the Consultant, noted that the instant proposal is for amendment in TOR dated 25.01.2021 for (1) inclusion of Inclusion of Shale and Quartzite, (2) Not to consider the project under violation and (3) Exemption of public hearing as per MoEF&CC OM No. 22-4/2020-IA.III dated 16.02.2021. The EAC noted that the PP has mined out the Shale without obtaining EC. Therefore, the production of shale amounts to be additional production over the EC granted to the project proponent on 21.04.2005 which is a violation of EIA Notification, 2006 and subsequent amendments. The EAC also noted that the TOR dated 25.01.2021 was issued keeping a view on violation of the EIA Notification, 2006. Thus, the EAC was of the view that the instant proposal will be considered as a violation case as per Ministry's SOP dated 07.07.2021. The EAC again reiterated the view taken by the EAC in its meeting held during 22nd – 24th December, 2020 while recommending the Terms of Reference (TOR) it was specifically mentioned that in specific condition (vi) that the PP needs to carry out Public Hearing as the proposal attracts the violation and the Public Hearing cannot be exempted. Hence, the MoEF&CC OM vide No. 22- 04/2020-IA.III dated 16.02.2021 is not applicable in the instant proposal.

Based on the above discussions held, the EAC **recommended** the proposal for amendment sought in para 6 for S.No:1 only (i.e., for Inclusion of Shale & Quartzite in ToR letter dated 25.01.2021) for M/s ACC Limited for mining of Limestone in Gagal Limestone mine with production capacity of 4.50 MTPA (Limestone 3.78 MTPA, Shale 0.64 MTPA & Quartzite 0.072 MTPA) subgrade mineral stacking 2,50,000 CuM per annum (maximum) (0.51 million tons) [Total Excavation: 5.01 MTPA] with two nos of existing crushers having capacity of 1000 TPH & 400 TPH from the mine lease area of 231.25 ha, located at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh with the additional specific conditions.

10. The Ministry of Environment, Forest and Climate Change has examined the proposal in accordance with the Environmental Impact Assessment Notification, 2006 and further amendments thereto and Ministry's SOP for identification and handling of violation cases under EIA, notification 2006 dated 07.07.2021, hereby accords the above mentioned amendment in ToR after accepting the recommendation of EAC during its 52nd EAC (Non-Coal Mining) meeting held during 14th-15th June, 2022 for amendment sought in para 6 for S.No:1 only (i.e., for Inclusion of Shale & Quartzite in ToR letter dated 25.01.2021) for M/s ACC Limited for mining of Limestone in Gagal Limestone mine with production capacity of 4.50 MTPA (Limestone 3.78 MTPA, Shale 0.64 MTPA & Quartzite 0.072 MTPA) subgrade mineral stacking 2,50,000 CuM per annum (maximum) (0.51 million tons) [Total Excavation: 5.01 MTPA] with two nos of existing crushers having capacity of 1000 TPH & 400 TPH from the mine lease area of 231.25 ha, located at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil

Sadar, District Bilaspur, Himachal Pradesh along with the following additional specific conditions: -

i. The Project Proponent needs to submit the risk assessment and hazard management report along with the EIA/EMP report which must particularly focus on the control and mitigation measures to be taken during the mining activities keeping in mind that the mine lease area falls in Seismic Zone-V as per IS-1893 (Part-1)-2002 and is at Highest Risk Zone.
ii. The Project Proponent should prepare the EMP considering the scenario of pollution to be generated for peak total excavation for assessing air and noise pollution.
iii. The Project Proponent needs to submit the scenario of additional pollution load in terms of air quality, noise level, ground vibration and traffic density due to mining of Shale and Quartzite and accordingly mitigation measures shall be proposed in the EIA/EMP report.
iv. The Project Proponent needs to clearly bring out the end use of the Shale and Quartzite and it's transportation route from source to the destination and the MoU signed with the consumers.
v. The Project Proponent needs to submit the penalty provisions as per Ministry's SOP dated 07.07.2021 at the time of appraisal of EC.
vi. The Project Proponent needs to submit the Certified Compliance Report (CCR) by the Ministry's Integrated Regional Office at the time of appraisal of EC as per Ministry's OM F.No. IA3-22/10/2022-IA.III [E 177258] dated 08.06.2022.
vii. The Project Proponent needs to submit the District Survey Report (DSR) as per Ministry's notification S.O 3611 (E) dated 25th July, 2018.
viii. The Project Proponent shall conduct drone survey of the mine lease area and buffer area and submit during the appraisal for EC.
ix. The Project Proponent needs to submit the status of court case at the time of appraisal of EC.
x. All other terms and conditions mentioned in the TOR letter dated 25.01.2021 shall remain unchanged.

11. This issues with the approval of Competent Authority.

Yours faithfully,

Pankaj Verma

(Pankaj Verma)
Scientist 'E'

Copy to:

i. **The Secretary,** Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
ii. **The Commissioner and Secretary,** Department of Mines & Geology, Government of Himachal Pradesh, Himachal Pradesh Secretariat, Shimla-171 002.
iii. **The Commissioner and Secretary,** Department of Environment, Government of Himachal Pradesh, Himachal Pradesh Secretariat, Shimla-171 002.
iv. **The Deputy Director General of Forests (C),** Ministry of Env., Forest and Climate Change, Integrated Regional Office, Shimla 1st & 2nd Floor, C.G.O. Complex, Longwood, Shimla – 171001.

v. **The Chief Wildlife Warden,** Government of Himachal Pradesh, Mist Chamber, 1st Floor, Khalini, Shimla - 171 002.
vi. **The Chairman,** Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office complex, East Arjun Nagar, New Delhi-1100032.
vii. **The Member Secretary,** Central Ground Water Authority, 18/11, Jam Nagar House, Man Singh Road, New Delhi-110011.
viii. **The Chairman,** Himachal Pradesh State Pollution Control Board, Paryavaran Bhavan, Phase-III, New Shimla - 171 009.
ix. **The Controller General,** Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.
x. **The District Collector,** Bilaspur District, Himachal Pradesh.
xi. **Guard File.**
xii. **PARIVESH Portal.**

Pankaj Verma

(Pankaj Verma)
Scientist 'E'

TOR COMPLIANCE

Point wise compliance of Terms of reference granted by MoEFCC, New Delhi vide letter no. J11015/130/2003-IA.II (M) dated 25.01.2021 and ToR Amendment granted on 27.06.2022 in favor of M/s. ACC Limited for Validation of EC Under MoEF&CC Notification S.O 1530(E) dated 06th April, 2018 for existing operative captive Gagal Limestone Mine (Area: 231.25 ha.) for Production Capacity 4.5 Million TPA (3.78 MTPA Limestone, 0.64 MTPA Shale & 0.072 MTPA Quartzite) and subgrade mineral stacking 2,50,000 CuM per annum (0.51 Million TPA) (Maximum) with two nos. of existing Crushers having capacity 1000 TPH & 400 TPH at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh.

ToR Point	ToR Condition	Compliance	Page Ref in EIA / EMP
ToR Amendment letter granted on 27.06.2022			
A. Additional Specific Condition			
1.	The Project Proponent needs to submit the risk assessment and hazard management report along with the EIA/EMP report which must particularly focus on the control and mitigation measures to be taken during the mining activities keeping in mind that the mine lease area falls in Seismic Zone-V as per IS-1893 (Part-1)-2002 and is at Highest Risk Zone.	The project and site specific risk assessment and hazard management report particularly focusing on the control and mitigation measures (Acc. To Seismic Zone V) has been prepared and is Annexed with this Draft EIA/EMP report.	Chapter 7, Para 7.4, Pg 203 – 213 **Annexure XXII**
2.	The Project Proponent should prepare the EMP considering the scenario of pollution to be generated for peak total excavation for assessing air and noise pollution.	The total Excavated Limestone, Shale, Quartzite and Subgrade mineral is 16034 TPD (Peak production will be 19240 TPD). EMP has been prepared considering the scenario of pollution to be generated for peak total excavation for assessing air and noise pollution and same information is given in this Draft EIA/EMP Report.	Chapter 10, Table 10.3, Pg 230 – 231
3.	The Project Proponent needs to submit the scenario of additional pollution load in terms of air quality, noise level, ground vibration and traffic density due to mining of Shale and Quartzite and accordingly mitigation measures shall be proposed in the EIA/EMP report.	This is an existing mine and being applied for validation of EC as per MoEFCC Notification 06.04.2018 without change in granted production capacity. Thus there is no additional pollution load to be generated due to the mining project. However, Mitigation measures adopted in existing practices as well as proposed is given in this Draft EIA/EMP Report.	Chapter 10, Table 10.3, Pg 230 – 231
4.	The Project Proponent needs to clearly bring out the end use of the Shale and Quartzite and its transportation route from source to the	The Shale and Quartzite will be used for clinkerization along with Limestone to manufacture cement in their Integrated Cement	

ToR Point	ToR Condition	Compliance	Page Ref in EIA / EMP
	destination and the MoU signed with the consumers.	Plant. Part of Cement plant is part of Mining lease area. From crusher to Cement plant, covered conveyor belt is being used for transportation. Mineral is not being transported outside the mining lease area. Same information is given in this Draft EIA/EMP Report	Chapter 2, Para 2.2, Pg 49-50
5.	The Project Proponent needs to submit the penalty provisions as per Ministry's SOP dated 07.07.2021 at the time of appraisal of EC.	Penalty provisions has been prepared as per Ministry's SOP dated 07.07.2021 and has been given in this Draft EIA/EMP Report	Chapter 13, Pg 246 – 264
6.	The Project Proponent needs to submit the Certified Compliance Report (CCR) by the Ministry's Integrated Regional Office at the time of appraisal of EC as per Ministry's OM F.No. IA3-22/10/2022-IA.lll [E 177258] dated 08.06.2022.	Compliance report of existing EC condition has been certified by IRO, MoEFCC vide letter No NC-IRO/ENV/HP/Monitoring/2022/519 dated 11th July 2022. Same information is given in this Draft EIA/EMP Report	Chapter 1, table 1.2, Pg 44 **Annexure V**
7.	The Project Proponent needs to submit the District Survey Report (DSR) as per Ministry's notification S.O 3611 (E) dated 25th July, 2018.	Request letter has been submitted to State Mines Department for requirement of DSR report vide our letter ACC/GCW/M/23/06/10 dated 17th June 2023. same information is given in this Draft EIA/EMP Report	***Annexure XX***
8.	The Project Proponent shall conduct drone survey of the mine lease area and buffer area and submit during the appraisal For EC.	Noted and will be complied	-
9.	The Project Proponent needs to submit the status of court case at the time of appraisal of EC.	Last Hearing was on 29.08.2019, with an order as "Adjourned by four weeks." and no further hearing was held as on date and it is still pending. Details of the same are given in this Draft EIA/EMP Report	Chapter 1, Para 1.2.1E, Pg 44 **Annexure III**
10.	All other terms and conditions mentioned in the TOR letter dated 25.01.2021 shall remain unchanged.	All the conditions stipulated in ToR letter granted on 25.01.2021 has been followed while preparing the EIA/EMP report.	-
ToR letter granted on 25.01.2021			
B. Specific Condition			
I.	The State Government/ SPCB to take action against the project proponent under the provisions of Environment (Protection) Act, 1986.	Sumamry of various communication made with SPCB to take action against the project proponent under the provisions of Environment (Protection) Act, 1986 is goven in this Draft EIA/EMP Report.	

ToR Point	ToR Condition	Compliance	Page Ref in EIA / EMP
II.	The project proponent shall be required to submit a bank guarantee equivalent to the amount of remediation plan and natural and community resource augmentation plan with the SPCB prior to the grant of EC. The quantum shall be recommended by the EAC and finalized by the regulatory authority. The bank guarantee shall be released after successful implementation of the EMP, followed by recommendations of the EAC and approval of the regulatory authority.	Noted and will be complied	Chapter 2, Table 2.6, Pg 58 **Annexure XII**
III.	Assessment of ecological damage with respect to air, water, land and other environmental attributes. The collection and analysis of data shall be done by an environmental laboratory duly notified under the Environment (Protection) Act, 1986, or an environmental laboratory accredited by NABL, or a laboratory of a Council of Scientific and Industrial Research (CSIR) institution working in the field of environment.	Detailed Assessment of Ecological Damage with respect to air, water, land and other environmental attributes has been carried by JM Environet Pvt. Ltd. and the data was collected by JM Enviro Lab which is accredited by NABL on 24.05.2023 valid till 23.05.2025. Same information has been given in this Draft EIA/EMP Report.	
IV.	Preparation of EMP comprising remediation plan and natural and community resource augmentation plan corresponding to the ecological damage assessed and economic benefits derived due to violation.	EMP has been prepared which comprises remediation plan and natural and community resource augmentation plan corresponding to the ecological damage assessed and economic benefits derived due to violation. Details of the same has been incorporated in this Draft EIA/EMP Report.	Chapter 10, Table 10.3, Pg 230 – 231
V.	The remediation plan and the natural and community resource augmentation plan to be prepared as an independent chapter in the EIA report by the accredited consultants	The remediation plan and the natural and community resource augmentation plan has been preapred as an independent chapter in the EIA report by the accredited consultants JM EnviroNet Pvt Ltd. Details of the same are given in this Dradft EIA/EMP Report	Chapter 13, Pg 246 – 264
VI.	PP needs to carry out the Public Hearing as the proposal attracts the violation and the PH cannot be exempted	Public Hearing to be conducted as per the provisions mentioned in EIA Notification, 2006	
VII.	PP should submit the note on the improvement in the EMP during last six months.	Note on improvement in the EMP done in last six month is given in this Draft EIA/EMP Report	Chapter 10, Table 10.2, Pg 229 – 230

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VIII.	PP should provide in the EIA Report details of all the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline after grant of EC.	All the details regarding the statutory clearances, permissions, no objection certificates, consents etc. required for this project under various Acts, Rules and regulations are mentioned in this Draft EIA/EMP report.	Chapter 2, Table 2.6, pg. no. 58-59
C. Additional ToR			
1.	The project proponent should provide in the EIA Report details of all the statutory clearances, permissions, No. objection certificates, consents etc. required for this project under various Acts, Rules and regulations and their status or estimated timeline after grant of EC.	Mining Lease is in favor M/s. ACC Limited. The Environmental Clearance for the existing mine was obtained from MOEF&CC on 21st April 2005 under the EIA notification 1994. Further, with compliance to MoEF&CC Notification S.O. 1530 (E) dated 06.04.2018, ACC Limited has applied for validation of the existing EC as per the EIA notification 2006. Details of statutory clearances, permissions, No objection certificates, consents etc. Required for this project under various Acts, Rules and regulations have been given in this EIA/EMP Report.	Chapter 2, Table 2.6, pg. no. 58-59
2.	The project proponent should submit the revenue plan for mining lease, revenue plan should be superimposed on the satellite imaginary clearly demarcate the Govt. land, private land, agricultural land etc.	Total Mining lease area is 231.25 ha in which 103.02 ha is forest land, 128.23 ha is private land. Revenue plan is incorporated in this EIA/EMP Report. Authenticated map with co ordinates from the State Govt is available and attached with Minign lease documents enclosed with Draft EIA/EMP Report.	Chapter 2, Para 2.3.3, Pg 54 **Annexure I**
3.	The project proponent should submit the real-time aerial footage & video of the mining lease area and of the transportation route. PP should submit the detailed plan in tabular format (year-wise for life of mine) for afforestation and green belt development in and around the mining lease. The PP should submit the number of saplings to be planted, area to be covered under afforestation & green belt, location of plantation, target for survival rate and budget earmarked for the afforestation & green belt development. In addition to this PP should show on a surface plan	The Crushed limestone is being/will be transported to cement plant through conveyor belt. Real-time aerial footage of the mining lease area and of the transportation route is given in this Draft EIA/EMP Report. Details have been incorporated in this Draft EIA/EMP Report. Total area under greenbelt is estimated as 6.0 Ha, out of which 4.0 Ha has already been covered and the rest 1.0 Ha will be completed in the next 1 year, rest 1 Ha is natural plantation and not accessible.	Chapter 4, Para 4.5.6, pg. no. 183 Chapter 4, Para 4.5.7.4, pg. no. 185 - 187

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	(5-year interval for life of mine) of suitable scale the area to be covered under afforestation & green belt clearly mentioning the latitude and longitude of the area to be covered during each 5 years. The capital and recurring expenditure to be incurred needs to be submitted. Presently in India there are many agencies which are developing forest in short interval of time. Thus, for the plantation activities details of the experts/ agencies to be engaged needs to be provided with budgetary provisions.	At the conceptual stage (Lease life), total area under plantation is estimated as 127.65 Ha, out of which 120.65 Ha has already been covered under plantation and the rest will be completed till the Conceptual period (lease life). Copy of plan for greenbelt development/ plantation along with Surface plan for 5-year interval for end of life of mine on suitable scale showing the area to be covered under afforestation & green belt is enclosed with this Draft EIA/EMP Report.	**Annexure XVC**
4.	PP should submit the quantity of surface or ground water to be used for this project. The complete water balance cycle needs to be submitted. In addition to this PP should submit a detailed plan for rain water harvesting measures to be taken. PP should submit the year wise target for reduction in consumption of the ground/surface water by developing alternative source of water through rain water harvesting measures. The capital and recurring expenditure to be incurred needs to be submitted.	The total water requirement for mining project is 120 KLD which is being met through Sutlej River. Same information along with water balance is given in this Draft EIA/EMP Report. No ground water is being/will be used for the project Detailed Rain water harvesting plan with budgetary provision is given in this EIA/EMP Report.	Chapter 2, Para 2.8.2, pg. no. 59 - 60
5.	PP should clearly bring out the details of the manpower to be engaged for this project with their roles /responsibilities/designations. In addition to this PP should mention the number and designation of person to be engaged for implementation of environmental management plan (EMP). The capital and recurring expenditure to be incurred needs to be submitted.	Total manpower requirement for this project is 78 persons. There is a team of 4 persons for implementation of EMP. The budget proposed for implementation of EMP is given as under: ➢ Capital cost: Rs. 4.22 crores/- ➢ Recurring cost: Rs. 0.78 crores per annum Details are given in this Draft EIA/EMP Report	Chapter 10, Para 10.6. Pg 228 – 229 Chapter 10, Table 10.3, Pg 230 – 231
6.	PP should submit the year-wise, activity wise and time bound budget earmarked for EMP, occupational health surveillance & Corporate Environmental Responsibility. The capital and recurring expenditure to be incurred needs to be submitted.	➢ Capital Cost of the Project: Rs. 84.83 Crore/. ➢ Capital Cost for EMP: Rs. 4.22 Crore ➢ Recurring Cost for EMP: Rs. 0.78 Crore ➢ Recurring Cost for Occupation health & safety: Rs 0.22 Crore Year-wise, activity wise and time bound budget earmarked for EMP in this Draft EIA/EMP Report.	Chapter 10, Table 10.3, Pg 230 – 231

ToR Point	ToR Condition	Compliance	Page Ref in EIA / EMP
		year-wise, activity wise and time bound budget will be earmarked under Corporate Environmental Responsibility after conduction of public hearing. year-wise, activity wise and time bound budget earmarked for occupational health surveillance is given in this Draft EIA/EMP Report.	Chapter 4, Table 4.25 & 4.26, Pg 191 - 192
7.	PP should submit the measures/technology to be adopted for prevention of illegal mining and pilferage of mineral. The project proponent should submit the detailed mineralogical and chemical composition of the mineral and percentage of free silica from a NABL/MoEF&CC accredited laboratory.	Measures/technology adopted for prevention of illegal mining and pilferage of mineral has been included in this Draft EIA/EMP Report. Detailed mineralogical and chemical composition of the mineral and percentage of free silica have been determined at NABL/MoEF&CC accredited laboratory. Same information is given in this Draft EIA/EMP Report.	Chapter 4, Para 4.5.8,Pg 188 **Annexure XXV**
8.	The project proponent should clearly show the transport route of the mineral and protection and mitigative measure to be adopted while transportation of the mineral. The impact from the center line of the road on either side should be clearly brought out supported with the line source modelling and isopleth. Further, frequency of testing of Poly Achromatic Hydrocarbon needs to be submitted along with budget. Based on the above study the compensation to be paid in the event of damage to the crop and land on the either side of the road needs to be mentioned. The PP should provide the source of equations used and complete calculations for computing the emission rate from the various sources.	The total Excavated limestone, Shale, quartzite and Subgrade is 16034 TPD (Peak production is 19240 TPD) is transported to the crusher located in the ML area via dumpers through haul roads. Further crushed limestone is being transported to the Cement Plant through conveyor belt. No public road is being used for the purpose of transportation. Hence, no effect on local transport infrastructure is being/ will be witnessed during the mining operations. Source of equations used and complete calculations for computing the emission rate from the various sources has been given in this EIA/EMP Report.	Chapter 4, Para 4.5.6, pg. no. 183 Chapter 4, Para 4.5.1.4, pg. no. 152 - 153
9.	PP should clearly bring out that what is the specific diesel consumption (liters/tonne for total excavation) and steps to be taken for reduction of the same. Year-wise target for reduction in the specific diesel consumption needs to be submitted.	At present specific diesel consumption is 0.4 litre/ tonne. As our existing mines is 38 years old, therefore we are going further deeper and our lead distance is also increasing. Since it's a old mines, and therefore, reduction in the specific oil consumption is not possible. However, we will try to sustain the current consumption rate with various steps like proper maintenance of	

ToR Point	ToR Condition	Compliance	Page Ref in EIA / EMP
		HEMMs, proper maintenance of haulage road, correct selection of the equipment etc. . Various steps will be taken to reduce the consumption of the same in due course of time. Year wise consumption of Diesel and steps for reduction in the specific diesel consumptions are given in this EIA/EMP Report.	Chapter 2, Para 2.8.5, Pg 62
10.	PP should bring out the awareness campaign to be carried out on various environmental issues, practical training facility to be provided to the environmental engineer/diploma holders, mining engineer/diploma holders, geologists, and other trades related to mining operations. Target for the same needs to be submitted.	ACC is being/will organize various awareness campaign on various environmental issues, practical training facility for the environmental engineers/diploma holders, mining engineer's/ diploma holders, geologists, and other trades related to mining operations.	
11.	The budget to be earmarked for the various activities shall be decided after perusal of the Standard EC Conditions published by the Ministry. After perusal of Standard EC conditions if agreed PP should also submit an undertaking by the way of affidavit for Compliance of Standard EC conditions already prescribed by the Ministry vide O.M. No and Specific condition if prescribed by the EAC/MoEF&CC.	➢ Capital Cost of the Project: Rs. 83.20 Crore/. ➢ Capital Cost for EMP: Rs. 4.22 Crore ➢ Recurring Cost for EMP: Rs. 0.78 Crore ➢ Recurring Cost for Occupation health & safety: Rs 0.22 Crore Standard EC Conditions published by the Ministry has been taken into consideration while preparing budget for EMP. Detailed breakup of EMP Budget (Capital & recurring) is given in this EIA/EMP Report. Undertaking of PP for Compliance of Standard EC will be submitted with Final EIA/ EMP Report.	Chapter 10, Table 10.3, Pg 230 – 231
12.	The project proponent should ensure that only NABET accredited consultant shall be engaged for the preparation of EIA/EMP Reports. PP shall ensure that accreditation of consultant shall be valid during the collection of baseline data, preparation of EIA/EMP report and during the appraisal process. The PP and consultant should submit an undertaking the information and data provided in the EIA Report and submitted to the Ministry are factually correct and PP and consultant are fully accountable for the same.	J.M. EnviroNet Pvt. Ltd. has been re-accredited by National Accreditation Board for Education and Training (NABET) (A body of Quality Council of India) with Certificate no. NABET/EIA/2023/SA 0172, dated 16th Aug., 2022 which is valid up to 07.08.2023. Details of the same is given in this EIA/EMP Report. Undertaking from PP and consultant stating that the information and data provided in the EIA Report and submitted to the Ministry are factually correct and PP and consultant are fully accountable for the same will be submitted with	Chapter 12, Pg. 245 ***Annexure XXVI***

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		Final EIA/EMP Report.	
13.	The PP should submit the photograph of monitoring stations & sampling locations. The photograph should bear the date, time, latitude & longitude of the monitoring station/sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyze the samples.	The photograph of monitoring stations & sampling locations is incorporated in this EIA/EMP Report. Original test reports and certificates of analysis will be submitted with Final EIA/EMP Report. Certificate of NABL accreditation of the lab is enclosed with this EIA/EMP Report.	***Annexure XVI*** ***Annexure XXVII***
D. Standard ToR			
1.	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	This is the existing limestone mining project. Year-wise production details since inception of mine has been certified by State Geology and Mines Dept. vide letter no. Udyog-Bhu/BLP/ACC Report/321 dated 22.06.2023. Details of the same are enclosed with this EIA/EMP Report.	Chapter 2, Para 2.11, Pg 71 **Annexure *XIV***
2.	A copy of the document in support of the fact that the Proponent is the rightful lessee of the unit should be given.	Mining Lease is in favour of M/s. ACC Limited. Details of the same is given in this Draft EIA/EMP Report.	Chapter 1, Para 1.2.1 C, Pg 43 ***Annexure I***
3.	All documents including EIA and public hearing should be compatible with one another in terms of the production levels, waste generation and its management and technology and should be in the name of the lessee.	All the documents including Modification in Mining Plan with Progressive Mine Closure Plan and EIA are consistent with one another and are in the name of M/s. ACC Limited.	

S. No.	Particulars	Description	Ref. in Draft EIA / EMP Report	Ref. in Modified MP with PMCP	Ref in PH Proceeding
1.	**Mine Lease Area**	231.25 Ha	Chap 1, Para 1.2.1 A, Pg 43	Page No. 1	Yet to be Conducted
2.	**Proposed Production Capacity**	4.5 Million TPA (Limestone 3.78 million TPA, Shale 0.64 million TPA, Quartzite 0.072 million TPA)	Chap 2, Table 2.20 Pg 70 - 71	Page No. 40	Yet to be Conducted
3.	**Waste Generation & Management**	Since no waste is being generated from the mining operations, so no dumping of waste is	Chap 2, Para 2.13, Page no. 73	Page No. 96	Yet to be Conducted

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			required. However, Stacking of Subgrade mineral is present.			
	4.	**Mining Technology**	Fully Mechanized opencast method	Chap 2, Para 2.10, Page no. 67	Page No. 60	Yet to be Conducted
4.	All corner coordinates of the Unit, superimposed on a High-Resolution Imagery/Toposheet should be provided. Such an Imagery of the proposed Unit should clearly show the land use and other ecological features of the study area (core and buffer zone).			Map showing Mining Lease Area with Geographical corner coordinates, Geomorphology and Geology of the area, superimposed on SOI Toposheet has been prepared and incorporated in this Draft EIA/EMP Report. Land use/ Land cover of study area has been assessed using satellite data. The study area mainly comprises of Forest and Reserved Forest i.e. 65.22% (44.89% + 20.33%), 19.89 % of area comprises of Agricultural Land. Built up area is represented by human settlements (5.78%) and industries (0.33%). Land use / land cover map of the study area is given in this Draft EIA/EMP Report.		Chapter 2, Para 2.3.2, Pg 52 - 53 Chapter 3, Para 3.4, Pg 83 - 91
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.			Map showing geomorphology of land forms of the area, soil type, important water bodies, stream, rivers and existing mineral has been prepared and incorporated in this EIA/EMP Report.		Chapter 2, Para 2.3.2, Pg 52 - 53
6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.			Mining lease is granted for Mining purpose.		***Annexure I***
7.	It should be clearly indicated 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			Yes, the company has well laid down Environment Policy adopted by the Board of Directors of M/s ACC Limited. The hierarchical system or administrative order of the company to deal with the environmental issues and for ensuring compliance with the EC conditions etc. has been given in Corporate		Chapter 10, Figure 10.2, Pg 227

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	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.	Environmental Policy of the company. Information of the same is given in this Draft EIA/EMP Report.	
8.	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.	Being an opencast mine, occurrence of Subsidence is not envisaged. Slope Stability Analysis is under process and will be submitted with Final EIA/EMP Report Blasting Study report has been annexed with this Draft EIA/ EMP report. The proposed Safeguard related to various mine safety measures has been incorporated in this Draft EIA/ EMP report.	***Annexure XVIII & XIX***
9.	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine/lease period.	The study area comprises of 10 km radius zone around the mining lease periphery. Map showing study area has been incorporated in this EIA/EMP Report. Since no waste is being generated from the mining operations, so no dumping of waste is required. However Stacking of Subgrade is being/ will be done. Details of the same has been incorporated in this Draft EIA/ EMP report.	Chapter 3, Fig. 3.1, Pg 81 Chapter 2, Para 2.13, Pg. 73
10.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given	Land use/Land cover map of the study area showing present land use pattern & also, delineating forest area, agriculture land, water bodies, human settlements and other ecological features etc. has been prepared & incorporated in this Draft EIA/EMP Report. Land use plan of the mine lease area in pre-operational, operational and post operational phases is included in this Draft EIA/EMP Report. Conceptual Plan showing change of land use is	Chapter 3, Para 3.4, Pg 83 - 91 Chapter 4, Table 4.18, Pg 173 ***Annexure XVC***

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		given in this Draft EIA/EMP Report.	
11.	Details of the land for any Over Burden Dumps outside the lease, such as extent of land area, distance from lease, its land use, R&R issues, if any, should be given.	This is a case of an existing mine and there is no provision of waste dump outside the mining lease area and will not be a case in future. Therefore, no such issue of R&R will arise.	-
12..	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the Project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	Total Mining lease area is 231.25 ha in which 103.02 ha is forest land, 128.23 ha is private land. Diversion of 103.02 ha of forest land for mining purpose in the ML area in favor of M/s ACC Limited was granted by MoEF&CC, Govt. of India *vide* F.No. 8-21/2000-FC dated 25.01.2001. Same information is given in this Draft EIA/EMP Report.	***Annexure VIII*** Chapter 2, Para 2.3.3, Pg 54
13.	Status of forestry clearance for the broken-up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	Total Mining lease area is 231.25 ha in which 103.02 ha is forest land, 128.23 ha is private land. The Forest Diversion of 103.02 ha of forest land for mining purpose in the ML area in favor of M/s ACC Limited was granted by MoEF&CC, Govt. of India *vide* F.No. 8-21/2000-FC dated 25.01.2001. Total NPV of Rs.6.76 Crs. have been deposited to CAMPA. Acknowledgement letter of Additional PCCF (FCA) has been attached with this Draft EIA/EMP Report	Chapter 2, Table 2.6, Pg 58 -59 ***Annexure VIII & XI***
14.	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	It is not applicable because here is no forest dwellers in this area.	-
15.	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	Bandli Wildlife Sanctuary is located within 3.55 km in East direction and its ESZ is located in ~2.54 km in East direction. Eco sensitive zone and Boundary of Majathal Wildlife Sanctuary is 10.05 km in SE direction. There are 31 Reserved Forest and Protected Forest present within 10 km study area.	***Annexure X*** Chapter 3, Table 3.1, Pg. 79 - 80 Chapter 3, Para

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		Details of the vegetation in RF/ PF are given in this EIA/EMP Report.	3.15, Pg. 121- 123 **Annexure XXIV**
16.	A study shall be got done to ascertain the impact of the 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.	Biological Study has been conducted for the project. Bandli Wildlife Sanctuary is located within 3.55 km in East direction and its ESZ is located in ~2.54 km in East direction. Eco sensitive zone and Boundary of Majathal Wildlife Sanctuary 10.05 km in SE direction. Detailed biological study has been carried out for the project in the Study on the impact of Mining on Flora and Fauna as well as the Management plan for threatened wildlife species in the Core and Buffer zone for Gagal Limestone Mines. Total 7 species come in Schedule- I fauna according to (IWPA) Indian Wildlife Protection Act' 1972. Out of these 2 mammals' species i.e., *Panthera pardus fusca* (Leopard), *Prionailurus bengalensis* (Leopard cat), and 1 reptiles' species i.e., *Varanus flavescens* (Yellow Monitor), and 4 Avi-faunal species i.e., *Pavo cristatus* (Peafowl), *Gyps africanus* (White-backed vulture), *Catreus wallichii* (Cheer pheasant) & *Lophura leucomelanos* (kalij pheasant) were recorded in the study area during field survey Study on the impact of Mining on Flora and Fauna as well as the Conservation plan for threatened and Schedule-I wildlife species in the Core and Buffer zone (which includes Bandli Wildlife Sanctuary and Majhathal Wildlife sanctuary as well) for Gagal Limestone Mines, has been submitted to Chief Wild Life Warden which is attached with this Draft EIA/EMP study report	Chapter 3, Para 3.15, Pg. 121- 123 **Annexure X & XXIV**
17.	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, 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	Bandli Wildlife Sanctuary is located within 3.55 km in East direction and its ESZ is located in ~2.54 km in East direction. Eco sensitive zone and Boundary of Majathal Wildlife Sanctuary is 10.05 km in SE direction. Distance verification certificate has been obtained from the office of	**Annexure X & XXIV**

ToR Point	ToR Condition	Compliance	Page Ref in EIA / EMP
	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.	Chief Wild Life Warden cum PCCF vide letter no WL(Misc.)/Mining/613 dated 12.05.2023. Details of the same are given in this Draft EIA/EMP Report.	Chapter 3, Para 3.15, Pg. 121- 123
18.	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduledI fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	Detailed biological study has been carried out for the project in the Study on the impact of Mining on Flora and Fauna as well as the Management plan for threatened wildlife species in the Core and Buffer zone for Gagal Limestone Mines. Total 7 species come in Schedule- I fauna according to (IWPA) Indian Wildlife Protection Act' 1972. Out of these 2 mammals' species i.e., *Panthera pardus fusca* (Leopard), *Prionailurus bengalensis* (Leopard cat), and 1 reptiles' species i.e., *Varanus flavescens* (Yellow Monitor), and 4 Avi-faunal species i.e., *Pavo cristatus* (Peafowl), *Gyps africanus* (White-backed vulture), *Catreus wallichii* (Cheer pheasant) & *Lophura leucomelanos* (kalij pheasant) were recorded in the study area during field survey Study on the impact of Mining on Flora and Fauna as well as the Conservation plan for threatened and Schedule-I wildlife species in the Core and Buffer zone (which includes Bandli Wildlife Sanctuary and Majhathal Wildlife sanctuary as well) for Gagal Limestone Mines, has been submitted to Chief Wild Life Warden which is attached with this Draft EIA/EMP study report	Chapter 3, Para 3.15, Pg. 121- 123 **Annexure X & XXIV**
19.	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining	No Critically Polluted areas as notified by the Central Pollution Control Board are located within 10 km from the boundary of mining lease. Hence, it is not applicable. The ML area does not fall under Aravalli range. Same information has also been given in this EIA/EMP Report.	-

ToR Point	ToR Condition	Compliance	Page Ref in EIA / EMP
	activities could be considered.		
20.	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the 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.	Total Mining lease area is 231.25 ha in which 103.02 ha is forest land, 128.23 ha is private land. This is an existing mine and production is being done within existing mining lease area. No additional land is required for mining. Same information is given in this Draft EIA/EMP Report.	Chapter 2, Para 2.3.3, Pg. 54
21.	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the unit in the pre-dominant downwind direction. The	One season primary baseline data for ambient air quality, (as per CPCB quality Notification, 2009), water quality, noise level, soil and flora & fauna has been collected during Post Monsoon Season (Oct to Dec, 2022). Details regarding the same have been incorporated in this Draft EIA/EMP Report. Detailed AAQM data of sampling locations are enclosed with this Draft EIA/EMP Report. Site-specific meteorological data has been recorded. The dominant wind direction is from South West direction. Location of the monitoring stations were selected keeping in view the pre- dominant downwind direction and location of the sensitive receptors and also that they represent whole of	Chapter 3, Para 3.10 (Pg 97) to Para 3.15, (Pg 124) **Annexure XVII** Chapter 3, Table 3.9, Pg

ToR Point	ToR Condition	Compliance	Page Ref in EIA / EMP
	mineralogical composition of PM10, particularly for free silica, should be given.	the study area. One location has been selected in downwind direction at 500 m from the lease boundary. Details of the same are given in this Draft EIA/EMP Report. Mineralogical composition of PM_{10} is given in this Draft EIA/EMP Report.	103 **Annexure XXV**
22.	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	Air quality modeling has been carried out using AERMOD Version 10.2 for prediction of impact of the proposed mining activity on the air quality of the study area. The air quality contours are shown on map indicating location of the mine site, sensitive receptors, etc. The wind rose showing pre-dominant wind direction has been indicated on the map. Details of same is given in this Draft EIA/EMP Report.	Chapter 4, Para 4.5.1, Pg 150 - 162
23.	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	The total water requirement for mining project is 120 KLD which is being met through Sutlej River. No groundwater is being used in this existing mining project. Detailed water balance has been given in this Draft EIA/ EMP report. Company have water deed agreement with Bhakra Beas Management Board which is under renewal. Same information along with water balance is given in this Draft EIA/EMP Report.	Chapter 2, Para 2.8.2, Pg. 59-60 **Annexure XIII**
24.	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be secured and copy furnished.	The total water requirement for mining project is 120 KLD which is being met through Sutlej River. We have water deed agreement with Bhakra Beas Management Board which is under renewal. Same information is given in this Draft EIA/EMP Report.	Chapter 2, Para 2.8.2, Pg. 59-60 **Annexure XIII**
25.	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	Water conservation measures proposed to be adopted for the project are as under: Workshop waste water is treated and reuse for washing purpose by installing gravity separation method to separate water & oil. The treated water is reused in washing purpose	

<table>
<tr><th>ToR Point</th><th>ToR Condition</th><th>Compliance</th><th>Page Ref in EIA / EMP</th></tr>
<tr><td></td><td></td><td>and oil residue is collected and sold to HPSPCB authorized vendors.
At the conceptual stage, Bottom most area of excavated pits will be converted into water reservpoir
Detailed Rain water harvesting plan with budgetary provision is given in this Draft EIA/EMP Report.</td><td>Chapter 4, Para 4.5.3.3, Pg. 171 – 172</td></tr>
<tr><td>26.</td><td>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.</td><td>Impact of the project on the water quality, both surface and groundwater along with necessary safeguard measures is incorporated in this Draft EIA/EMP Report.</td><td>Chapter 4, Para 4.5.3, Pg. 168 - 170</td></tr>
<tr><td>27.</td><td>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 activity 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><table><tr><td>Site Elevation Range</td><td>545 m -900 m AMSL</td></tr><tr><td>General Ground level</td><td>560 m AMSL</td></tr><tr><td>Ground Water Level</td><td>507 to 508 m AMSL (52 to 53 m below ground level</td></tr><tr><td>Existing Working Depth</td><td>690 m AMSL (130 m above ground level)</td></tr><tr><td>Working Depth during Plan Period</td><td>660 m AMSL (100 m above ground level)</td></tr><tr><td>Ultimate Pit Depth</td><td>621 m AMSL (61 m above ground level) (Lease life)
550 m AMSL (10 m bgl) (Life of mine)</td></tr></table>No intersection of water table will be there at the end of lease life. Same information is given in this Draft EIA/EMP Report.</td><td>Chapter 4, Para 4.5.3.2, Pg. 170 - 171</td></tr>
<tr><td>28.</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 same on the hydrology should be brought out.</td><td>Due to the hilly terrain and dendritic drainage pattern small depressions carry the rainwater from higher level to lower level. One of this kind of seasonal nalla is there within the ML area which is around 400m away from the Ultimate pit limit and check dams are present near the</td><td>Chapter 4, Para 4.5.3.1, Pg. 168</td></tr>
</table>

<table>
<tr><th>ToR Point</th><th>ToR Condition</th><th>Compliance</th><th>Page Ref in EIA / EMP</th></tr>
<tr><td></td><td></td><td>nalla in order to arrest the silts.</td><td></td></tr>
<tr><td>29.</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>
<table>
<tr><td>Site Elevation Range</td><td>545 m -900 m AMSL</td></tr>
<tr><td>General Ground level</td><td>560 m AMSL</td></tr>
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<tr><td>Ultimate Pit Depth</td><td>621 m AMSL (61 m above ground level) (Lease life)
550 m AMSL (10 m bgl) (Life of mine)</td></tr>
</table>
A schematic diagram showing all mining details for the same is given in Hydro-geological study report enclosed with this EIA/EMP Report.</td><td>Chapter 4, Para 4.5.3.2, Pg. 170 - 171

Chapter 7, Para 7.2, Pg 202 – 203

<u>Annexure XXIII</u></td></tr>
<tr><td>30.</td><td>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.</td><td>Total area under greenbelt is estimated as 6.0 Ha, out of which 4.0 Ha has already been covered and the rest 1.0 Ha will be completed in the next 1 year, rest 1 Ha is natural plantation and not accessible.

At the conceptual stage (Lease life), total area under plantation is estimated as 127.65 Ha, out of which 120.65 Ha has already been covered under plantation and the rest will be completed till the Conceptual period (lease life).

Phase wise plan of Plantation and Compensatory Afforestation has been incorporated in this Draft EIA/ EMP report.
Species selected for green belt is having /will have greater ecological value and good utility value to local population. Local Species are being/will be selected with consultation of local forest dept. and plantation will be undertaken</td><td>Chapter 4, Para 4.5.7.4, Pg. 185 – 187</td></tr>
</table>

ToR Point	ToR Condition	Compliance	Page Ref in EIA / EMP
		on forest development pattern. Details of same are given in this Draft EIA/EMP Report.	
31.	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	The total Excavated Limestone, Shale, Quartzite and Subgrade mineral is 16034 TPD (Peak production: 19240 TPD) is being/ will be transported to the crusher located in the ML area via dumpers through haul roads. Further crushed limestone is being transported to the Cement Plant through conveyor belt. No public road is being used for the purpose of transportation. Hence, no effect on local transport infrastructure is being/ will be witnessed during the mining operations	Chapter 4, Para 4.5.6, pg. no. 183
32.	Details of the onsite shelter and facilities to be provided to the workers should be included in the EIA report.	This is existing Limestone Mining Project. Existing Site services like rest shelter, drinking water facilities, first aid centers etc. have already been provided to the mine workers. Details for the same are given in this Draft EIA/EMP Report.	Chapter 2 Para 2.5, Pg 57
33.	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	At the conceptual stage (Lease life) Total excavated area will be 63.28 Ha, area under Infrastructure and Road is i.e., 13.37 Ha and 4.63 Ha respectively, reclaimed area as mango orchard will be 1.05 Ha, 7.76 ha area under sub grade/waste stacking followed by plantation, 126.6 Ha will be under green belt/ Plantation and the remaining 14.56 ha will be Virgin Land. Same information along with Conceptual Plan and sections is given in this Draft EIA/EMP Report.	Chapter 2 Para 2.14, Pg 74 - 75 ***Annexure XVC***
34.	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area should be detailed.	Occupational health impacts of the Project have been assessed and details regarding it are incorporated in this report along with details of pre-placement medical examination and periodical medical examination schedules. The project specific occupational health mitigation measures with medical facilities are being/to be provided at mine site have been incorporated in this Draft EIA/EMP Report.	Chapter 4, Para 4.5.9, Pg. 189 – 192

ToR Point	ToR Condition	Compliance	Page Ref in EIA / EMP
35.	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	Public health implications of the project and related activities for the population in the impact zone have been evaluated and common diseases were identified. The same is given in this Draft EIA/EMP Report. Budgetary allocation for health-related activities is being/to be taken up by ACC have been incorporated in this Draft EIA/EMP Report.	Chapter 4, Para 4.5.5.5, Pg. 181 - 182
36.	Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	Details of community welfare activities are being/to be done for the local community, along with proposed budget have been incorporated in this Draft EIA/EMP Report.	Chapter 8, Para 8.2.4, Pg. 215 – 221
37.	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	Environmental management plan (EMP) for the existing mining project has been prepared and incorporated in this Draft EIA/EMP Report.	Chapter 10, Pg. 224 - 231
38.	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the EIA/EMP Report of the Project.	Public hearing yet to be conducted for the project.	
39.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the project should be given.	One case has been filed by M/s Archana Dutt. The case filed by M/s Archana Dutt is not a specific case under Environment (Protection) Act, Air (P & CP) Act & Water (P & CP) Act. It is filed in general under Article 226 of Constitution Of India, by M/s Archana Dutt against the Union of India through the Ministry of Commerce & Industries, and made State of Himachal Pradesh, State agencies like HPSPCB and all the cement companies in the State of Himachal Pradesh as a respondents. Last Hearing was on 29.08.2019, with an order as "Adjourned by four weeks." and no further	***Annexure III***

ToR Point	ToR Condition	Compliance	Page Ref in EIA / EMP
		hearing was held as on date. It is still pending. Details of the same is given in this Draft EIA/EMP Report.	Chapter 1, Para 1.2.1 (E) Pg. 44
40.	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	➢ Capital Cost of the Project: Rs. 83.20 Crore/. ➢ Capital Cost for EMP: Rs. 4.22 Crore ➢ Recurring Cost for EMP: Rs. 0.78 Crore ➢ Recurring Cost for Occupation health & safety: Rs 0.22 Crore Details of the same are given in this EIA/EMP Report.	Chapter 10, Para 10.7, Pg 229 – 231
41.	A Disaster Management Plan shall be prepared and included in the EIA/EMP Report.	Disaster Management and Risk Assessment Plan has been prepared and incorporated in this Draft EIA/EMP Report.	Chapter 7 Para 7.4, Pg. 203 – 213 ***Annexure XXII***
42.	Benefits of the Project, if the project is implemented should be outlined. The benefits of the projects shall clearly indicate environmental, social, economic, employment potential, etc.	The benefits of the Project clearly indicating environmental, social, economic, employment potential, etc. have been incorporated in this Draft EIA/EMP Report	Chapter 8, Pg. 214 - 222
	Besides the above, the below mentioned general points are also to be followed: -		
a.	All documents to be properly referenced with index and continuous page numbering.	Complied with	
b.	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated	Complied with	
c.	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	Analysis results of water, air, soil, noise etc. for the project using the MoEF&CC/NABL accredited laboratories have been incorporated in this Draft EIA/ EMP Report. Noted	Chapter 3, Table 3.10, 3.12, 3.15, 3.17, 3.18 (Pg 105, 108, 111 – 112, 115 – 116, 118 – 119)
d.	Where the documents provided are in a language other than English, an English translation should be provided.	Complied with.	
e.	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted	Duly filled Questionnaire for environmental appraisal of Mining project will be submitted with Final EIA/EMP Report.	-
f.	While preparing the EIA report, the instructions	Instructions issued by MoEF&CC vide O.M. No. J-	

ToR Point	ToR Condition	Compliance	Page Ref in EIA / EMP
	for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	11013/41/2006-IA.II (I) dated 4th August, 2009, have been followed.	
g.	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation	Noted and complied with	
h.	As per the circular no. J-11011/618/2010-IA. II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	The Environmental Clearance for the existing mine was obtained from MOEF&CC vide letter No J-11015/130/2003-IA. II(M) Dated: 21.04.2005 under the EIA notification 1994. Certification of Compliance Report of existing EC has been done by RO, MoEFCC vide letter No NC-IRO/ENV/HP/Monitoring/2022/519 dated 8th June 2022. Same information is given in this Draft EIA/EMP Report.	Chapter 1, Table 1.2, Pg 44 – 45 ***Annexure IV &V***
i.	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	Surface plan, Geological plan and sections of the mine area have been included within this Draft EIA/EMP Report.	***Annexure XVA & XVB***

CHAPTER -1

INTRODUCTION

1.1 PURPOSE OF THE REPORT

M/s. ACC Limited has an existing operative captive Gagal Limestone Mine (Area: 231.25 ha.) for Production Capacity 4.5 Million TPA (Limestone, shale & Quartzite) and subgrade mineral stacking 2,50,000 CuM per annum (0.51 MTPA) (Maximum) with two nos. of existing Crushers having capacity 1000 TPH & 400 TPH at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh.

This is an existing operating captive limestone mine to ACC's Integrated Gagal Cement Plant having Unit I & II with Clinker production capacity 3.00 MTPA, cement production of 4.64 million TPA at Village Barmana Tehsil: Sadar, District: Bilaspur, Himachal Pradesh.

Environment Clearance for the existing mine was obtained on 21st April, 2005 under the EIA notification 1994. Public hearing was carried out on 20.10.2004. Pursuant to the MoEF&CC circular 6th April 2018, Present EC application is submitted under EIA notification 2006 for revalidation of Environmental Clearance. There is no increase in the production capacity or increase of mining lease area of the project.

This report has been prepared as per Terms of Reference (ToR) and ToR Amendment granted during 25th and 52nd meeting of EAC (Non-Coal Mining) held on 22-24 Dec, 2020 & 14-15 June, 2022 respectively, (Agenda Item No. 2.4) and ToR Letter was issued by MoEF&CC vide letter no. J11015/130/2003-IA.II (M) dated 25.01.2021 and ToR Amendment was granted on 27.06.2022 respectively, in accordance to the EIA Notification 2006 and amended as on date for carrying out the Environmental Impact Assessment study.

The baseline data for environmental studies has been collected during Post Monsoon Season (Oct to Dec, 2022).

The main purpose of this EIA report is to provide a coherent statement of the potential impacts of proposal and the measures that can be taken to eliminate, reduce and remedy them. It contains essential information for:

- The proponent to implement the proposal in an environmentally and socially responsible way
- The responsible authority to make an informed decision on the proposal, including the terms and conditions that must be attached to an approval or authorization;
- The project proponent to understand the mitigation measures suggested and earmark proper resources & budget for the impacts envisaged; and
- The public to understand the proposal and its likely impacts on people and the environment.

1.2 IDENTIFICATION OF THE PROJECT AND PROJECT PROPONENT

1.2.1 IDENTIFICATION OF THE PROJECT

A. Proposed Project

M/s. ACC Limited has an existing operative captive Gagal Limestone Mine (Area: 231.25 ha.) for Production Capacity 4.5 Million TPA (3.78 MTPA Limestone, 0.64 MTPA Shale & 0.072 MTPA Quartzite) and subgrade mineral stacking 2,50,000 CuM per annum (0.51 Million TPA) (Maximum) with two nos. of existing Crushers having capacity 1000 TPH & 400 TPH at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh.

B. Screening Category

As per EIA Notification dated September 14, 2006, as amended from time to time; the project falls under Category "B", Project or Activity 1 (a) but due to presence of Bandli Wildlife Sanctuary at a distance of 3.55 km in NE direction from mine site, General Condition is applicable for this project. Hence this project is being dealt at MoEFCC.

C. Mining Lease Status

The mining lease details of the Existing Gagal Limestone mine are written in the table given below:

Table 1.1: Chronological events of Mining Lease

Sl. No	Particulars	Letter No. & Date
1.	Mining lease for the mineral Limestone was granted in favor of M/s. ACC Limited over an area of 265.97 Ha for a period of 20 years from 10.02.1979	5-205 / 77–Ind (Glg) -6253 dated 11.08.1978
2.	Lease deed was executed in favor of M/s. ACC Limited over a lease area of 265.97 Ha for a period of 20 years	10.02.1979
3.	Renewal of Lease area of 231.25 Ha for a period of 20 years.	Udyog-Bhu (Khani-4) Major-47 / 98-I-7556 dated 29.01.2003
4.	Lease deed executed	26.07.2003
5.	Inclusion of Shale and Quartzite in the Limestone Mining Lease	Udyog-Bhu (Khani-4) Major 47/98–I-3449 dated 21.08.2003
6.	Supplementary lease deed executed for inclusion of mineral Shale and Quartzite	01.05.2004
7.	Validity Extension of lease area as per provision of Section 8A(5) of MMDRA Act and extended up to 09.02.2029	Udyog-Bhu (Khani-4) Major 47/98–I-2540 dated 09.06.2015
8.	Corrigendum for Validity extension to rectify the Validity from 09.02.2029 to 31.03.2030	Udyog – Bhu (Khani-4) Major – 47 / 98 – I -5133 dated 12.08.2015
9.	Supplementary Lease Deed Executed in favor of M/s. ACC Limited	10.06.2016

Mining lease documents are enclosed as **Annexure I** with this Draft EIA/EMP Report

D. Status of approval of Mining Plan

Reviewed and Updated Mining Plan with Progressive Mine Closure Plan has been approved by IBM, Dehradun for 231.25 Ha vide letter no. 792-1/2/2023-DDN-IBM_RO_DDN dated 29.03.2023. Copy of Approval Letter of Mining Plan is enclosed as ***Annexure II***

E. Status of Court Case

- One case has been filed by M/s Archana Dutt. The case filed by M/s Archana Dutt is not a specific case under Environment (Protection) Act, Air (P & CP) Act & Water (P & CP) Act. It is filed in general under Article 226 of Constitution Of India, by Ms. Archana Dutt against the Union of India through the Ministry of Commerce & Industries, and made State of Himachal Pradesh, State agencies like HPSPCB and all the cement companies in the State of Himachal Pradesh as a respondents, Union of India and others)
- The State of Himachal Pradesh through its Chief Secretary, Civil, Secretariat, Chotta Shimla, Shimla 171002 (H.P)
- The Himachal Pradesh Pollution Control Board, Him Parvesh , Phase-III, New Shimla, Shimla 171009 (H.P)
- M/s ACC limited, Gagal Cement works , Barmana, District Bilaspur -174013 (H.P.)
- Ambuja Cement Darlaghat , District -Solan (H.P)
- Ultra tech cement limited, Bagga, District Solan (HP)
- Cement corporation of India, Rajban, district, Sirmoue (HP).

Last Hearing was on 29.08.2019, with an order as "Adjourned by four weeks." and no further hearing was held as on date. It is still pending. Details are enclosed as ***Annexure III***

F. Status of Statutory Clearances, Permissions, No Objection Certificates and Consents

The existing mining project has been implemented after obtaining all the statutory clearances and consents from the concerned authorities. Proposed schedule for obtaining Clearances and consents for the mining project is given as under in table no 1.2

Table - 1.2
Status of Statutory Clearances, Permissions, No Objection Certificates and Consents

Existing Environmental Clearances (EC)			
Sl. No.	**Particular**	**Letter No & Date**	**Annexure No.**
1.	Environment Clearance for expansion of total production capacity of Limestone from 1.5 Million TPA to 4.5 Million TPA over an area of 231.25 Ha was obtained from MoEF&CC, New Delhi in favor of M/S ACC Limited	J-11015/130/2003-IA. II(M) Dated: 21.04.2005	***Annexure IV***
Certified Compliance Report			
1.	Certification of compliance of EC Conditions by IRO, MoEFCC	NC-IRO/ENV/HP/Monitoring/2022/519 dated 11.07.2022	***Annexure- V***
Existing NOC/Consent for Establish (CTE)			

1.	Consent to Establish under Air and Water Act of Limestone Production of 15000 TPD (4.5 MTPA)	PCB /(3776) ACC Unit-I (Mining) Expansion/2002-1052-56 Dated 26.04.2004	**Annexure VI**
Existing Consent for Operation (CTO)			
1.	Consent to Operate under Air and Water Act of Limestone production capacity 4.5 million TPA	CTO/BOTH/RENEW/RO/2021/1781277 dated: 05.02.2021 Valid till: 31.03.2025	**Annexure VII (A)**
2.	Corrigendum to exclude Shale and Quartzite from Consent to Operate	End st No.PCB/ (3776)/M/s ACC Ltd. (Gagal Limestone Mine)/Bilaspur/2021-1100-1101 dated: 28.04.2021 Valid Till:31.03.2025	**Annexure VII (B)**
Forest Diversion			
1.	Diversion of 103.02 ha of forest land for mining purpose in the ML area in favor of M/s ACC Limited was granted by MoEF&CC, Govt. of India	F.No. 8-21/2000-FC dated 25.01.2001	***Annexure VIII***

G. Status of Project for Environment Clearance

The chronology of the project activities undertaken so far with respect to the process of getting Environment clearance are given in the table 1.3:

Table - 1.3

Status of proposal for Environment clearance

S. No.	Project Activity	Date/Duration
1.	Application for ToR submitted to MoEFCC	04.10.2018
2.	Essential Details Sought by MoEFCC	02.11.2018
3.	EDS reply Submitted to MoEFCC	07.11.2019
4.	Technical Presentation for ToR held before 12th EAC	20.12.2019
5.	ADS by MoEFCC	07.02.2020
6.	ADS reply Submitted to MoEFCC	11.05.2020
7.	ToR Reconsideration ppt held before 18thEAC (non-Coal)	23.06.2020
8.	MoM was uploaded and the committee is of the opinion that the instant proposal attracts the violation of EIA Notification, 2006.	01.07.2020
9.	ToR Reconsideration ppt held before 25thEAC (Non-Coal) and the committee recommended the proposal under Violation	23.12.2020
10.	ToR Letter issued by MoEF&CC, New Delhi	25.01.2021
11.	Application for ToR Amendment was submitted to MoEFCC	25.09.2021
12.	ToR Amendment ppt held before 39th EAC	11.10.2021

S. No.	Project Activity	Date/Duration
13.	Application Returned in present form	20.10.2021
14.	Fresh Application for ToR Amendment was submitted to MoEFCC	04.04.2022
15.	Essential Details Sought by MoEFCC	26.04.2022
16.	EDS reply Submitted to MoEFCC	26.05.2022
17.	ToR Amendment ppt held before 52nd EAC	15.06.2022
18.	ToR Amendment Letter issued by MoEF&CC	27.06.2022
19.	Baseline Monitoring & Data Collection	Post Monsoon Season, (Oct., 2022 to Dec., 2022)

1.2.2 INTRODUCTION OF THE PROJECT PROPONENT

- M/s ACC Ltd. is the oldest and one of the largest cement producers in India with annual production capacity of more than 30 Million tonnes per annum (MTPA).
- ACC is India's foremost manufacturer of cement and concrete. ACC's operations are spread throughout the country with 17 modern cement factories, more than 85 Ready Mix Concrete plants and several sales offices and several zonal offices. It has a workforce of about 6650 persons and a countrywide distribution network of over 56,000 dealers. The manufacturing units are backed by a technology support service centre.
- Since its inception in 1936, the company has been a trendsetter and important benchmark for the cement industry in respect of its production, marketing and personnel management. Its commitment to environment-friendliness, its high ethical standards in business dealings and its on-going efforts in community welfare programmes have won it acclaim as a responsible corporate citizen. ACC has made significant contributions to the nation building process by way of quality products, services and sharing its expertise.

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

1.3.1 BRIEF DESCRIPTION OF NATURE, SIZE & LOCATION OF PROJECT

The brief description of the nature, size and location of the project has been given in table 1.4:

Table - 1.4

Brief description of the project

S. No.	Particular	Details
A.	**Nature of the Project**	Fully Mechanized Opencast Mine
B.	**Size of the Project**	
1.	Mining Lease Area	231.25 Ha (103.02 ha is Forest land, 108.23 Ha is Waste Land & 20 Ha is Agricultural Land)

S. No.	Particular	Details	
2.	Production capacity	**Limestone**	3.78 Million TPA
		Shale	0.64 Million TPA
		Quartzite	0.072 Million TPA
		Subgrade Stacking	0.51 Million TPA
		Total Excavation	5.01 Million TPA
		Crusher Capacity	1000 TPH & 400 TPH
C.	**Location Details**		
1.	Villages	Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain.	
2.	Tehsil	Sadar	
3.	District	Bilaspur	
4.	State	Himachal Pradesh	
5.	Latitude & Longitude	**Latitude:** 31° 23' 30.3" N to 31° 24' 57.50" N **Longitude:** 76° 50' 15.5" E to 76° 51' 8" E	
6.	Toposheet No. of the Study area	**Core:** H43E15 **Buffer:** H43E15, H43E11, H43F15, H43E14	

Source: *Pre-feasibility Report*

1.3.2 PROJECT IMPORTANCE TO THE COUNTRY AND REGION

The cement demand in the country is growing at the rate 9-10% (Compound Average Growth Rate CAGR) particularly in the northern states, due to various infrastructural projects planned by State/Central Governments and also due to rapid growth of industries, the demand is likely to be higher than average for the country. Keeping in view, M/s. ACC Ltd. has Integrated Cement Plant to meet market demand. For Manufacturing of clinker and cement, existing Gagal Limestone Mines is opened for captive use to get limestone as raw material from the mine having Mining Lease Area 231.25 ha. The Limestone Production of 4.5 Million TPA is being done & crushed at existing crushers having capacity 1000 TPH and 400 TPH at Bilaspur (Himachal Pradesh). Subsequently, sub grade Mineral 2,50,000 CuM per annum (0.51 MTPA) (Maximum) will be stacked within the Lease area in the non- mineralized zone.

The company is committed to socio – economic development of the region. In the present scenario, the company will go for scientific use of limestone for manufacturing of Clinker and Cement. Execution of project has generated direct as well as indirect employment and also additional revenue is being generated for the State Government. Maximum utilization of marginal as well as sub grade limestone will be done for Conservation of limestone.

1.4 SCOPE OF THE STUDY

Scope of this study covers all the points given in the ToR prescribed by the MoEFCC, New Delhi dated 25.01.2021 & 27.06.2022. The regulatory scoping of the project as per the ToR (1-14) has been covered and mentioned in "Point wise compliance of ToR".

The data generated from various studies for EIA/EMP are presented and discussed in following chapters of this report prepared as per Appendix-III of the EIA Notification, 2006.

Chapters	Description
Chapter-1	Introduction
Chapter-2	Project Description
Chapter-3	Description of the Environment
Chapter-4	Anticipated Environmental Impacts and Mitigation Measures
Chapter-5	Analysis of Alternatives (Technology & Site)
Chapter-6	Environmental Monitoring Plan
Chapter-7	Additional Studies
Chapter-8	Project Benefits
Chapter-9	Environment Cost Benefit Analysis
Chapter-10	Environment Management Plan
Chapter-11	Summary & Conclusion
Chapter-12	Disclosure of Consultants Engaged
Chapter- 13	Remediation Plan and Natural & Community Resource Augmentation Plan (NCRAP)

CHAPTER- 2

PROJECT DESCRIPTION

2.1 TYPE OF THE PROJECT

M/s. ACC Limited has an existing operative captive Gagal Limestone Mine (Area: 231.25 ha.) for Production Capacity 4.5 Million TPA (Limestone 3.78 MTPA, Shale 0.64 MTPA & Quartzite 0.072 MTPA) and subgrade mineral stacking 2,50,000 CuM per annum (0.51 Million TPA) (Maximum) with two nos. of existing Crushers having capacity 1000 TPH & 400 TPH at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh.

As per EIA Notification dated September 14, 2006, as amended from time to time; the project falls under Category "B", Project or Activity 1 (a) but due to presence of Bandli Wildlife Sanctuary at a distance of 3.55 km in NE direction from mine site, General Condition is applicable for this project. Hence this project is being dealt at MoEFCC. Fully Mechanized Open cast mining method is being adopted.

2.2 NEED FOR THE PROJECT

Limestone produced from this mine is being used in existing Integrated Cement Plant at ACC Gagal Cement Works [Clinker 3.0 MTPA (Unit-I 4500 TPD & Unit-II 5500 TPD), Cement 4.64 MTPA (Unit-I 2.0 MTPA & Unit-II 2.64 MTPA)] at Village & PO Barmana, Tehsil Sadar, District Bilaspur, State Himachal Pradesh. Details of Interlinked cement plant with status of Environment clearance is given below:

Table – 2.1

Interlinked Project Detail

S. No	Name of Project along with capacity	Status of Environment clearance
1	existing Integrated Cement Plant at ACC Gagal Cement Works [Clinker 3.0 MTPA (Unit-I 4500 TPD & Unit-II 5500 TPD), Cement 4.64 MTPA (Unit-I 2.0 MTPA & Unit-II 2.64 MTPA)] at Village & PO Barmana, Tehsil Sadar, District Bilaspur, State Himachal Pradesh	• Unit-I EC Granted by SEIAA vide doc # STE.F(2)-4/2002 dated 19.04.2004. • Unit-II EC Granted by MoEF & CC vide letter # J.11011/308/2005-IA.II(I) dated 27th December 2005.

Table 2.2

Material Balance of Existing Plant

S. No.	Project Name	Clinker Capacity (MTPA)	Limestone Requirement @ 1.5 times clinker capacity (MTPA)
1.	Existing Cement Plant of Capacity Unit-I 2.0 MTPA & Unit-II 2.64 MTPA-Cement located at Village & PO Barmana, Tehsil Sadar, District Bilaspur, State Himachal Pradesh	3.0	4.5

Total 5.01 (Dispatch will be restricted to 4.5 Million TPA and this sub grade mineral will be stacked separately because it cannot be used in present scenario as it contains very high magnesia and low Cao which is below the threshold limit defined by IBM) MTPA of Limestone, Shale and Quartzite is required for existing interlinked cement plant located at Village & PO: Barmana, Tehsil: Sadar, District: Bilaspur, State: Himachal Pradesh.

Apart from the generation of revenue, the project has been proved beneficial in terms of socio-economic development of the area. The project activities have already increased the average income level, employment opportunities, flow of revenue in the area, which ultimately result in better standard of living of the local people and also earnings to the state exchequer.

2.3 LOCATION OF THE PROJECT

The mine site is located at villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil: Sadar, District: Bilaspur, Himachal Pradesh

The maps showing general location, specific location (Mine Lease boundary) along with geographical coordinates, geology & geomorphology of the mine site has been given in the following sections:

2.3.1 LOCATION MAP (GENERAL AND SPECIFIC)

The map showing general as well as specific location of the mine site is as given below-

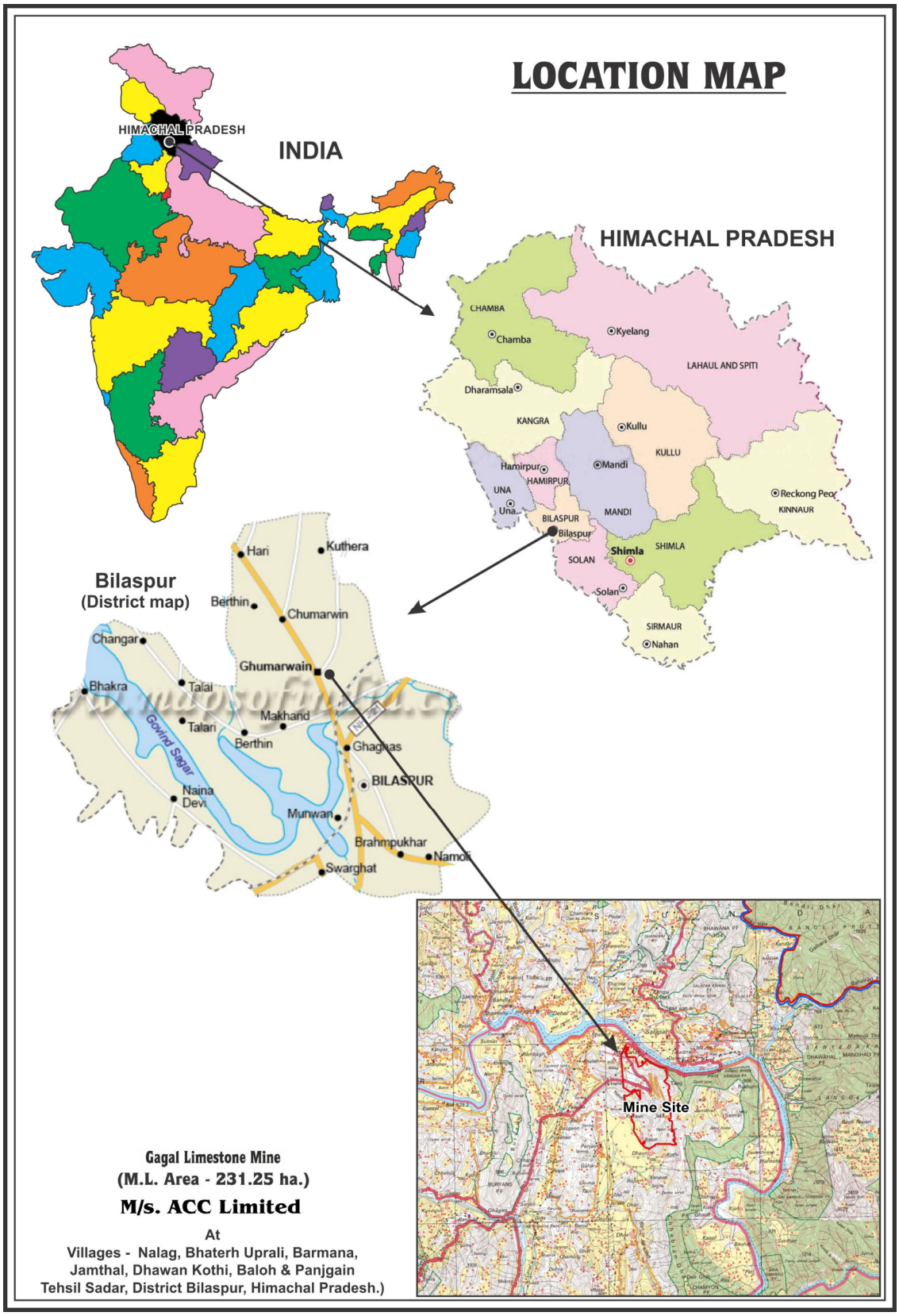


Figure 2.1: Location Map (Showing general as well as specific location of the ML area)

2.3.2 MAP SHOWING GEOLOGY & GEOMORPHOLOGY OF THE MINE SITE

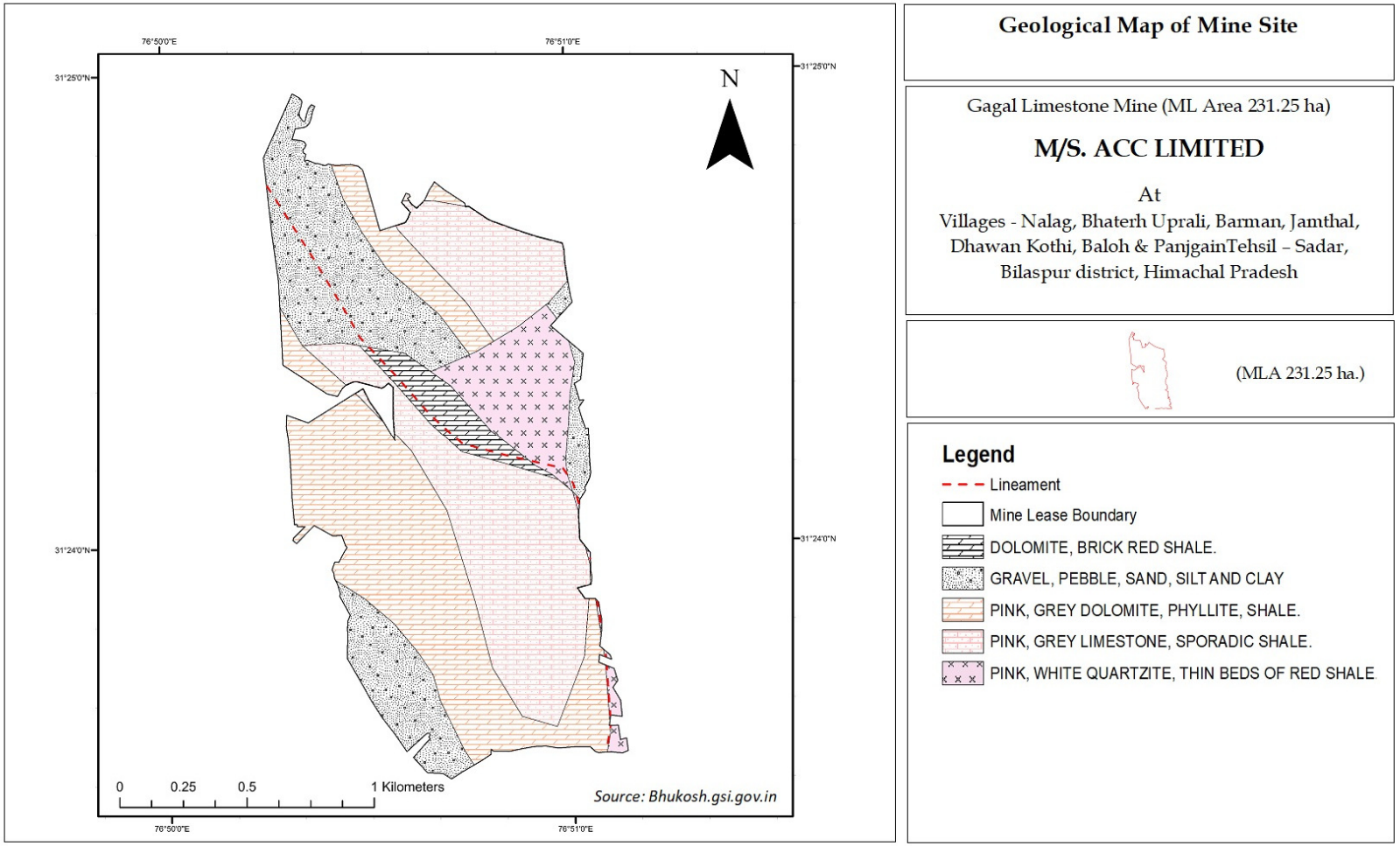


Figure 2.2 Map showing Geology of the Mine Site

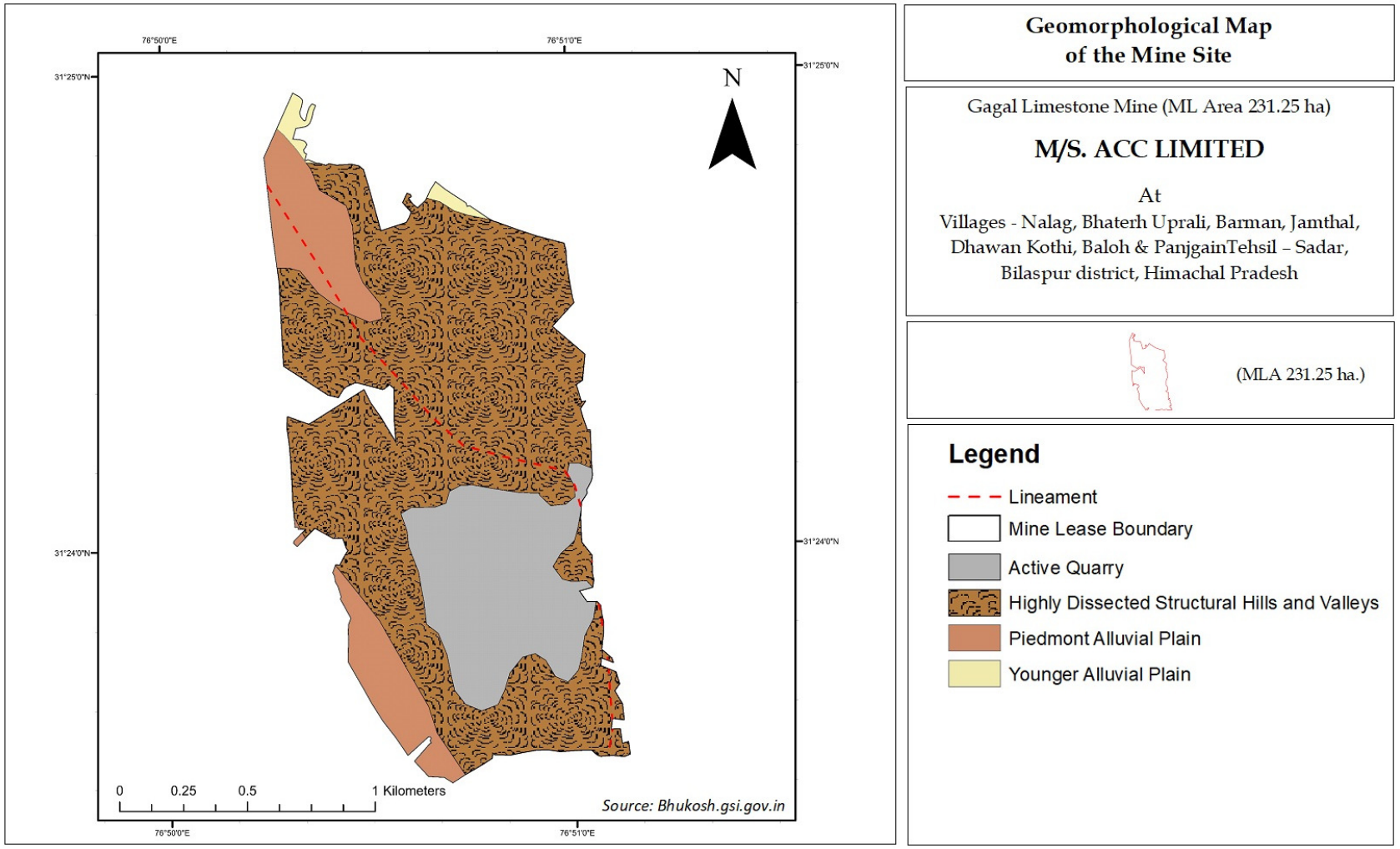


Figure 2.3 Map showing Geomorphology of the Mine Site with Geographical Extents

2.3.3 PROJECT SITE LAYOUT

Land Details

Total Mining lease area is 231.25 ha in which 103.02 ha is forest land, 128.23 ha is private land. This is an existing mine and production is being done within existing mining lease area. Mining lease falls in 7 villages namely Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain. Details of village wise extent of the land granted for the Mining Lease area are given in the table below:

Table – 2.3

Breakup of Mining lease area (Village wise)

S. No.	Village	Private Land (Ha.) acquired	Forest Land (Ha)	Total (Ha)
1	Nalag	51.2	34.87	86.07
2	Bhaterh Uprali	0.53	0.22	0.75
3	Barmana	12.39	17.65	30.04
4	Jamthal	0	1.69	1.69
5	Dhawan Kothi	17.15	14.26	31.41
6	Baloh	16.54	6.41	22.95
7	Panjgain	30.42	27.92	58.34
Total Land		**128.23**	**103.02**	**231.25**

Source: *Approved, Reviewed and Updated Mining Plan with Progressive Mine Closure Plan*

Forest Diversion in respect of 103.02 Ha has been granted by MoEF&CC vide letter no F.No – 8-21/2000-FC dated 25.01.2001. The same has been enclosed as ***Annexure VIII.***

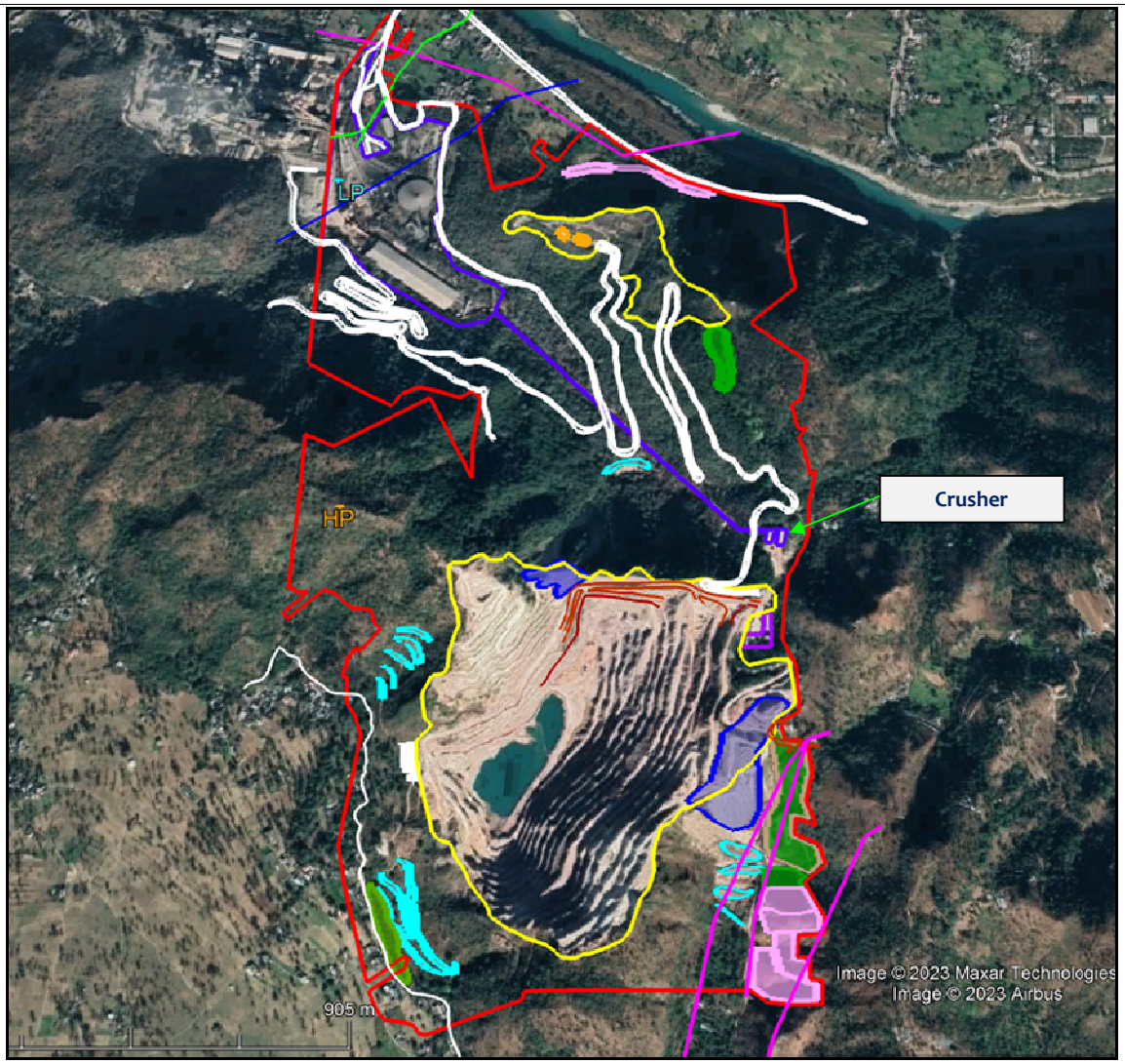
2.3.4 SALIENT FEATURES OF THE LEASE AREA

Table – 2.4

Salient Features of the lease area

S. No.	Particulars	Details
1.	**Public Road**	A Public Road of length (~3.5 km), is passing through ML area which connects Village Barmana and Khatehr with NH 154 in the NW part of the Lease area. This public road is around 500 m from the ultimate pit limit and 60 m from the pit limit of Plan period so no impact on the road will be there.
2.	**Water bodies**	Due to the hilly terrain and dendritic drainage pattern small depressions carry the rainwater from higher level to lower level. One of this kind of seasonal nalla is there within the ML area which is around 400m away from the Ultimate pit limit and check dams are present near the nallah in order to arrest the silts.
3.	**Electric Lines**	Two transmission lines of 440 KV is passing through the lease area in the SE part of the Lease area, where mining won't be done and is around 100m away from the Ultimate pit limit.
4.	**Mining Pit**	Gagal pit is being excavated for production of minerals.

All the site features have been shown in Google image given below:



	Lease Boundary		**Mine Office and Worksho**
	Existing Pit		**Infrastructures**
	Haul Road		**Check dams**
	Roads		**Plantation during 2013-2018**
	LT Lines		**Plantation during 2019-2023**
	HT Lines		**Mineral stack**
	Crusher and Conveyor belt		**Mango**

Figure 2.4: Google image showing Existing Site Features

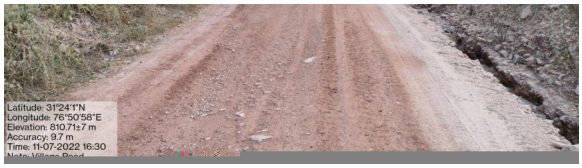
2.3.5 PROJECT SITE PHOTOGRAPHS

Mining Pit

Sub Grade Mineral Stack

Crusher in ML area

Conveyor belt



Road in ML area

Figure 2.5: Project Site Photographs

2.4 SIZE OR MAGNITUDE OF OPERATION/SALIENT FEATURES OF OPERATION (INCLUDING ASSOCIATED ACTIVITIES REQUIRED BY OR FOR THE PROJECT)

The size and magnitude of the lease area is as given in table 2.5:

Table - 2.5

Size or Magnitude of Operation

S. No.	Particulars	Details	
1.	ML Area (Ha.)	231.25 ha	
2.	Geological Resources (Million Tonnes) (As on 01.08.2022)	Limestone	461.29
		Shale	45.22
		Quartzite	0.94

S. No.	Particulars	Details	
3.	Mineable Reserves (Million Tonnes) (As on 01.08.2022)	Limestone	159.1
		Shale	12.22
		Quartzite	0.94
4.	Production Capacity	4.5 MTPA (Limestone 3.78 MTPA, Shale 0.64 MTPA & Quartzite 0.072 MTPA)	
5.	Method of Mining	Fully Mechanized Opencast Mining	
6.	Crushing	Existing Crusher of 1000 & 400 TPH	
7.	Life of Mine	Limestone	42 years
		Shale	20 years
		Quartzite	14 years
8.	Total Man Power (Nos.)	78	
9.	Total Cost of the Project	83.20 Crore	
10.	Estimated Cost for EMP	Rs. 4.22 Crore	
11.	Recurring Cost for EMP	Rs. 0.78 Crore/annum	

Source: *Approved, Reviewed and Updated Mining Plan with Progressive Mine Closure Plan*

2.5 ASSOCIATED ACTIVITIES/ FACILITIES PROPOSED

As per the provision for repair and maintenance workshop, mobile service, van facility, power supply, water supply, office and stores, first aid room, canteen and other support facilities is available within the lease area.

Mine Workshop

Crusher

Mine Office

2.6 STATUS OF STATUTORY CLEARANCES, PERMISSIONS, NO OBJECTION CERTIFICATES AND CONSENTS PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION

This is an existing mining project and has already been implemented after getting all the Statutory Clearances, Permissions, No Objection Certificates, Consents etc which are required/necessary for this project under various Acts, Rules and Regulations is as given in table below:

Table - 2.6
Status of Statutory Clearances, Permissions,
No Objection Certificates and Consents

S. No.	Particulars	Date & Status
A. Statutory Clearances		
1.	As per Section 8A (5) of MMDR (Amendment) 2015, Lease period of Mining leases has been extended upto 31.03.2030 as per Department of Mines & Geology	09.06.2015 & 12.08.2015 (**Annexure I**)
2.	Reviewed and Updated Mining Plan with Progressive Mine Closure Plan has been approved by IBM, Dehradun	Letter no. 792-1/2/2023-DDN-IBM_RO_DDN dated 29.03.2023 (**Annexure II**)
3.	Environment Clearance for expansion of total production capacity of Limestone from 1.5 Million TPA to 4.5 Million TPA over an area of 231.25 Ha has been obtained from MoEF&CC, New Delhi in favor of M/s ACC ltd under EIA Notification 1994.	J-11015/130/2003-IA. II(M) dated: 21.04.2005 (**Annexure IV**)
4.	Certified EC Compliance report by IRO, MoEFCC	NC-IRO / ENV / HP / Monitoring / 2022 / 519 dated 11.07.2022 (**Annexure V**)
5.	CTE for 4.5 MTPA Limestone Production Capacity	PCB /(3776) ACC Unit-I (Mining) Expansion/2002-1052-56 dated 26.04.2004 (**Annexure VI**)
6.	CTO for 4.5 MTPA Limestone Production Capacity	CTO/BOTH/RENEW/RO/2021/1781277 dated: 05.02.2021 Valid till: 31.03.2025 (**Annexure VIIA**)
7.	Corrigendum to exclude Shale and Quartzite from Consent to Operate	End st No.PCB/ (3776)/M/s ACC Ltd. (Gagal Limestone Mine)/Bilaspur/2021-1100-1101 dated: 28.04.2021 Valid Till:31.03.2025 **(Annexure VIIB)**
8.	Diversion of 103.02 ha of forest land for mining purpose in the ML area in favor of M/s ACC Limited was granted by MoEF&CC, Govt. of India	F.No. 8-21/2000-FC dated 25.01.2001 (**Annexure VIII**)
9.	NBWL Clearance has been obtained from MoEFCC (Wildlife Division)	Vide letter # 6-147/2015 WL (36th Meeting) dated 09.11.2015 (**Annexure IX**)
B. No Objection Certificates		
10.	Authentication of Location Map and list of flora and fauna within 10 km radius study area from Pr. Chief Conservator of Forests (Wildlife)-cum-CWLW, HP Shimla-1	Authenticated list of flora and fauna has been obtained vide letter No WL (Misc)/Mining/613 Himachal Pradesh dated 12.05.2023. (**Annexure X**)
11.	Confirmation of NPV Submission on 15.12.2020 to Forest	29.01.2021 (**Annexure XI**)

	department	
C. Correspondence with HSPCB for Action taken		
1.	Correspondence with the State Government/ SPCB to take action against the project proponent under the provisions of Environment (Protection) Act, 1986.	17.01.2023, 12.12.2022, 06.08.2022, 02.06.2021, 25.05.2021 (**Annexure XII**)

2.7 PROJECT SCHEDULE FOR APPROVAL

Tentative schedule for approval of the existing project, has been formulated and given in the below table.

Table - 2.7

Proposed Tentative Schedule for Approval

S. No.	Activity Description	Cumulative Duration (Months)
1.	Mining plan preparation & approval by IBM	Completed
2.	Environment Clearance from MoEF&CC, New Delhi	
	Application submission to MOEF&CC, New Delhi	Completed
	Grant of ToR	Completed
	Baseline Study Conduction Oct 2022 to Dec 2022 (Post Monsoon Season)	Completed
	Submission of PH documents to SPCB	June, 2023
	Conducting Public hearing	45 Days
	Appraisal from MOEF&CC, New Delhi	60 Days
	Grant of EC by MOEF&CC	60 Days
3.	Amendment in Consent to Establish (CTE)	60 days
4.	Amendment in Consent to Operate (CTO)	60 days

2.8 IMPLEMENTATION

This is an existing mining project which has been implemented in accordance with the existing Acts and Rules applicable to mining operations as well as in accordance with any Act/Rule/Guidelines issued by Central or State government time to time. The future implementation of the mining activities will be done as per the Approved Modified Mining Plan and Progressive Mine Closure Plans approved by Indian Bureau of Mines (IBM), Dehradun.

2.8.1 PROJECT REQUIREMENTS

The project requirements such as water, power, man-power, machinery with source of supply is described in the sections below:

2.8.2 WATER REQUIREMENT

Existing water requirement of mine is 120 KLD which is being sourced from Satluj River and rain water collected in mine sump. No addition water requirement is involved in the project. No ground water is being/will be used for the project. Copy of water supply agreement is enclosed with this

Draft EIA/EMP Report as **Annexure XIII**

The break-up of water requirement for different units in the mine is given below:

Table – 2.8

Water Requirement

S. No.	Activities	Requirement (KLD)
1.	Dust suppression and Water Sprinkling in Crusher	95
2.	Drinking Water and House keeping	5
3.	Mine Processes & Workshop	15
4.	Greenbelt/ Plantation	5
Total		**120**

Source: *Approved, Reviewed and Updated Mining Plan with Progressive Mine Closure Plan*

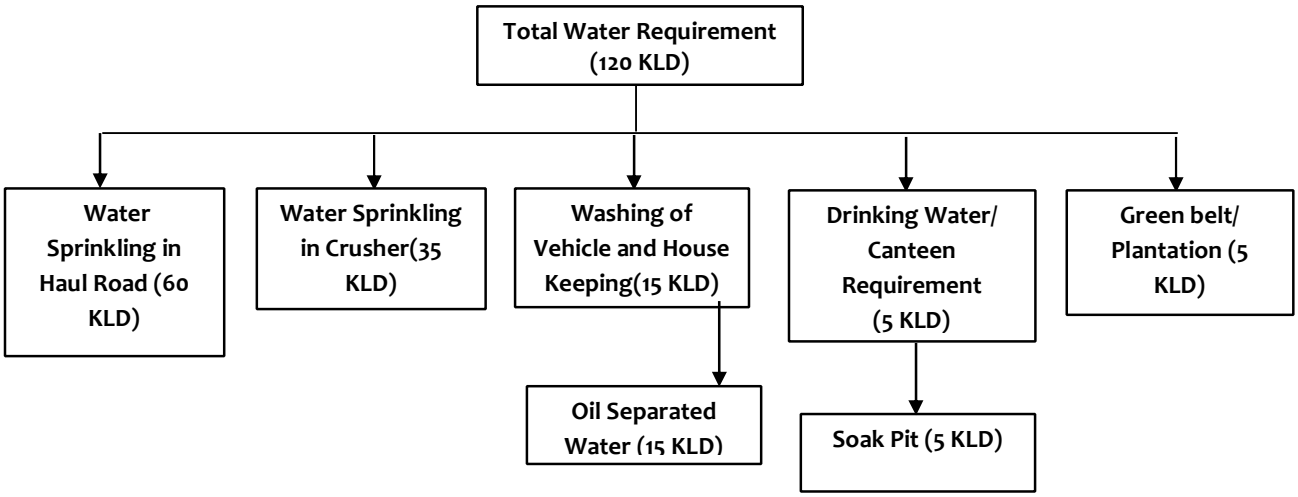


Figure 2.6: Water Balance Diagram

Table 2.9

Details of Waste water generation

S. No	Type/Source	Quantity of waste water generated	Treatment capacity	Treatment method	Mode of disposal
1.	Domestic/Drinking	5 KLD	5 KLD	Soak Pit	Soak Pit
2.	Mechanical Workshop	15 KLD	15 KLD	Oil & Grease Separator	Recycled for washing

2.8.3 POWER REQUIREMENT

Annual electricity consumption for Crusher and other activities is 2.5 MW which is being sourced from the Himachal Pradesh State Electricity Board Limited. No addition power requirement is there.

2.8.4 MAN POWER REQUIREMENT

Total man power requirement in the existing project is 78 No additional manpower is required as this is a revalidation project. Breakup of man power is given below:

Table 2.10

Details of Manpower

S. No.	Classifications	Total
1.	Managerial Staff (Highly Skilled)	12
2.	Supervisory Staff	6
3.	Skilled Workers (Mechanics, Operators)	52
4.	Semi-Skilled Workers	8
	Total	**78**
Source: *Approved, Reviewed and Updated Mining Plan with Progressive Mine Closure Plan*		

Table - 2.11

Detailed Breakup of Manpower

S. No.	Designations	No s	Roles & Responsibility	Qualification
1	Manager	1	Head – Mining (Overall Incharge of Mining & Maintenance)	Graduate in Mining Engineering with 1st Class Manager's certificate of Competency.
2	Mining Engineer	1	Mining	Graduate in Mining Engineering
3	Geologist	1	Geology	M.Sc. in Geology
4	Asst. Manager	3	Shift Engineers	Graduate / Diploma in Mining engineering with 1st / 2nd class Manager's Certificate of Competency
5	Mines Foremen	3	Shift Supervisor	Diploma in Mining engineering or Foreman's C certificate of Competency.
6	Mechanical Engineer	2	HEMMs Maint.	Graduate / Diploma in Mechanical / Automobile engineering
7	Engineer	1	Crusher Mechanical Maintenance	Diploma in Mechanical / Automobile engineering
8	Engineer	3	Shift Engineers	ITI in electrical / mechanical
9	Others (HEO, Fitter, Mechanic and Crusher operation and Maintenance etc.)	63	HEO, Fitter, Mechanic and Crusher operation and Maintenance etc	Skilled and well trained
Total		**78**		

2.8.5 FUEL REQUIREMENT

1800 KL/year of diesel is being used to operate the drills, shovels, dumpers and other transport vehicles in mine lease to transport the lime stone, over burden, sprinkling of water and other mining operation and no additional requirement of fuel is envisaged. Fuel requirement is given in Table-2.12

Table: 2.12

Fuel Requirement

S. No	Fuel	Consumption	Calorific Value (Kcal/Kg)	% Ash	% Sulphur
1.	Diesel	1800 KL/year	10800	Negligible	<0.5%

Source: *Approved Mining Plan*

Table: 2.13

Year wise Target for reduction of diesel consumption

Year	Targeted Production (Mill. Ton)	Annual Fuel Consumption (Ltr.)	Specific Diesel Consumption (Ltr./ton)	Target Reduction
2023-24	4.2	1680000	0.4	8400
2024-25	4.5	1800000	0.4	9000
2025-26	4.5	1800000	0.4	9000
2026-27	4.5	1800000	0.4	9000
2027-28	4.5	1800000	0.4	9000
Till life of mine i.e., 2030	9.0	1800000	0.4	18000

At present specific diesel consumption is 0.4 litre/ tonne. As our existing mines is 38 years old, therefore we are going further deeper and our lead distance is also increasing. Since it's an old mine, and therefore, reduction in the specific oil consumption is not possible. However, we will try to sustain the current consumption rate with various steps like proper maintenance of HEMMs, proper maintenance of haulage road, correct selection of the equipment etc. Various steps will be taken to reduce the consumption of the same in due course of time.

Steps to be taken for reduction of diesel consumption

- Schedule preventive maintenance of HEMM Vehicle timely.
- Fuel pump & injectors will be monitored & calibrated if required timely.
- Procure new energy efficient (BS6) Equipment against those had crossed recommended OEM life.
- Give training to operator for operation accuracy.
- Avoid unnecessary Marching / overload.
- Reduce Equipment ideal time / used a shorter distance for transportation.
- Using only genuine OEM Filters for equipment.
- Maintain proper cycle time to increase productivity.
- Maintaining proper haul road to optimize transporting unit's fuel consumption.

2.8.6 EXTENT OF MECHANIZATION

The machinery & equipment is being/ will be required for mining operation given in table 2.14:

Table - 2.14

Machinery & Equipment for Mining

S. No.	Type of Machinery/ Equipment deployed	Make	Capacity	No. of Equipments
1.	Excavator Backhoe	PC 1250	7.2 cu m	3
2.	Crawler Mounted	Caterpillar D8R	320 hp	1
3.	Hydraulic Drilling Machine with 115 mm dia	Atlas Copco	-	1
4.	Hydraulic Drilling Machine with 150 mm dia	Atlas Copco	-	1
5.	Dumpers	Komastu HD465	22.0 cu m	10

Source: *Approved, Reviewed and Updated Mining Plan with Progressive Mine Closure Plan*

2.9 TECHNOLOGY DESCRIPTION

2.9.1 REGIONAL GEOLOGY

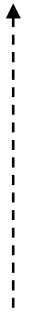
Himachal Pradesh is covered by the rocks ranging in age from Precambrian to Recent. These rocks has been affected by the later event of thrusting in the lesser Himalayan part. The rocks present in Bilaspur district belongs to Shali group, Sirmur group & Siwalik group. Rock groups present in this district vary in age from Middle Proterozoic to Early Pleistocene. Geology of the lease area belongs to Shali group. Shali group dominantly comprises of Dolomite & Limestone besides subordinate Quartzite & Shale of Meso- Proterozoic age. Sirmur group (Eocene to Early Miocene) comprises shale, siltstone, sandstone & claystone with limestone. The Siwalik group consists of sandstone, clay & conglomerate belongs to Middle Miocene to Plio- Pleistocene. The Quaternary sediments include the alluvium of terrace deposit occur along Satluj river & its tributaries comprising sand & pebbles. The stratigraphic succession is intersected by three NW-SE trending thrusts, the Main Boundary Thrust, Barsar Thrust & Gambhar Thrust.

2.9.2 LOCAL GEOLOGY

<u>Geology of the mining lease area</u>

The formation of this area belongs to Shali series which are considered to be of Meso-Proterozoic age. The geological succession of the lithologies encountered in the mines is given below.

Alluvium/Top Soil
Upper High Mg Limestone
Shale (Grey)
Purple Limestone
Lower High Mg Limestone
Shale (Red)
Quartzite



Limestone band is folded here and the type of fold can be classified as Reclined fold structure. Vertical thickness of the folded limestone unit is approximately 500m from the center of the

quarry. The overall strike of the deposit is NE-SW and dip is around 40° to 60° towards NW. At some places in the quarry limestone beds are almost vertical. Limestone bedding thickness varies from one side of the quarry to the other side like mainly thin bedded limestone is encountered in the NW direction of the quarry while bedding thickness gradually increases towards SE. Purple colored fine grained limestone is inter-layered with purple shale layers. At places interstitial clay pockets are identified as cavity fillings within the limestone.

The water table is encountered from 50 to 100m depth in the valley portions. The mining operations would be far above the existing surface water regime of surroundings. Hence, groundwater regime would not be intercepted during mining operations.

Description of individual rock types could further be elaborated below for clarity: -

Shale (Red) and Quartzite:

Both Red shale & Quartzite are exposed at the foothill of the Gagal hill. Quartzite is pink and white in color. The red shale is high in silica as well as alkalis. Typical quality as seen from the samples analyzed is as described below.

	SiO2 %	Al2O3 %	Fe2O3 %	CaO %	MgO %	LOI %
Shale (Red)	64.6	18.2	6.2	1.0	1.4	3.9
Sandstone / Quartzite	85.8	7.3	3.2	0.6	0.6	1.8

Lower High Mg Limestone:

The Lower High Mg Limestone is grey and reddish in color and occurs east and north east of Gagal hill covering extensive areas. Outcrops exhibit characteristic elephant skin surface and at places are juxtaposed with the Red shale towards east and south east. A typical of this lithology is given below:

SiO2 %	Al2O3 %	Fe2O3 %	CaO %	MgO %	LOI %
11.9	0.7	0.4	31.1	14.3	40.9

Purple Limestone:

Purple limestone occurs extensively in Gagal and Barmana hills. Due to the intense tectonic disturbance in the area, the limestone is highly jointed and fractured. The limestone is well bedded, typical sedimentary type with fine grained texture and intercalated with shale, which are laminated. The rock breaks easily along these partings. Several sets of joints are seen and along these joints, fractures and solution cavities, veins and secondary infillings of calcite are noticed and these are stained red or honey yellow. Purple color fine grained limestone is interlayered with purple shale layers. At places interstitial clay pockets are identified as cavity fillings within the limestone unit during geological investigation. Typical quality of this limestone would be as under.

SiO2 %	Al2O3 %	Fe2O3 %	CaO %	MgO %	LOI %
8.8	2.4	0.9	46.5	1.6	38.1

Shale (Grey):

Color of this shale varies from ash grey to buff grey and sometimes brownish or greenish with iron stains. It has been noticed that calcareous portions of this shale are generally grey in color which otherwise is composed of olive green and black siliceous material. This Grey shale, being comparatively low in alkali content, is suitable to use as a corrective material. In few boreholes, in

between Grey shale, patches of weathered black shale are encountered. A typical analysis of Grey shale would be as follows.

SiO2 %	Al2O3 %	Fe2O3 %	CaO %	MgO %	LOI %
42.9	8.3	2.9	21.1	2.1	12.9

Upper High Mg Limestone:

Upper High Mg Limestone is grey in color and well exposed. The outcrops have bouldary appearance. A typical analysis of the lithology is given below:

SiO2 %	Al2O3 %	Fe2O3 %	CaO %	MgO %	LOI %
11.9	0.7	0.6	30.3	14.3	40.9

Source: *Approved Modified Mining Plan & Progressive Mine Closure Plan, Page no.17-20*

2.9.3 DETAILS OF EXPLORATION AND RESOURCES

Gagal & Barmana hill was explored in various phases by the company. A summary of the bore holes drilled in various investigations are given below:

Year	Meter drilled	No of Bore Holes	Type of drilling
1989 - 90	910	8	Core
1992-94	2970	24	Core
2001	1488	8	Core
2007-08	4135	20	Core
2016-17	1811	19	Core
2021-2022	1364	17	Core
Total	**12678**	**96**	

Source: *Approved, Reviewed and Updated Mining Plan with Progressive Mine Closure Plan*

Total 12678 meters exploratory drilling was done in the total lease area that explored Gagal & Barmana hill. Bore holes were drilled at 100 m x 100m or lesser interval in entire area. Total 96 bore holes have been drilled in the entire area. Boreholes are shown in Geological Plan and Sections.

2.9.4 ESTIMATION OF RESERVES

Details of Geological reserves as per UNFC classification is given in table below:

Table – 2.15

Reserves/Resources of Limestone as per UNFC (As on 01.08.2022)

S. N	Classification	Code	Quantity (Million Tonnes)			Mineral	Remarks
			Forest	Non-Forest	Total		
A.	**Mineral Reserve**						
1	Proved Mineable Reserve	111	66.41	75.79	142.20	Limestone	CaO> 34% & MgO< 5%
			0.54	0.39	0.94	Quartzite	Sio2 85.8
			7.09	5.13	12.22	Shale	Sio2 42.9
2	Probable Mineral Reserve	122 & 122	9.80	7.09	16.90	Limestone	CaO> 34% & MgO< 5%
			-	-	-	Quartzite	-

			-	-	-	Shale	-
B.	**Total Remaining Resources**						
1	Feasibility Mineral Resource	211	175.27	126.92	302.19	Limestone	CaO> 34% & MgO< 5%
			-	-	-	Quartzite	-
			19.13	13.85	32.99	Shale	Sio2 42.9
2	Pre-Feasibility Mineral Resource	221 & 222	-			-	-
3	Measured Mineral Resource	331	-			-	-
4	Indicated Mineral Resource	332	-			-	-
5	Inferred Mineral Resource	333	-			-	-
6	Reconnaissance Mineral Resource	334	-			-	-
Total Reserves + Resources (A+B)			**461.29**			**Limestone**	-
			0.94			**Quartzite**	
			45.22			**Shale**	

Source: *Approved, Reviewed and Updated Mining Plan with Progressive Mine Closure Plan*

The reserves/resources of quartzite were considered only in sections between ML 0A and ML 1. We are planning to develop this area for scientific development of benches and to expose the limestone to maximum extent. The entire quantity of quartzite excavated will be consumed in our process.

Note: It is not be possible to quantify grade wise reserves, as normally there is considerable variation in size and grade distribution within the ore zone, which results variable recovery factor and bulk density. Thus, tonnages arrived are tentative.

2.9.5 MINABLE RESERVES AND ANTICIPATED LIFE OF THE MINE

Table – 2.16

Life of Mine as per reserves available on 01.08.2022

2

S.No.	Particulars	Reserves (in Million Tonnes)		
		Limestone	Quartzite	Shale
1.	Mineable Reserves (As on 01.08.2022)	159.1	0.94	12.22
2.	Production till during 01.10.2022 to 31.03.2023	0.907	0 (Nil)	0 (Nil)
3.	Production during Plan Period (2023-24 to 2027-28)	19.36	0.288	2.56
4.	Reserves after 5 years plan period	139.74	0.652	9.66
5.	Proposed rate of production per year thereafter	3.78	0.072	0.64
6.	Life of Mine after year 2027 – 28	36.96	9.05	15.09
7.	Total life of mine as on 01.08.2022	41.96 or 42 years	14.05 or say 14 years	20.09 or say 20 years

Source: *Approved, Reviewed and Updated Mining Plan with Progressive Mine Closure Plan*

2.9.6 USE OF MINERAL

The limestone & shale mined out from the existing Gagal Limestone Mine fulfill the requirement of its existing integrated cement plant located at Village & PO Barmana, Tehsil Sadar, District Bilaspur, State Himachal Pradesh.

2.9.7 PROCESS DESCRIPTION

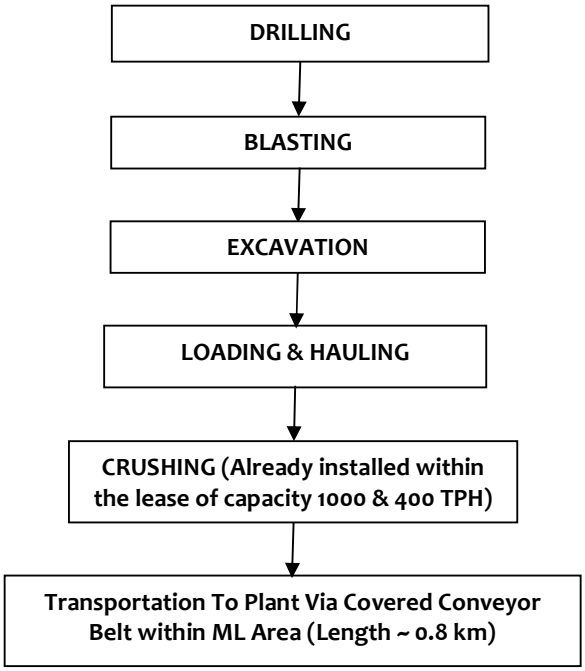


Figure 2.7 Process Flow Chart for Mining Process

2.10 METHOD OF MINING

- Mining operations are opencast fully mechanized method of mining by making benches of height 10m and width 15 m wide and loaders and tippers combination is adopted at Gagal Limestone Mine.
- The limestone is hard so drilling and blasting is in practice.
- Deep hole drilling & controlled blasting is being /will be adopted. Hydraulic rock breaker is being/ will used and no secondary blasting will be involved.
- The limestone after blasting is being loaded by hydraulic excavators into dump trucks for its transportation to crusher.

Sequence of Mining: -

✓ **Soil & OB/SB/IB Removal**

No topsoil and overburden are available thus no requirement of its removal towards exposing mineral limestone, shale and quartzite.

✓ **Drilling**

High-capacity equipment are deployed. Drilling is being carried out with the help of sharp drill bits which help in reducing noise. Drill hole diameter is being/ will be 115 mm- 150 mm and 10 m depth.

✓ **Blasting**

- Blasting details has been provided in the table below:

Table - 2.17

Blasting Details

S. No	Particular	Details
1.	Hole Diameter	115 – 150 mm
2.	Spacing	5 m
3.	Burden	4 m
4.	Depth of Hole	10 m
5.	Charge per Hole	85 kg
6.	Maximum number of holes blasted in a round	20 holes
7.	Number of Rows	2
8.	Yield per holes in ore,	200 Tonnes
9.	Type of explosives used / to be used	Aluminized Gelled Slurry Explosives
10.	Powder factor	7 Tonne/Kg
11.	Secondary blasting	No, Hydraulic rock-breaker for breaking boulders.

Source: *Approved Reviewed and Updated Mining Plan with Progressive Mine Closure Plan*

✓ **Excavators (Loading Shovels)**

The limestone after blasting is being loaded by hydraulic excavators into dump trucks for its transportation to crusher.

✓ **Hauling**

The mineral is transported from the faces to the crusher by 55 tonne off highway rear dumpers.

✓ **Crushing**

The crushing plant plays a major role in preparation of the limestone for cement manufacturing process. It is receiving limestone from the mine through dumpers. The maximum acceptable size of the limestone is dumped into crusher RCC hopper and through apron feeder is being fed to crusher. The output size of the crusher is – 75 mm, which is controlled by adjusting the impact arm and lower grinding path of L & T impactor. Regular feedback of the final product size is received from stacker and Re-claimer and corrective action is taken accordingly.

The crushing plant consist of two crushers, namely

1. L&T of 1000 TPH capacity.

2. Hammer Mill of 400 TPH capacity.

The output from the crushing plant is conveyed by a series of belt conveyors with transfer point and hopper up to limestone gantry, which is approximately 1 km away from crushing

plant. The longest belt conveyor is LSH-5, which is approximately 0.8 KM in length, and its 40% length is 12 degree declining from one transfer point to another transfer point. Its drive station is at the centre of the belt length.

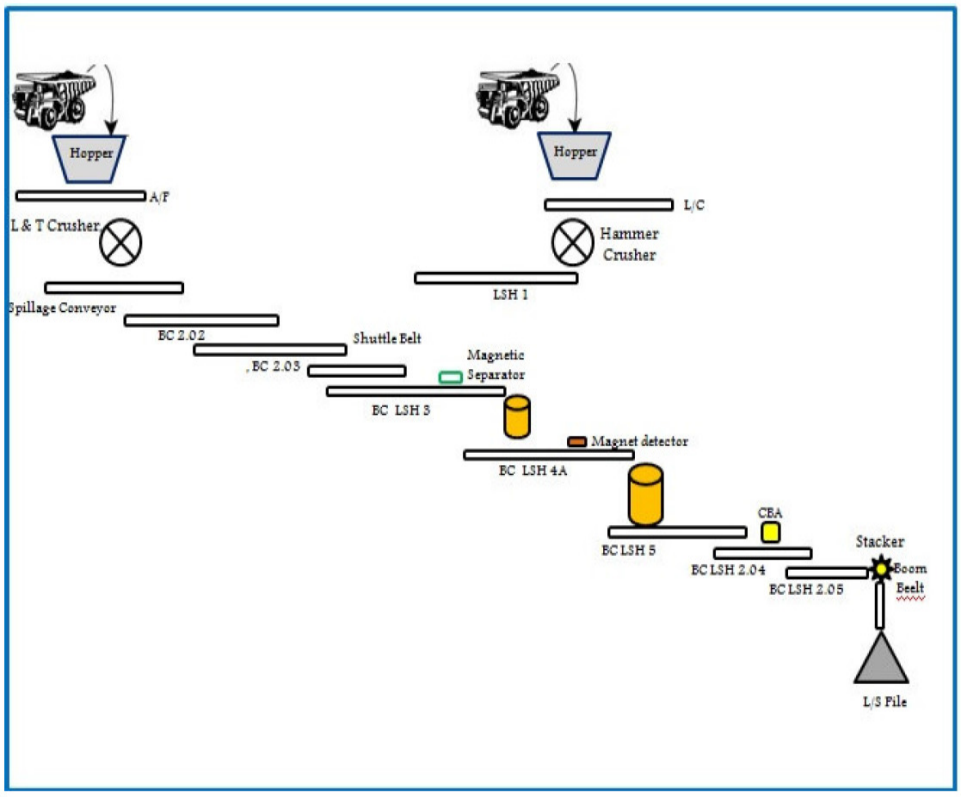


Figure 2.8: Crusher Flow Diagram

Table - 2.18
Crusher Details

S. No.	Particular	Details
1.	Crusher Capacity	1000 TPH & 400 TPH
2.	Feed Material	Limestone, Shale & Quartzite
3.	Feed Size	1000 mm
4.	Output size	50 and 70 mm
5.	Rotor Speed	1000 TPH – 900 RPM & 400 TPH – 750 RPM
6.	Type of Blow Bar	S Type Blow Bar

✓ **Transportation to Cement Plant**

After crushing, the limestone is being/will be transported by ~0.8 km long covered conveyor belt to cement plant for being used as main raw material for clinker/cement manufacturing.

Table-2.19

Material balance (Existing Crusher 1000 & 400 TPH)

S. No.	Parameter	UOM	Crusher
1	Material	--	Limestone, Shale & Quartzite
2	ROM from mines to Crusher	MT	5.01 MTPA
3	Mine working days	Nos.	300

4	Production per day	TPD	16769.17
5	Input Feed to the Crushing Plant	TPH	~1003
6	Material Passing through /feed roller Feeder	TPH	1003
7	Screen/Reject	TPH	Not Available
8	Material Passing through Crusher	TPH	1003

Drilling

Blasting

Excavation

Loading

Bag Filter at Crushing

Transportation by Belt conveyor

Fig 2.9: Photographs showing mining activities

Table - 2.20:
Mining Details

S. No.	Particulars	Details	
1)	Mining Method	Fully Mechanized Opencast Method	
2)	Production Capacity (Million TPA)	Limestone	3.78
		Shale	0.64

		Quartzite	0.072
		Subgrade Stacking	0.51
		Total Excavation	5.01
		Crusher Capacity (TPH)	1000
3)	Geological Resources (Million Tonnes) (As on 01.08.2022)	Limestone	461.29
		Shale	45.22
		Quartzite	0.94
4)	Mineable Reserves (Million Tonnes) (As on 01.08.2022)	Limestone	159.1
		Shale	12.22
		Quartzite	0.94
5)	Life of Mine	Limestone	42 years
		Shale	20 years
		Quartzite	14 years
6)	Bench Parameters	Height - 10 m; Width – 15 m	
7)	Bench Slope	75°	
8)	Ultimate pit slope	45°	
9)	Site Elevation Range	545 m to 900 m AMSL	
10)	General Ground level	560 m AMSL	
11)	Ground Water Level	507 to 508 m AMSL (52 to 53 m below ground level	
12)	Existing Working Depth	690 m AMSL (130 m above ground level)	
13)	Working Depth during Plan Period	660 m AMSL (100 m above ground level)	
14)	Ultimate Pit Depth	621 m AMSL (61 m above ground level) (Lease life) 550 m AMSL (10 m bgl) (Life of mine)	
15)	Number of Working days	300	
16)	Number of Working Shifts	02 Shifts (6 hours each)	
17)	Stripping Ratio	1:00 (no waste Generation)	

Source: *Approved, Reviewed and Updated Mining Plan with Progressive Mine Closure Plan*

2.11 YEAR WISE PRODUCTION SINCE INCEPTION OF MINE

This is the existing limestone mining project. Year-wise production details since inception of mine has been certified by State Geology and Mines Dept. vide letter no. Udyog-Bhu/BLP/ACC Report/321 dated 22.06.2023 (***Annexure XIV***).

Table - 2.21:
Year wise past production data

Year	Limestone	Shale	Quartzite	Total
1993-94	929807	Nil	NA	929807
1994-95	1566041	Nil	NA	1566041
1995-96	1942242	Nil	NA	1942242

1996-97	2181767	Nil	NA	2181767
1997-98	2160556	Nil	NA	2160556
1998-99	2281995	Nil	NA	2281995
1999-00	2376817	Nil	NA	2376817
2000-01	2489060	Nil	NA	2489060
2001-02	2754834	Nil	NA	2754834
2002-03	2927387	Nil	NA	2927387
2003-04	2844221	57626	NA	2901847
2004-05	3068546	104982	NA	3173528
2005-06	3338447	135700	NA	3474147
2006-07	3276500	135600	NA	3412100
2007-08	3844700	166590	NA	4011290
2008-09	3889650	217450	NA	4107100
2009-10	3850200	285800	NA	4136000
2010-11	3901500	320800	NA	4222300
2011-12	3929800	403250	NA	4333050
2012-13	3521200	404200	NA	3925400
2013-14	3320450	488050	NA	3808500
2014-15	3578800	553800	NA	4132600
2015-16	3548682	532405	NA	4081087
2016-17	3334254	478605	NA	3812859
2017-18	3670813	531201	NA	4202014
2018-19	3728492	286205	0	4014697
2019-20	3734750	405350	0	4140100
2020-21	3084550	344350	0	3428900
2021-22	3882200	33700	0	3915900
2022-23	2763650	0	0	2763650

2.12 YEAR WISE PRODUCTION & EXCAVATION DETAILS FOR FIRST 5 YEARS

Year-wise production for first five years has been given in table 2.22:

Table - 2.22

Tentative Excavation during Plan Period

Sl. No.	Year	ROM (Tons)	ROM (m^3)	Saleable Mineral (Tons)	Mineral Reject (Tons)	Ore to OB Ratio
1.	**2023-24**	4498750	1799500	4209500	285250	Nil
2.	**2024-25**	5000125	2000050	4499625	500500	Nil
3.	**2025-26**	4999300	1999720	4499550	499750	Nil
4.	**2026-27**	4998900	1999560	4499650	499250.	Nil
5.	**2027-28**	4998800	1999520	4499800	499000	Nil
Total		**24495875**	**9798350**	**22208125**	**2287750**	-

Source: *Approved, Reviewed and Updated Mining Plan with Progressive Mine Closure Plan*

Note: The Bulk density for Limestone, Shale and Quartzite is 2.5 ton/m³

2.13 WASTE GENERATION AND MANAGEMENT

In Gagal Limestone mine there is no topsoil, overburden and waste are available. There is only Sub-grade mineral in which magnesium oxide (MgO) is very high (MgO 5-13%) with lower percentage of Calcium Oxide (CaO 17.7-33.9%). This sub-grade mineral is forming as top capping of the limestone and grey shale, which is being/ will be removed and stacked in non-mineralized area as shown in production and Development plan. Total 1145000 Tonnes of Subgrade mineral has been generated as on 01.12.2022.

Management: The entire Subgrade has been stacked in 4.0 Ha area having 15m height of the Subgrade Stack.

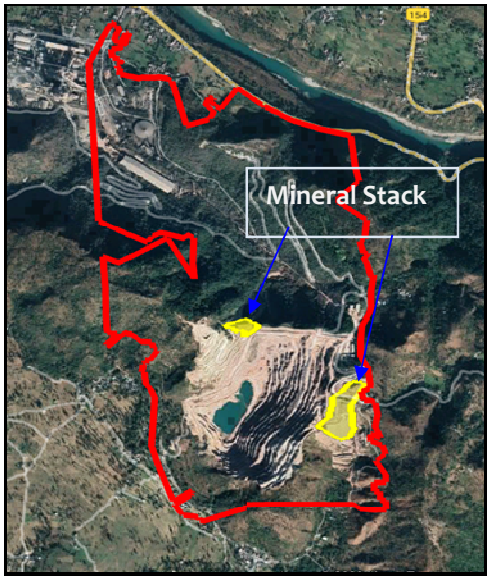
WASTE TO BE GENERATED

During Plan Period

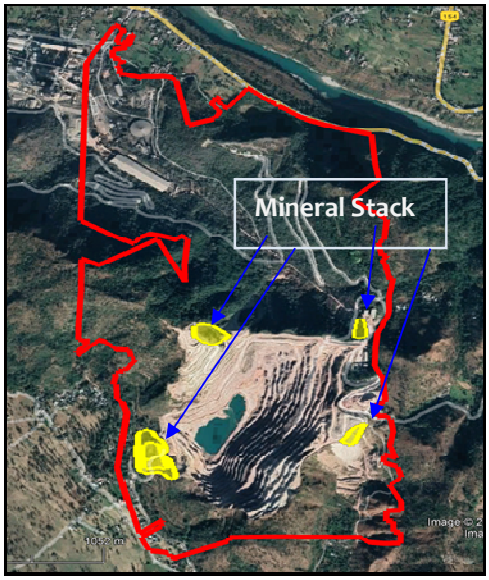
Generation and Management: Sub grade mineral has been generated which has been stacked in the Subgrade Stack area, existing stack and proposed stack detailed is tabularized below:

S No.	Year	Stack ID	Proposed Area (ha)	Height (m)	Total Stack Quantity (m³)	Stack Location
A.	**Existing Stack**					
1.	2023-24	MS-1 (Stacking for High MgO Limestone)	0.37	15.0	55700.0	N3475067-N3 475186, E675 825-E675908
2.	2024-25	MS-1 (Stacking for Shale & High MgO Limestone)	0.90	20.0	199600.0	N3475516-N3 475612, E675 229-E675363
B.	**Proposed Stack**					
1.	2023-24	Proposed MS for Shale 2023-24	0.40	15.0	60000.00	N3475558-N3 475652, E 675 843-E675895
2.	2024-25	proposed MS for High MgO Limestone 2024-25	0.98	20.0	200200.00	N3474894-N3 475018, E 675 062-E675216
3.	2025-26	Proposed MS for High MgO Limestone	1.11	20.0	199900.00	N3474980-N3 475115, E 675 055-E675173
4.	2026-27	Proposed MS for High MgO Limestone 2026-27	0.85	20.0	199700.00	N3474940-N3 475058, E 675077-E675178

Source: *Approved, Reviewed and Updated Mining Plan along with Progressive Mine Closure Plan*



Existing Sub grade Stack



Proposed Sub grade Stack

Fig: 2.10 -Photograph of Existing Sub grade stack

Conceptual Period: Total 3.28 Million tonnes of Sub grade/waste will be generated till Conceptual period which will be stacked in 6.0 ha area and its height will be 20-25 m.

2.14 CONCEPTUAL MINING PLAN

At the conceptual stage (Lease life) Total excavated area will be 63.28 Ha, area under Infrastructure and Road is i.e., 13.37 Ha and 4.63 Ha respectively, reclaimed area as mango orchard will be 1.05 Ha, 7.76 ha area under sub grade/waste stacking followed by plantation, 126.6 Ha will be under green belt/ Plantation and the remaining 14.56 ha will be Virgin Land. Post mining land use breakup of mine site is given below:

Table - 2.23

Post Mining Land Use of Core Zone

S. No	Particulars	Land Use (In Ha)				
		Plantation	**Public Use**	**Water Reservoir**	**Undisturbed area**	**Total**
1.	Excavated area	-	-	63.28	-	63.8
2.	Greenbelt (7.5 m lease periphery)	6.0	-	-	-	6.0
3.	Sub grade storage	-	7.76	-	-	7.76
4.	Plantation on Undisturbed Area	120.6	-	-	-	120.6
5.	Reclaimed Land	1.05	-	-	-	1.05
6.	Area Under Infrastructure	-	18.00	-	-	18.00
7.	Undisturbed area	-	-	-	14.56	14.56
	Total	127.65	25.76	63.28	14.56	231.25

Source: *Approved, Reviewed and Updated Mining Plan along with Progressive Mine Closure Plan*

2.15 DESCRIPTION OF MITIGATION MEASURES

The mitigation measures given in this section are for management of the emissions (particulate or gaseous), waste water & surface run-off and Noise pollution generated from the mining operations to meet the environmental standards and environmental operating conditions.

A. AIR QUALITY MANAGEMENT

During Drilling Operation

- Drilling machines are being equipped with wet drilling arrangements as well as with dust collection system to prevent dust from getting air borne.
- Reduction of Dust generation by using sharp teeth of shovels.

During Blasting Operation

- Controlled Blasting is being/ will be adopted with the optimum use of explosive energy which is/ will help in reducing air pollution.
- Rock breaker is being/ will be used to break the boulders and no secondary blasting is done.

During loading and hauling operation

- Dust Suppression System (water spraying) at Quarry Haul Road.
- Regular water spraying on the haul roads are being/will be done.
- Overloading of material during transportation is being/will be avoided.
- Transportation of crushed limestone from mine face to crusher is being/will be done via HEMMS.

During Crushing

- Water spraying system at the crusher hoppers.
- Operation of Bag Filters is being/will be done.
- Development of green belt/plantation around mine boundary and safety zone is being/ will be carried out to control the air pollution.

During movement of HEMM & transportation vehicles

- Crushed limestone from mine face to crusher is being/will be transported via HEMMs.
- Development of green belt/plantation around mine boundary, roads and other places is being/will be carried out.
- Proper maintenance of the HEMMs & transportation vehicles is being/will be done.
- Vehicular emissions are being/ will be kept under norms.
- Personal Protective Equipment like dust masks provided to all employees.
- Regular ambient air quality monitoring is being/ will be carried out.

B. WATER QUALITY MANAGEMENT (Generation and Mitigation)

The probable cause of surface water pollution in the existing mining area is soil erosion and washes off from the stacked material. Adequate control measures have been adopted to check not only the wash-off from and soil erosion but also uncontrolled flow of mine water. There is & in future too, will not be any mine discharge as mining will not interfere with ground water. The following are the various measures adopted at Gagal mines to check surface water contamination and soil erosion are:

- Foot hill of mining area is covered with soil bunds to arrest soil erosion. A parapet wall had also been constructed, which arrests soil & water. This helps in water recharging to the mother earth.
- 60 nos. check dams and 250 m of dry rubble walls have been provided at various sensitive points.
- Periodic maintenance & cleaning of check dams is done annually before the onset of monsoons and the accumulated material, which is a part of excavated raw material, is recovered & fed to the crusher.
- Garland drainage system has been provided and also proposed during the plan period with 205 m and 155 m bund length in 2024-25 and 2025-26 respectively.
- Fencing is proposed around the water reservoir at the end of Mines Life with total length of 2305 m.
- 670 m wall length of retaining wall proposed to be constructed within the plan period.
- Large sumps & pits are built at the foot of the hill where the entire water run off along with rubbles is allowed to accumulate. The sumps are built in a manner that it allows only water to pass holding back all the rubble & debris. After the rains, the accumulated material, which is a part of excavated raw material, is recovered & fed to the crusher.
- Mixed plantation of shrubs, bushes and trees have been raised to minimize the impact of rain and surface run off. Following steps were taken over the years for prevention of soil erosion;
    - Putting of elephant grass, Ipomea along the roadside slopes.
    - Shrubs are planted towards down of the slope.
    - Plantation of trees along the ridge and slopes.
    - Suitable drainage system has been provided to direct surface water from entering into mines, to reduce soil wash off.

- The worked-out slopes are being stabilized by planting appropriate shrub/grass species on the slopes. This prevents wash-off of material from these slopes.

- 15 KLD of Waste water from workshop is treated using Oil – Water separator and treated water is being re circulated & used in HEMMs washing etc.
- 5 KLD of Domestic waste water generated from mines office & canteen is disposed off in soak pit via septic tank.
- Periodical monitoring of Ground water level & quality is carried out regularly & reports are submitted to MoEF & CC Dehradun regional office.

C. NOISE LEVEL MANAGEMENT

The noise is generally generated by drilling, blasting, movement of heavy machinery, crushing and air blast. Air blast is caused due to unconfined or partially confined explosion and detonating cords exposed in atmosphere. The following control measures are being adopted to keep the ambient noise levels well below the limits:

DRILLING

- ROC L6, Atlas Copco make drills are being used for drilling holes.
- This technology is being used globally and is equipped with dust pre separator & dust collector to mitigate pollution at source.
- Rock breaker is used to break the boulders and no secondary blasting is done.
- Rock breaker is also being used for removing the ridges without blasting.

BLASTING & VIBRATION

- Ground vibrations do not affect the structures in the vicinity of ML area as blasting is done in accordance with standards prescribed by DGMS for controlled blasting. It is based on scientific study.
- Explosives charge per hole and per delay is maintained as per DGMS guidelines.
- Controlled Blasting is adopted with proper spacing; burden and stemming is maintained. Blasting is done during day hours only. Secondary blasting is totally avoided.
- Minimum quantity of detonating fuse is consumed by using alternatively Raydet Excel non-electrical initiation system.
- The blasting is carried out during favorable atmospheric condition and low human activity timings.
- All mines employees are provided with earplugs/earmuffs.

TRANSPORTATION

- Adequate silencers in HEMM are being/will be provided to reduce generation of noise.
- Proper and regular maintenance, oiling and greasing of machines at regular intervals are being/will be done to reduce generation of noise.
- All HEMMs are/will be equipped with acoustic ac closed cabins for operators.
- Ear muffs / ear plugs shall be provided to workers closed to noise producing machines.
- A thick tree belt would be provided in phased manner around the periphery of the mine to attenuate noise.
- Noise monitoring is being/will be carried out regularly.
- Crusher is covered with Noise Acoustic Panels to absorb/mitigate the noise generated

during crushing operations.

D. GREEN BELT/ PLANTATION

- Total area under greenbelt is estimated as 6.0 Ha, out of which 4.0 Ha has already been covered and the rest 1.0 Ha will be completed in the next 1 year, rest 1 Ha is natural plantation and not accessible.
- At the conceptual stage (Lease life), total area under plantation is estimated as 127.65 Ha, out of which 120.65 Ha has already been covered under plantation and the rest will be completed till the Conceptual period (lease life).
- Native species has been planted in consultation with State Forest Department.
- Trees will be planted @2500 plant/ ha and survival rate will be 90%.

2.16 ASSESSMENT OF NEW AND TESTED TECHNOLOGY FOR THE RISK OF TECHNOLOGICAL FAILURE

From the nature and extent of the deposit, the reserves and the quality have been proved with adequate degree of reliability. Therefore, opencast mechanized method is the most feasible method for mining in this mining lease area. It is also a matter of fact that the mining machineries are rapidly change with time and therefore the Project Proponent would act fast to adopt more advanced equipment and automation for safe and environment friendly mining technology in the years to come.

CHAPTER - 3

DESCRIPTION OF THE ENVIRONMENT

3.1 INTRODUCTION

The knowledge of present environment of the core and buffer zone of the existing mining area is important to assess the impact of various project activities on environment. The knowledge of present day environment is also helpful in planning management of environment and planning of mitigation measures. To assess the baseline environmental quality of the area, field assessment has been conducted considering following components of the environment, viz. land, meteorology, air, noise, water, soil, biological and socio-economic.

The relevant information and data (both primary and secondary) were collected in core as well as buffer zone (10 km distance from the Mining Lease boundary) during Post Monsoon Season (October to December, 2022) in accordance with the guidelines of MoEF&CC for undertaking EIA Studies and preparation of EIA/EMP Report.

3.2 STUDY AREA AT A GLANCE

Study Area: The study area includes ML Area and an area of 10 km radius (aerial distance) from the existing project site of mine. The area of project site (within ML boundary) is considered as core zone and rest of the study area within 10 km radius around the core zone is known as buffer zone.

The area of mining lease is considered as core zone.

- **Core Area:** 231.25 ha
- **Buffer Area:** 38518.98 ha (within 10 Km radius from Core Area)

The major environmental settings of the study area w.r.t.the mining lease are as given in the table below:

Table - 3.1
Environmental Settings of the Area
(with approx. Aerial Distance & Direction from the Mining Lease boundary)

S. N	Particulars	Details
1.	Nearest Village	Barmana, Baloh (Within ML)
2.	Nearest Town/City	Bilaspur (~ 10.0 km in South West direction)
3.	National/State Highway within 10 km radius study area.	➢ NH-154 (Adjacent in NE direction) ➢ MDR-34 (~1.5 km in SW direction) ➢ NH-103 (~4.5 km in WSW direction)
4.	Nearest Railway Station	Kiratpur Sahib (~35.5 Km in South West Direction)
5.	Nearest Airport	Jubber Hatti (Shimla) (~40 Km in SE direction)
6.	National Park, Wild Life Sanctuaries, Biosphere Reserves, Tiger Reserves, Wildlife Corridors, Reserved/ Protected Forests within 10 km radius study area	1. Bandli Sanctuary at a aerial distance of 3.55 kms for which we have clearance from National Board for Wildlife vide letter # 6-147/2015 WL (36th Meeting) dated 9th November 2015. 2. Eco sensitive zone & Boundary of Majathal Wildlife Sanctuary ~10.05 km in SE direction.

S. N	Particulars	Details
7.	Reserve/Protected Forest within 10 km radius study area	➢ Sangan PF (~1.0 km in East direction) ➢ Chamyon PF (~1.5 km in South direction) ➢ Salapar Kangu PF (~2.0 km in NNE direction) ➢ Ain Sanwali Shisham PF (~2.5 km in SE direction) ➢ Ghamohu PF (~2.5 km in NNE direction) ➢ Buryans PF (~3.0 km in WSW direction) ➢ Aina Sanwali PF (~3.5 km in SE direction) ➢ Bhawana PF (~3.5 km in NNE direction) ➢ Dhawahal PF (~3.5 km in ENE direction) ➢ Barpat PF (~4.0 km in NE direction) ➢ Maliawar PF (~4.5 km in NNW direction) ➢ Mandihali PF (~4.5 km in ENE direction) ➢ Dartak PF (~5.0 km in North direction) ➢ Gudidhar PF (~5.5 km in NNW direction) ➢ Mungrani PF (~6.0 km in SSW direction) ➢ Umri PF (~6.0 km in NNW direction) ➢ Gaiharu PF (~6.0 km in East direction) ➢ Sungal PF (~6.5 km in WSW direction) ➢ Bandli PF (~7.0 km in NE direction) ➢ Baila PF (~7.0 km in NNE direction) ➢ Harlog PF (~7.0 km in WNW direction) ➢ Bajarial PF (~7.0 km in ESE direction) ➢ Samtiari PF (~7.0 km in SE direction) ➢ Ghan PF (~7.5 km in NW direction) ➢ Dhanu PF (~8.0 km in NW direction) ➢ Petidhar PF (~8.0 km in WNW direction) ➢ Manj Khad (~8.5 km in NNW direction) ➢ Bishna PF (~8.5 km in NNE direction) ➢ Dhanu PF (~9.5 km in NNW direction) ➢ Chauri PF (~9.5 km in ESE direction) ➢ Khatrul PF (~9.5 km in SE direction)
8.	Water bodies within 10 km radius study area	➢ Sutlej River (1.5 km in North direction) ➢ Rao of Jal Khad (~1.5 km in SSW direction) ➢ Bumka Nala (~3.5 km in NNE direction) ➢ Bahna Khad (~4.0 km in NNW direction) ➢ Bahairari Khad(~5.0 km in NE direction) ➢ Suin Khad (~5.5 km in ESE direction) ➢ Ali khad (~6.5 km in WSW direction) ➢ Seri Khad (~7.5 km in ENE direction) ➢ Govind Sagar (~8.5 km in WNW direction) ➢ Manwal Khad (~8.5 km in ESE direction)
9.	Seismic Zone	Zone V as per IS:1893 (Part -1 :2016)

Source: *Site Visit & Pre-feasibility Report*

The map showing environmental settings within 10 km from the mine site is given on the next page.

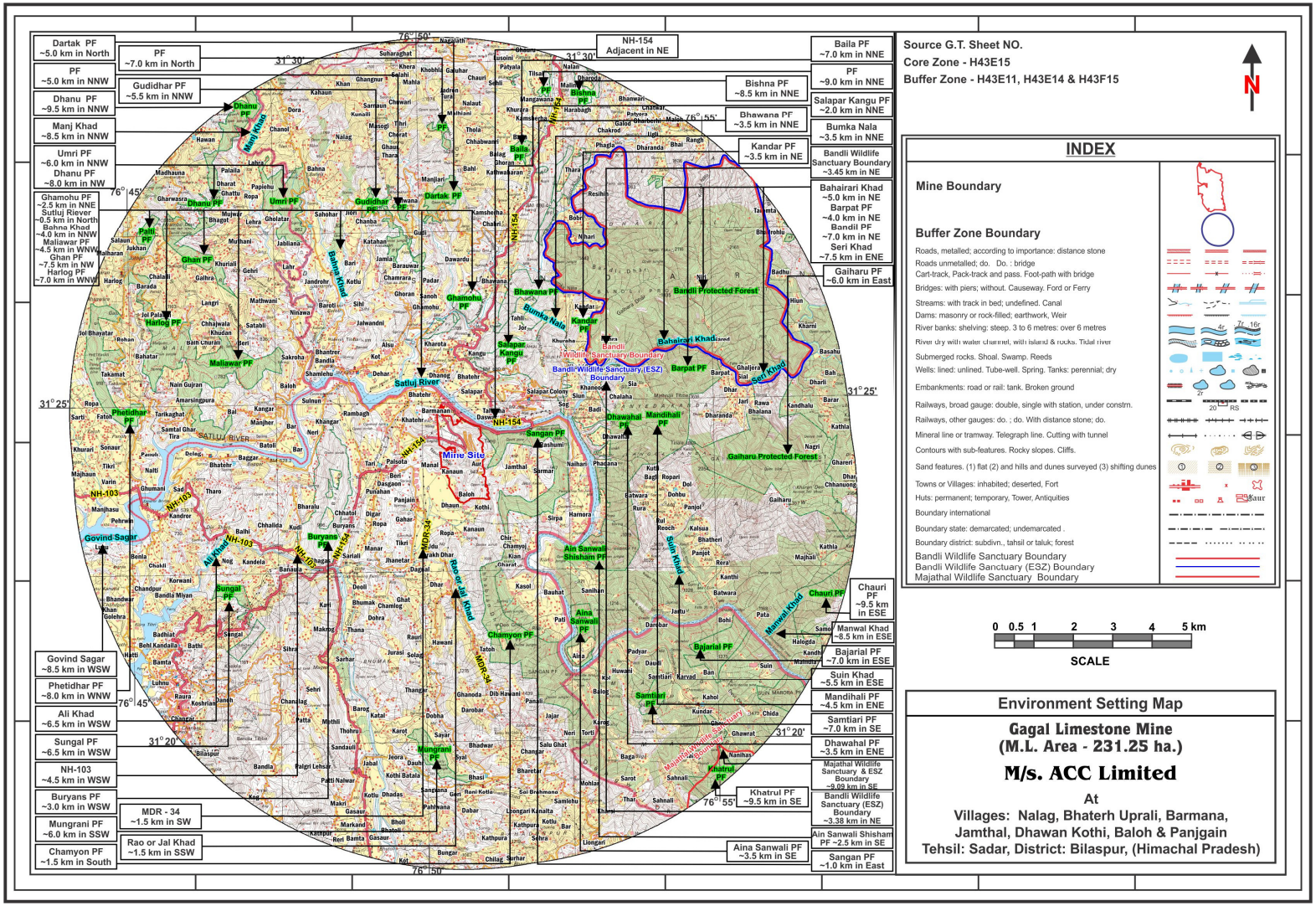


Figure: 3.1 Map Showing Environmental Settings of the 10 km Radius Area of the Mining Lease Boundary

3.3 BASELINE DATA COLLECTION

Baseline environment data on various components of the environment in the study area were collected during Post Monsoon Season (Oct to Dec, 2022) to assess the present scenario of the area. Details are given in the table given below:

Table - 3.2
Baseline data collection
Post Monsoon Season (Oct to Dec, 2022)

S. No.	Environmental component	Primary data				Secondary data
		Parameters	Frequency	Monitoring locations	Methodology	
1.	Land	Land use and land cover	Once in a season	Study area	Field survey	Satellite image from NRSC, Hyderabad
		Soil	Once in a season	6	As per IS 2720/USDA	-
2.	Meteorology	Temperature, Relative Humidity, Wind Speed, Wind Direction, rain fall	Hourly	1	--	IMD book (Climatological normals 1981-2010) Rainfall data for Sundernagar
3.	Air	PM10, PM2.5, SO2 and NO2	(24 hourly), twice a week	9	CPCB Guidelines /NAAQS/IS 5182	--
		O3, Pb, CO, NH3, C6H6, BaP, As, Ni	Once in a season			
4.	Noise	Equivalent noise levels in Leq dB (A)	Once in a season (day & night time)	9	CPCB Guidelines /IS 9989	--
5.	Surface Water	Parameters as per IS 10500-2012	Once in a season	1	IS 10500-2012	--
6.	Ground Water/Drinking water		Once in a season	6		-
8.	Biological Environment	Flora and fauna	Once in a season	Study area	Quadrate method/random sampling	-

9.	Socio-Economic Environment	Socio- Economic status	Once in a season	Study area	Field survey through questionnaire, group discussion and random sampling	• Census data, 2011 • Medical facilities and records for Sadar Tehsil. • Tehsil Map

3.3.1 INSTRUMENTS USED FOR ENVIRONMENTAL BASELINE DATA COLLECTION

The following instruments were used at the site for environmental baseline data collection work.

1. Respirable Dust Sampler with attachment for gaseous Pollutants, Envirotech APM 460.
2. Fine Particulate Matter (FPS) Sampler APM 550
3. Sound Level Meter Model Envirotech SLM - 100
4. Digital D.O. Meter Model - 831 E (CPCB Kit)
5. Weather Monitoring Station Model Enviro WM 271
6. Water Level Indicator and
7. Global Positioning System (GPS)

Apart from collecting samples of air, water, noise and soil from representative sampling points given in proceeding sections, the data on land use, vegetation and agricultural crops were also collected by the field team through interaction with a large number of local inhabitants of the study area and different Government departments/agencies. This provided an excellent opportunity to the members of the field team for obtaining clear scenario of the existing environment of the study area.

3.4 LAND USE / LAND COVER STUDY

As per standard ToR point no. 10 "Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of Mining 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." To fulfill the requirement of the above said ToR point the following process has been adopted:-

- Preparation of land use & land cover map using land coordinates of the mine lease area and study area comprising 10 kms from ML boundary.
- Identification and marking of important basic features according to primary and secondary data.
- Evaluation of the impact on existing land use/land cover due to mining operations.
- Mitigative measures for conservation and sustainable use of land.

3.4.1 DATA USED

Current vintage data of Indian Remote Sensing Satellite RESOURCESAT-2A (LISS-IV) digital FCC (False Color Composite) has been used for preparation of Land use/ Land cover thematic map of study area.

Satellite image has been procured from National Remote Sensing Centre, Hyderabad. Survey of India toposheet as a reference map on 1:50,000 scale has been used for preparation of base layer data like road, rail network and villages for geo-referencing of satellite image.

S. No.	Particulars	Details
1.	Satellite Image	RESOURCESAT-2A (LISS-IV)
2.	Vintage Date	20.03.2022
3.	Satellite Data Source	NRSC, Hyderabad
4.	SOI Toposheets No	H43E15, H43E11, H43F15, H43E14
5.	Software Used	Earth Resources Data Analysis System (ERDAS) Imagine 9.2

Satellite Image (FCC) for 10 km radius study area is given in Figure - 3.2

3.4.2 METHODOLOGY

- Preliminary / primary data collection of the study area
  - Satellite data procurement from NRSC, Hyderabad
- Secondary data collection from authorized bodies
  - Survey of India Toposheet (SOI)
  - Cadastral / Khasra map
  - GPS Coordinates of Mine Lease Boundary
  - Mining Maps approved by IBM, Dehradun.
- Processing of satellite data using ERDAS Imagine 9.2 and to prepare the Land use and Land cover maps (e.g. Forest, agriculture, settlements, wasteland, water bodies etc.) by digital image processing (DIP) technique.
  - Geo-Referencing of the Survey of India Toposheet
  - Geo-Referencing of satellite Imagery with the help of Geo-Referenced Toposheets
  - Geo-Referenced Khasara Maps
  - Enhancement of the Satellite Imagery
  - Base Map layer creation (Roads, Railway, Village Names and others Secondary data etc.)
  - Data analysis and Classification using Digital interpretation techniques.
  - Ground truth studies or field Verification.
  - Error fixing / Reclassification
  - Final Map Generation

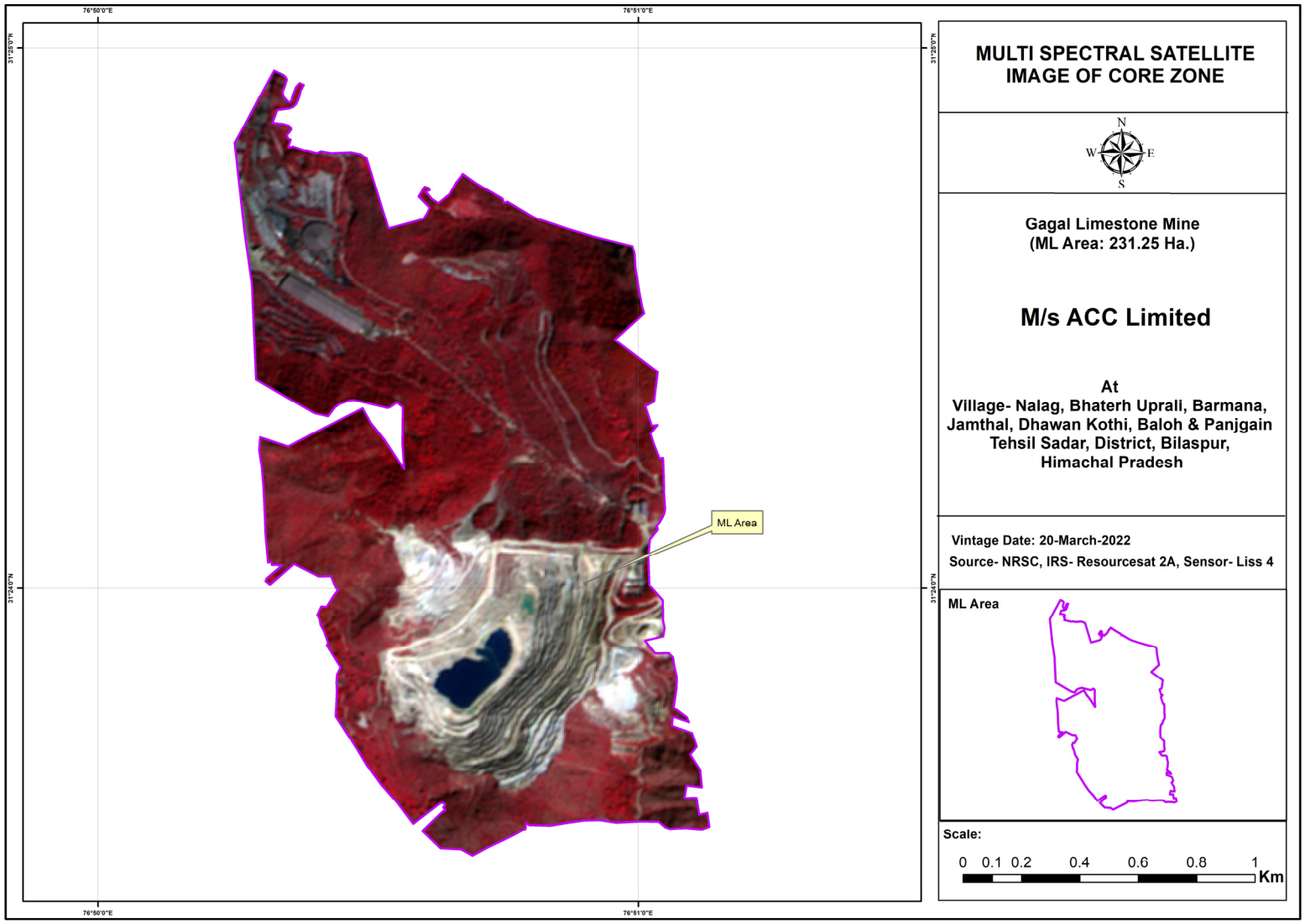
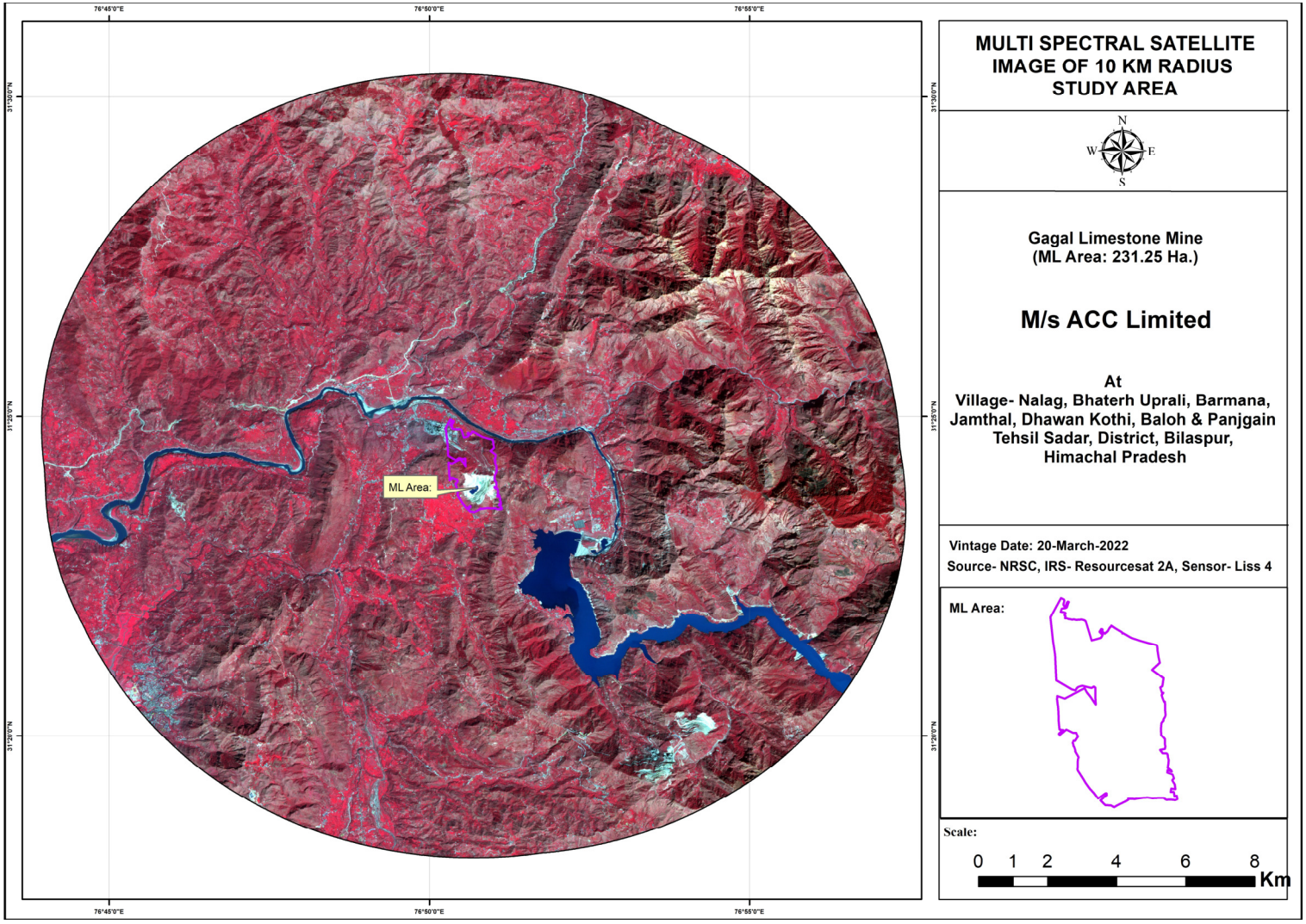


Figure 3.2: Satellite Image of the Core Zone



Source: *NRSC, IRS-Resourcesat 2A, Sensor-Liss 4*

Figure 3.3: Satellite Image of Study Area

3.4.3 DETAILS OF LAND USE LAND COVER (LULC)

3.4.3.1 Land Use and Land Cover Classes - There are the following LULC Classes:-

Water Bodies, Crop land, Fallow Land, Human Settlement, Industrial Area, Mine Quarry, Scrub Land, Plantation, Railway Line, Road Network, Forest Land, Stony Waste Land, Open Land etc. as per NRSC Guide Line.

Definitions of LULC Classes

(Reference- National Remote Sensing Center Guideline)

Agriculture Land: These are the lands primarily used for farming and for production of food crops, fiber, and other commercial and horticultural crops. It includes land under crops (Irrigated and non-irrigated, Fallow, Plantation etc.)

Crop Land:These are the areas with standing crop as on date of satellite overpass. Cropped areas appear in bright red to red in color with varying shape and size in a contiguous to non-contiguous pattern. Three cropping seasons exist in India viz., Kharif (June/July-September/October), Rabi (November-December-February-march) and Zaid (April-May).

Open Scrub Land: Scrub is a vegetation found in regions with less than 100 cms of rainfall. Therefore it indicates a dry region.

Open Land: It refers to non-built-up land with no, or with insignificant, vegetation cover.

Stony waste Land: A large area usually in arid/semi arid regions where the finer sand/soil has blown away leaving a surface covered with boulders, stones and pebbles.

3.4.3.2 GENERATION AND ANALYSIS OF DATA

- ***Geo-referencing of the Survey of India Toposheet***

  Scanned Survey of India Toposheets were registered in geographic lat/long projection system with the help of ERDAS imagine software and re-project in UTM WGS 84 with respective zone.

- ***Geo-Referencing of the Satellite Imagery***

  Registered Toposheet is used as a reference map for Geo-Referencing of Raw satellite imagery by taking suitable Ground Control Points (GCP) like intersection point of railway, Road network, Canal intersection and some other permanent features.

- ***Enhancement of Satellite Image***

  Satellite data is composed of substantial noise and haze errors due to various environmental factors, which affect the amount of reflectance (information) that can be deciphered. Since mapping of satellite images is based on spectral signatures, it is necessary to normalize the redundant values into near true values. This process of deriving true reflectance values is known as normalization. This enhances interpretability of the satellite image thereby facilitating better identification of land features viewed on satellite imagery. Histogram equalization and radiometric correction has been used for satellite image enhancement.

- ***Base Map Layer Creation***

  Base map has been prepared using Survey of India Toposheet as a reference map on 1:50000 scale. In base layer linear and point feature like road, rail, canal, village location and other

secondary information have been created in vector data format with the help of ArcGIS Software.

- ***Data Analysis and Classification Using Digital Interpretation Technique***

  Image interpretation is the process of identifying objects or conditions in images and determining their meaning or significance**.** Satellite imageries are composed of array of grid, each grid have a numeric value that is known as digital number. Smallest unit of this grid is known as a pixel that captures reflectance of ground features represented in terms of Digital number, which represent a specific land features.

  Using image classification technique, the satellite data is converted into thematic information map based on the user's knowledge about the ground area.

  Hybrid technique has been used i.e. visual interpretation and digital image processing for identification of different land use and vegetation cover classes based on spectral signature of geographic feature. Spectral signature represents various land use classes.Based on the Interpretation key and Spectral signature,entire satellite imagery is classified in different classes like Water Bodies, Crop land, Fallow Land, Human Settlement, Industrial Area, Mine Quarry, Scrub Land, Plantation, Railway Line, Road Network, Forest Land, Stony Waste Land, Open Land etc.

- ***Ground Data Collection and Verification***

  Ground truth/ field verification is an important component in mapping and its validation exercise. Utmost care and planning is required for collecting ground data and verification. To facilitate a good ground truthing exercise the following steps were followed:

  - Identifying and listing all the doubtful areas for the ground verification and referring all such areas with respect to the toposheet to know their geographical location and accessibility on the ground.
  - Field traverse plan was prepared to cover maximum doubtful areas in the field in such a way that each traverse covers, as many land use and land cover classes as possible, apart from the doubtful areas.
  - Sufficient numbers of points were covered for each Land Use Class as required for quality checking as well as accuracy assessment.

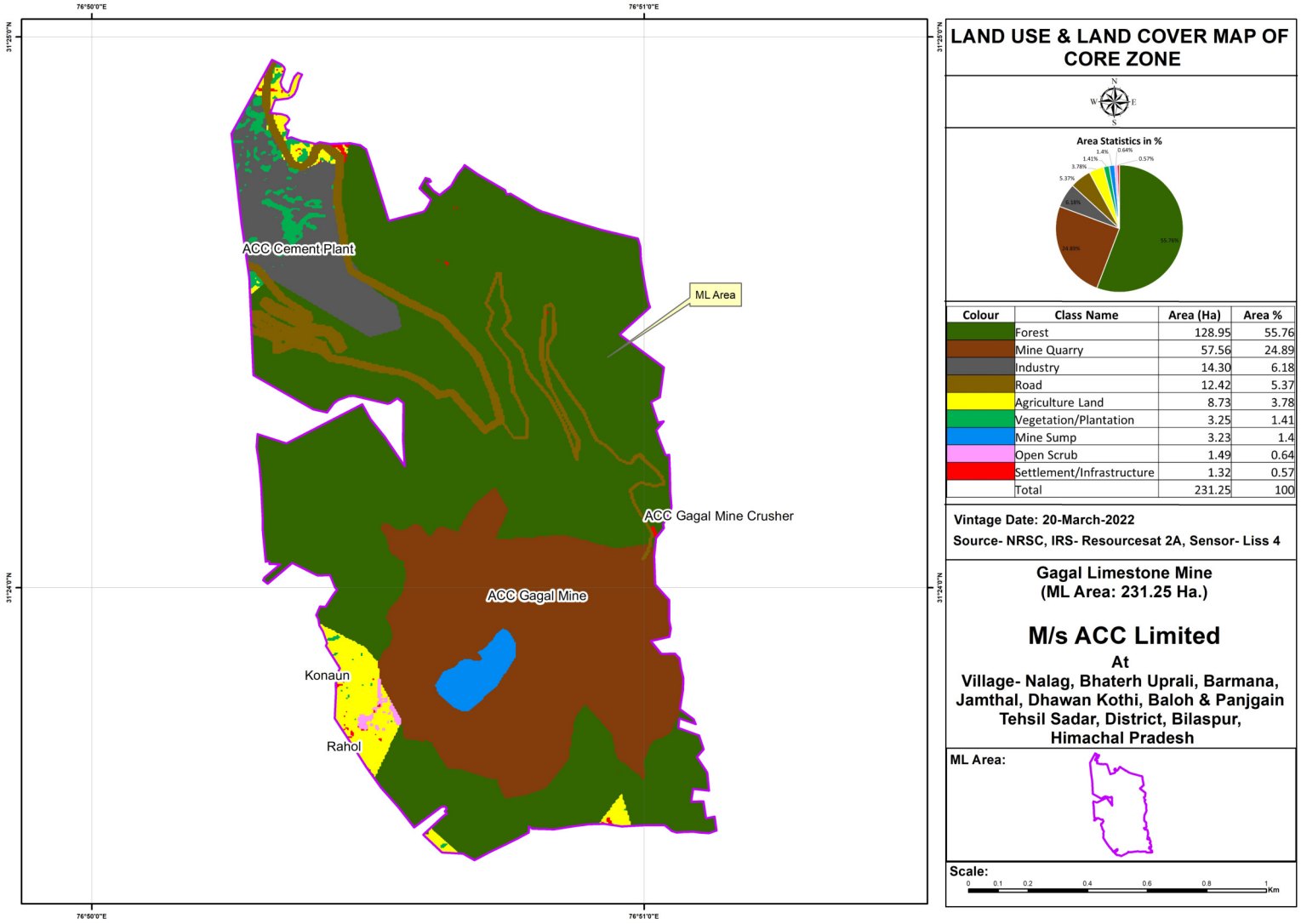
- ***Error Fixing / Reclassification***

  Reclassification of Land Use classes was done on the basis of data collected / verified during ground truthing.

- ***Final Map Generation***

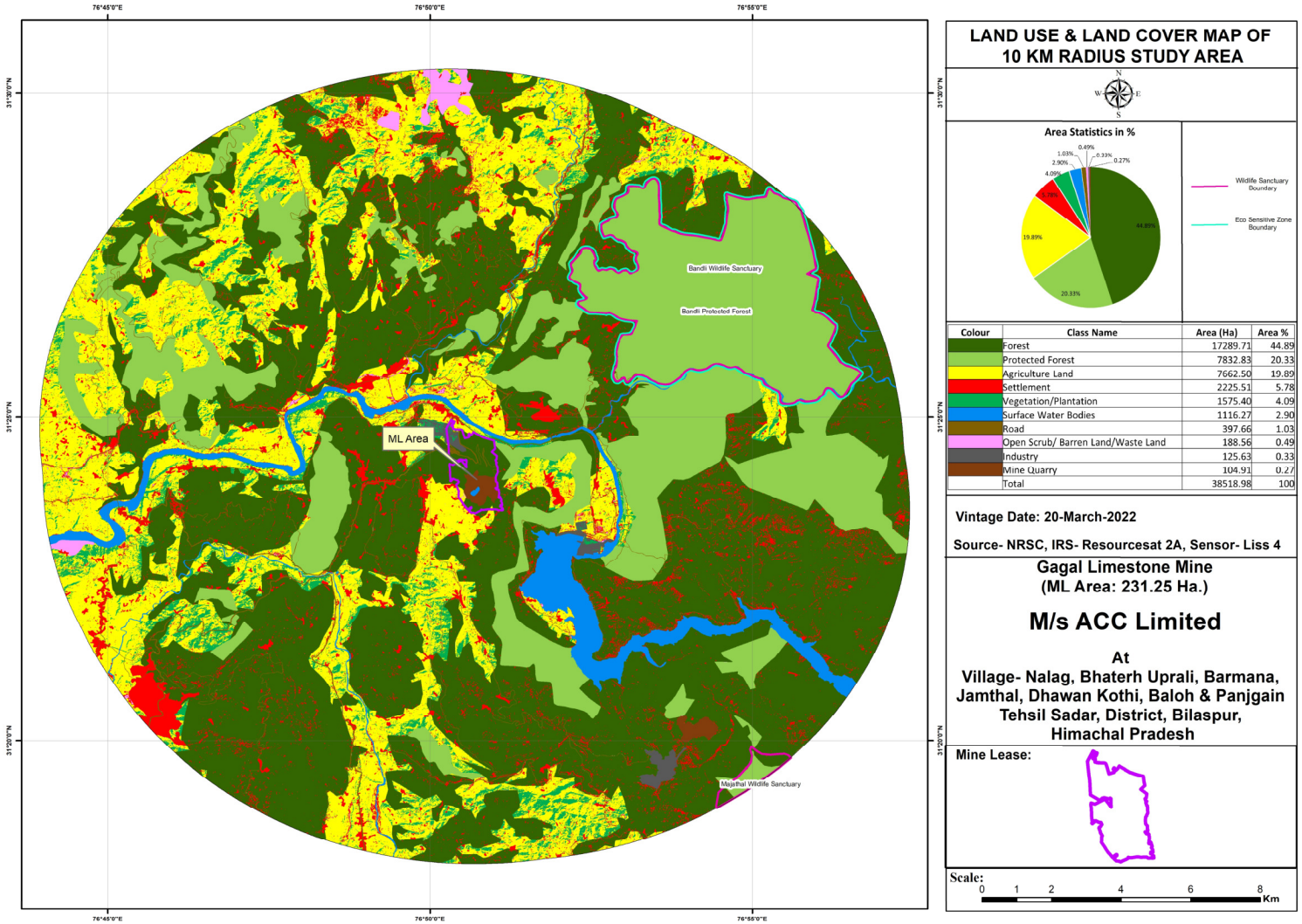
  Final maps are generated for the core area as well as Buffer area. 3 Pixels are Filtered using Clump and Eliminate Process after ensuring to maintain crucial classes of importance. Base map layers are overlaid on the classified raster data and then thematic maps are generated on the layout consisting of Project name, legend, source of data, Index map, scale bar and North arrow.

3.4.4 LAND USE / LAND COVER



Colour	Class Name	Area (Ha)	Area %
	Forest	128.95	55.76
	Mine Quarry	57.56	24.89
	Industry	14.30	6.18
	Road	12.42	5.37
	Agriculture Land	8.73	3.78
	Vegetation/Plantation	3.25	1.41
	Mine Sump	3.23	1.4
	Open Scrub	1.49	0.64
	Settlement/Infrastructure	1.32	0.57
	Total	231.25	100

Figure 3.4: Land Use / /Land Cover Map of the Core Zone



Source: *Satellite Image & NRSC, IRS-Resourcesat 2A, Sensor-Liss 4*

Figure 3.5: Land Use / /Land Cover Map of the Study Area

The land use and land cover details of the Study area are given in Table - 3.3.

Table - 3.3

Land Use / Land Cover Details of Study Area

S. No.	Legend	Area (in ha)	Area (in %)
1.	Forest	17289.71	44.89
2.	Protected Forest	7832.83	20.33
3.	Agriculture Land	7662.50	19.89
4.	Settlement	2225.51	5.78
5.	Vegetation/ Plantation	1575.40	4.09
6.	Surface Water Bodies	1116.27	2.90
7.	Road	397.66	1.03
8.	Open Scrub/ Barren Land/ Waste Land	188.56	0.49
9.	Industry	125.63	0.33
10.	Mine Quarry	104.91	0.27
Total		**38518.98**	**100**

Source: *LU/LC Map for Buffer Zone*

3.4.5 INTERPRETATION OF THE LAND USE/LAND COVER STUDY

- The study area mainly comprises of Forest and Protected Forest i.e. 65.22% (44.89% + 20.33%), 19.89 % of area comprises of Agricultural Land.
- Built up area is represented by human settlements (5.78%) and industries (0.33%).
- There is no National Park, Biosphere Reserve etc. within 10 km radius of study area. Bandli Wildlife Sanctuary is located within 3.55 km in East direction and it's ESZ is located in ~2.54 km in East direction.
- Eco sensitive zone and Boundary of Majathal Wildlife Sanctuary ~10.05 km in SE direction.
- There are 31 Reserved Forest and Protected Forest present within 10 km study srea.
- Mining area comprises of active quarries (0.27%). These are captive mines and present near the industries that are in turn contributing to the development of that area.

3.5 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.

Approx. 59 % of the land area of India is vulnerable to seismic hazard damage. In India, seismic zones are divided into four zones i.e. V, IV, III and II. Details of the seismic zones are given in below Table.

Table - 3.4
Seismic Zones in India

S. No.	Seismic Zone	Risk	Intensity of Earthquake (o=n Mercalli Intensity Scale)
1	Zone – V	Very High Risk Zone	IX and above
2	Zone – IV	High Risk Zone	VIII
3	Zone – III	Moderate Risk Zone	VII
4	Zone – II	Low Risk Zone	VI and below

Source: *www.ndma.gov.in/images/guidelines/earthquakes.pdf*

As per the BIS seismic zonation map, Himachal Pradesh falls in Zone IV and V. And five districts, namely Chamba (53.2%) Hamirpur (90.9%), Kangra (98.6%), Kullu (53.1%), Mandi (97.4%) have 53 to 98.6 percent of their area liable to the severest design intensity of MSK IX or more, the remaining area of these districts being liable to the next severe intensity VIII. Two districts, Bilaspur (25.3%) and Una (37.0%) also have substantial area in MSK IX and rest in MSK VIII. The remaining districts also are liable to intensity VIII.Besides, the earthquake, the people of HP are also affected by landslides, avalanches, flash floods, floods, fires – domestic and wild, and droughts. Monsoon season brings all the hazards associated with it such as cloud burst, flash floods, landslides etc. There is huge loss of life and property every year.

From seismicity point of view, the state of Himachal Pradesh which forms a part of NW Himalayas is very sensitive. During the last century the state has been shaken by a number of micro as well as macro earthquakes. A number of damaging earthquakes has struck the state and the adjoining parts of Punjab,U.P.and J& K. Some of the prominent earthquakes that rocked the state are Kangra earthquake 1905(M=8.0) in which 18,815 people were killed, Kinnaur earthquake 1975 (M=6.7) in which 60 people lost their lives and Dharamshala earthquake 1986 (M5.7). Besides these major earthquakes the state has been rocked by about 250 earthquakes with magnitude 4.0 and 62 earthquakes with magnitude more than 5.0 . As per the earthquake hazard map of state , the areas falling in districts Chamba, Kangra, Mandi, Kullu, Hamirpur Bilaspur are very sensitive as they fall in Very High Damage Risk Zone (MSK IX or More) i. e. Zone V, where as the rest of the areas falls in High Damage Risk Zone (MSK VIII). Some of the major devastating earthquake that have rocked the state during the last century are as per table below.

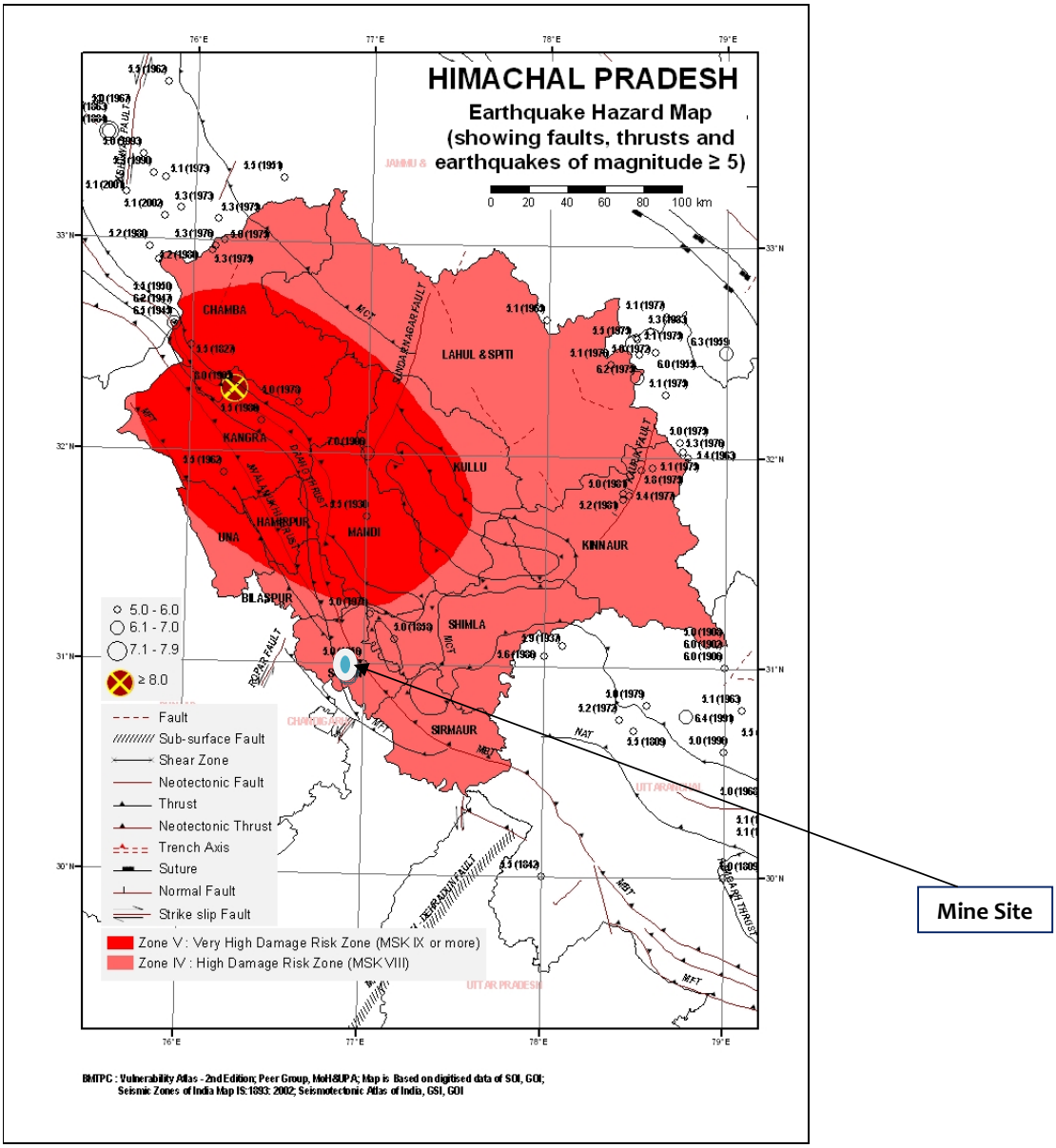
The project site as well as study area lies in Zone-V of Seismic Zoning Map of India, updated by India Metrological Department (IMD) and National Institute of Disaster Management (NIDM), and thus can be said to be located in an area of Moderate Risk Zone by national standards.

Most Severe earthquakes in Himachal Pradesh

Date	Locations Affected	Magnitude	Damage
4th April 1905	Kangra	7.8	20,000 people died 53,000 domestic animals perished 1,00,000 houses destroyed Economic cost of recovery 2.9 million rupees
1st June 1945	Chamba	6.5	NA
19th January, 1975	Kinnaur	6.8	60 people died

			100 badly injured 2000 dwellings devastated 2500 people rendered homeless
26th April 1986	Dharamshala	5.5	6 people died Extensive damage to buildings Loss estimated at 65 crore
1st April 1994	Chamba	4.5	
24th Dec 1995	Chamba	4.9	Fearsome shaking More than 70% houses developed cracks
29th July 1997	Sundernagar	5	Damage to about 1000 houses

***Source**: http://hpenvis.nic.in/Database/HazardProfileofState_4178.aspx?format=Print*



***Source:** https://hp.gov.in/hpsdma/ProfileOfState/HazardProfile.html*

Figure 3.6: GSHAP Hazard map of Himachal Pradesh

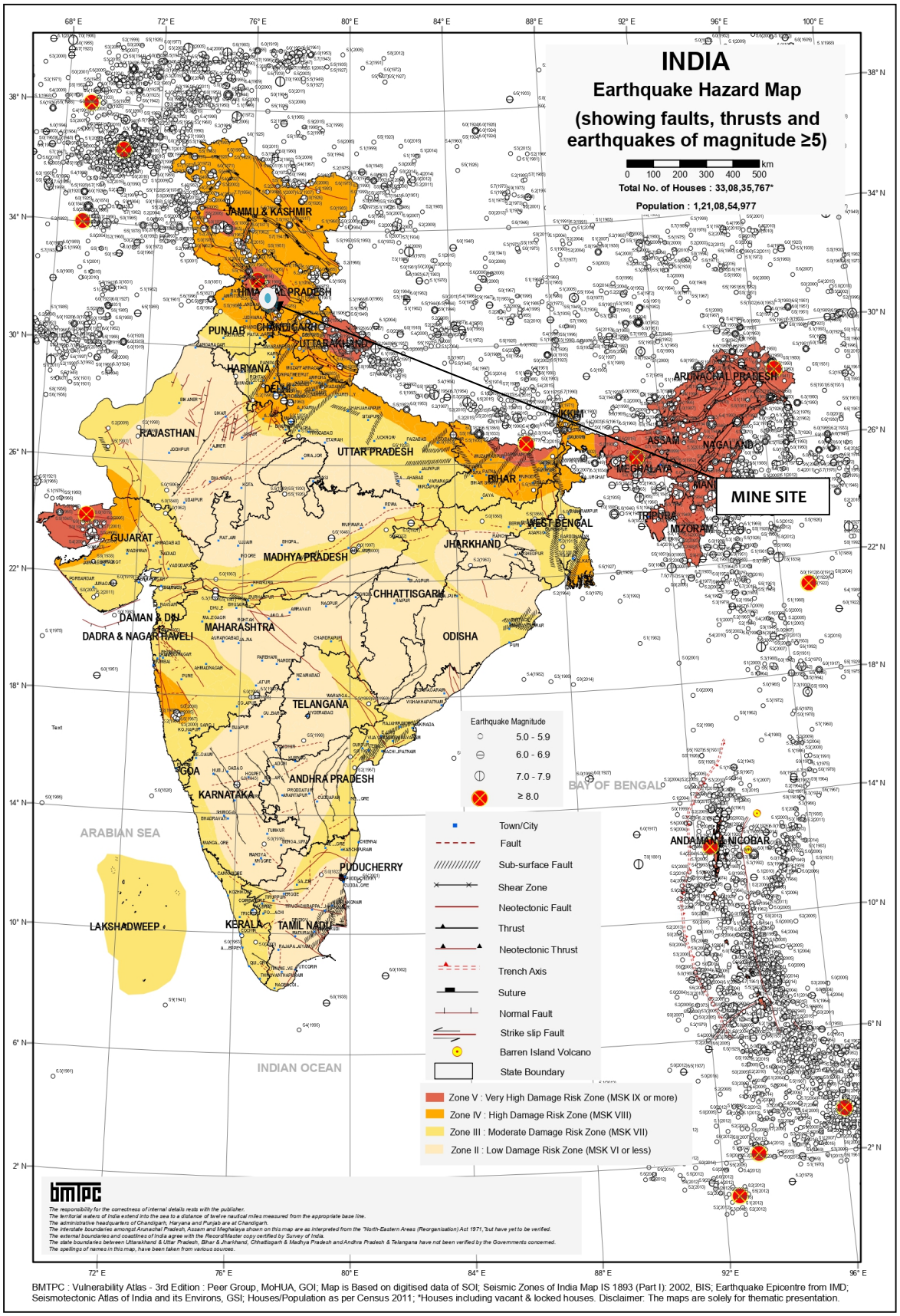
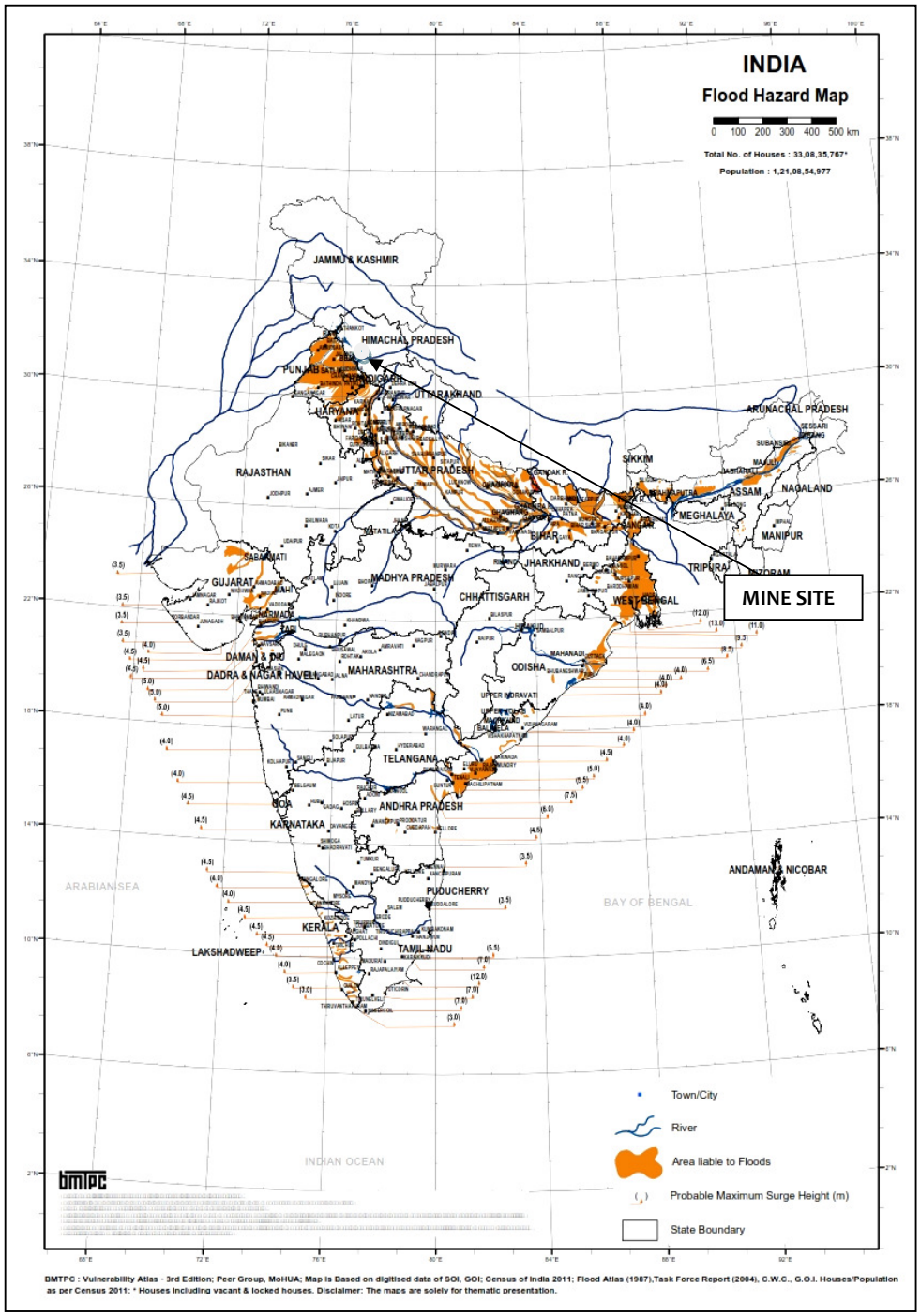


Figure: 3.7 Seismic Zone Map Showing Mine Site falls in Zone V

3.6 FLOOD HAZARD ZONATION OF THE AREA

As per the "Vulnerability Atlas-2nd Edition; Peer Group, Ministry of Housing (MoH) and UPA (Urban Povery Alleviation); based on digitized data of SOI, GOI; Flood Atlas, Task Force Report, C.W.C., GOI" the mine site does not fall under "area liable to flood". Flood Hazard Zonation Map showing the mine site is given in Figure - 3.6.



Source: *https://hp.gov.in/hpsdma/ProfileOfState/HazardProfile.html*

Figure: 3.8 Flood Hazard Zonation Map of the Area

3.7 TOPOGRAPHY & DRAINAGE PATTERN

Topography

The area for mining lease forms part of the lesser Himalayan ranges, which are characterized by extremely rugged topography comprising of high peaks, steep slopes and deep incised valleys. No flat plain except on the top of the bhaga block is seen in and around the area of mining lease. The mountain that hosts the limestone deposit gains its elevation from the banks of river Satluj that meanders between inter mountainous valleys and the recorded elevation at River Satluj is 610 mRL. The lease area falls in the Himalayan hill ranges of Himachal Pradesh and is dominated by mountainous terrain with its landscape shaped in the Quaternary period by glacial and fluvial activities. It displays prominent relief characterized by lofty mountains and deep valleys with gradual blending of different forms of relief and slopes.

Drainage Pattern

The drainage pattern of this area is of dendritic type and the gullies formed out of drainage extends over all the flanks and converging joints in different places in different khads. The Eastern and southern slopes of the mining lease are drained by nala passing through Dhaun Kothi and Baloh villages joining Ali khad near Deoli (5 Km) which later joins Sutlej River at a distance of about 14 KM. The northern and north eastern slopes are drained by a nala passing through Khaterh village which later joins Sutlej at a distance of 2 km. Western drainage is locally controlled by Sutlej River through nalas directly joining it. There are number of series and parallel check dams made at the bottom of the mines to prevent silt and water to enter the village and nala.

There is Perennial River Sutlej in prominent drainage and other streamlets namely are Bhairari Khad, Seri Khad, Manwal Khad, are in the study area. It is drained by some natural 1st, 2nd, 3rd and 4th order streams only. These streams are sub-dendritic, trellis, Radial in pattern and are seasonal in nature.

3.8 CLIMATE AND RAINFALL

The climate of this region is characterized by severe winter with temperature dipping as low as 3^{o}C. January and February are the coldest months during the year whereas in the summer, the temperature rises up to 44^{o}C, June being the hottest month. The area receives precipitation in the form of rainfall mainly during the monsoon period from July to September. The average annual rainfall in the area is about 1302.34 mm with 55 to 75 average rainy days.

Table - 3.5
Rainfall data for last 11 years

S.No	Year	Rainfall (mm)	S.No	Year	Rainfall (mm)
1	2012	997.91	7	2018	1551.89
2	2013	1286.12	8	2019	1443.04
3	2014	1330.99	9	2020	1178.59
4	2015	1513.12	10	2021	1059.8
5	2016	1258	11	2022	1208.59
6	2017	1497.64	**Average Rainfall (mm)**		**1302.34**

Source: *IMD (WRIS)*

3.9 LIST OF INDUSTRIES / MINES IN STUDY AREA

The list of existing industries and mines in the 10 km radius of the mine site is summarized in the table given below:

Table - 3.6
List of industries/ Mines in Study Area

S. No.	Name of the Industry	Type of Industry	Approx. Distance and direction from Mine site
1	M/s. ACC Limited	Cement Plant	Adjacent Part within ML
2	M/s. Ultra Tech Cement Limited	Cement Plant	~8.5 km in SSE direction
3	Baga Bhalag Limestone Mine (M/s. UTCL)	Limestone Mine	~8.0 km in SSE direction
4	Kol Dam Hydro Power Project (NTPC)	Hydro Power	~2.5 km in ESE direction

3.10 METEOROLOGY

Meteorology plays a vital role in determining the transport and diffusion pattern of air pollutants released into atmosphere. The principal variables include horizontal convective transport (average wind speed and direction), vertical convective transport (atmospheric stability) and topography of the area.

Meteorological characteristics of an area are very much important in assessing possible environmental impacts and in preparing environmental management plan.

Since meteorological factors show wide fluctuations with time, meaningful interpretation can be drawn only from long-term reliable data. Such source of data is India Meteorological Department (IMD), which maintains a network of meteorological stations at several important locations.

The nearest IMD stations to the mine site is located in Sundernagar (~12.0 km in NNE direction). Based on the previous IMD data [Climatological Normals (1981-2010)], the pre-dominant wind direction (seasonal as well as annual) was considered. As per the data, pre-dominant wind direction throughtout year was observed from South West, according to which, the locations for ambient air quality monitoring were selected. Seasonal windrose prepared based on secondary meteorological data obtained for Sundernagar (Figure 3.9) is given as under.

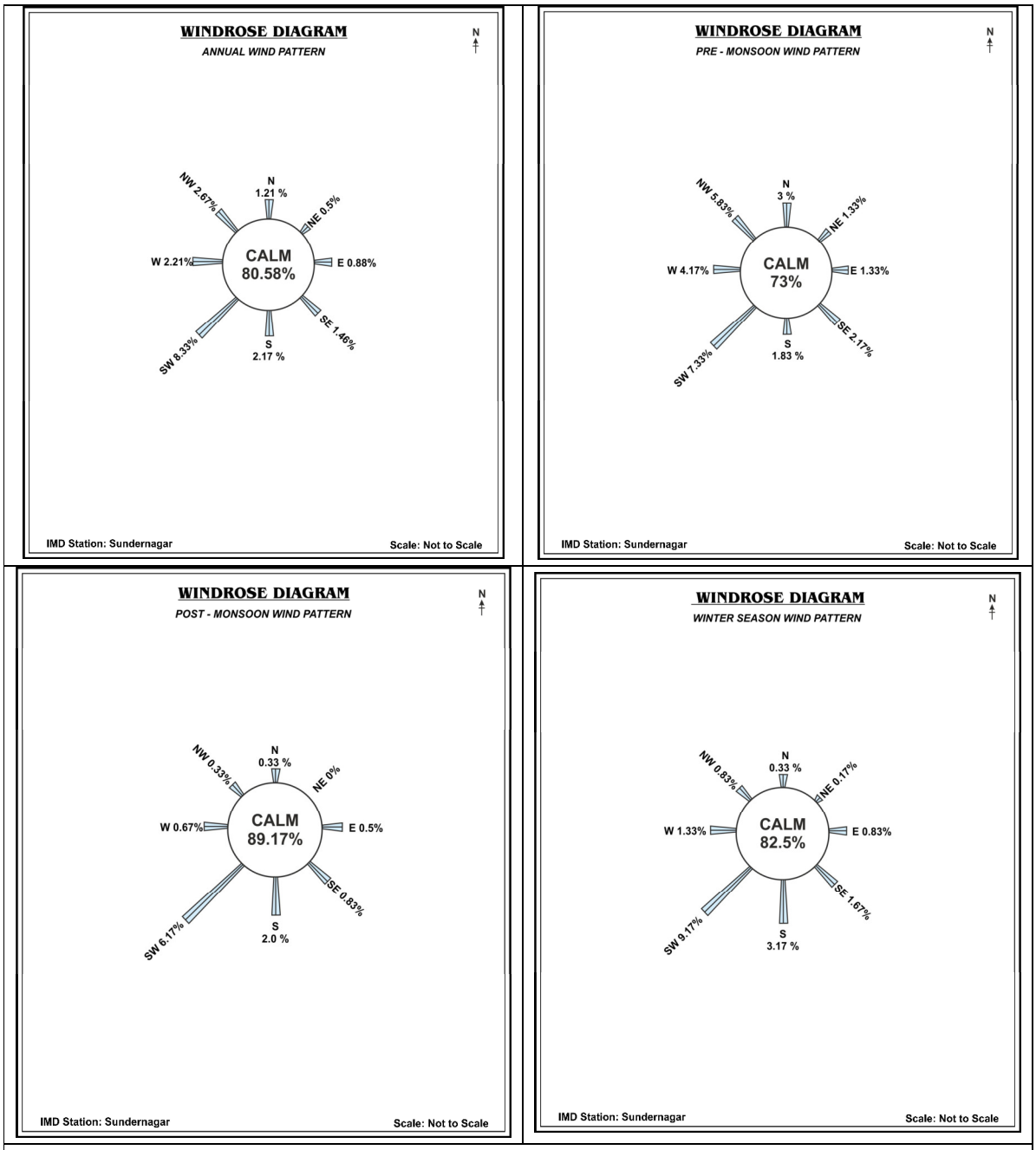


Figure 3.9: Windrose Diagram for Sundernagar
As per Climatological Normals (1981-2010)

3.10.1 METEOROLOGY AT SITE

Meteorological station was set-up at site to record meteorological parameters like wind speed, wind direction etc. during Post Monsoon Season (Oct to Dec, 2022) which has enabled 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 were calculated and plotted as wind rose diagrams. Maximum and minimum temperatures including percentage relative humidity were also recorded simultaneously.

It was observed that the predominant over all wind patterns for the study period was from South West direction. Summary of the meteorology at site is given in Table - 3.7.

Table - 3.7

Meteorology at Site

Study Period: Post Monsoon Season (Oct to Dec, 2022)

Month	Temperature (°C)		Relative Humidity (%)		Wind Speed (m/s)	
	Max.	Min.	Max.	Min.	Max.	Min.
Oct, 2022	28.33	10.72	99.88	16.19	5.48	0.12
Nov, 2022	22.19	8.35	75.94	23.38	5.32	0.15
Dec, 2022	21.12	0.72	88.94	16.19	5.46	0.17

Source: *Meteorological Station at Site*

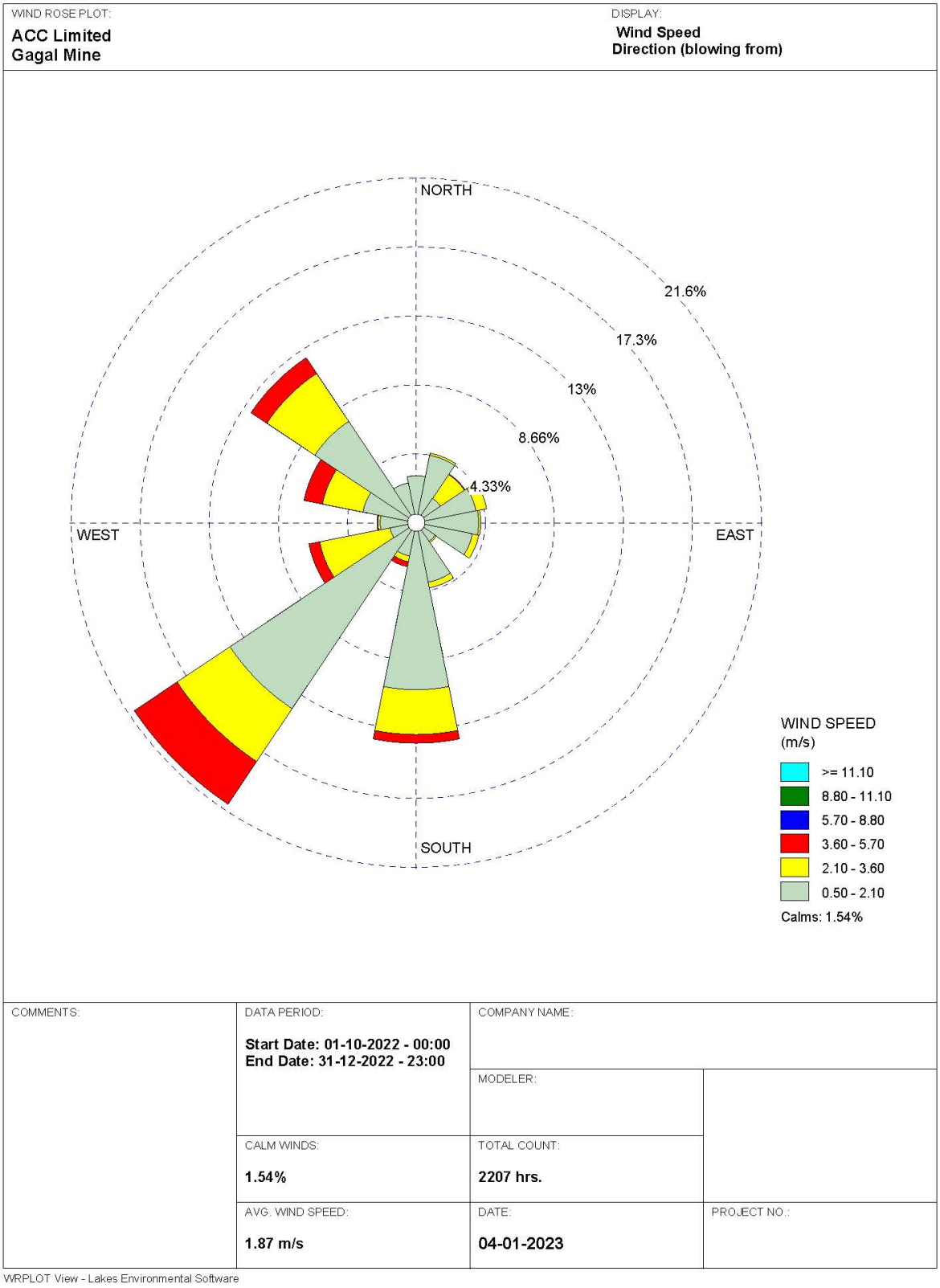


Figure 3.10: Primary Windrose Diagram for Sundernagar Post Monsoon Season (Oct to Dec, 2022)

3.11 AMBIENT AIR ENVIRONMENT

Ambient air quality monitoring has been carried out within the study area to determine the baseline concentration of various air pollutants in the ambient air. The ambient air quality depends upon the emission sources, meteorological conditions and the background concentration of specific pollutants and it helps in providing a data base for predicting impact on the surrounding area due to the project activity. It will also be useful in ascertaining the quality of air environment in conformity to standards of the ambient air quality during operation phase of project.

Monitoring schedule

Air quality monitoring has been carried out at 09 locations for 24 hours (twice a week) for three months (26 observations for one location).

Parameters monitored are:

- Sulphur Dioxide (SO_2)
- Nitrogen dioxide (NO_2)
- Particulate Matter (PM_{10} and $PM_{2.5}$)
- Carbon Monoxide (CO) & Benzene were monitored once in the study period

The sources of air pollution in the region are dust rising from unpaved roads, domestic fuel burning, vehicular traffic, mining activities, crusher and cement plant located near by.

Table - 3.8

Details of Test Procedures

S. No.	Parameters	Test Method Specification against which tests are performed	Range of testing	Limit of detection	Equipment used for monitoring	
					Equipment required for Sampling	Equipment required for Analysis
1.	Sulphur Dioxide (SO_2)	IS: 5182, (P-2), 2001 Reaffirmed 2017	5 µg/m³ to 1050 µg/m³	5 µg/m³	Respirable dust sampler/Low flow Pump	UV spectrophotometer
2.	Nitrogen Dioxide (NO_2)	IS: 5182, (P-6), 2006 Reaffirmed 2017	5 µg/m³ to 750 µg/m³	5 µg/m³	Respirable dust sampler/Low flow Pump	UV spectrophotometer
3.	Particulate Matter (PM_{10})	IS: 5182, (P-23), 2006 Reaffirmed 2017	10 µg/m³ to 1000 µg/m³	10 µg/m³	Respirable dust sampler,	Desiccator, high accuracy weighing balance
4.	Particulate Matter ($PM_{2.5}$)	JMELPL/STOP/03 (Issue Date – 09.11.2017)	10 µg/m³ to 500 µg/m³	10 µg/m³	Fine Particulate sampler	Desiccator, high accuracy weighing balance
5.	Carbon Monoxide (CO)	IS: 5182, (P-10), 1999 Reaffirmed 2014	0.5 mg/m³ to 50 mg/m³	0.5 mg/m³	Sampling in Tedlar Bag with low flow pump	Gas chromatography with detector (FID)
6.	*Benzene	IS:5182, (P-11):2006	1 µg/m³	1 µg/m³	Sampling in Charcoal	Gas

		Reaffirmed 2017	to 100 µg/m³		tube with low flow pump,	chromatography with detector (FID)
7.	*Benzo (a) pyrene (BaP) particulate Phase Only	IS:5182, (P-12):2004 Reaffirmed 2014	0.5 ng/m³ to 2000 ng/m³	0.5 ng/m³	Sampling in Charcoal tube with low flow pump,	Gas chromatography with detector (FID)
8.	Arsenic	IS:5182 (Part-22) 2004 Reaffirmed 2014/CPCB Guidelines	0.5 ng/m³ to 100 ng/m³	0.5 ng/m³	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy
9.	Nickel	IS:5182 (Part-22) 1979/2004 Reaffirmed 2014/CPCB Guidelines	1 ng/m³ to 100 ng/m³	1 ng/m³	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy
10.	Lead	IS:5182 (Part-22) 2004 Reaffirmed 2014	0.02 µg/m³ to 50 µg/m³	0.02 µg/m³	Respirable dust sampler with EPM filter paper	Atomic absorption spectroscopy
11.	Ozone	IS:5182 (Part-9) 1974 Reaffirmed 2014	1.0 µg/m³ to 200 µg/m³	1.0 µg/m³	Respirable dust sampler/Low flow Pump	UV spectrophotometer
12.	Ammonia	Method of Air Sampling & Analysis (3rd Edition – 1988)	1 µg/m³ to 400 µg/m³	1 µg/m³	Respirable dust sampler/Low flow Pump	UV spectrophotometer

Note: *- Parameter not covered in our NABL scope.
Protocol Used: *CPCB Guidelines/IS-5182*
RDS: *Respirable Dust Sampler*
FPS: *Fine Particulate Sampler*

Sampling Locations

Sampling locations were selected for AAQ Monitoring keeping in view the pre-dominant wind direction prevailing in the area based on the previous IMD source.

Monitoring stations selected for Ambient Air Quality Monitoring during the study period are given in table- 3.9:

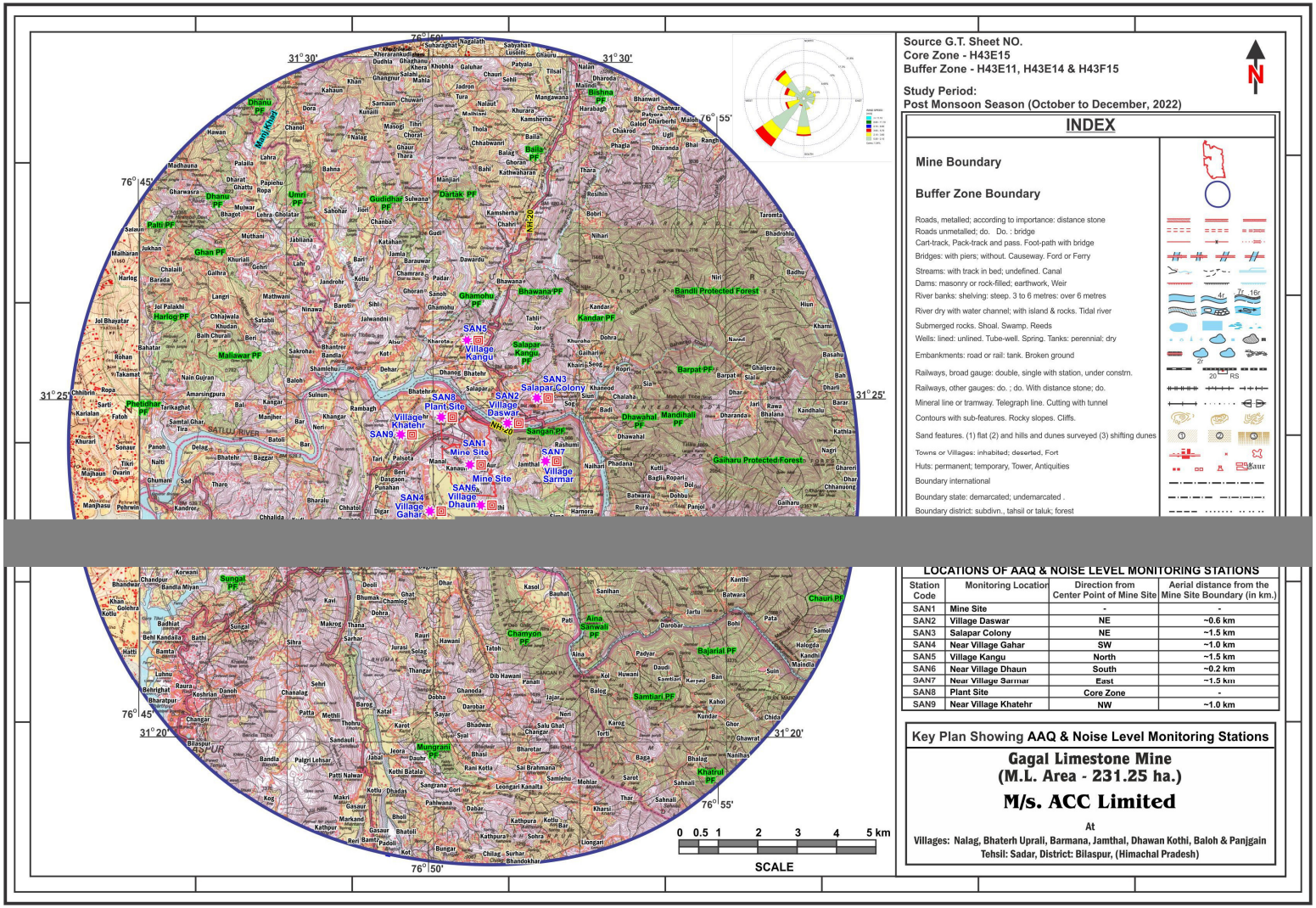
Table - 3.9

Locations of Ambient Air Quality Monitoring Stations

Study Period: Post Monsoon Season (Oct to Dec, 2022)

Station code	Sampling Location	Approx. Aerial distance from Mine Site Direction from centre	Selection Criteria
SA1	Mine Site	Core Zone	Core Zone
SA2	Daswar village	~600m in NE direction	• ~500 m in downwind of pre dominant wind • Habitation in Study area • Nearby to RF
SA3	Salapar Colony	~1.5 km in NE direction	• Downwind of predominant wind • Habitation in Study area
SA4	Near Village Gahar	~1.0 km in SW direction	• Upwind of Dominant wind direction • Habitation in Study area
SA5	Kangu village	~1.5 km in North direction	• Downwind of crosswind • Habitation in Study area • Near to temple
SA6	Near Dhaun Village	~200 m in South direction	• Upwind of Crosswind • Habitation in Study area
SA7	Near Sarmar Village	~1.5 km in East direction	• Habitation in Study area • Near PF
SA8	Plant Site	Core Zone	• Plant Site within ML Area
SA9	Near Khatehr Village	~1.0 km in NW direction	• Habitation in Study area • Near NH 154

The photograph of monitoring stations & sampling locations is incorporated **Annexure XVI** with this Draft EIA/EMP Report.



Source: *SOI Toposheet and field Survey*

Figure 3.11: Key Plan showing Ambient Air Quality & Noise Level Monitoring Locations

Ambient Air Quality Monitoring

Table - 3.10 (A) & (B) shows the maximum and minimum concentration of the air pollutants monitored at different locations (as mentioned in Table: 3.8) during the study period. All 26 observations of pollutants for each location are detailed in Ambient Air Quality Monitoring Tables enclosed as ***Annexure XVII*** along with this Draft EIA/EMP Report. Monitoring results are given as under:

Table - 3.10 (A)

Ambient Air Quality Monitoring Results

Study Period: Post Monsoon Season (Oct to Dec, 2022)

Station Code	Monitoring Location	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		NO_2 (µg/m³)		SO_2 (µg/m³)		CO (mg/m³)	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
SA1	Mine Site	44.6	37.2	76.9	67.6	23.8	17.9	11.7	8.8	0.65	0.56
SA2	Daswar village	38.4	31.4	65.1	57.2	19.3	14.8	9.8	7.1	BDL	BDL
SA3	Salapar Colony	27.9	22.4	50.7	42.8	14.2	11.2	6.7	5.4	BDL	BDL
SA4	Near Village Gahar	33.4	26.0	57.5	48.4	17.3	13.4	7.9	6.5	0.59	0.54
SA5	Kangu village	38.6	29.8	62.3	53.7	16.8	12.7	8.2	5.9	BDL	BDL
SA6	Near Dhaun Village	37.4	28.7	66.7	57.2	19.3	14.5	9.5	7.5	BDL	BDL
SA7	Near Sarmar Village	33.9	24.8	58.4	49.3	18.7	13.9	6.9	5.6	BDL	BDL
SA8	Plant Site	42.4	32.6	78.1	71.6	24.1	18.5	11.8	9.4	0.72	0.65
SA9	Near Khatehr Village	31.8	24.8	62.4	52.6	19	14.7	9.3	7.5	0.61	0.53
NAAQS*		**60**		**100**		**80**		**80**		**04**	

Table - 3.10 (B)

Ambient Air Quality Monitoring Results

Station Code	Monitoring Location	Parameters						
		Ozone (O3) (µg/m³)	Lead (Pb) (µg/m³)	Ammonia (NH3) (µg/m³)	Benzene (C6H6) (µg/m³)	Benzo(a)pyrene (BaP)-Particulate phase only (ng/m³)	Arsenic (As) (ng/m³)	Nickel (Ni) (ng/m³)
SA1	Mine Site	24.9	BDL	28.1	BDL	BDL	BDL	BDL
SA2	Daswar village	20.2	BDL	22.7	BDL	BDL	BDL	BDL
SA3	Salapar Colony	14.9	BDL	16.7	BDL	BDL	BDL	BDL
SA4	Near Village Gahar	18.1	BDL	20.3	BDL	BDL	BDL	BDL
SA5	Kangu village	17.7	BDL	19.8	BDL	BDL	BDL	BDL
SA6	Near Dhaun Village	20.3	BDL	22.8	BDL	BDL	BDL	BDL
SA7	Near Sarmar Village	19.6	BDL	21.9	BDL	BDL	BDL	BDL
SA8	Plant Site	25.3	0.15	28.4	BDL	BDL	BDL	BDL
SA9	Near Khatehr Village	20	BDL	22.4	BDL	BDL	BDL	2.52
NAAQS*		180	1	400	5	1	6	20

BDL - Below Detectable Limit, Detection Limit of CO = 0.5 mg/m³

Source: Ambient Air Quality Monitoring Results from JM EnviroLab Pvt. Ltd.

**NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009*

3.11.1 NATIONAL AMBIENT AIR QUALITY STANDARDS

Table - 3.11 shows the NAAQS prescribed by CPCB.

Table - 3.11
National Ambient Air Quality Standards

S. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		Method of Measurement
			Industrial Area, Residential Rural and Other Areas	Ecologically Sensitive Area (Notified by Central Govt.)	
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO_2), µg/m³	Annual Average * 24 hours **	50 80	20 80	1. Improved West and Gaeke Method. 2. Ultraviolet fluorescence.
2	Oxides of Nitrogen as NO_2, µg/m³	Annual Average * 24 hours **	40 80	30 80	1. Modified Jacob andHochheiser (Na-Arsenite) Method. 2. Chemiluminescence (Gas phase).
3	Particulate Matter (size less than 10 µm) or PM_{10}, µg/m³	Annual Average * 24 Hours **	60 100	60 100	1. Gravimetric, 2. TOEM, 3. Beta attenuation.
4	Particulate Matter (size less than 2.5 µm) or $PM_{2.5}$, µg/m³	Annual Average* 24 Hours **	40 60	40 60	1. Gravimetric, 2. TOEM, 3. Beta attenuation
5	Ozone (O_3), µg/m³	8 Hours ** 1 Hours *	100 180	100 180	1. UV Photometric, 2. Chemilminescence, 3. Chemical Method.
6	Lead (Pb), µg/m³	Annual Average * 24 Hours **	0.50 1.0	0.50 1.0	1. AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper. 2. ED-XRF using Teflon filter.
7	Carbon Monoxide (CO), mg/m³	8 Hours** 1 Hours	02 04	02 04	Non Depressive Infrared (NDIR) Spectroscopy.
8	Ammonia (NH_3), µg/m³	Annual Average* 24 hours **	100 400	100 400	1. Chemiluminescence (Gas phase). 2. Indophenol blue method.
9	Benzene (C_6H_6), µg/m³	Annual Average*	05	05	1. Gas Chromatography based continuous analyzer, 2. Adsorption and Desorption followed by GC analysis.

10	Benzo (α) Pyrene (BaP)-Particulate Phase only, ng/m^3	Annual Average*	01	01	Solvent extraction followed by HPLC'GC analysis.
11	Arsenic (As), ng/m^3	Annual Average*	06	06	AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper.
12	Nickel (Ni), ng/m^3	Annual Average*	20	20	AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper.

* 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.

Note: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it was considered as adequate reason to institute regular or continuous monitoring and investigation.

3.11.1.1 INTERPRETATON OF AAQM RESULTS

Ambient Air Quality Monitoring results reveals that the concentrations of PM10 and PM2.5 for all the 9 AAQM stations were found between 42.8 to78.1 µg/m^3 and 22.4 to 44.6 µg/m^3 respectively.

As far as the gaseous pollutants SO2 and NOx are concerned, the prescribed CPCB limit of 80 µg/m^3 has never surpassed at any station. The concentrations of SO2 and NO2 were found to be in range from 5.4 to 11.8 µg/m^3 and 11.2 to 24.1 µg/m^3 respectively. CO concentration was found to be in range of BDL mg/m^3 to 0.72 mg/m^3.

The concentration of Ozone was found to be in the range of 14.9 to 25.3 µg/m^3 which is well below the standards i.e. 180 µg/m^3 whereas Ammonia was found 16.7 to 28.4 µg/m^3 which is well below the standards i.e. 400 µg/m^3.

AAQ parameters in the study area have been found well within prescribed limits of NAAQS at Mines, Plant & its periphery. Minimum results were found at village Salapar Village as there is no major source of air pollution and valley/hills are in between the Mine site and the village.

Detailed Mineralogiacl and chemical composition is enclosed as **Annexure XXV** with this Draft EIA/EMP Report

3.12 NOISE ENVIRONMENT

Noise is often defined as unwanted sound, interferes with speech communication, causes annoyance, distracts from work and disturbs sleep; thus deteriorating quality of human environment.

Source of Noise

There are several sources of noise in the 10 km radius study area, which contributes to the local noise level of the area. Ambient noise sources in the vicinity of the project include the noise due to operating mine, plant, traffic on road, human activities in villages and agricultural fields.

Sampling Schedule

Noise level monitoring was carried out at 9 locations during the day and night time once in the study period. Locations / stations selected for noise level monitoring are given in table – 3.9.

Ambient Noise Level Monitoring

Ambient noise levels monitoring results monitored at different locations (as mentioned in Table – 3.9) during the study period are given in table – 3.12.

Table – 3.12
Ambient Noise Level Monitoring Results
Study Period: Post Monsoon Season (Oct to Dec, 2022)

Station code	Monitoring Location	Noise Levels dB Leq (A)	
		Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 6:00 am)
SN1	Mine Site	62.3	48.9
SN2	Daswar village	51.7	41.6
SN3	Salapar Colony	52.8	42.0
SN4	Near Village Gahar	53.1	42.7
SN5	Kangu village	53.4	42.9
SN6	Near Dhaun Village	52.2	41.6
SN7	Near Sarmar Village	51.9	41.8
SN8	Plant Site	65.2	50.4
SN9	Near Khatehr Village	53.2	43.5

Source: *Ambient Noise Level Monitoring*

CPCB Noise Standards are given in Table - 3.13.

Table - 3.13
CPCB Noise Standards

Area Code	Category of Area	Limits in Leq. dB (A)	
		Day Time (06.00 am–10.00 pm)	Night Time (10.00 pm–6.00 am)
(A)	Industrial Area	75	70
(B)	Commercial Area	65	55
(C)	Residential Area	55	45
(D)	Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.
2. Night Time is reckoned between 10.00 PM to 6.00 AM.
3. Silence Zone is defined as an area up to 100m around premises of Hospitals, Educational Institutions and Courts. Use of vehicle horn, loudspeaker and bursting of crackers is banned in these zones.
Note: *Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply.*

Source: *Central Pollution Control Board Norms*

3.12.1 INTERPRETATON OF NOISE RESULTS

Ambient noise levels were measured at 9 locations in and around the mine site. Noise levels varied from 51.7 to 65.2 Leq dB (A) during day time and from 41.6 to 50.4 Leq dB (A) during night time.

Maximum noise levels during day & night time were observed at existing Plant Site due to operational manufacturing of cement activities. Whereas, the minimum noise level during day time was found at Daswar Village.

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.

3.13 WATER ENVIRONMENT

(A) **Type of sampling**

Grab sampling has been done as single sample collected at a specific spot and at a site over a short period of time, grab samples are taken at a single selected location, depth and time.

(b) **Sampling method**

Sample were collected manually from various type of sampling location by method described below-

Surface Water: The samples were collected from various sources.

Drinking Water/Ground water: samples have been collected from handpump/ borewells in the study area.

3.13.1 SURFACE WATER QUALITY

Surface water samples was collected from Sutlej River, Khads and Pond to know the surface water quality of the area. The various sampling locations are listed inthe table below:

Table – 3.14

Surface Water Sampling Locations

Study Period: Post Monsoon Season (Oct to Dec, 2022)

Station code	Sampling Stations	Distance & Direction
SW1	Mine Site	Core Zone
SW2	Sutlej River	~200m in North direction
SW3	Ali Khad	~4.0 km in SW direction
SW4	Bahna Khad	~4.0 km in NW direction
SW5	Suin Khad	~5.0 km in ESE direction
SW6	Manwal Khad	~8.5 km in Se direction
SW7	Bahairari Khad	~4.5 km in NE direction
SW8	Seri Khad	~7.5 km in East direction
SW9	Govind Sagar	~9.0 km in West direction

***** 3 Sampling locations namely Rao or Jal Khad, Bumka Nala and Manj Khad were found to be dry as they were seasonal.

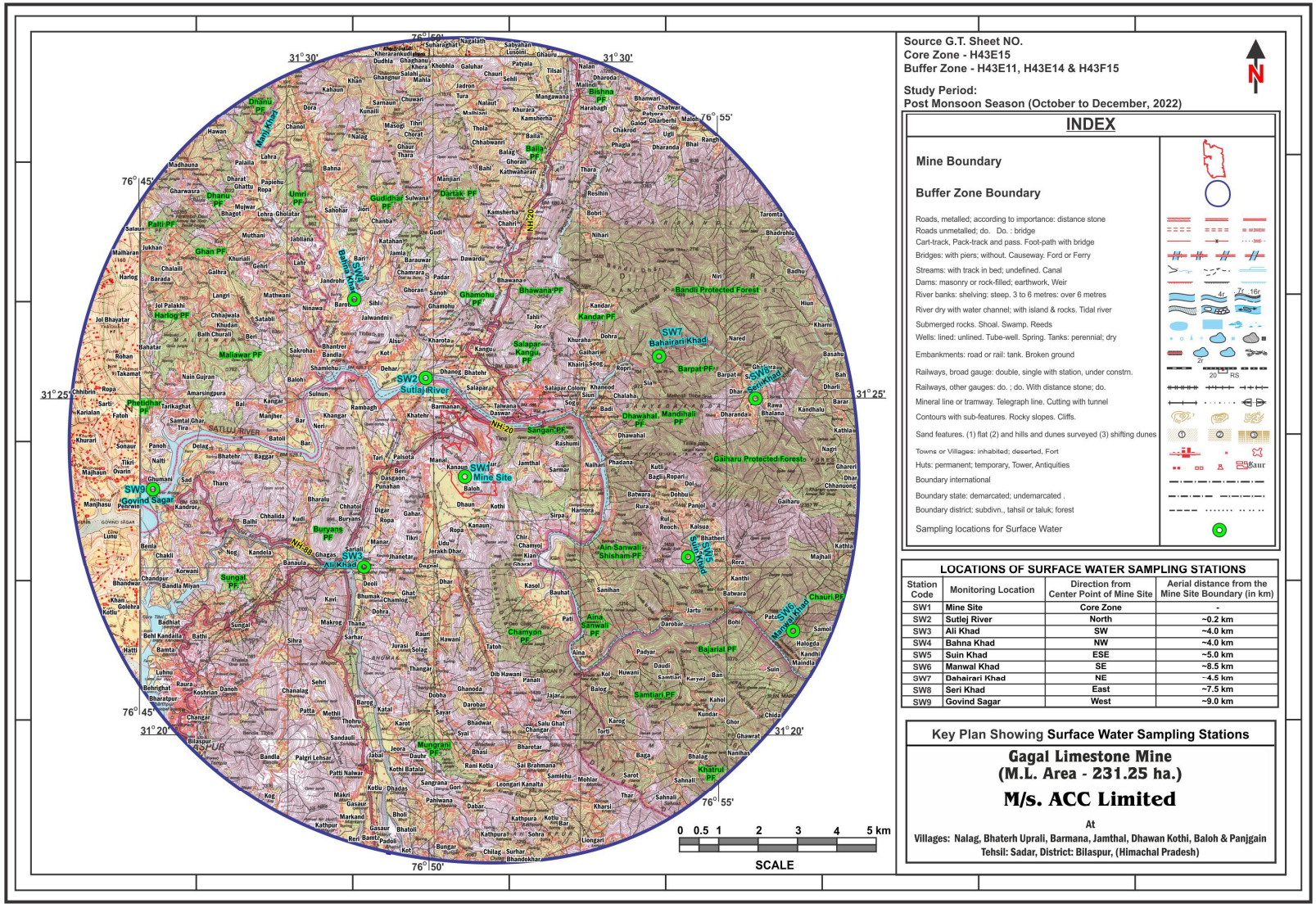


Figure 3.12 Key Plan showing Surface water Sampling Locations

Table - 3.15
Surface Water Analysis
Study Period: Post Monsoon Season (Oct to Dec, 2022)

S. No.	Parameters	Unit	Mine Site	Sutlej River	Ali Khad	Bahna Khad	Suin Khad	Manwal Khad	Bahairari Khad	Seri Khad	Govind Sagar
1.	pH (at 25°C)	--	7.04	7.11	7.59	7.52	7.66	7.35	7.28	7.21	7.16
2.	Colour	Hazen Unit	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)
3.	Turbidity	NTU	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)
4.	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Total Hardness as $CaCO_3$	mg/l	118.8	138.6	183.2	173.3	193.1	163.4	148.5	123.75	133.6
6.	Calcium as Ca	mg/l	31.68	43.56	53.46	61.38	71.28	47.52	31.68	33.66	29.70
7.	Alkalinity as $CaCO_3$	mg/l	85.50	99.8	166.3	156.8	175.7	142.5	114.0	104.50	99.8
8.	Chloride as Cl	mg/l	22.49	27.49	39.90	32.48	44.90	24.90	19.90	22.4	27.40
9.	Residual free Chlorine	mg/l	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)
10.	Cyanide as CN	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)
11.	Magnesium as Mg	mg/l	9.62	7.21	12.04	4.82	3.62	10.83	16.83	9.62	14.42
12.	Total Dissolved Solids	mg/l	132.0	170.0	246.0	218.0	258.0	202.0	176.0	172.0	162.0
13.	Sulphate as SO_4	mg/l	9.85	23.45	28.76	16.88	21.74	21.64	19.24	26.42	22.42
14.	Fluoride as F	mg/l	0.14	0.22	0.26	0.11	0.15	0.08	0.12	0.24	0.15
15.	Nitrate as NO_3	mg/l	1.86	2.41	1.79	1.13	1.52	1.46	1.32	1.07	1.78
16.	Iron as Fe	mg/l	0.07	0.11	0.07	0.15	0.09	0.06	0.13	0.08	0.09
17.	Aluminium as Al	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)
18.	Boron	mg/l	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)
19.	Phenolic Compounds	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)
20.	Anionic Detergents as MBAS	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)

21.	Hexa Chromium as Cr^{+6}	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)
22.	Zinc as Zn	mg/l	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)
23.	Copper as Cu	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)
24.	Manganese as Mn	mg/l	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)
25.	Lead as Pb	mg/l	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)
26.	Selenium as Se	mg/l	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)
27.	Arsenic as As	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)
28.	Mercury as Hg	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)
29.	Phosphate as Po_4	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	0.08	0.05	0.04	0.04	0.03	0.03	0.03
30.	Total Suspended Solid	mg/l	6.00	5.00	7.00	3.00	7.50	9.00	8.00	5.50	7.50
31.	Biochemical Oxygen Demand	mg/l	4.90	4.10	5.40	4.30	6.30	8.40	7.20	5.20	6.10
32.	Chemical Oxygen Demand	mg/l	20.00	16.0	20.0	16.0	24.0	32.0	28.0	20.0	24.0
33.	Sodium as Na	mg/l	2.2	3.4	6.2	3.4	4.8	6.0	2.9	4.1	3.5
34.	Potassium as K	mg/l	0.5	0.8	1.2	0.9	1.2	1.4	0.6	1.3	1.2
35.	Conductivity	µs/cm	206.0	266.0	384.0	340.0	402.0	314.0	274.0	268.0	252.0
36.	Nickel	mg/l	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)
37.	Dissolve Oxygen	mg/l	7.0	7.2	6.9	7.1	7.1	6.5	6.6	6.9	6.8

Source: *Surface Water Monitoring*

Note: Surface water quality was also analyzed for Residual Free Chlorine, Cyanide, Aluminium, Boron, Phenolic Compounds, Anionic detergents, Hexa Chromium, Zinc, Copper, Manganese, Lead, Selenium, Arsenic, Nickel, Mercury, etc. and were found below detection limit.

3.13.2 INTERPRETATON OF SURFACE WATER QUALITY RESULTS

The pH of collected water sample is from 7.04 to 7.66 indicating that water is near to neutral. Odour was found agreeable at all the locations whereas turbidity is below detection limit in the above mentioned water bodies indicates that it is good for the growth of aquatic life.

Total hardness (118.8 to 193.1 mg/l), Total dissolved solids (132 to 258 mg/l), Chloride (22.4 to 44.9 mg/l), Alkalinity (85.5 to 175.7 mg/l) and conductivity (206 to 402 µs/cm) were found to be within standards in water samples. BOD was found (4.1 to 8.4 mg/l) & COD was found (16 to 32 mg/l).

The nutrients were also found viz. Sulphate (9.85 to 28.76 mg/l), Nitrate (1.07 to 2.41 mg/l), Calcium (29.7 to 71.28 mg/l), Magnesium (3.62 to 16.83 mg/l) indicate that the water bodies are rich in Calcium, silica, potassium, magnesium and bicarbonates.

Some of the parameters like Colour (DL 5.0 Hazen), Turbidity (DL 1.0), Residual free Chlorine (DL 0.20 mg/l), Cyanide as CN (DL 0.02 mg/l), Aluminium as Al (DL 0.03 mg/l), Boron (DL 0.2 mg/l), Phenolic Compounds (DL 0.001 mg/l), Anionic Detergents as MBAS (DL 0.02 mg/l), Zinc as Zn (DL 0.0005 mg/l), Copper as Cu (DL 0.02 mg/l), Manganese as Mn (DL 0.10 mg/l), Lead as Pb (DL 0.008 mg/l), Selenium as Se (DL 0.005 mg/l), Arsenic as As (DL 0.002), Mercury as Hg (DL 0.001), Hexa Chromium as Cr^{+6} (DL 0.03 mg/l), Nickel (DL 0.005 mg/l) were analysed and not detected.

3.13.3 GROUND WATER QUALITY

Ground water as well as potable water samples were collected from the available water resources around the mine site i.e. Hand pumps and Bore wells. The samples were collected and tested from different sites. The quality of ground water was studied by collecting 8 water samples. The water samples were collected from Handpumps/ borwell. Details of ground water and soil sampling locations and their distance and directions are given in table - 3.16. Ground water analysis results are given in table - 3.17.

Table - 3.16

Locations of Ground Water & Soil Sampling Stations

Study Period: Post Monsoon Season (Oct to Dec, 2022)

Station Code	Sampling Location	Distance & direction
SGWS 1	Mine Site	Core Zone
SGWS 2	Plant Site	~500m in NW direction
SGWS 3	Deoli village	~4.0 km in SW direction
SGWS 4	Near Beri Village	~700m in East direction
SGWS 5	Naihari village	~2.5 km in East direction
SGWS 6	Kandar Village	~4.0 km in NE direction
SGWS 7	Dhaun Village	Adjacent to ML boundary
SGWS 8	Near Shirpa Village	~1.5 km in SE direction

***Source**: SOI Toposheet & field Survey*

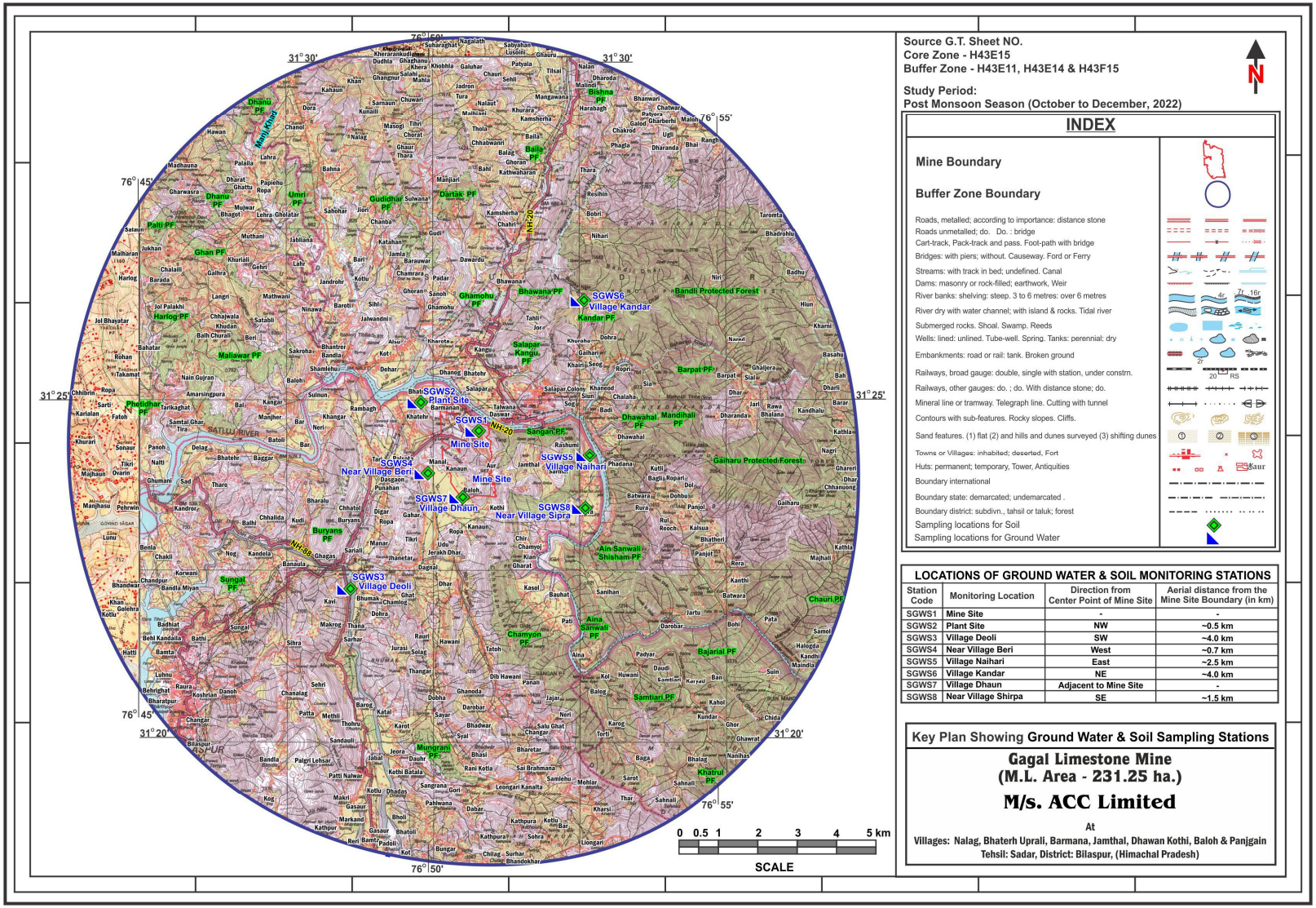


Figure 3.13 Key Plan showing Ground Water & Soil Sampling Locations

Table - 3.17
Ground Water Analysis
Study Period: Post Monsoon Season (Oct to Dec, 2022)

S. No.	Parameters	Unit	Mine Site	Plant Site	Deoli village	Near Beri Village	Naihari village	Kandar Village	Dhaun Village	Near Shirpa Village
1.	pH (at 25°C)	-	7.52	7.41	7.64	7.73	7.24	7.31	7.65	7.36
2.	Colour	Hazen Unit	BDL (DL 1)	BDL (DL 1)	BDL (DL 1)	BDL (DL 1)	BDL (DL 1)	BDL (DL 1)	BDL (DL 1)	BDL (DL 1)
3.	Turbidity	NTU	BDL (DL 1)	BDL (DL 1)	BDL (DL 1)	BDL (DL 1)	BDL (DL 1)	BDL (DL 1)	BDL (DL 1)	BDL (DL 1)
4.	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
6.	Total Hardness as $CaCO_3$	mg/l	316.8	341.5	430.6	321.7	287.1	336.6	381.2	351.5
7.	Calcium as Ca	mg/l	79.20	91.08	128.70	85.14	65.34	99.00	106.90	102.90
8.	Alkalinity as $CaCO_3$	mg/l	356.25	327.8	413.3	304.0	261.3	299.3	365.7	318.3
9.	Chloride as Cl	mg/l	54.98	69.90	87.40	59.98	54.98	77.47	92.47	82.47
10.	Cyanide as CN	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)
11.	Magnesium as Mg	mg/l	28.86	27.66	26.45	26.45	30.07	21.60	27.60	22.90
12.	Total Dissolved Solids	mg/l	414.0	440.0	588.0	424.0	350.0	438.0	536.0	494.0
13.	Sulphate as SO_4	mg/l	26.54	39.64	72.64	49.7	31.76	39.76	58.62	67.24
14.	Fluoride as F	mg/l	0.18	0.24	0.35	0.40	0.28	0.39	0.44	0.38
15.	Nitrate as NO_3-N	mg/l	2.18	4.06	8.42	6.59	3.62	8.54	11.62	9.86
16.	Iron as Fe	mg/l	0.03	0.08	0.17	0.11	0.06	0.09	0.13	0.16
17.	Aluminium as Al	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)
18.	Boron	mg/l	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)	BDL (DL 0.20)
19.	Phenolic Compounds	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)
20.	Anionic Detergents	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)

	as MBAS									
21.	Hexa Chromium as Cr^{+6}	mg/l	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)	BDL (DL 0.03)
22.	Chromium as Cr	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)
23.	Zinc as Zn	mg/l	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)	BDL (DL 0.0005)
24.	Copper as Cu	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)
25.	Manganese as Mn	mg/l	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)	BDL (DL 0.01)
26.	Cadmium as Cd	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)
27.	Lead as Pb	mg/l	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)	BDL (DL 0.008)
28.	Arsenic as As	mg/l	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)	BDL (DL 0.002)
29.	Mercury as Hg	mg/l	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)	BDL (DL 0.001)
30.	Sodium as Na	mg/l	2.80	4.8	9.8	7.6	3.9	6.5	11.2	12.2
31.	Potassium as K	mg/l	0.50	1.2	1.4	1.1	0.4	1.3	2.1	1.6
32.	Phosphate as PO_4	mg/l	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)	BDL (DL 0.02)
33.	Nickel	mg/l	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)	BDL (DL 0.005)
34.	Conductivity	µS/cm	642.0	680.0	910.0	656.0	542.0	678.0	830.0	764.0
35.	Total Suspended Solid	mg/l	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)	BDL (DL 1.0)

BDL - Below Detectable Limit, DL - Detection Level
Source- Ground Water Analysis Report, JMEPL
Note: Ground water quality was also analyzed for Aluminium, Cyanide, Phenolic Compounds, Zinc, Copper, Manganese, Cadmium, Lead, Selenium, Arsenic, Mercury, Total Coliform & E-coli etc. and were found below detection limit

3.13.4 INTERPRETATON OF GROUND WATER QUALITY RESULTS

The physico-chemical quality of groundwater was compared with drinking water standard (IS:10500- 2012). The ground water/drinking water samples were collected from 8 locations, the ground water was found potable. All the groundwater samples showed more or less similar and good quality of water. Ranges observed for some of the ground water quality parameters are given as under:-

- The pH of collected water samples varied from 7.24 to 7.73
- Total hardness varies from 287.1 to 430.6 mg/l
- Total dissolved solids varied from 350 to 588 mg/l
- The water samples contain, chloride from 54.98 to 92.47 mg/l, SO_4 varies from 26.54 to 72.64 mg/l, Ca from 65.34 to 128.70 mg/l, Mg varies from 21.6 to 30.07 mg/l.

Thus can be conclude from the baseline sampling results for groundwater that all the samples, were observed to be within the permissible limits and complies to the drinking water standard (IS: 10500-2012).

Some of the parameters like Cyanide as CN (DL 0.02 mg/l), Aluminium as Al (DL 0.03 mg/l), Boron (DL 0.20 mg/l), Phenolic Compounds (DL 0.001 mg/l), Anoionic Detergents as MBAS (DL 0.02 mg/l), Chromium as Cr (DL 0.005), Zinc as Zn (DL 0.0002 mg/l), Copper as Cu (DL 0.02 mg/l), Manganese as Mn (DL 0.10 mg/l), Cadmium Cd (DL 0.002 mg/l), Lead as Pb (DL 0.008 mg/l), Arsenic as As (DL 0.002 mg/l), Mercury as Hg (DL 0.001 mg/l), Nickel as Ni (DL 0.005 mg/l), Hexa Chromium as Cr+6 (DL 0.03 mg/l), Phosphate as PO4 (DL 0.02 mg/l) and total suspended solids (DL 1.0) were analyzed and not detected.

As the ground water quality is good in the area, the villagers use ground water for drinking purposes. No adverse impact on water quality is envisaged due to existing mining project.

3.14 SOIL ENVIRONMENT

3.14.1 SOIL QUALITY AND CHARACTERISTICS

The information on soil quality has been arrived by collection and analysis of soil samples from representative locations.

In order to assess the base line characteristics of soil profile of the area representing project and nearby areas, the samples were analyzed for key and chemical parameters.

The sampling locations were finalized with the following considerations:

- To enable information on baseline characteristics and,
- To determine the impact of mining activities on soil characteristics.
- To determine the type of plantation

Representative soil samples were collected from 6 different specified locations within the study area of the mine site. Standard operating procedures were followed for the sampling and analysis of physico-chemical parameters.

Location of soil sampling stations is given in Table –3.16 and shown in figure no. 3.13.

Soil analysis results are given in Table - 3.18 and Standard Soil Classification is given in Table –3.19.

Table - 3.18

Soil Quality Analysis Results

Study Period: Post Monsoon Season (Oct to Dec, 2022)

S. NO.	PARAMETERS	Unit	Sampling Locations							
			Mine Site	Plant Site	Deoli village	Near Beri Village	Naihari village	Kandar Village	Dhaun Village	Near Shirpa Village
1.	pH (at 25°C) (1:2.5 soil water sus.)	-	7.22	6.92	7.85	7.15	8.24	7.02	6.98	6.82
2.	Conductivity (1:2 soil water sus)	mS/cm	0.36	0.33	0.41	0.38	0.43	0.38	0.34	0.31
3.	Salanity	ppt	0.17	0.16	0.2	0.18	0.21	0.18	0.16	0.15
4.	Soil Texture	-	Silty Loam	Silt	Silty Loam	Silty Loam	Silty Loam	Silt	Silt	Silt
a	Sand	%	22.0	8.0	20.0	21.0	20.0	6.0	8.0	4.0
b	Silt	%	76.0	88.0	75.0	76.0	74.0	90.0	89.0	91.0
c	Clay	%	2.0	4.0	5.0	3.0	6.0	4.0	3.0	5.0
5.	Colour	-	Reddish Brown	Light Brownish	Light Brownish	Light Brownish	Dark Brownish	Light Brownish	Light Brownish	Light Brownish
6.	Water Holding Capacity	%	40.64	44.82	46.78	47.15	42.98	43.78	44.67	41.28
7.	Porosity	%	49.72	53.9	53.21	53.26	52.06	52.86	53.75	50.36
8.	Bulk Density	gm/cc	1.42	1.48	1.39	1.47	1.44	1.51	1.38	1.36
9.	Chloride	mg/kg	486.93	565.06	859.04	600.86	709.33	732.27	607.83	728.97
10.	Calcium	mg/kg	1918.09	1723.11	2137.96	1884.44	2366.83	1668.7	1557.91	1344.21
11.	Sodium	mg/kg	141.17	126.82	157.35	138.69	174.2	122.82	114.66	98.93
12.	Potassium	kg/hec	239.99	215.6	267.5	235.78	296.14	208.79	194.93	168.19
13.	Organic Matter	%	0.75	0.91	0.86	1.06	1.12	1.09	1.14	0.98
14.	Magnesium as Mg	mg/kg	441.16	396.32	491.73	433.42	544.37	383.8	358.32	309.17
15.	Available Nitrogen as N	kg/hec	207.88	160.94	225.68	192.23	252.58	268.24	203.41	167.08
16.	Available Phosphorus	kg/hec	81.07	62.77	88.02	74.97	98.51	104.61	79.33	65.16

17.	Zinc as Zn	mg/kg	23.46	31.24	40.82	25.68	21.89	24.98	25.42	19.68
18.	Manganese as Mn	mg/kg	113.42	121.63	108.92	114.78	98.68	103.46	96.64	102.38
19.	Chromium as Cr	mg/kg	BDL (DL 5.0)	BDL (DL 5.0)	6.28	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)
20.	Lead as Pb	mg/kg	11.96	15.76	16.63	12.94	13.44	BDL (DL 5.0)	16.91	BDL (DL 5.0)
21.	Cadmium as Cd	mg/kg	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)	BDL (DL 5.0)
22.	Copper as Cu	mg/kg	BDL (DL 5.0)	7.88	8.8	14.38	7.47	BDL (DL 5.0)	BDL (DL 5.0)	8.21
23.	Organic Carbon	%	0.44	0.53	0.5	0.61	0.65	0.63	0.66	0.57
24.	SAR Value	-	0.76	0.72	0.8	0.75	0.84	0.71	0.68	0.63

Source: *Soil Quality Analysis results from JMEPL*

Table - 3.19
Standard Soil Classification

S. No.	Parameters	Classification
1.	pH	<4.5 extremely acidic 4.51 – 5.0 very strong acidic 5.01 – 5.5 strongly acidic 5.51 - 6.0 moderately acidic 6.1 – 6.5 slightly acidic 6.51 – 7.30 Neutral 7.31-7.8 slightly alkaline 7.81-8.5 moderately alkaline 8.51 – 9.0 strongly alkaline >9.0 Very strongly alkaline
2.	Salinity Electrical Conductivity (mho/cm)	Up to 1.0 average 1-2 harmful to germination 2-3 harmful to crops
3.	Nitrogen (kg/ha)	Up to 50 very less 51-100 less 110-150 good 151-300 better >300 sufficient
4.	Phosphorus (kg/ha)	Up to 15 very less 15 – 30 less 31-50 medium 51-65 on average sufficient 66-80 sufficient >80 more than sufficient
5.	Potassium (kg/ha)	0-120 very less 120-180 less 180-240 medium 241-300 average 301-360 better >360 more than sufficient

Source: *Indian Agricultural Research Institute Handbook.*

3.14.2 INTERPRETATON OF SOIL QUALITY RESULTS

The soil samples exhibits Light Brownish, Dark Brownish and Reddish Brown which indicates moderate organic matter level and iron oxides in the soil samples. The organic matter (0.75 % to 1.14 %) and organic carbon (0.44 % to 0.66 %) present in the soil observed to be appropriate for the plant growth. The texture of the soil samples were Silty Loam and Silt. All soil samples are in the range of neutral to slightly alkaline having pH ranging from 6.82 to 8.24 which is an optimal range for most the plant to thrive and grow. Six essential nutrients required for an ideal plant growth are Nitrogen, Phosphorus, Potassium, Magnesium, Sulphur and calcium.

All the essential nutrients were Nitrogen (160.94 to 268.24 kg/ha), Phosphorous (62.77 to 104.61 kg/ha), Potassium (168.19 to 296.14 kg/ha), Magnesium (309.17 to 544.37 mg/kg), Calcium (1344.21 to 2366.83 mg/kg). Higher calcium values in the soil sample is due to the presence of slightly alkaline soil in nature within the area, thus would positively affect the plant growth. These results indicate that the soil quality within the study area is of a good quality and contains sufficient macronutrients which is vital for healthy plant life.

3.15 BIOLOGICAL ENVIRONMENT

3.15.1 SCOPE OF WORK

Scope of work for this Ecology & Biodiversity study includes identification of ecologically sensitive receptors, based on literature survey, field investigations and their mitigation with conservation action plan. The study was carried out for existing limestone mine and surrounding areas. The study area includes "Bandli Sanctuary" at a aerial distance of 3.55 km in NE direction, for which ACC Cement limited already have clearance from National Board for Wildlife vide letter # 6-147/2015 WL (36th Meeting) dated 9th November 2015 & Eco sensitive zone and Boundary of "Majathal Wildlife Sanctuary" at distance of ~10.05 km in SE direction. Forest area of 103.02 ha falls under the mining lease area, ACC Cement Limited already have Forest clearance for the same via letter no. 8-21/2000 – FC on dated 25.01.2001.

The study was carried out systematically and scientifically using primary and secondary data in order to bring out factual information on the ecological conditions of the existing limestone mine site (Core Zone) and 10 km radius study area (Buffer Zone).

The study involved assessment of general habitat type, vegetation pattern, preparation of inventory of flora and fauna for terrestrial and aquatic ecosystem in core and buffer zone. Biological assessment of the study area was done to identify ecologically sensitive areas and whether there are any rare, endangered, endemic or threatened (REET) species of flora & fauna in the core area (existing limestone mine) as well its buffer zone to be impacted. The study also designed to suggest suitable mitigation measures if necessary for protection of wildlife habitats and conservation of REET species if any.

The biological study was undertaken as a part of the EIA study report to understand the present status of ecosystem prevailing in the study area and to study the floristic and faunal diversity of the terrestrial and aquatic environment of the study area. The Biological Study has been conducted on November, 2022.

3.15.2 OBJECTIVES OF THE STUDY

The Biological study was undertaken with the following objectives:

i. To understand the spectrum of domesticated and wild biodiversity of the study area.
ii. To study the likely impact of the existing project on the local biodiversity and to suggest mitigation measure, if required, for vulnerable biota.
iii. To assess the nature and distribution of vegetation (Terrestrial and Aquatic) in and around the existing project area.

iv. Detail of flora and fauna, Endemic, Rare, Endangered and Threatened (RET Species) separately for core and buffer area based on such primary field survey and clearly indicating the Schedule of 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.

v. To devise management & conservation measures for biodiversity.

3.15.3 STUDY APPROACH AND METHODOLOGY

Basic Framework for data collection

The prediction of impacts on flora, fauna and wildlife depends upon the activities related to the existing limestone mine and its effects on the existing ecology.

Collection of comprehensive baseline information on flora and fauna is therefore a pre-requisite for assessment of impacts of developmental activities. It would also help in advance planning and mitigate the impacts and ultimately managing the natural habitats and resources. The approach to achieve the stated objectives within defined scope of work, include field surveys, interviews, reviews of literature and consultation with experts.

We utilized specific secondary data on forest & wildlife from the Forest Working Plan. Following was the basic frame work of the data collection and analysis for the present study.

Inventory of species of different life forms (tree, shrub, climber, herb, bamboo, grass and sedge) was done by simple listing. The quantification of flora was done by using plots (Mueller-Dombois and Ellenberg 1967, Kershaw 1973), of varying size according to the life form. The sampling of vegetation was done in different habitat/land use, identified for the study. In each of the study habitat, both inside the core area (existing mine site) and the buffer of 10 km, where mining related activities were bare minimum or absent.

As mentioned above, 25 m radius circular plots was laid at every sample point to assess trees (>20 cm Girth at Breast Height - GBH); 10 m radius plot to assess the shrub, climber & bamboo, while herb, grass and sedge were quantified using two 1 X 1 m plots that were laid at two location within the larger tree plot.

Specific set of data, pertaining to different life form was collected from each respective plot. In the case of trees: the species, girth at Breast Height (GBH -1.3 m height from ground), whether cut and lopped were recorded. Further, in these plots, the epiphyte species and their numbers were also recorded. In the case of shrubs and climber for which 10 m radius plot was used, laid inside the larger tree plot, where species and their numbers were enumerated.

The herbs, grass and sedge were enumerated in two 1 m^2 plots, each placed randomly at two different locations inside the larger tree plot. In each plot, species and their numbers were recorded. All the smaller plots were laid/nested within the larger tree plot. Among the habitats and land uses studied, in the Agriculture Habitat, only listing/inventory of species was done, while in all other habitats/land uses vegetation was quantified.

Table 3.20
No. of Sample Points, Size of Plot of Study Area

Flora Life Forms	No. of Sample Points	Plot size	Area Sampled in ha.
Tree	10	25m radius	1.96
Shrub	10	10m radius	0.314
Climber	10	10m radius	0.314
Herb	10	$1m^2$	0.001
Grass& Sedge	10	$1m^2$	0.001
Total			**2.59 Ha.**

Identification of species and their respective life forms were according to Haines 1921–1924 and Jain et al. 1975 (specifically grasses). The IUCN Red List for plants **(https://dx.doi.org/10.2305/IUCN.UK.1998.RLTS.T32098A9675296.en.&https://dx.doi.org/10.2305/IUCN.UK.1998.RLTS.T33260A9765049.en.),** was referred for identifying the species of conservation significance.

Field surveys

Field visit were carried out in the month of November, 2022 to understand and assess the impacts of existing project activities on flora & fauna. The distribution and abundance of flora and fauna in the study area through primary and secondary data sources was evaluated.

3.15.4 ANALYSIS OF FLORA

In Core, Buffer Zone & in RF/ PF

During the surveys, an inventory of the various plant groupings discovered in the study region was created. In the Study area, 119 plant species from 85 families were identified. Among them 43 trees, 37 shrubs, 23 herbs, 09 grasses, as well as 07 climber and 01 Bamboo species have been recorded in the study area based on primary observation as well as based on information collected from the secondary data. The dominant family in the project area is Rosaceae, which has 16 species, followed by Poaceae and Fabaceae, which each have 09 and 08 species respectively.

Authenticated list of flora and fauna has been obtained from Pr. Chief Conservator of Forests (Wildlife)-cum-CWLW, HP Shimla-1 vide letter No WL (Misc)/Mining/613 Himachal Pradesh dated 12.05.2023.

Status of Agricultural Diversity

Agriculture is most vital sector of the economy our country. Agriculture was found as the major livelihood for the people living around the study area. The topography of the region is dominated by mountainous terrain with its landscape shaped in the Quaternary period by glacial and fluvial activities. It displays prominent relief characterized by lofty mountains and deep valleys with gradual blending of different forms of relief and slopes. The main drainage of this region is controlled by the Sutlej river. There are a number of nallahs and natural channels through which the rain water flows and finds its way to Sutlej river. Major crops of the study area as kharif crop (Maize, Rice and Chickpea) and as Rabi crop (Wheat, Barley), some other vegetables like Potato, Cauliflower, Tomato and Onion also were noticed. The area mainly consists of blackish clay with

sandy loam texture, with adequate nutrients. The choice of the crop depends on the availability of the ground water and seasonal rains.

3.15.5 ANALYSIS OF FAUNA

A primary field survey was carried out within 10 km radius impact zone in and around the project area to study the floral and faunal diversity of the terrestrial and aquatic environment of the study area.

Among fauna, Total 103 species of faunal species which includes 21 species of mammals, 13 species of reptiles and amphibians and 06 species of Butterfly and Arthropods were recorded from the study area. Among avifauna, 63 species were recorded in the study area.

As per Indian Wildlife Protection Act 1972

The area is represented by fauna of Schedule I, II, III, IV and V category according to (IWPA) Indian Wildlife Protection Act, 1972. Mammals, Reptiles, Amphibians, Butterfly and Arthopods are commonly found species in the area.

Total 7 species come in Schedule- I fauna according to (IWPA) Indian Wildlife Protection Act' 1972. Out of these 2 mammals' species i.e., *Panthera pardus fusca* (Leopard), *Prionailurus bengalensis* (Leopard cat), and 1 reptiles' species i.e., *Varanus flavescens* (Yellow Monitor), and 4 Avi-faunal species i.e., *Pavo cristatus* (Peafowl), *Gyps africanus* (White-backed vulture), *Catreus wallichii* (Cheer pheasant) & *Lophura leucomelanos* (kalij pheasant) were recorded in the study area during field survey.

As per IWPA 1972 Conservation status, 07 species of schedule I, 13 speiceis of schedule II, 04 species of Schedule III , 79 species of schedule IV and 02 Species of Schedule V, were reported from primary and secondary survery.

As per Indian Wildlife Protection Amendment Act, 2022

The area is represented by fauna of Schedule I, II, III, IV category according to (IWPA) Indian Wildlife Protection Amendment Act, 2022. Mammals, Reptiles, Amphibians, Butterfly and Arthopods are commonly found species in the area.

Study on the impact of Mining on Flora and Fauna as well as the Conservation plan for threatened and Schedule-I wildlife species in the Core and Buffer zone (which includes Bandli Wildlife Sanctuary and Majhathal Wildlife sanctuary as well) for Gagal Limestone Mines, has been submitted to Chief Wild Life Warden which is attached with this Draft EIA/EMP study report as ***Annexure XXIV***

The study area includes "Bandli Sanctuary" at a aerial distance of 3.55 km in NE direction, for which ACC Cement limited already have clearance from National Board for Wildlife vide letter # 6-147/2015 WL (36th Meeting) dated 9th November 2015 & Eco sensitive zone and boundary of "Majathal Wildlife Sanctuary" at distance of ~10.05 km in SE direction.

3.16 SOCIO-ECONOMIC ENVIRONMENT

3.16.1 INTRODUCTION

An essential part of environmental study is socio-economic environment incorporating various facts related to socio-economic conditions in the area, which deals with the total environment. Socio economic study includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as feature of aesthetic significance such as temples, historical monuments etc. at the baseline level. This would helps in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

Socio-economic study of an area provides a good opportunity to assess the socio-economic condition and possibly makes a change in living and social standards of the particular area benefitted due to the Project.

It can undoubtedly be said that this mine operation work has/ will provide direct and indirect employment and improve the infrastructural facilities and standards of living of the area. In the nearby areas, gross economic production has/ will increase substantially due to the existing limestone mining project in the area.

3.16.2 OBJECTIVE OF THE STUDY

The objectives of this socio-economic report consist of:

- To determine the demographic profile of the area.
- To know/identify the current socio-economic condition within the study area by understanding the determinants such as education, health, sanitation, water, employment, transportation, communication, electrification, livelihood etc.
- To identify the basic needs of the nearby villages within the study area.
- To contribute in the development and growth based on the identified needs of the nearby areas using practical strategic interventions under the CSR activities.
- To increase the employment opportunities and improve the living standards.

3.16.3 METHODOLOGY AND ANALYSIS

- ***Collection of Data***

Data for this project was collected from secondary sources like Government department, Census 2011, District Census Handbook, Maps, Literature research etc. The study area has been divided into three major segments namely Primary Zone (0 - 3 km), Secondary Zone (3 - 7 km) and Outer Zone (7 - 10 km).

- ***Presentation of Data & Analysis***

The data collected were presented in a suitable, concise form i.e. tabular or diagrammatic or graphic form for further analysis. These tabulated data were interpreted and analyzed with the help of various qualitative techniques and ideographic approaches.

3.16.4 BACKGROUND INFORMATION OF THE AREA

The existing project is located in the Tehsil: Sadar, District: Bilaspur, in the state of Himachal Pradesh.

Himachal Pradesh is a northern Indian state in the Himalayas. It's home to scenic mountain towns and resorts such as Dalhousie. Host to the Dalai Lama, Himachal Pradesh has a strong Tibetan presence. This is reflected in its Buddhist temples and monasteries, as well as its vibrant Tibetan New Year celebrations. The region is also well known for its trekking, climbing and skiing areas.

The demography of the study area is shown below:

Table - 3.21

Socio-Economic Profile of the Area

S. No.	Particular	Himachal Pradesh	Bilaspur	Study Area
1.	Area (sq km)	55673	1167	385.1898
2.	No. of Households	1483280	80485	14529
3.	Population	6864602	381,956	69211
4.	Male	3481873	192,764	3506
5.	Female	3382729	189,192	34142
6.	Scheduled Tribes	392126	10693	927
7.	Scheduled Castes	1729252	98989	17781
8.	Literacy (%)	82.79	84.59	83.11
9.	Sex Ratio (Females per 1000 Males)	972	981	974

Source: *Census of India, 2011*

3.16.5 BASELINE DATA & ANALYSIS

The socio-economic data was collected from ***Census India Handbook 2011*** including demographic, educational, medical & health, occupational, agriculture & cropping pattern, basic amenities and religious rituals details. The study area was categorized on the basis of the distance of the village from the project site. First zone was identified from 0-3 km radius area, Second zone in 3-7 km and outer zone 7-10 km radius area from the project site. 173 Villages have been included in buffer zone for this project and keeping that in view, the socio-economic condition of the project area has been analyzed.

The study area (buffer zone) is categorized on the basis of the distance of the villages from the project site of M/s. ACC Limited.

The demographic features of the study area as per area classification are given in Table below:

To understand the socio-demographic profile of the 10 km study area, village wise distribution has been done based on the below given determinants:

1. Number of Household
2. Number and type of Population
3. Sex Ratio
4. Literacy rate
5. Number and type of workers and Non- workers.

3.16.6 DEMOGRAPHY OF THE STUDY AREA

Table - 3.22
Demographic details of the study area

S.No.	Name	Total Household	Total Population	Total Male	Total Female	Sex Ratio	SC Population	ST Population	Total Literacy Rate	Male Literacy Rate	Female Literacy Rate	Total Workers	Main Workers	Marginal Workers	Non Workers
0-3 Km															
1	Kasol	154	747	371	376	1013	46	0	81.92	90.45	73.31	638	74	564	109
2	Chamyon	58	257	126	131	1040	125	0	77.88	87.38	69.30	168	35	133	89
3	Ropa	44	210	104	106	1019	0	0	79.46	86.21	73.47	82	53	29	128
4	Kanaun	98	494	264	230	871	83	4	84.32	91.95	75.49	202	159	43	292
5	Dhaon Kothi	133	585	304	281	924	255	0	81.39	88.46	73.88	227	156	71	358
6	Baloh	46	185	98	87	888	0	0	81.21	91.46	71.08	66	53	13	119
7	Harnora	64	258	141	117	830	33	0	83.65	91.07	75.00	160	72	88	98
8	Naihar	124	693	335	358	1069	397	3	76.85	79.72	74.30	277	257	20	416
9	Jamthal	306	1214	648	566	873	203	7	82.08	89.95	73.32	636	414	222	578
10	Bagi	134	694	348	346	994	389	0	81.54	90.23	72.79	234	148	86	460
11	Talwara	175	748	383	365	953	147	0	87.78	96.45	79.18	446	208	238	302
12	Barmana	132	521	265	256	966	90	0	85.28	93.16	77.19	179	118	61	342
13	Bhatehr	93	440	226	214	947	35	0	91.86	96.95	86.41	281	141	140	159
14	Jol	6	28	14	14	1000	0	0	80.00	92.31	66.67	10	10	0	18
15	Kharota	150	702	353	349	989	105	1	89.61	96.18	83.18	437	159	278	265
16	Kot	18	127	70	57	814	8	0	84.55	93.22	74.51	42	41	1	85
17	Bhatehr Uparli	216	968	502	466	928	218	8	86.19	92.47	79.72	354	271	83	614
18	Khatehr	538	1866	979	887	906	282	1	91.62	95.27	87.44	668	619	49	1198
19	Tali	78	364	187	177	947	28	0	84.91	96.30	73.08	252	118	134	112
20	Palsoti	25	124	57	67	1175	31	0	89.72	97.87	83.33	67	31	36	57
21	Beri Rajadyan	173	816	405	411	1015	107	0	87.02	93.10	81.16	97	93	4	719
22	Dasgaon	37	176	85	91	1071	50	0	88.13	93.51	83.13	48	42	6	128
23	Punahan	29	146	70	76	1086	10	0	91.67	95.24	88.41	48	47	1	98
24	Digar	21	112	47	65	1383	0	0	86.96	90.00	84.62	42	40	2	70

S.No.	Name	Total Household	Total Population	Total Male	Total Female	Sex Ratio	SC Population	ST Population	Total Literacy Rate	Male Literacy Rate	Female Literacy Rate	Total Workers	Main Workers	Marginal Workers	Non Workers
25	Ropa Gandhiyan	25	119	57	62	1088	0	0	94.59	98.08	91.53	34	34	0	85
26	Gahar	66	262	135	127	941	16	0	88.24	93.50	82.61	102	78	24	160
27	Manar	45	249	128	121	945	40	0	87.21	94.39	80.36	82	78	4	167
28	Tikri	57	264	143	121	846	49	0	80.51	92.86	66.36	104	80	24	160
29	Nalag (131)	153	780	403	377	935	375	0	89.02	93.63	84.12	221	217	4	559
30	Panjgain (126)	356	1914	960	954	994	360	1	87.46	94.28	80.63	647	560	87	1267
Sub Total		**3554**	**16063**	**8208**	**7855**	**957**	**3482**	**25**	**85.97**	**92.64**	**79.12**	**6851**	**4406**	**2445**	**9212**
3-7 Km															
31	Hawani	35	174	87	87	1000	0	0	93.21	96.20	90.36	109	52	57	65
32	Tatoh	56	227	107	120	1121	63	0	88.57	96.88	81.58	118	42	76	109
33	Dobha	41	221	110	111	1009	64	0	73.85	83.16	65.00	68	61	7	153
34	Sayar	116	649	329	320	973	199	0	80.64	88.58	72.26	246	161	85	403
35	Neri	48	255	135	120	889	44	0	81.50	90.91	70.75	135	134	1	120
36	Jajjar	136	550	261	289	1107	65	0	97.48	99.56	95.62	427	149	278	123
37	Bhatwara	53	252	131	121	924	19	0	87.50	96.69	77.48	148	137	11	104
38	Doharu	27	133	67	66	985	0	82	86.21	92.86	80.00	30	9	21	103
39	Dol	7	38	19	19	1000	0	9	78.79	76.47	81.25	22	5	17	16
40	Roparhi	31	146	77	69	896	13	0	90.84	95.45	86.15	89	13	76	57
41	Darahal	2	16	8	8	1000	6	0	78.57	85.71	71.43	8	4	4	8
42	Chalawa	5	26	11	15	1364	0	9	100.00	100.00	100.00	18	3	15	8
43	Dhar	113	622	314	308	981	185	0	83.72	93.93	73.48	356	147	209	266
44	Bhawanna	33	169	85	84	988	37	0	92.47	98.57	86.84	55	31	24	114
45	Godhan	4	14	6	8	1333	0	0	81.82	100.00	75.00	10	7	3	4
46	Katheran	20	88	41	47	1146	0	0	81.01	86.84	75.61	53	4	49	35
47	Bahl	19	106	56	50	893	9	68	77.42	82.00	72.09	70	53	17	36
48	Dabat Manjari	494	2465	1247	1218	977	640	106	79.31	87.11	71.42	1227	240	987	1238
49	Cheri	40	182	90	92	1022	46	0	88.82	94.87	83.13	150	28	122	32

S.No.	Name	Total Household	Total Population	Total Male	Total Female	Sex Ratio	SC Population	ST Population	Total Literacy Rate	Male Literacy Rate	Female Literacy Rate	Total Workers	Main Workers	Marginal Workers	Non Workers
50	Chamarrha	13	70	34	36	1059	0	0	86.67	89.29	84.38	41	13	28	29
51	Jamlag	22	82	40	42	1050	0	0	90.54	97.22	84.21	51	22	29	31
52	Salwan	82	383	191	192	1005	42	0	89.21	96.97	82.02	218	167	51	165
53	Kotlu	9	43	20	23	1150	3	0	86.49	88.24	85.00	22	21	1	21
54	Sihla	74	414	207	207	1000	166	1	76.39	86.63	66.32	260	74	186	154
55	Baroti	62	305	152	153	1007	114	161	77.15	83.21	70.77	237	80	157	68
56	Ninawa	142	647	315	332	1054	123	0	80.10	89.40	71.19	368	212	156	279
57	Jandehr	45	209	94	115	1223	59	18	86.02	90.59	82.18	79	26	53	130
58	Lahot	128	586	295	291	986	224	0	87.04	95.69	78.63	244	166	78	342
59	Jablana	186	918	464	454	978	105	8	75.91	87.53	64.41	573	144	429	345
60	Khurani	51	259	135	124	919	0	0	71.24	83.33	58.93	150	63	87	109
61	Chhajwala	47	217	110	107	973	3	0	83.42	91.84	74.74	71	71	0	146
62	Balh Churani	83	366	183	183	1000	3	0	81.60	90.96	71.88	103	100	3	263
63	Sakroha	42	190	92	98	1065	125	0	79.38	85.53	73.81	108	46	62	82
64	Baloh	44	218	116	102	879	17	0	83.65	93.64	72.45	114	56	58	104
65	Salnun	127	567	266	301	1132	66	0	88.27	94.87	82.53	125	122	3	442
66	Nain Gujran	46	235	121	114	942	57	115	94.34	97.17	91.51	136	22	114	99
67	Amar Singh Pura	22	101	55	46	836	43	0	94.51	100.00	88.10	43	16	27	58
68	Khangar	36	169	75	94	1253	70	0	82.07	89.06	76.54	39	37	2	130
69	Majher	50	305	156	149	955	44	0	81.64	89.84	73.44	242	178	64	63
70	Neri	16	76	37	39	1054	14	0	74.29	81.82	67.57	35	10	25	41
71	Barnu	86	438	224	214	955	41	0	68.15	79.49	56.38	256	254	2	182
72	Bhatoli	40	214	117	97	829	47	0	81.91	89.11	73.56	140	118	22	74
73	Delag	300	1367	695	672	967	791	0	79.71	88.75	70.13	268	94	174	1099
74	Kandror	298	1235	611	624	1021	298	0	87.96	93.48	82.81	508	203	305	727
75	Kudi	77	372	193	179	927	138	3	83.13	89.29	76.83	117	78	39	255
76	Bahli	18	72	40	32	800	0	0	85.48	82.35	89.29	29	15	14	43

S.No.	Name	Total Household	Total Population	Total Male	Total Female	Sex Ratio	SC Population	ST Population	Total Literacy Rate	Male Literacy Rate	Female Literacy Rate	Total Workers	Main Workers	Marginal Workers	Non Workers
77	Bharathu	132	612	303	309	1020	100	89	81.33	89.22	73.53	120	70	50	492
78	Nog	215	1063	538	525	976	318	38	80.81	87.20	74.09	429	117	312	634
79	Kandela	24	110	59	51	864	65	0	76.24	85.19	65.96	59	24	35	51
80	Banaula	77	378	184	194	1054	120	0	84.50	91.61	78.16	98	87	11	280
81	Sungal	78	492	263	229	871	0	2	84.65	91.91	76.44	141	117	24	351
82	Sirha	244	1302	661	641	970	265	0	75.77	84.02	67.20	771	106	665	531
83	Barog	33	185	98	87	888	42	0	78.79	86.21	70.51	39	27	12	146
84	Karot	44	181	75	106	1413	1	1	81.88	85.29	79.35	95	92	3	86
85	Solag Jurasi	254	1296	662	634	958	359	0	75.04	82.63	66.97	213	86	127	1083
86	Chamlog	68	340	187	153	818	35	0	85.90	95.21	75.17	208	121	87	132
87	Deoli	269	1435	741	694	937	736	0	79.19	88.51	69.14	637	360	277	798
88	Sarar	18	84	43	41	953	0	0	77.63	89.74	64.86	46	11	35	38
89	Magrot	58	279	141	138	979	12	0	80.65	87.20	73.98	173	29	144	106
Sub Total		**4940**	**24148**	**12174**	**11974**	**984**	**6036**	**710**	**81.54**	**89.27**	**73.75**	**10945**	**4935**	**6010**	**13203**
7-10 Km															
90	Rani Kotla	79	438	225	213	947	51	0	75.26	82.41	67.88	274	262	12	164
91	Gori	47	254	129	125	969	53	0	80.89	89.74	71.30	70	61	9	184
92	Sangrana	29	156	78	78	1000	24	0	77.21	88.73	64.62	33	23	10	123
93	Pahlwana	76	350	180	170	944	179	0	74.04	84.47	62.91	69	42	27	281
94	Dabar	44	215	110	105	955	32	0	75.54	83.33	67.05	97	49	48	118
95	Bogar	25	145	72	73	1014	37	0	68.50	80.00	56.45	93	26	67	52
96	Chilag	35	182	95	87	916	85	0	78.92	90.70	66.25	106	55	51	76
97	Surhwar	65	382	199	183	920	7	0	76.56	89.89	61.64	241	124	117	141
98	Bhandokhar	46	224	115	109	948	0	0	77.13	86.73	66.67	143	74	69	81
99	Sohra Biyuns	43	233	113	120	1062	11	0	69.08	79.80	59.26	143	9	134	90
100	Leongari Kanaitan	25	183	95	88	926	0	0	74.85	85.37	64.20	130	4	126	53
101	Samlehu	10	56	27	29	1074	0	0	72.00	92.00	52.00	36	12	24	20

S.No.	Name	Total Household	Total Population	Total Male	Total Female	Sex Ratio	SC Population	ST Population	Total Literacy Rate	Male Literacy Rate	Female Literacy Rate	Total Workers	Main Workers	Marginal Workers	Non Workers
102	Sai Brahmna	121	652	345	307	890	28	0	81.31	89.84	71.79	399	166	233	253
103	Bhareter	73	364	190	174	916	77	0	72.87	81.98	62.82	210	83	127	154
104	Leongari Brahmna	33	183	93	90	968	0	0	76.69	89.29	63.29	114	20	94	69
105	Suin	103	578	292	286	979	30	0	73.02	87.06	58.63	368	185	183	210
106	Kathla	78	406	211	195	924	128	24	83.48	93.22	73.56	240	63	177	166
107	Dhar Bhartha	27	140	71	69	972	24	3	85.00	98.36	71.19	79	23	56	61
108	Bah	78	414	194	220	1134	152	0	93.35	96.05	90.95	390	29	361	24
109	Badhu	11	58	29	29	1000	43	0	78.18	78.57	77.78	31	9	22	27
110	Tarontara	58	246	114	132	1158	9	0	90.00	97.00	84.17	134	26	108	112
111	Maloh	18	85	41	44	1073	17	61	84.93	94.12	76.92	34	9	25	51
112	Galor	35	187	97	90	928	33	0	75.15	83.33	66.67	142	41	101	45
113	Padyalag	137	631	323	308	954	196	0	90.40	95.21	85.41	285	264	21	346
114	Chuwadi	85	453	244	209	857	233	0	88.21	93.43	82.47	276	61	215	177
115	Tihri	11	57	29	28	966	0	0	87.50	96.43	78.57	27	5	22	30
116	Khan	57	241	126	115	913	0	0	87.16	94.59	79.44	140	44	96	101
117	Lehra	41	204	109	95	872	38	0	84.82	90.20	78.65	104	30	74	100
118	Bhagot	52	252	133	119	895	29	0	87.88	95.00	80.18	137	59	78	115
119	Majhwar	34	181	90	91	1011	94	0	80.89	88.75	72.73	101	28	73	80
120	Paplehu	21	103	50	53	1060	23	0	83.70	95.45	72.92	68	14	54	35
121	Ropa Gholatar	68	348	174	174	1000	71	0	77.99	89.54	66.67	214	51	163	134
122	Paliala	44	243	123	120	976	9	0	82.79	87.74	77.98	138	7	131	105
123	Dharat	56	294	150	144	960	27	0	81.30	88.81	73.44	183	28	155	111
124	Hawan	143	664	329	335	1018	204	0	85.05	93.29	76.97	412	77	335	252
125	Gharwasra	47	263	145	118	814	0	0	82.91	88.98	75.70	194	63	131	69
126	Galehra	26	101	54	47	870	0	0	92.63	96.08	88.64	61	19	42	40
127	Jukhan	22	100	52	48	923	1	0	81.91	93.75	69.57	88	10	78	12
128	Maiharan	49	218	105	113	1076	104	0	87.24	93.62	81.37	111	68	43	107

S.No.	Name	Total Household	Total Population	Total Male	Total Female	Sex Ratio	SC Population	ST Population	Total Literacy Rate	Male Literacy Rate	Female Literacy Rate	Total Workers	Main Workers	Marginal Workers	Non Workers
129	Chalaili	174	829	393	436	1109	154	0	81.65	89.66	74.55	429	114	315	400
130	Harlog	127	559	278	281	1011	135	0	85.77	93.00	78.71	329	117	212	230
131	Jol Palakhin	185	820	410	410	1000	147	2	85.49	91.71	79.31	553	81	472	267
132	Rohan	336	1495	761	734	965	282	88	82.43	88.95	75.92	1042	614	428	453
133	Ropa	106	411	202	209	1035	153	0	87.04	93.18	81.01	249	153	96	162
134	Chhibrin	40	205	108	97	898	112	0	84.62	87.76	80.95	123	28	95	82
135	Sarti	53	215	98	117	1194	48	0	82.99	87.06	79.82	124	57	67	91
136	Fatoh	159	747	395	352	891	270	0	85.45	92.77	77.39	618	136	482	129
137	Khurari	38	159	79	80	1013	64	0	93.20	100.00	85.71	94	26	68	65
138	Sanaur	112	549	274	275	1004	223	0	85.09	93.33	76.95	334	81	253	215
139	Nalti	151	694	384	310	807	272	0	83.18	89.17	76.09	258	118	140	436
140	Panoh	129	577	283	294	1039	339	0	85.11	90.23	80.22	287	100	187	290
141	Ghumani	74	334	163	171	1049	106	0	88.45	91.78	85.35	158	41	117	176
142	Majhaun	40	196	105	91	867	56	0	91.85	96.88	86.36	108	37	71	88
143	Tikri	91	374	171	203	1187	84	0	93.77	95.42	92.39	270	22	248	104
144	Manjiasu	47	210	104	106	1019	23	0	86.77	97.83	76.29	111	54	57	99
145	Pehrwin	106	453	211	242	1147	38	1	88.73	95.79	82.82	205	108	97	248
146	Benla Brahmana	103	509	254	255	1004	93	0	87.61	93.42	81.70	130	109	21	379
147	Lunu Kanaita	102	576	298	278	933	283	0	84.30	89.14	79.12	361	81	280	215
148	Chakli	16	74	40	34	850	0	0	77.14	86.49	66.67	42	11	31	32
149	Chandpur	122	540	272	268	985	64	0	85.80	94.61	77.14	149	87	62	391
150	Bandla Miyan	45	207	106	101	953	42	0	91.05	97.85	84.54	56	19	37	151
151	Bhandwar	65	240	121	119	983	9	0	91.93	97.35	86.36	137	53	84	103
152	Kotlu	71	255	120	135	1125	62	0	89.57	95.41	84.30	146	110	36	109
153	Badhiat	91	423	221	202	914	207	0	88.30	93.10	83.16	127	77	50	296
154	Baihl Kandaila	106	509	250	259	1036	200	0	89.30	94.76	83.84	186	138	48	323
155	Bamta	84	379	205	174	849	73	4	95.03	100.00	89.70	119	114	5	260

S.No.	Name	Total Household	Total Population	Total Male	Total Female	Sex Ratio	SC Population	ST Population	Total Literacy Rate	Male Literacy Rate	Female Literacy Rate	Total Workers	Main Workers	Marginal Workers	Non Workers
156	Rauna	46	232	116	116	1000	166	4	78.79	86.00	71.43	149	101	48	83
157	Kosrian	138	662	346	316	913	340	0	83.48	88.78	77.94	502	163	339	160
158	Bhagatpur	167	715	325	390	1200	118	0	88.58	94.20	83.82	484	387	97	231
159	Patta	138	729	364	365	1003	403	0	87.41	93.29	81.57	116	70	46	613
160	Thohru	30	146	76	70	921	28	0	74.05	80.60	67.19	35	14	21	111
161	Sandauli	60	334	166	168	1012	130	0	69.29	77.62	60.58	92	12	80	242
162	Bandla	272	1421	741	680	918	362	6	75.02	83.18	66.23	903	216	687	518
163	Jeora	20	101	52	49	942	0	0	88.64	93.33	83.72	61	56	5	40
164	Jabal	3	11	6	5	833	6	0	54.55	66.67	40.00	6	6	0	5
165	Daur	19	101	48	53	1104	0	0	96.74	100.00	93.88	46	35	11	55
166	Kothi Batalan	38	176	98	78	796	35	0	83.44	92.94	71.21	115	109	6	61
167	Makri	126	740	384	356	927	195	0	80.96	89.57	71.74	227	178	49	513
168	Gasaur	117	548	271	277	1022	209	0	84.98	92.50	77.64	334	164	170	214
169	Bholi	142	735	390	345	885	512	0	67.64	75.15	59.28	444	239	205	291
170	Kathpur	57	264	135	129	956	151	0	74.27	83.33	64.35	103	47	56	161
171	Bhatoli	44	156	72	84	1167	20	0	84.14	92.54	76.92	28	28	0	128
172	Padohari	74	439	210	229	1090	207	0	98.20	98.38	98.03	403	30	373	36
173	Kot	75	381	190	191	1005	153	0	73.72	83.23	64.02	261	23	238	120
Sub Total		**6391**	**30914**	**15647**	**15267**	**976**	**8623**	**193**	**83.13**	**90.25**	**75.92**	**17169**	**6787**	**10382**	**13745**
Grand Total		**14885**	**71125**	**36029**	**35096**	**974**	**18141**	**928**	**83.23**	**90.46**	**75.89**	**34965**	**16128**	**18837**	**36160**

Source: ***Census 2011***

3.16.7 POPULATION DISTRIBUTION

The population as per 2011 Census records is 71125 (for 10 km radius buffer zone). Total no. of household is 3554, 4940 and 6391 respectively, in primary, secondary and outer zone. Sex ratio is 957, 984 and 976 (females per 1000 males) observed in primary, secondary and outer zone respectively. SC population distribution is 3482, 6036 and 8623 respectively in primary, secondary and outer zone. ST population distribution is 25, 710 and 193 respectively in primary, secondary and outer zone respectively. Demographic profile of study area is given in the Table below:

Table - 3.23

Demographic Profile of the Study Area

Zone	No. of Villages	Total Household	Total Population	Total Male Population	Total Female Population	Sex Ratio
Primary Zone (0 - 3 Km)	30	3554	16063	8208	7855	957
Secondary Zone (3 - 7 Km)	59	4940	24148	12174	11974	984
Outer Zone (7 - 10 Km)	84	6391	30914	15647	15267	976
Total	**173**	**14885**	**71125**	**36029**	**35096**	**974**

Source: *Census of India, 2011*

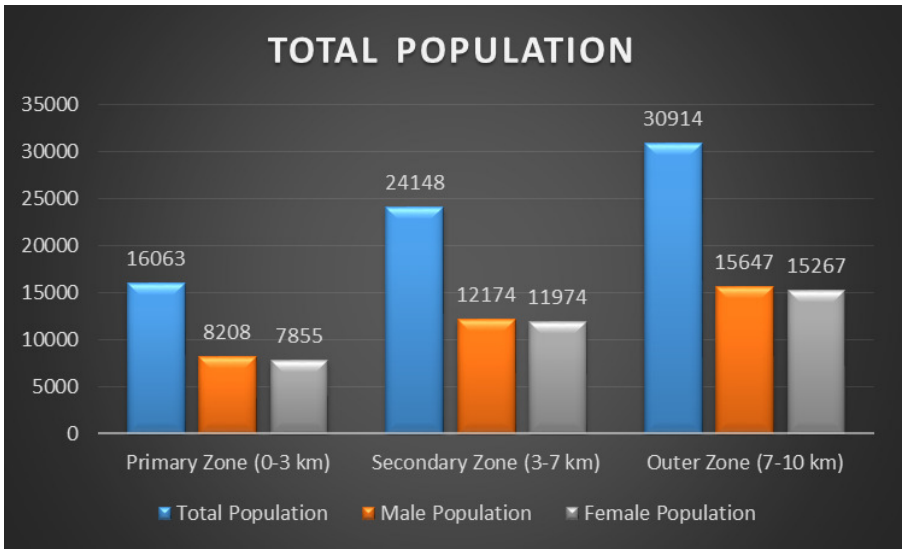


Figure: 3.14 Demographic Profile of the study area

3.16.7.1 VULNERABLE GROUPS

While developing an Action Plan, it is very important to identify the population which falls under the marginalized and vulnerable groups and special attention has to be given towards these groups while making action plans. Special provisions should be made for them. In the overview of villages, schedule caste (S.C.) population is 8%, Schedule Tribe (ST) population is 2%.

Table - 3.24

SC and ST population of the Study Area

Zone	No. of Villages	Total Population	Vulnerable Groups		Other Group
			SC Population	ST Population	
Primary Zone (0 - 3 Km)	30	3554	3482	25	12556
Secondary Zone (3 - 7 Km)	59	4940	6036	710	17402
Outer Zone (7 - 10 Km)	84	6391	8623	193	22098
Total	**173**	**14885**	**3482**	**25**	**12556**

Source: *Census of India, 2011*

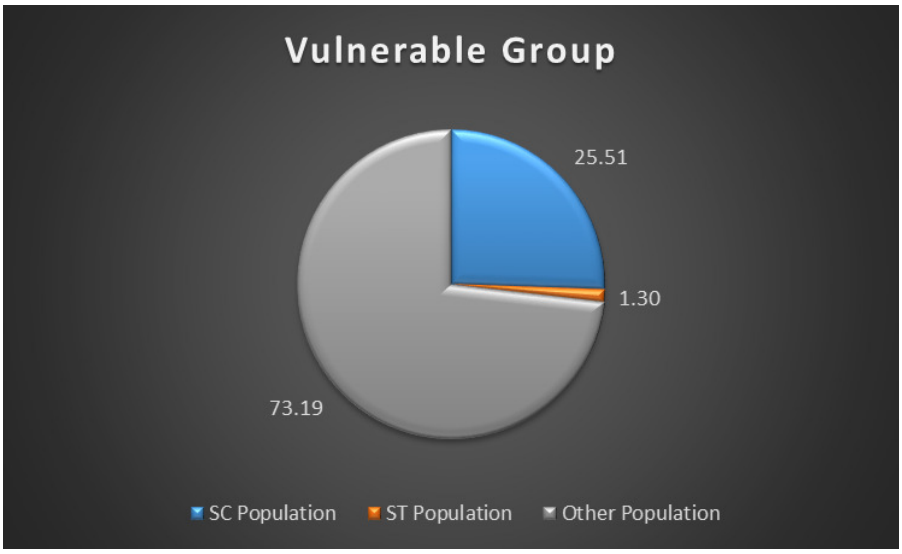


Figure: 3.15 SC and ST Population in Study Area

3.16.7.2 LITERATE POPULATION

Literacy is the ability to read and write one's own name and further for knowledge and interest, write coherently, and think critically about the written word. The analysis of the literacy levels is done in the study area. The 10 km radius study area demonstrates a literacy rate of 83.23 % as per census 2011. The male literacy rate works out to be 90.46 % whereas the female literacy rate, which is an important factor for social change, is observed to be 75.89% in the study area. This indicates that the education facilities in the villages are good but there is need to be aware as the female literacy as it is very important for our society and from the survey it is clear that the literacy rate of female is low comparison to male.

Table - 3.25

Literacy Rate of Study Area

Zone	No. of Villages	Male Literacy Rate	Female Literacy Rate	Total Literacy Rate
Primary Zone (0-3 Km)	30	92.64	79.12	85.97
SecondaryZone(3-7 Km)	59	89.27	73.75	81.54
Outer Zone (7 - 10 Km)	84	90.25	75.92	83.13

Zone	No. of Villages	Male Literacy Rate	Female Literacy Rate	Total Literacy Rate
Study Area (0-10 Km)	**173**	**90.46**	**75.89**	**83.23**

Source: *Census of India, 2011*

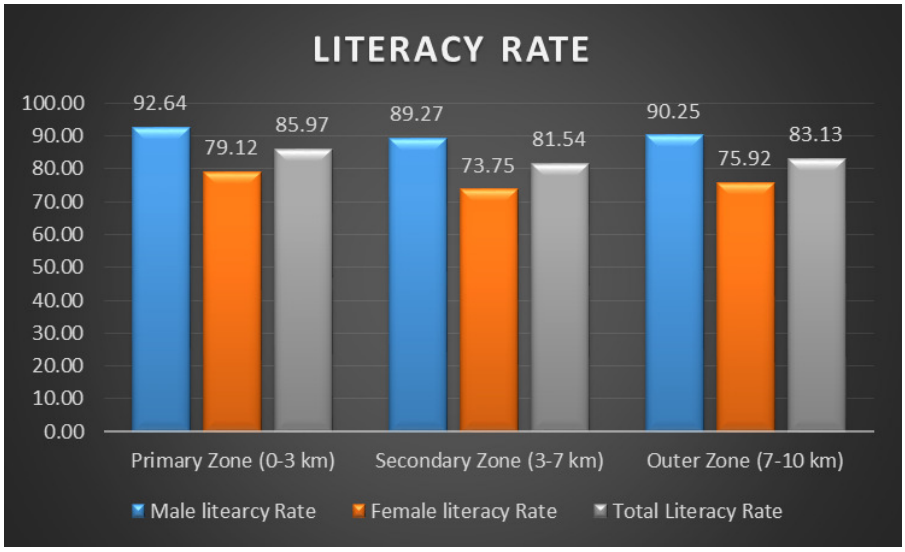


Figure: 3.16 Literate Population in the Study Area

3.16.7.3 ECONOMIC ACTIVITIES

The economy of an area is defined by the occupational pattern and income level of the people in the area. The occupational structure of residents in the study area is studied with reference to work category. The population is divided occupation wise into three categories, viz., main workers, marginal workers and non-workers. The workers include cultivators, agricultural labourers, those engaged in household industry and other services.

The marginal workers are those workers engaged in some work for a period of less than 180 days during the reference year. The non-workers include those engaged in unpaid household duties, students, retired persons, dependents, beggars, vagrants etc. besides institutional inmates or all other non-workers who do not fall under the above categories.

Table - 3.26

Working Population of the Study Area

Zone	No. of Villages	Total Workers	Main Workers	Marginal Worker	Non Worker
Primary Zone (0 - 3 Km)	30	6851	4406	2445	9212
Secondary Zone (3 - 7 Km)	59	10945	4935	6010	13203
Outer Zone (7- 10 Km)	84	17169	6787	10382	13745
Study Area (0-10 Km)	**173**	**34965**	**16128**	**18837**	**36160**

Source: *Census of India, 2011*

Total working population within the 10 km study area are 34956, where 16128 are main workers and 18837 of the total working population are marginal worker, 36160 of the total population are Non- Workers.

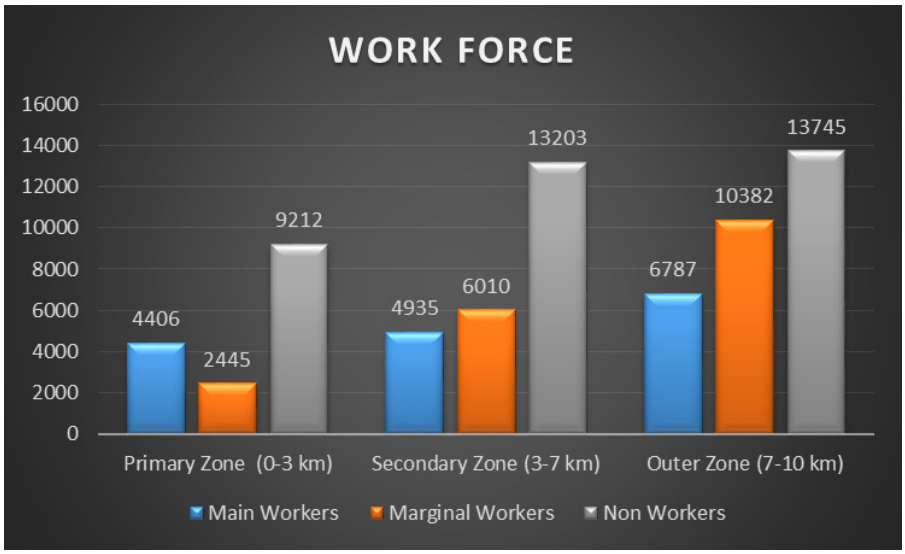


Figure: 3.17 Work force in study area

3.16.7.4 BASIC AMENITIES

A. EDUCATION FACILITIES

Education and learning are one of the most important processes in today's society. Education is not just restricted to teaching a person the basic academics, say computers, mathematics, geography or history, education is a much larger term. It is really a means to discover new things which we don't know about and increase our knowledge. Government has provided educational facilities in each village instead some villages do not have school facility. According to census india handbook 2011, Primary Schools are available in every villages and Middle, Secondary and Senior Secondary School (depend on population size) are available in some of the villages. It can be concluded from the available census data that people have to go far away from the villages for colleges and schooling. For higher education people have to migrate to the bigger cities. Educational and literacy details were collected from census india handbook 2011 and we observed lack of Education. After analysing the literacy rate from census data, we found that literacy rate is good. The available educational structure for the population in the case study area is mentioned in the table below.

Table - 3.27

Education facilities in the study area

Zone	Govt. Pri. Schl.	Govt. Midd. Schl.	Govt. Sec. Schl.	Govt. Sr. Sec. Schl.
Primary Zone (0 - 3 Km)	23	10	6	4
Secondary Zone (3 - 7 Km)	42	18	7	6
Outer Zone (7 - 10 Km)	63	26	11	9

Source: *Census of India, 2011*

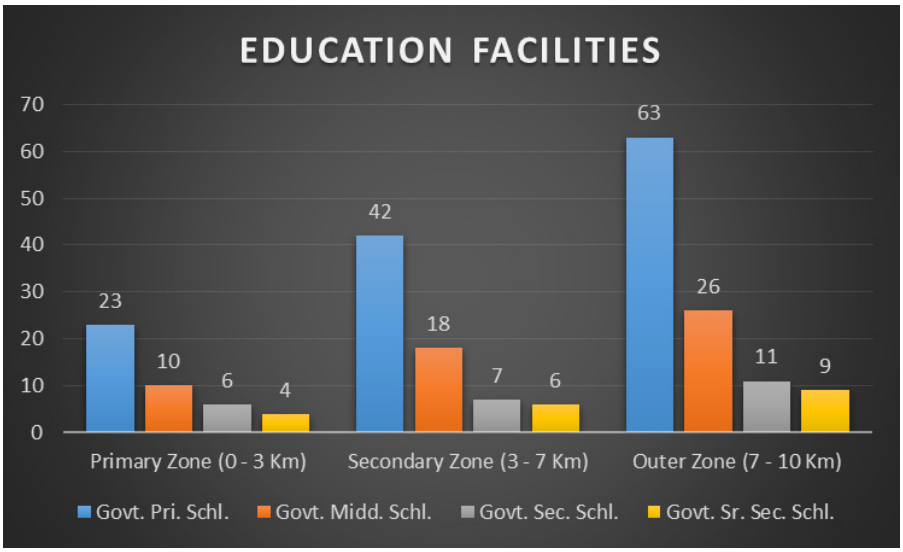


Figure: 3.18 Education facilities in study area

B. **HEALTH FACILITIES**

Health is a premier asset of human capital which is an important factor for growth of any economy. It is a source of human welfare. Health and nutrition play a major role for developing a healthy society as it impacts the productivity of a person.

The healthcare facilities in the study area consisted of Community health centre, Primary Health Centre, Primary Health Sub-Centre's; Maternity and Child Welfare Centre; Dispensaries and TB Clinic, Veternary hospitals, Non-Govt. medical facilities Medicine shops. Sub-Centres and Primary Health Centres. As per the data of 10 km radius study area collected from Census India Handbook 2011, medical facilities are needed to be improved by the Government as satisfactory facilities are not available for any medical emergencies. Patients have to move to Cities for any serious illness.

Table: 3.28

Healthcare Facilities in the Study Area

Zone	Primary Health Centre	Primary Heallth Sub Centre	Maternity And Child Welfare Centre	Veterinary Hospital	Dispensary
Primary Zone (0 - 3 Km)	4	7	1	6	4
Secondary Zone (3 - 7 Km)	1	5	0	8	7
Outer Zone (7 - 10 Km)	3	6	2	6	9

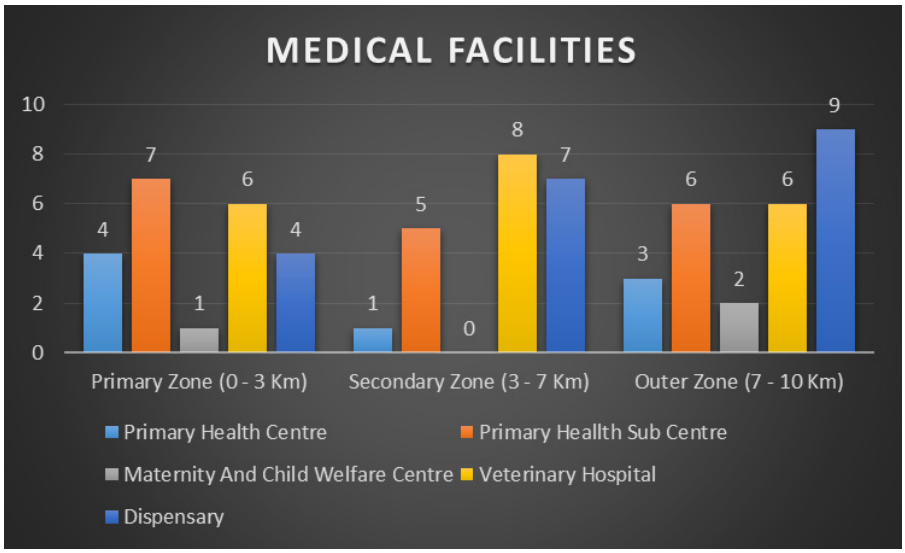


Figure: 3.19 Health facilities in the Study Area

C. OTHER INFRASTRUCTURE FACILITIES

Electrification in the Area

The source of electricity is fulfilled by the Government. Most of the villages are electrified and power supply is good in the study area.

Drinking Water Facilities:

As per the data collected from census India handbook 2011, it has been noticed that the requirement of drinking water is being fulfilled by Tap Water and handpumps. All villagers are availing drinking water facilities from Tap Water. The drinking and domestic water sources are Tap Water, Covered Well, Hand Pump, Tube Well / Bore Well, Tank / Pond / Lake.

Table 3.29

Drinking Water Facilities in the Study Area

Zone	Tap Water	Covered Well	Hand Pump	Tube Well / Bore Well	Tank / Pond / Lake
Primary Zone (0 - 3 Km)	30	2	23	3	6
Secondary Zone (3 - 7 Km)	55	9	40	7	7
Outer Zone (7 - 10 Km)	79	6	60	1	11

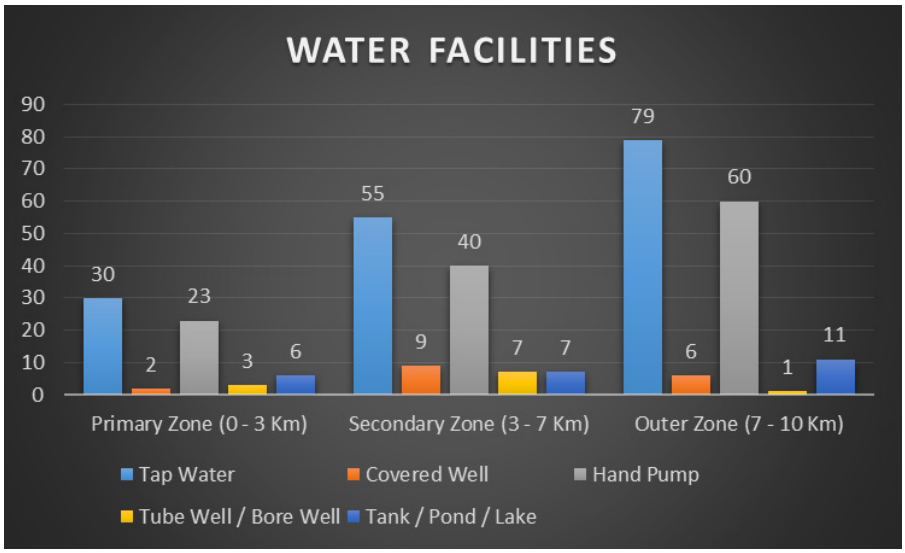


Figure:3.20 Water facilities in the Study Area

3.16.7.5 Other Infrastructure Facilities

Other facilities like Telephone services, mobile network coverage is good in almost every village lying in study area. Post office is available in few major villages. Daily newspaper, power facilities are available in almost every village. Better Infrastructure facilities in the study area is the need of the hour.

3.17 ECONOMIC EXPOSURE AND DEVELOPMENT

Implementation of the project has/ will make financial institutions as well as related economic facilities, infrastructure and services available to the people. This has/ will expose and introduce the local population to factors of economic development including the banking system, financial services, and credit and investment schemes. The exposure has/ will enable community members to invest their income and prevent dependency or living a life of "tomorrow will take care of itself". ". Regular interaction held with the community and provide information for various social security schemes like Atal Pension Yojna, Pradhan Mantri Jeewan Jyoti Beema Yojna, Kanya Sukanya Yojna etc. with the help of financial institutions.

ADVERSE SOCIAL IMPACTS

- **Health Impacts**

  The project has the potential for triggering health impacts through increased dust, creation of breeding grounds for disease vectors.

- **Noise and Vibration**

  The mining activity is being carried out by drilling & blasting. The noise & vibration is generated only for for short time due to transportation of vehicles thus there is no major adverse impact has seen.

- **Livelihood change**

  Due to the labour intensity of the mining sector, the project has attracted the more able-bodied persons from the community which in turn has lead to low labor availability in other sectors of the economy including agricultural, education and health skilled workers. Local employment opportunities has been created by the project. This impact is insignificant due to low level of education and skills in the area which resulted in sourcing skilled workforce from outside the immediate area. But the magnitude of this impact was high due to high number of dependants in a household.

- **Managing Loss of Livelihood and Income**

  To cushion the population against impacts of mine closure, comprehensive retrenchment packages that include adequate advance warning to employees and contractors to allow them to source alternative opportunities should be undertaken. Skills development programmes should also be undertaken well before the closure of the Plant. However, adequate protection measures has been/ will be taken by the mine management to take care of environment and to guard against adverse environmental impact.

Source: *Field Survey*

Identification of Needs

During the survey the needs of the people were identified and as per their requirement they have been enlisted below. It has been identified that Electricity, employment and other needs.

Table - 3.30
Need of the Area

Needs	Details
Transportation	Public Transportation means are required in order to commute to nearby cities. Private Vehicle is the only mean to commute to different cities or places.
Healthcare facilities	Healthcare facility like a permanent and regular dispensary with doctors and nurses for common ailments and deliveries is a requirement. It can be common to all the nearby villages. People spend huge amounts on treatment of ailments and there Ambulances can be run in the village on a regular basis so patients can be taken in emergencies. There is in the vicinity and so a regular practicing doctor is needed along with a dispensary for minor illnesses and deliveries. People are completely dependent on unqualified doctors, who are basically quacks.
Drinking water	Water facility for each household will help the people during summers and reduce the inconvenience caused to them as they put in considerable time in fetching water. . In primary zone drinking water facilities is being maintained by project (Barmana Panchayat and village Biriyahi of Jamthal Panchayat).
Livelihood options	People need livelihood options to raise income levels. This can be explored through SHGs and training programmes through proper market linkages.

Needs	Details
	They have no option but to look for work each day. This is affecting their life in every possible way. SHGs, technical training are options that need to be explored to raise their income levels. Youth and female members can also be engaged in a big way to contribute to the family income. The dependent population is high here. So more livelihood or income generation options are required. Business Skill Development can be promoted in order to make people self dependent and Soft loan can be given to the selected villagers without interest for a specified time period to start their own business. 58 SHGs are being managed in Barmana, Dhounkothi and panjgain panchayat. Some small enterprises like bag making , pickle making, stitching unit, mushroom cultivation are managed by the SHG members for additional household income. All SHGs are linked with FFI for loan and other baking facilities. Skill development centre is being manged at Baramana for providing skill trainng to the youth as per the market demand. This centre is operationalize since 2013 58 SHGs are being managed in Barmana, Dhounkothi and panjgain panchayat. Some small enterprises like bag making , pickle making, stitching unit, mushroom cultivation are managed by the SHG members for additional household income. All SHGs are linked with FFI for loan and other baking facilities. Skill development centre is being manged at Baramana for providing skill trainng to the youth as per the market demand. This centre is operationalize since 2013
Infrastructural needs	All the basic needs are required in these Villages ✓ Colleges ✓ Banks ✓ Skill Development Centre ✓ Solar Lights installed as per the demand of the panchayat and so far 80 solar light has been installed in three core panchayat(Barmana, Dhounkothi and Panjgain)
Others	✓ Awareness programme for villages ✓ Cultural programme for community

Recommendation and Suggestion

The village development plans are made in consultation with the community through Gram Sabah; these appear to address the needs of the community. However, it may be noted that at the implementation stage these plans often are fraught with problem of inadequate funds, lack of proper planning, corruption, vested interests and political agendas. Hence while ascertaining the scope for convergence with the government activities, care must be taken to ascertain realistic possibilities for implementation.

- Women empowerment– Home based income generation activities, vocational training programme, Common education centre for increase the literacy.

- Education – free uniform, construction of common rooms and library, computer education and physical education, additional schools for girls, furniture and equipment in schools.
- Vocational Trainings – Establishment of a vocational training center within the villages with a curriculum designed to suit market demands. Vocational training for disability persons.
- Agriculture/livestock –infrastructure such as agriculture electric connections, assistance with buying improved tools and equipment, capacity building, supply and/or knowledge of better variety of seeds, pasture land development and trainings on animal husbandry & facility of veterinary doctor .
- Health – improvement in sanitary conditions of the villages, assistance with construction of latrines, improvement in drainage system, health camps and awareness campaigns for diseases like malaria, typhoid, tuberculosis, yellow fever and pneumonia. Repairing of PHCs and Aanganbadi centers, Provision of water tanks at discreet village locations for sanitation, extending health facility to needy amongst surrounding villages , ambulances to local health centres in improving facility to public health.
- Persons with disability: Establishment of center for special education, sensitization of the community towards disabled and awareness on Govt.

3.18 CONCLUSION

The environment baseline study was conducted in the project area by both secondary data and primary data collections. Abiotic factors including air, water and soil were studied for the core and buffer zone.

It was found that most of the parameters were within the limits as per the Standards. Similarly, the study for the biotic factors was conducted. It can be concluded that the present environment status of the study area is good enough for the project activity. Adoption of adequate pollution control measures will protect the surrounding environment.

CHAPTER–4

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 INTRODUCTION

The environmental parameters likely to be affected by mining are related to many factors, i.e., physical, social, economic, agriculture and aesthetic. Opencast mining involves drilling, blasting, excavation, loading, crushing, transportation, unloading etc. Excavated limestone is being/will be loaded by large size hydraulic excavators of capacity 7.2 m^3 into the dumpers for onward dispatch to the crusher (for limestone). Crushed limestone is being/will be transported from the mine site to its integrated Gagal Cement Plant of ACC via covered conveyor belt of length ~1.1 Km.

The operations may disturb environment of the area in various ways such as removal of mass, change of landscape, flora and fauna of the area, surface drainage and change in air, water and soil quality. While for the purpose of development and economic upliftment of people there is need for establishment of mining industries because the area is rich in mineral resources, but these should be environment friendly. Therefore, it is essential to assess the impacts of mining on different environmental and Socio-economic parameters before starting the mining operations so that abatement measures could be planned in advance for minimizing the impacts wherever feasible.

The likely impacts on different environmental parameters due to the mine site location, possible accidents, mine design, development, operations & final closure of this mining project are discussed below.

4.2 METHODOLOGY OF IMPACT ASSESSMENT

The impact assessment has been undertaken following a systematic process that identifies, predicts and evaluates the impacts that the project could have on aspects of the physical, biological, social/ socio-economic & cultural environment, and identifies measures that the project will take to avoid, minimise/reduce, mitigate, offset or compensate for adverse impacts; and to enhance positive impacts where practicable. The stages of the impact assessment process comprise of the following:

- ***Impact identification:*** to identify the potential impact of the project on the various environmental parameters.
- ***Impact prediction:*** to determine what could potentially happen to resources/receptors as a consequence of the project and its associated activities.
- ***Impact evaluation:*** to evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resources/ receptors.
- ***Impact mitigation:*** to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts.

4.3 BASIS OF IMPACT ASSESSMENT

The impact of the existing project is assessed on the basis of their characteristics i.e., nature, type, extent, duration, intensity & frequency and its significance.

Characteristics of Impacts

The impact is described in terms of its characteristics such as nature, type etc. Impact characteristics are given in table - 4.1.

Table - 4.1
Impact Characteristics

Characteristic	Classification	Description
Nature	Positive impact	When impact is considered to represent improvement to baseline or introduce a new positive factor/change.
	Negative impact	When impact is considered to represent adverse change from the baseline or introduce a new undesirable factor/change.
	Neutral	When there is no impact to represent any change from the baseline and not introducing any new factor/change.
Type	Direct impact	Resulting from a direct interaction between a project activity and the receiving environment / receptors.
	Indirect impact	Resulting from other activities that happened as a consequence of the project.
	Cumulative impact	Impacts that act together with other impacts (including those from concurrent or planned future third-party activities) to affect the same resources and/or receptors as the Project.
Extent	Project Area	When impact due to the project related activities is restricted within the premises of project area i.e., core zone.
	Local	When impact due to the project related activities is restricted within the immediate surroundings i.e., up to 3 km radius.
	Zonal	When impact due to the project related activities is restricted within the study area i.e., up to 10 km radius.
	Regional	When an impact due to the project activity extends within as well as beyond 10 km radius.
Duration	Short - term	When the impact is usually temporary or last for a short time or will have an effect soon rather than in the distant future.
	Long- term	When impact would occur during the development of the project and either takes a long time or lasts a long time or cause a permanent change in the affected receptor/resource.
Intensity	Low	When resulting in slight changes of prevailing baseline conditions and quality of existing physical environment is good. Ecological environment as well as human receptors is not likely to be affected due to the existing project activity.
	Medium	When resulting in changes of prevailing baseline conditions which are

Characteristic	Classification	Description
		within the benchmark norms and quality of existing physical environment shows some signs of stress. Ecological environment as well as human receptors could be sensitive to change in quality of prevailing baseline condition, but human receptors retain an ability to adapt to change.
	High	When resulting in changes of prevailing baseline conditions which are exceeding the benchmark norms and quality of existing physical environment is already under stress. Ecological environment as well as human receptors would be impacted to the larger extent and the ability of human receptors to adapt to changes would be undermined.
Frequency	Remote (R)	When resulting in remote or one-off chance of an event due to an activity on a receptor/ resource.
	Occasional (O)	When an impact due to an activity is occurring intermittently from time to time on a receptor/resource.
	Periodic (P)	When an impact due to an activity is resulting on periodic basis for a week or a month on a resource/receptor.
	Continuous (C)	When an impact due to an activity is continuously resulting on a resource/receptor.

Significance of Impacts

Impacts are described in terms of 'significance'. Significance is a function of the magnitude & sensitivity / importance of the impact.

Classification of impact significance is given in table - 4.2.

Table - 4.2

Significance of Impact

Significance	Description
Insignificant	Negligible impact or where a resource or receptor (including people) will not be affected in any way by a particular activity or the predicted effect is deemed to be 'negligible' or 'imperceptible' or is indistinguishable from natural background variations.
Minor	Where an effect will be experienced, but the impact is well within accepted standards/guidelines with or without mitigation.
Moderate	Where an effect will be experienced and the impact is within accepted standards/guidelines with mitigation.
Major	Impact where an accepted limit or standard may be exceeded or the impact occurs to the highly valued/sensitive resource/receptors.

Irreversible and Irretrievable commitments of environmental components

Determining the irreversible and irretrievable commitment of the resources is one of the major stages of impact evaluation, which gives an understanding about the potential impacts that are likely to affect future generations of the area and facilitates for adoption of proper mitigation measure regarding the same.

Table - 4.3

Irreversible and Irretrievable commitments of environmental components

Commitment of resources	Description
Irreversible	Irreversible commitment of resources refers to the impact or loss of the resources that cannot be recovered or reversed. Irreversible is a term that describes the loss of future options. It applies primarily to the impacts of use of nonrenewable resources or to those factors that are renewable only over long periods of time.
Irretrievable	Irretrievable is a term that applies to the loss of production, harvest or use of natural resources. Irretrievable commitment of resources may be considered as the loss of resources as a result of change (both reversible & irreversible) due to any project activity that cannot be regained or recovered.

4.4 INTERACTION MATRIX

The interaction matrix enables a methodical identification of the potential interactions each project activity may have on the range of resources/receptors within the Area of Influence for the Project.

The interaction matrix for the project activities and likely impacted resources/receptors is presented in Table - 4.4 which covers potential interactions, regardless of probability of occurrence. The matrix consists of a list of resources/ receptors that could be affected against a list of project activities.

Entries in the matrix cells are tick marked to indicate whether:

- An interaction is not reasonably expected (blank);
- An interaction is reasonably possible and may lead to potential impact (tick marked).

Table - 4.4

Interaction Matrix

S. No.	Project Activity / Likely Impacted Resources / Receptors	*Land Acquisition*				Mine development & Process					*Reclamation and Greenbelt/plantation*		*Miscellaneous*		
		Acquiring land	Displacement of households	Displacement of occupation	Rehabilitation & Resettlement of PAFs	Site Clearing within the project area and leveling of site (removal of vegetation, structures etc.), Storage of soil	Mining Operation (excavation with Drilling, blasting)	Loading and unloading of mined out material	Crushing of limestone, Shale and Quartzite in the crusher (located in lease)	Transportation of crushed mineral by conveyor belt	construction of garland drains & retaining walls	Greenbelt Development and maintaining greenbelt of 7.5 m statutory barrier & along roads. Plantation on non-mining zone	Workshop for HEMM maintenance in mine.	Meeting points of workers/ employees i.e. Rest shelter, canteen	Handling of high explosive in magazine & AN storage shed and fuel
A.	**Physical**														
1.	Air					√	√	√	√		√	√			√
2.	Noise & / Vibration					√	√	√	√			√		√	
3.	Land Use					√	√				√	√			
4.	Topography						√	√			√				
5.	Geology						√					√			
6.	Drainage Pattern					√	√								
7.	Surface Water														
8.	Ground Water						√	√	√			√	√	√	
9.	Soil					√	√	√				√			
B.	Biological														

1.	Flora					√	√	√			√	√			
2.	Fauna					√	√					√			
3.	NP/WLS/BR/reserves/Forests etc.														
C.	**Social / Socio-Economic**														
1.	Demography														
2.	Physical Displacement														
3.	Land Use (w.r.t. Population influx)						√								
4.	Habitation														
5.	Economy & Livelihood					√	√								
6.	Social & Cultural Structure													√	
7.	Infrastructure & Public Services														
8.	Public Health						√					√			
9.	Agriculture						√								
10.	Transport Infrastructure														
D.	**Occupational Health**														
1.	Injury					√	√	√	√	√			√		√
2.	Health						√	√							√
3.	Non - routine risk						√								√
	Legends		Show no interactions is reasonably								√	Show interactions reasonably possible with one of the outcomes may lead to potential impact			

According to the interactions identified between project activities and resource/receptors as described in the above table, it is evident that the following aspects are likely to have impact due to the mining project (Table: 4.5) and therefore, to be considered for Impact Assessment:

Table - 4.5

Likely Impacted Resources / Receptors

S. No.	Likely Impacted Resources / Receptors	
A.	Physical	Air Quality
		Noise Level, ground vibrations
		Water environment (Surface & Ground water)
		Soil Environment
		Land Use
		Geology &Topography
B.	Biological environment	Flora
		Fauna
C.	Socio economic environment	Habitation & Demography
		Physical Displacement
		Land use (w.r.t. population influx)
		Economy & Livelihood
		Social & Cultural Structure
		Infrastructure & Public Services
		Public Health
		Agriculture
		Transport Infrastructure
D.	Occupation Health & Safety	Injury
		Health
		Non-Routine Risk

Source: *Interaction Matrix*

The impacts of mining on various environmental parameters were assessed and are given below:

4.5 ENVIRONMENTAL IMPACT ASSESSMENT AND MITIGATION MEASURES

The mining activities may impact the environment in various ways such as degradation of land, dust generation, deterioration of water and soil quality, affecting the biological and socio-economic environment of the area. The impacts of mining on various environmental parameters were assessed and are given below.

4.5.1 IMPACT ON AIR QUALITY AND MITIGATION MEASURES

The existing project includes various mining operations involving drilling, excavation, loading, transportation of material by dumper, unloading, crushing of limestone and transportation of

crushed material via covered conveyor belt. These operations generally result in generation of dust material and thereby pose health hazards. However, adequate control measures is being/will be provided at every stage of operation such as water sprinkling on haul roads, maintaining optimum vehicle speed etc. to reduce fugitive dust emissions.

4.5.1.1 AIR POLLUTION DUE TO EXISTING MINING PROJECT

(i) Gaseous Pollution

Gaseous pollutants ($SO_2$and NO_X) are anticipated from blasting operation and movement of machineries like excavator, loaders, dumpers & other vehicles; while generation of pollutants during blasting is instantaneous.

(ii) Particulate Matter

The generation of dust is anticipated from various mining activities like drilling, blasting, excavation, loading, unloading, crushing, and transportation and other related activities.

4.5.1.2 AMBIENT AIR QUALITY IMPACT PREDICTION MODELING

Impact Prediction is an important part of Environmental Impact Assessment Study. There are various techniques available to predict the impacts. Mathematical modeling is an established and accepted technique for the same.

At present mine is running with 4.5 million TPA maximum production capacity and the ambient air quality impact prediction has been carried out for normative and peak production capacity as mentioned below:

Table 4.6

Ambient Air Quality Impact Prediction

S. No.	Particular	Capacity Million TPA	Normative Capacity (TPD)	Peak Production by increasing 20% capacity (TPD)
1	Limestone	3.78	12116	14539
2	Shale	0.64	2052	2462
3	Quartzite	0.072	231	277
	Total Production	**4.492**	**14,399**	**17,278**
4	Sub grade stacking	0.51	1635	1962
Total Excavation		**5.01**	**16034**	**19240**

Source: *Approved Modified Mining Plan with Progressive Mine Closure Plan*

Total proposed material handling of 5.01 Million TPA comprises Limestone: 3.78 MTPA, Shale: 0.64 MTPA, Quartzite: 0.072 MTPA and Subgrade Stacking: 0.51 MTPA.

At Peak Stage (20%): In case of shut down/break down/major maintenance in crusher with belt conveyor system production of mine and due this short fall may create in limestone stock in Plant side; therefore, to cover up this short fall, considered 20% maximum production as compared to daily production. However, the annual production will remain same i.e., Limestone: 3.78 MTPA, Shale: 0.64 MTPA, Quartzite: 0.072 MTPA and Subgrade Stacking: 0.51 MTPA.

After considering the 20% maximum the limestone production of per day will be 14539 tonnes, Shale will be 2462 tonnes, Quartzite will be 277 tonnes and Subgrade Stacking will be 1962 tonnes; thus, total handling will be 19240 tonnes/day (At Peak Stage). The same has been considered for air quality modelling.

This report gives the peak incremental concentration of Particulate Matter to a distance of 10 km, due to the mining & allied activity. The concentrations have been predicted in all directions.

Spatial distributions of all the pollutants are also presented in the form of Isopleths.

4.5.1.3 ACTIVITIES INVOLVED IN THE PROJECT

Opencast Mining activities such as clearing of vegetation, drilling, blasting occasionally, excavation, loading, unloading, crushing & transportation are being/will be conducted in such a way to ensure maximum mineral conservation and minimum environmental degradation. The transportation of limestone from the working faces to the crusher is being carried out by dumpers. After crushing the crushed limestone is transported to the Gagal cement works via covered conveyor belt (~ 1.1 km).

4.5.1.4 EMISSION RATE AS PER MATERIAL HANDLED

Numerous researchers have derived various formulation based on the experimental data and generalized the emission calculation for various open cast mining activities irrespective of type of mining (*CIMFR, 1998; Chakraborty et al. 2002*). The details of emissions computed from mining operations existing in mining lease are given below:

A. Area Source

Table 4.7

Emission rate & Load for PM10 and PM2.5

S.No	Activity	Category of Source	For Normative Production			For Peak Production by increasing 20% capacity		
			Emission Rate		Emission Load	Emission Rate		Emission Load
			Values	Unit	Kg/day	Values	Unit	Kg/day
1.	Drilling	Point	0.618034094	g/s	26.70	0.618034094	g/s	26.70
2.	Limestone loading	Point	0.604050324	g/s	26.09	0.609398639	g/s	26.33
3.	Shale Loading	Point	0.62412692	g/s	26.96	0.644075665	g/s	27.82
4.	Quartzite Loading	Point	0.147803336	g/s	6.39	0.147803336	g/s	6.39
5.	Sub Grade Mineral Loading	Point	0.458598836	g/s	19.81	0.470678579	g/s	20.33
6.	Haul Road	Line	0.045103552	g/s/m	1149.60	0.045428239	g/s/m	1157.87
7.	Limestone Unloading	Point	0.292955338	g/s	12.66	0.29803329	g/s	12.88
8.	Shale Unloading	Point	0.605172674	g/s	26.14	0.622835249	g/s	26.91
9.	Quartzite Unloading	Point	0.032042347	g/s	1.38	0.034482615	g/s	1.49
10.	Sub Grade Mineral Unloading	Point	0.247800137	g/s	10.70	0.247800137	g/s	10.70

11.	Exposed Pit surface	Area	2.66558E-05	g/s/m²	659.37	2.66558E-05	g/s/m²	659.37
12.	Exposed Sub Grade Mineral dump	Area	0.000123798	g/s/m³	171.14	0.000123798	g/s/m³	171.14
Total SPM Load (kg/day)				2136.94		2147.92		
SPM Emission (g/s)				37.10		37.29		
SPM Emission Rate (g/s/m²) (Pit Area)				**1.6043E-05**		**6.51242E-05**		
Uncontrolled								
PM_{10} Emission Rate @50 % of SPM					18.55	18.65		
$PM_{2.5}$ Emission Rate @ 40% of PM_{10}					7.42	7.46		
Controlled								
PM_{10} Emission Rate @80 % efficient mitigations measures – 20% of PM10					3.71	3.73		
$PM_{2.5}$ Emission Rate @80 % efficient mitigations measures – 20% of PM2.5					1.48	1.49		

Table 4.8

Emission rate & Load for SO2 and NO2

S. No	Pollutant	For Average Production		For Peak Production by increasing 20% capacity	
		(g/s)	Kg/day	(g/s)	Kg/day
1.	SO2 Emission Rate	0.87	34.48	0.17	6.83
2.	NO_2 Emission Rate	0.22	8.70	0.19	7.42

4.5.1.5 STACK DETAILS FOR EXISTING CRUSHER (1000 TPH& 400 TPH) IN MINE LEASE

Table - 4.9

Stack Details (For crushing activity) 2 nos. of Existing crusher

S. No.	Stack attached to	Stack No.	Height from ground level (m)	Internal Diameter (Top)(m)	Emission Rate (g/sec) PM	Exit Velocity (m/sec)	Exhaust Gas	
							Temp (°C)	Volumetric Flow (m^3/sec)
1.	Primary Crusher (Existing, 1000TPH)	1	27.0	5.20	0.70	9.15	50	17
2.	Primary Crusher (Existing, 400 TPH)	2	26.0	4.25	0.60	5.41	50	10

4.5.1.6 MODELING PROCEDURE

Prediction of incremental ground level concentrations (GLC's) due to existing Limestone Mine has been made by AERMOD version 10.2. It is US-EPA approved model for prediction of the air quality. For this study, uniform polar receptors have been assumed. Modelling has been done considering area source, line source and point source for mine.

4.5.1.7 METEOROLOGICAL DATA/INPUT PARAMETERS FOR AERMOD

Data recorded at the weather monitoring station are wind speed, direction and temperature at one-hour interval during Post Monsoon Season (Oct to Dec, 2022) has been used as meteorological input.

4.5.1.8 AMBIENT AIR QUALITY STANDARDS

Ambient air quality standards promulgated by National Ambient Air Quality Standards for different areas are as follows:

Table - 4.10

Ambient Air Quality Standards

Area	Time Weighted Average	Concentration (µg/m³)			
		PM_{10}	$PM_{2.5}$	SO_2	NO_2
Industrial Area, Residential Rural and Other Areas	Annual Average	60	40	50	40
	24 hours	100	60	80	80
Ecologically Sensitive Area (Notified by Central Govt.)	Annual Average	60	40	20	30
	24 hours	100	60	80	80

4.5.1.9 PRESENTATION OF RESULTS

In the present case, air quality impact prediction has been carried out for existing mining Project to obtain an optimum description of variations in concentration over the existing sites in 10 km radius.

The incremental concentrations have been estimated based on mathematical emission data-based modelling. Existing value has been covered in the Background Ambient Air Quality Monitoring. The Ground level incremental concentrations are estimated for the monitoring period. For each time scale, i.e., for 24 hrs, the model computes the maximum GLC observed during the period over all the measurement points. Existing value has been covered in the Background Ambient Air Quality Monitoring. The Ground level incremental concentrations are estimated for the monitoring period. For each time scale, i.e., for 24 hr the model computes the highest concentrations observed during the period over all the measurement points.

The maximum incremental concentration due to the mining project and cement plant for PM10, PM2.5, SO2 and NO2 is superimposed on the baseline concentration recorded at the monitoring locations during the field monitoring period. The GLCs (Baseline + incremental) due to the mining project for PM10 is 3.82 µg/m³, for PM2.5 is 1.46 µg/m³, for SO2 is 1.79 µg/m³ and for NO2 is 1.82 µg/m³ restricted within the mine lease area.

Table - 4.11

Predicted Incremental & Ground Level Concentration (GLC)

S. No.	Particular	PM10	PM2.5	SO_2	NO_2
1.	Predicted incremental Max concentrations (In µg/m³)	3.82	1.46	1.79	1.82
2.	Monitored Baseline concentrations (In µg/m³)	76.9	44.6	11.7	23.8
3.	Resultant Maximum concentrations (In µg/m³)	80.72	46.06	13.49	24.90
4.	**NAAQS (dated 2009)**	**100**	**60**	**80**	**80**

For PM10, maximum predicted incremental concentration for existing limestone, Shale and Quartzite mine is found to be 3.82 µg/m^3 (Figure 4.1).

For PM2.5, maximum predicted incremental concentration for existing limestone, Shale and Quartzite mine is found to be 1.46 µg/m^3 (Figure 4.2).

For SO2, maximum predicted incremental concentration for existing limestone, Shale and Quartzite mine is found to be 1.79 µg/m^3 (Figure 4.3).

For NO2, maximum predicted incremental concentration for existing limestone, Shale and Quartzite mine is found to be 1.82 µg/m^3 (Figure 4.4).

There will be no significant threat to the gaseous pollutants of the ambient air quality; however, concentration of particulate matter is a subject of concern - though not immediate. Proper mitigation plan for dust and emission control is being/ will be implemented in the plant premises.

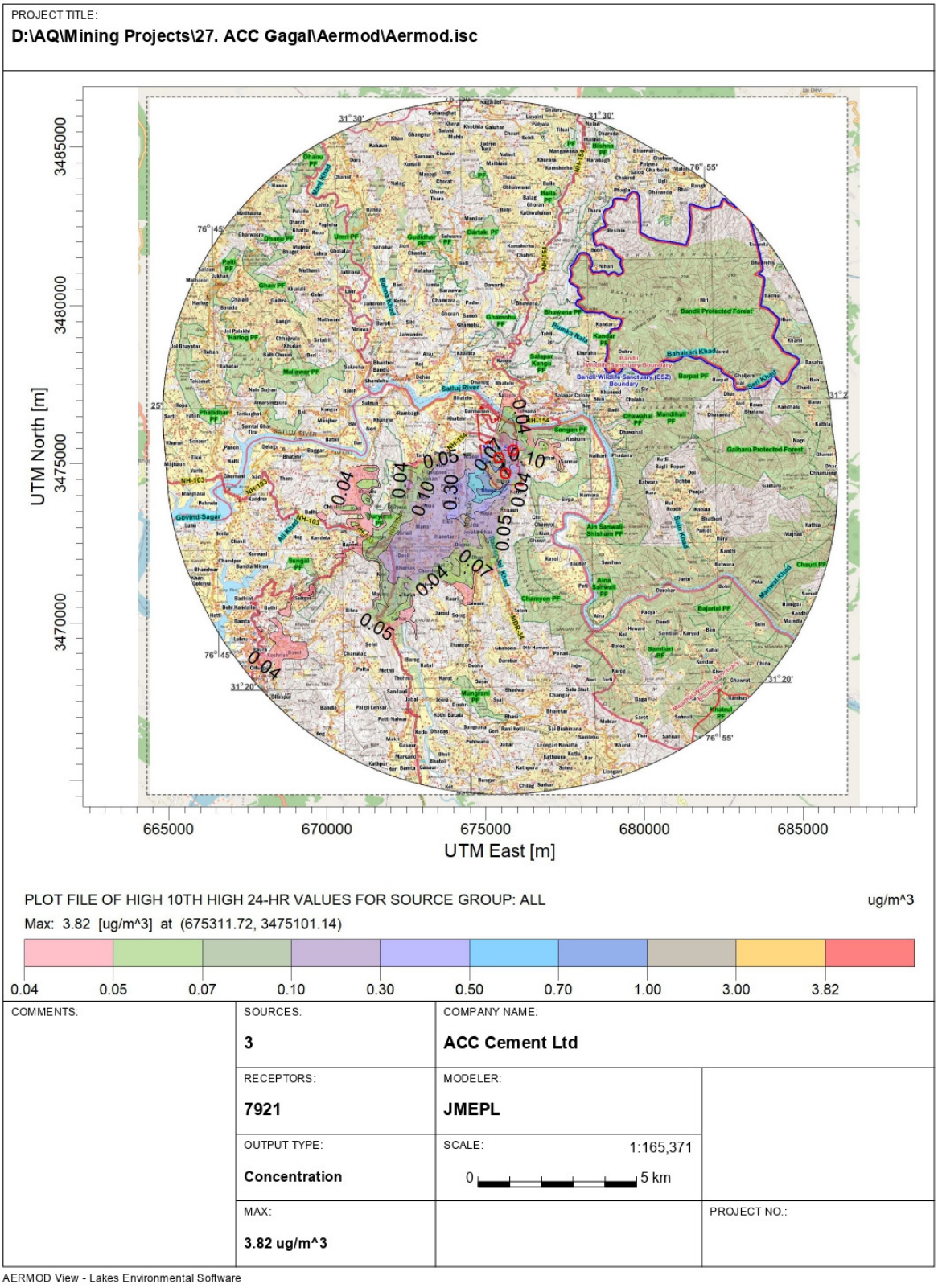


Fig 4.1: Isopleth showing the incremental concentration *of PM10*

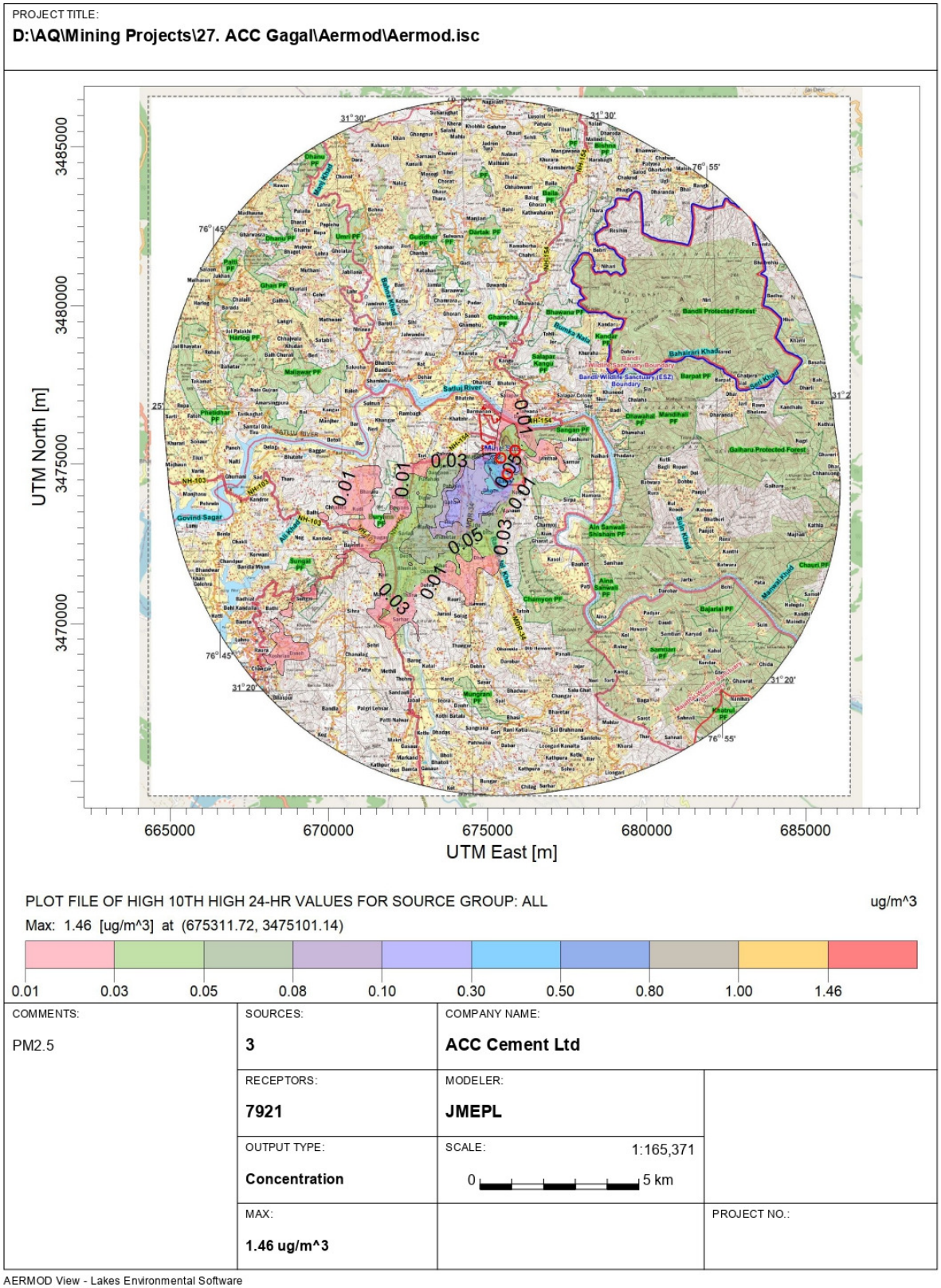


Fig 4.2: Isopleth showing the incremental concentration *of PM2.5*

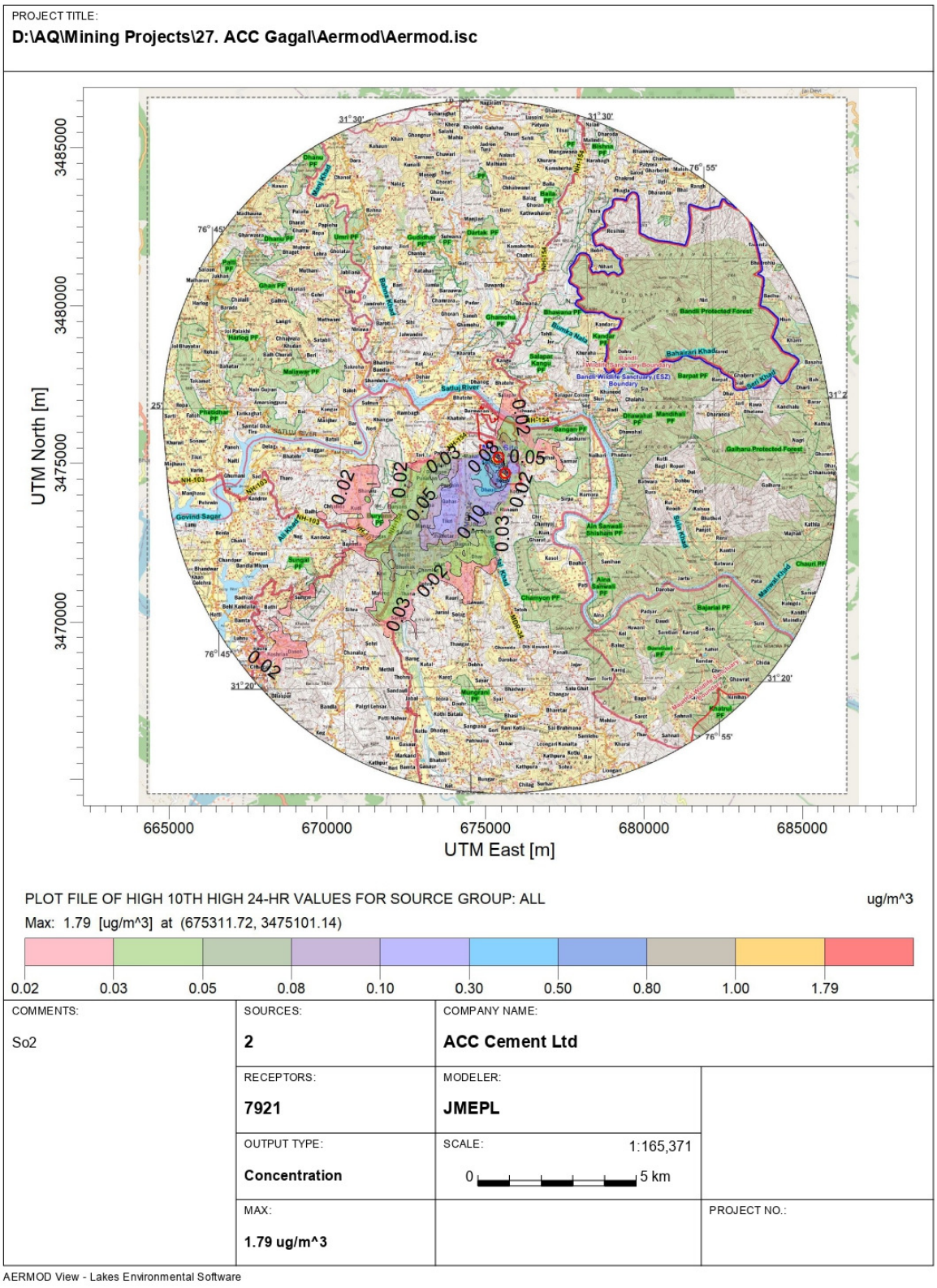


Fig 4.3: Isopleth showing the incremental concentration *of SO2*

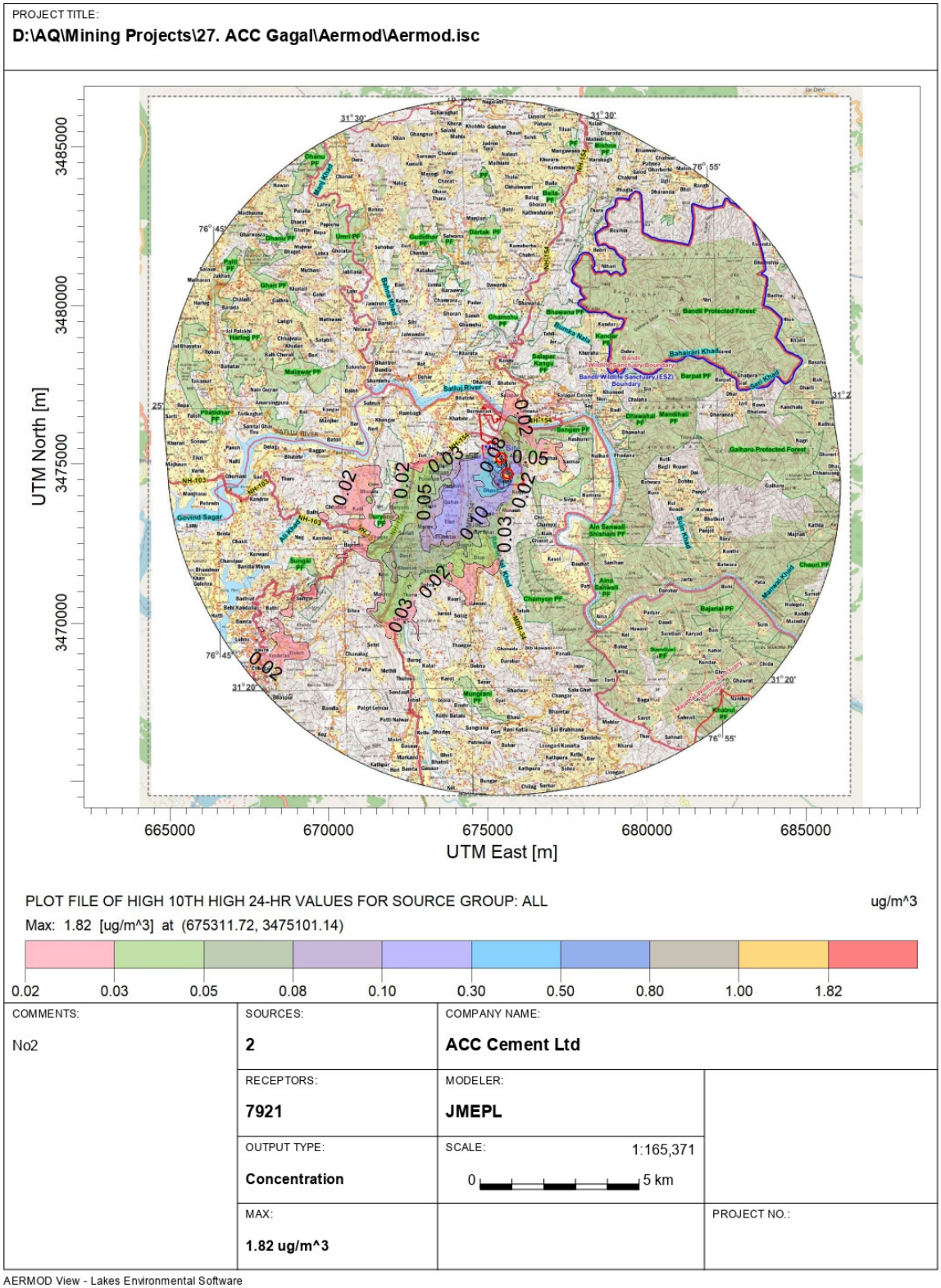


Fig 4.4: Isopleth showing the incremental concentration *of* NO_2

4.5.1.10 MITIGATION MEASURES

The following mitigation measures is being/ will be adopted to mitigate air pollution generated due to the mining activities:

During Drilling Operation

- Dust generation is reduced by using sharp drill bit is being used.
- Providing dust extractors to drilling units.
- Personal protective equipment is being provided to drill operators and his helpers.

During Blasting Operation

- Proper stemming in blast holes.
- Avoiding blasting during unfavourable condition.
- Use of Rock Breaker to avoid blasting in ridges.

During loading operation

- Latest generation loading equipment's like hydraulic excavators is being/ will be used and operated by skilled operators to load dumpers.
- Water tanker arranged for water sprinkling on haul roads and Loading Point.
- Propagation of this dust will be confined to loading point only and won't affect any person nearby. Both the operators of excavator and dumpers present at that point operate the machine from a closed cabin.

During Crushing

- Crusher hoppers are installed with automated dry fogging system to mitigate fugitive dust emissions during unloading of dumpers in the crusher hopper.
- Both the Crushers are installed with High-Capacity Bag Filters.
- Belt conveyor systems are (totally covered with the GI Sheets and provided with dust suppression system at transfer points.
- Completely covered stacker and reclaimer shed are provided.

During Transport operation

- Water tanker is operated at haulage road during regular intervals for dust suppression. Rain Guns are also provided on main haulage road and on the haulage road to crusher hopper.
- To control the gaseous emission, all mine machineries are maintained in proper order through routine checklist.
- Crushed mineral is being transported to interlinked cement plant via Covered conveyor belt.
- Strict speed limit (max 30 km/hr) of vehicles is being/ will be implemented.
- Regular maintenance of HEMMs & transportation vehicles.
- Measures will be taken to reduce the diesel consumption during transportation.

Plantation work

- Total area under greenbelt is estimated as 6.0 Ha, out of which 4.0 Ha has already been covered and the rest 1.0 Ha will be completed in the next 1 year, rest 1 Ha is natural plantation and not accessible.
- At the conceptual stage (Lease life), total area under plantation is estimated as 127.65 Ha, out of which 120.65 Ha has already been covered under plantation and the rest will be completed till the Conceptual period (lease life).
- Local forest trees (*Acacia catechu, Acacia nilotica, Acacia Senegal, Aeglemarmelos, Albiziaamara, Albizialebbeck, Albiziaodoratissima, Albiziaprocera, Alstoniascholaris, Anogeissuslatifolia, Azadirachtaindica, etc..)* has been used for plantation/greenbelt.

Monitoring

- Four ambient air quality stations have been established in the core and buffer area respectively for SPM, RPM, CO, NOx& SO2.
- The ambient air quality monitoring locations are
  - Crusher
  - Mines Office
  - Core Zone
  - Magazine Point
- Ambient air quality monitoring is being carried out on Quarterly basis and the same is submitted to Authorities on regular basis.

Bag House Filter at Crusher

Water Sprinkling on Haul road

Regular Maintenance at Work Shop

Water Sprinkled on Haul Road


Green Belt/ Plantation

4.5.1.11 IMPACT EVALUATION

Ambient Air Quality monitoring results are given in table 3.9 & 3.10, Chapter 3 of this Draft EIA/EMP report. Maximum incremental GLC is obtained by Air quality impact prediction for PM_{10}, $PM_{2.5}$, $SO_2$and NO_2 as shown in isopleths diagrams vide Figure no. 4.1 to 4.4. From this, it is evident that baseline AAQ results when added in the predicted GLC, the resultant concentrations are found well within the prescribed norms. Impact evaluation is further given in table 4.12:

Table - 4.12

Impact Evaluations for Ambient Air Quality

Impact Evaluation Element	Change in Air Quality due to the existing limestone, Shale and Quartzite mining project			
Potential Effect/ Concern	Impact on health of humans and nearby biological/ecological receptors due to line and point sources of air emissions including fugitive dust emissions during mining activities from the existing Project.			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	*Project Area*	*Local*	**Zonal**	Regional
	√			
Duration	Short - term		Long- term	
			√	
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	**Continuous (C)**
				√

Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

4.5.2 IMPACT OF NOISE / VIBRATIONS AND MITIGATION MEASURES

4.5.2.1 IMPACT OF NOISE ON WORKING ENVIRONMENT

Mining operations for mine development, mining by drilling, blasting, excavation, transportation and crushing of limestone, Shale and Quartzite are imperative that noise levels would increase.

1. Noise Generated due to Drilling, Excavation, Transportation, Crushing and Screening

Various mining activities i.e., drilling, excavation, transportation and crushing will increase the noise level in surrounding environment. The noise levels in the working environment are maintained within the standards prescribed by Central Pollution Control Board. These standards were established with the emphasis on reducing the hearing loss. The permissible limits, as laid down by CPCB, are presented in following table:

TABLE - 4.13

Permissible Exposure in Case of Continuous Noise (CPCB, Govt. of India)

S. No.	Sound Level (dB A)	Continuous Duration (Hours)
1.	85	8
2.	88	4
3.	91	2
4.	94	1
5.	97	0.5
6.	100	0.25
7.	103	0.125
8.	106	0.067

Source: Factories Noise Regulations, 1997

2. Noise Generated Due to Blasting

- Noise generated from blasting is for a short duration and is instantaneous.
- Noise of blast is site specific and depends on type, quantity and strength of explosives, dimensions of drill holes and degree of compaction of explosive in the blast holes.
- The noise levels tend to decrease with distance. The impact of noise is being/ will be restricted to mining activity area only, as plantation/ green belt is being /will be developed around the mine which restricts the propagation of noise.

3. Noise Impact Analysis on Community

Baseline Noise levels varied from 51.7 to 65.2 Leq dB (A) during day time and from 41.6 to 50.4 Leq dB (A) during night time.

Overall, it can be stated that the impact on the present noise levels due to mining operations will mainly be restricted to the active mine lease area only and it will attenuate fast at ML

boundary in majority of directions. Therefore, no significant increase in ambient noise levels is anticipated.

4.5.2.2 MITIGATION MEASURES TO REDUCE AMBIENT NOISE LEVELS

The following control measures are being/ will be adopted to keep the ambient noise levels within the limits:

- When conventional drilling, use of sharp drill bits to achieve optimum drilling performance and to reduce noise generation at source.
- Avoiding the secondary blasting.
- Adoption of control blasting with proper spacing, burden and stemming.
- Minimum quantity of detonating fuse is to be consumed by using alternatively "Raydet /Excel non electrical initiation system" or by electronic detonators.
- Blasting is to be carried out during favourable atmospheric conditions and low human activity timing.
- Use of proper designed machinery, maintained properly.
- Crusher is totally enclosed in a covered building to minimize sound propagation.
- Sound insulated chambers for the workers deployed on the machineries producing higher level of noise like dozers, drills etc.
- Regular maintenance, oiling and greasing of machines at regular intervals is being/ will be done to reduce generation of noise.
- All employees and operators are being/ will be provided with protective equipment, earmuffs and earplugs as a protective measure from the high noise level generated near the machinery.
- NoiseMonitoring is carried out in core zone and buffer zone by NABL accredited laboratory.

Sound Insulated Chambers

4.5.2.3 IMPACT EVALUATION OF NOISE

Ambient Noise Level monitoring results are given in Chapter 3 of this Draft EIA/EMP report. From this it is evident that results are well within the prescribed norms. Impact evaluation is given in table below.

Table - 4.14

Impact Evaluation for Noise

Impact Evaluation Element	Change of Noise Level due to the existing Limestone, Shale and Quartzite Mining Project.
Potential Effect/ Concern	Impact on health of humans and biological factors/receptors due to noise

	generated due to mining activities during day and night time and also on occupational health of the workers exposed to noise.			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	***Project Area***	*Local*	Zonal	Regional
	√			
Duration	Short - term		Long- term	
	√			
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	**Continuous (C)**
			√	
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

4.5.2.4 IMPACT OF VIBRATION DUE TO BLASTING

Ground vibration, fly rock, noise, dust and fumes are the deleterious effects of blasting operation on environment. The explosive energy generates a seismic wave in the ground, which can cause significant damage to structures and disturbance to human occupants.

When an explosive charge is fired inside the blast hole it is converted into hot gases and sound which exert intense pressure on the blast-hole walls. High intensity shock waves propagate radially in all directions and cause the rock particles to oscillate. This oscillation is felt as ground vibration. Blasting, in addition to easing the hard strata generates ground vibrations and instantaneous noise. Ground vibration from mine blasting is expressed by amplitude, frequency and duration of blast. The variables, which influence ground vibrations, are controllable and non-controllable. The non-controllable variables include general surface terrain, type and depth of overburden. Similarly, the controllable variables include type of explosives, charge per delay, delay interval, direction of blast progression, burden, spacing, specific charge and coupling ratio.

The oscillation of rock particles is called Particle Velocity and its value is called Peak Particle velocity (PPV), which is measured in millimetres per second. The standards for safe limit of PPV are established by Director General of Mines Safety for safe level criteria through Circular No. 7 dated 29.08.1997.

The safe level criteria PPV as mentioned in Circular No. 7 of DGMS are presented below:

Table - 4.15

Permissible Peak Particle Velocity (mm/s)

S. No.	Type of Structure	Dominant Excitation Frequency (Hz)		
		< 8 Hz	8 - 25 Hz	> 25 Hz
A)	Buildings/structures not belonging to the owner			
1.	Domestic houses/structures (Kuchcha brick and cement)	5	10	15
2.	Industrial Buildings (RCC and framed structures)	10	20	25
3.	Objects of historical importance and sensitive structure	2	5	10
B)	Buildings belonging to the owner with limited life span			
1.	Domestic houses/structures (Kuchcha brick and cement)	10	15	25
2.	Industrial buildings (RCC and framed structures)	15	25	50

(***Source**: DGMS Circular No. 7 dated 29.8.1997)*

As the distance increases the PPV value is likely to reduce. Table given below shows the PPV Value with respect to Scaled distance. Table given below shows the Summary of Ground Vibration, Air Overpressure, with respect to Scaled distance:

Blast No.	Event details		Frequency			Vibration/ Air over pressure		Scaled distance		Distance	Max. charge per delay
	Instrument details	Date	T (Hz)	L (Hz)	V (Hz)	mm/sec	dBL	$d/w^{1/2}$	$d/w^{1/3}$	(m)	Q_{max} (kg)
GB-1	BE18247	16.11.2022	19	17	23	5.60	118	42	72	210	25.1
GB-1	21757	16.11.2022	73.10	0	102.40	2.83	88	94	161	470	25.1
GB-2	BE18247	17.11.2022	7.1	13	12	0.813	106	40	68	200	25.1
GB-2	21757	17.11.2022	-	-	-	-	-	86	147	430	25.1
GB-3	BE18247	17.11.2022	-	-	-	-	-	56	92	250	20.1
GB-3	21757	17.11.2022	-	-	-	-	-	100	166	450	20.1
GB-4	BE18247	17.11.2022	13	17	14	1.25	104	32	61	220	46.17
GB-4	21757	17.11.2022	-	-	-	-	-	66	125	450	46.17
GB-5	BE18247	18.11.2022	23	16	24	0.783	114	70	120	350	25.1
GB-5	21757	17.11.2022	-	-	-	-	-	50	136	400	25.1
GB-6	BE18247	18.112022	13	26	34	0.852	104	45	85	310	47.97
GB-6	21757	18.11.2022	128	0	128	1.77	92	65	124	450	47.97
GB-7	BE18247	19.11.2022	9	9.3	12	3.79	105	24	41	120	25.1
GB-8	BE18247	19.11.2022	8	14	12	1.81	119	55	94	275	25.1
GB-9	BE18247	21.11.2022	12	13	16	1.56	104	48	82	240	25.1
GB-10	BE18247	21.11.2022	9.3	9.5	10	1.38	112	32	61	225	50.2
GB-11	BE18247	22.11.2022	14	20	20	1.37	105	30	51	150	25.1
GB-12	BE18247	22.11.2022	0	8	11	0.684	91	46	88	315	46

Detailed Blasting Study report has been enclosed with this EIA/ EMP report as ***ANNEXURE XVIII***

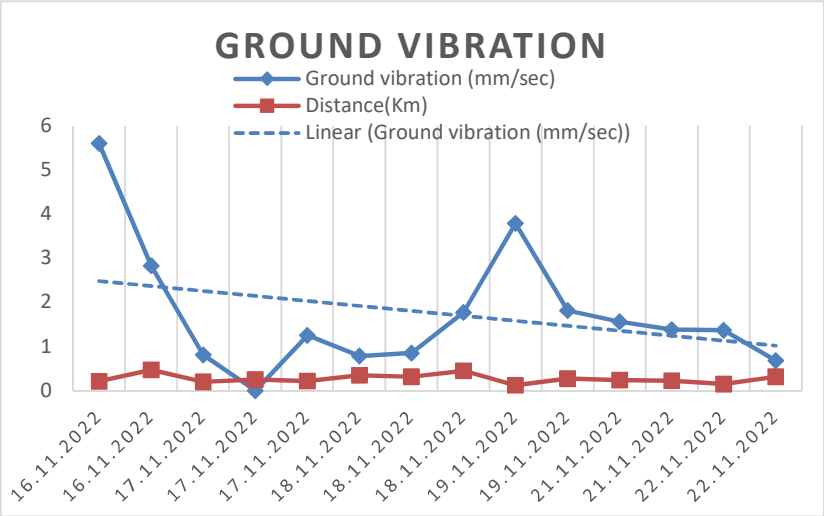


Figure 4.5: Graphical Representation of the data date wise

Following mitigation measures is being/ will be adopted to combat the ground vibrations due to blasting:

- Blasting to be performed strictly as per guidelines specified under blasting technology.
- Overcharging to be strictly avoided.
- Charge per delay is to be minimized by using more number of delays per blast.
- Blasting operations to be carried out only during the daytime as per safety guidelines.
- Adequate safe distance from centre of blasting is to be maintained.
- Drilling parameters like burden, depth, diameter and spacing has to be properly designed to give least ground vibrations.
- Effective stemming of explosives is to be done always in the blast holes.
- Explosive to be used should have (a) high velocity of detonation (b) good water resistance (c) good storage quality and resistance to atmospheric parameters.
- To minimize Charge per delay Ground vibration and AOP will be monitored for each and every blast on daily basis and record of the same will be maintained.

4.5.2.5 IMPACT SIGNIFICANCE OF GROUND VIBRATIONS

Table - 4.16

Impact Evaluation for Ground Vibrations

Impact Evaluation Element	Ground Vibrations due to the existing mining project			
Potential Effect/ Concern	Impact on buildings and other structures and on the workers involved in the blasting process.			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
	√			

Extent	***Project Area***	***Local***	Zonal	Regional
	√			
Duration	Short – term		Long- term	
	√			
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	**Periodic (P)**	Continuous (C)
			√	
Significance of Impact				
Significance	Insignificant	**Minor**	Moderate	Major
		√		

4.5.3 IMPACT ON WATER ENVIRONMENT AND MITIGATION MEASURES

4.5.3.1 IMPACT ON SURFACE WATER AND MITIGATION MEASURES

Due to the hilly terrain and dendritic drainage pattern small depressions carry the rainwater from higher level to lower level. One of this kind of seasonal nalla is there within the ML area which is around 400m away from the Ultimate pit limit and check dams are present near the nalla in order to arrest the silts.

The mine workings are being undertaken well above the water table. There is no accumulation of water in the mine. However, during rains, the water flows out on hill slopes and the company has construct 60 check dams and earthen bunds at the bottom periphery of the hill (where mining is going on) to arrest silt load reaching to downstream nallas.

There is no perennial watercourse in the area. So, there will be no adverse impact on surface water body due to mining.

The fractures created due to mining activity in the local rocks will also enhance the natural recharge in the area. Constant monitoring of ground water levels and quality is proposed during coming years. It can be concluded that mining activities within the mine lease area will not have any deleterious effect on the ground water regime of the area.

Mitigation measures to protect Surface water Bodies

- No waste water is being/ will be discharged outside the mining lease area to prevent mixing with surface water bodies.
- Garland drainage system has been provided and also proposed during the plan period with 205 m and 155 m bund length in 2024-25 and 2025-26 respectively. Location wise details is tabularized below:

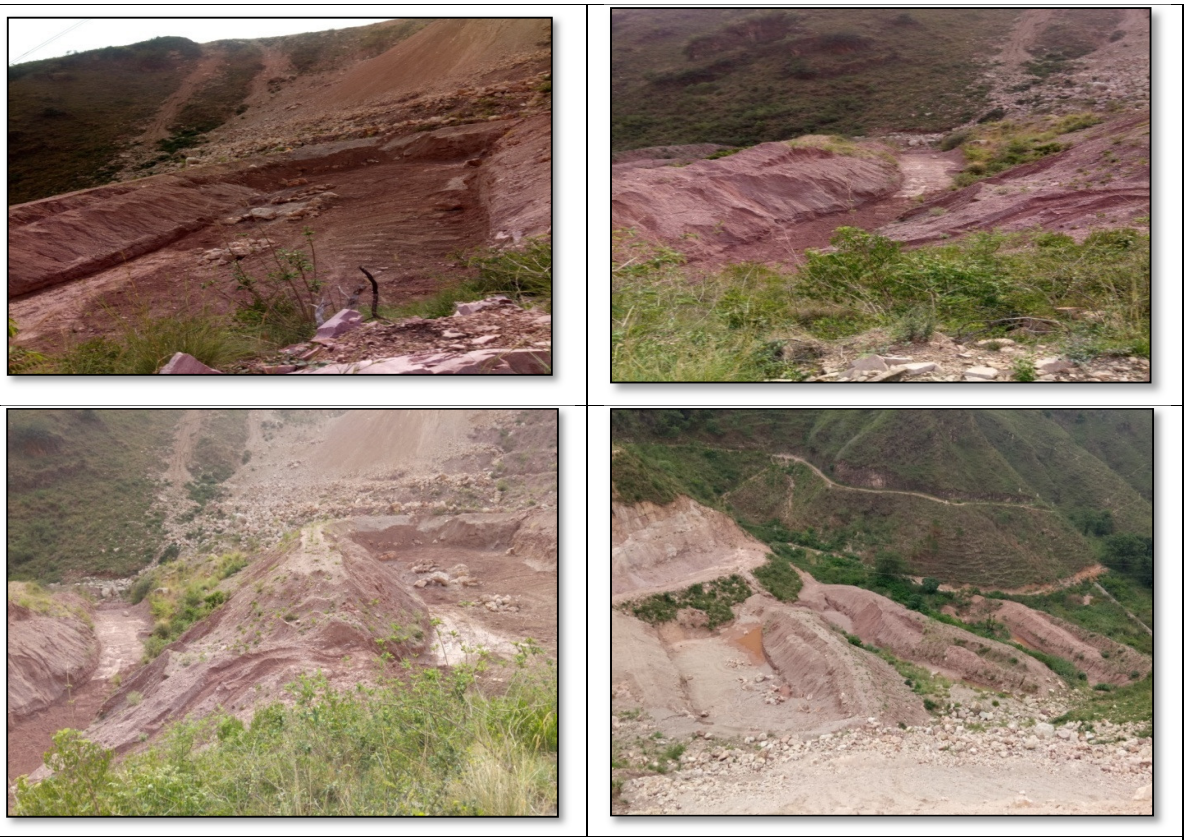
Sl. No.	Year	Length (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss	
			From	To	From	To
1.	2024-2025	205	31:23:43.46	31:23:46.53	76:50:28.66	76:50:33.91
2.	2025-2026	155	31:23:46.53	31:23:50.75	76:50:28.41	76:50:29.74

- Retaining wall is proposed during the plan period. Details is as under:

Sl. No.	Year	Length (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss	
			From	To	From	To
1.	2023-2024	210	31:23:47.53	31:23:53.03	76:50:57.72	76:51:01.01
2.	2024-2025	200	31:23:43.46	31:23:46.53	76:50:28.66	76:50:33.91
3.	2025-2026	150	31:23:46.53	31:23:50.75	76:50:28.41	76:50:29.74
4.	2027-2028	100	31:24:05.90	31:24:06.72	76:50:35.52	76:50:39.32

- To control the surface runoff Check dams has already been constructed having dimension (L*W*D = 65 m x 18 m x 5 m) in collection area having Retaining Wall around L*W*D = 65 m x 2 m x 5 m), towards Dhaun Koth is side and another check dam at Down Hill is having dimension (L*W*H = 78 m x 22 m x 4 m) is the collection area having Retaining Wall around of (L*W*H = 78 m x 6 m x 4 m)
- Fencing is proposed around the water reservoir during the plan period and details of the fencing is as under:

Sl. No.	Year	Length (m)* Width	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss	
			From	To	From	To
1.	2023-2024	425	31:23:35.20	31:23:40.15	76:50:56.71	76:51:00.11
2.	2024-2025	420	31:23:35.20	31:23:39.56	76:52:52.88	76:53:56.73
3.	2025-2026	490	31:23:33.07	31:23:36.69	76:50:37.03	76:53:56.73
4.	2026-2027	470	31:24:36.23	31:24:39.24	76:50:52.44	76:51:00.09
5.	2027-2028	500	31:24:41.15	31:24:44.70	76:50:36.45	76:50:44.16



Existing Check Dams

Existing retaining wall

4.5.3.2 IMPACT ON GROUND WATER AND MITIGATION MEASURES

There will be impact on ground water by following ways:

1. **<u>Ground water pollution by toxic substances:</u>** Ground water pollution can take place only if the mining rejects contain toxic substances, which get leached by the precipitation of water and percolate to the ground water table thus polluting it. Any nearby wells or other sources of water can be rendered unfit for drinking and even for industrial use. The mineral limestone, Shale and Quartzite along with associated rocks do not contain any toxic substances. Therefore, there is no significant impact of mining activities on any source of water and its quality.

2. **Ground water Withdrawal:** Total water requirement for the project is 120 KLD which is being pumped through Sutlej River. No ground water is envisaged to fulfill the requirements.
3. **Ground water intersection due to Mining activity:** Details are given as below:

S. No	***Particulars***	***Details***
1.	Site Elevation Range	545 m -900 m AMSL
2.	General Ground level	560 m AMSL
3.	Ground Water Level	507 to 508 m AMSL (52 to 53 m below ground level)
4.	Existing Working Depth	690 m AMSL (130 m above ground level)
5.	Working Depth during Plan Period	660 m AMSL (100 m above ground level)
6.	Ultimate Pit Depth	621 m AMSL (61 m above ground level) (Lease life) 550 m AMSL (10 m bgl) (Life of mine)

As per the above-mentioned details, water table will not be intersected by mine working during the conceptual period. Detailed Hydro-geological study has been conducted for the project and same is enclosed as ***Annexure XXIII*** with this EIA/EMP Report.

4.5.3.3 WATER CONSERVATION MEASURES

- No ground water is being/will be used
- Total water requirement is being/will be met from Gobind Sagar
- Workshop waste water is treated and reuse for washing purpose by installing gravity separation method to separate water & oil.
- The treated water is reused in washing purpose and oil residue is collected to use in lubrication purpose at plant.
- To avoid siltation from mining operation a series of check dams are constructed along the periphery of the mining area. These check dams are well maintained and cleaned every year before the onset of monsoon.
- Retaining walls and parapet walls all along the main service road from Plant to Mines has already been constructed. It also helps in protecting the slopes stability.
- There is no accumulation of water in the mine. However, during rains, the water flows out on hill slopes and the company has construct 60 check dams and earthen bunds at the bottom periphery of the hill (where mining is going on) to arrest silt load reaching to downstream nallas.
- Rainwater falling directly into the mine pits will be completely dewatered for mining purpose and the water will be used for dust suppression during the monsoon season.
- Periodical monitoring of Ground water level & its quality is being/ will be carried out.

RAIN WATER HARVESTING PLAN

There is no use of ground water to fulfil the requirements; all the requirements are being fulfilled by Sutlej River. Rainwater Harvesting is not proposed during the plan period or at the end of lease period. However, at the end of life of mine 40.0 Ha of area will be covered under Rain water

Harvesting. It would serve as a ground water recharge and will be helpful for surrounding agriculture.

PROTECTIVE SAFETY MEASURES FOR WATER RESERVOIR AT THE END OF LIFE OF MINE

- Construction of wire fencing along the periphery of the reservoir.
- Bench Plantation will be done.
- Conduction of geo-technical stability studies involving expert agencies.

4.5.3.4 IMPACT EVALUATION

Impact evaluation is given in table below**:**

Table - 4.17

Impact Evaluations for Water Environment

Impact Evaluation Element	Change in the water environment (quantity as well as quality of Surface and Ground water) due to existing mining project.		
Potential Effect/ Concern	Increase in water availability in the area due to development of water reservoir and catch drains in the lease area.		
Characteristics of Impacts			
Nature	***Positive***	Negative	Neutral
	√		

4.5.4 IMPACT ON SOIL / LAND USE PATTERN AND MITIGATION MEASURES

4.5.4.1 IMPACT ON SOIL ENVIRONMENT

As per approved mining plan, no top soil, overburden and waste is available.

No major impact on soil of the study area is envisaged due to mining activities, as mining process neither involves any wet mineral beneficiation process or any chemical mineral beneficiation process.

Fugitive dust of mining area will mainly be confined within ML area and will not impact soil of buffer zone. Further, dust in mining area is of neutral nature and does not contain toxic elements which may impact soil. Greenbelt area has been/ shall be developed in statutory barrier of ML boundary barrier where mineralization exists this will help to contain fugitive dust within ML area itself.

Run Off

- To control the surface runoff Check dams has already been constructed.
- Retaining walls and parapet walls all along the main service road from Plant to Mines has already been constructed.

Soil Erosion

- Total area under greenbelt is estimated as 6.0 Ha, out of which 4.0 Ha has already been covered under green belt and the rest 1.0 Ha will be completed till the Conceptual period rest 1 Ha is natural plantation and not accessible.
- Total area under plantation is estimated as 127.65 Ha, out of which 120.65 Ha has already been covered under plantation and the rest will be completed till the Conceptual period.

- Local forest trees *(Acacia catechu, Acacia nilotica, Acacia Senegal, Aeglemarmelos, Albiziaamara, Albizialebbeck, Albiziaodoratissima, Albiziaprocera, Alstoniascholaris, Anogeissuslatifolia, Azadirachtaindica*, etc.) has been used for plantation/greenbelt.
- The increased green cover will substantially prevent soil erosion.

Hence, no major impact on soil of the study area is envisaged due to the existing mining activities, as mining process neither involves any wet mineral beneficiation process nor any chemical mineral beneficiation process.

4.5.4.2 LANDSCAPE AND LAND USE PATTERN

Land use pattern of the mining lease area during pre-operational, operational and post-operational phases is given in table 4.18:

Table –4.18

Land Use of Core Zone (231.25 Ha)

Sl. No.	Particulars	At Present	At the end of Plan Period	At the end of Lease Period (31.03.2030)	At the End of Life of Mine
1	Excavated Area (excluding reclaimed area)	58.90	61.28	63.28	74.69
2	Area Reclaimed as Mango Orchard	1.05	1.05	1.05	9.56
3	Sub grade Mineral Stacking	4.0	7.76	7.76	-
4	Infrastructure (Mines Office, Workshop, Plant, Crushers)	13.37	13.37	13.37	-
5	Roads	4.63	4.63	4.63	-
6	Green Belt / Plantation	119.6	124.6	126.6	147
7	Area not put to be in use	29.7	18.56	14.56	-
Total Lease Area		**231.25**	**231.25**	**231.25**	**231.25**

Source: *Approved, Reviewed and Updated Mining Plan with Progressive Mine Closure Plan*

4.5.4.3. IDENTIFICATION OF IMPACTS ON LAND USE PATTERN DUE TO THE MINING ACTIVITY

I. Core Zone: This is an existing mining project. Total Mining lease area is 231.25 ha in which 103.02 ha is forest land, 128.23 ha is private land.

A. Impact on Land use:

- This is an existing mine; no additional land is required for the purpose of construction as facilities are already available in the lease area.
- The land use of the lease area will alter due to mining activities such as formation of pits, greenbelt, etc.
- At present 58.90 ha area is under mining, 13.37 ha is under Infrastructure (Mine Office, Workshop, Plant, Crusher), 1.05 Ha is already developed as mango orchard, 4.63 Ha is under Road, 4.0 Ha is under Sub grade/waste Stacking followed by

plantation, 115.6 ha is under green belt/ Plantation and remaining 29.7 ha is Virgin land.

- At the conceptual stage (Lease life) Total excavated area will be 63.28 Ha, area under Infrastructure and Road is i.e., 13.37 Ha and 4.63 Ha respectively, reclaimed area as mango orchard will be 1.05 Ha, 7.76 ha area under sub grade/waste stacking followed by plantation, 126.6 Ha will be under green belt/ Plantation and the remaining 14.56 ha will be Virgin Land.

B. Impact on Roads and mitigation measures

- A Public Road of length (~3.5 km), is passing through ML area which connects Village Barmana and Khatehr with NH 154 in the NW part of the Lease area. This public road is around 500 m from the ultimate pit limit and 60 m from the pit limit of Plan period so no impact on the road will be there.

C. Impact on Electric Lines and mitigation measures

Two transmission lines of 440 KV is passing through the lease area in the SE part of the Lease area, where mining won't be done and is around 100m away from the Ultimate pit limit.

Guidelines for mining near HT lines

- No rods, pipes or other similar materials shall be brought within the flash over distance of bare live conductors or lines.
- No material or earth work or agricultural produce shall be dumped or stored, no trees grown below or in the vicinity of, bare overhead conductors or lines.
- No flammable material shall be stored under the electric supply line.
- No fire shall be allowed above underground cables.
- Firing of arty material below electric lines shall be prohibited.
- No blasting for any purpose shall be done within 300 m from, the boundary of a sub-station or from the electric supply lines of voltage exceeding 650 V.
- No cutting of soil within ten meters from the tower structure of 132 kV and above voltage level shall be permitted without the written permission of the owner of tower structure.

II. Buffer Zone

Mining activity will be confined to the mineralized zone and proper pollution control measures is being/ will be adopted to restrict the pollution load within the active zone in order to prevent any negative impact on nearby areas. Adequate measures are being/ will be taken to control the pollutants within active mine area.

A. Impact on Bandli & Majhatahal Wildlife Sanctuary

- Distance of Bandli Wildlife Sanctuary and Eco Sensitive zone of Bandli Wildlife Sanctuary is 3.55 km & 2.54 km respectively. Eco-sensitive zone of Majhathal Wildlife Sanctuary is ~10.05 km from the ML area.
- The mining has no adverse impact on biodiversity of the Wildlife Sanctuaries.

- Study on the impact of Mining on Flora and Fauna as well as the Conservation plan for threatened and Schedule- I wildlife species in the Core and Buffer for Gagal Limestone Mines, has been submitted to the Chief Wild Life Warden for approval which is attached with this Draft EIA/EMP study report as ***Annexure XXIV*.**

Mitigation Measures:

- Miyawaki Afforestation will be done in the surrounding area in order to create a small ecosystem for the birds and animals living or coming to those areas.
- Effective steps will be taken to reduce Human and Animal Conflict by many methods like use of Strobe lights, making Natural Barriers, Solar power electric fences to arrest the movement of Animals and supporting Eco Tourism by monetizing the animal value and this should be owned by the locals as they know the animal behavior and this will also generate indirect employment
- The boundary wall has been made at the lease periphery.
- Thick Greenbelt is being developed at the 7.5 m lease boundary.
- Proper planning and practicing such systematic mining techniques, a large water reservoir has formed which enriched the indigenous biodiversity and conserved the endemic biodiversity in the mining lease area.
- Many harvested watershed or marshy plants have started growing naturally, thus harboring a rich biodiversity.
- Conducting awareness program for conservation of biodiversity among the local communities.
- Deployment of security guards at various locations to extend attention / protection toward wildlife all along the outside boundary of mining lease.

Source:https://howtoconserve.org/category/conservation-success-stories/

B. IMPACT ON SUTLEJ RIVER

- Sutlej River is flowing within 200m to the ML Area in North direction and is around 1.35 km from Pit during Plan period.

Mitigative measures to protect water reservoir

- Sutlej River is around 1.35 km away from the pit during plan period and is around 1.25 km away from the Ultimate Pit limit, so no adverse effect will be there.
- Fugitive emissions are being/ will be arrested due to presence of hill between mining pit and Sutlej River.
- No erosion wash off will be directly allowed to go to the Natural System as it is being/ will be arrested by Check dams.
- Regular Surface Water Quality Monitoring is being/ will be analysed. Details have been discussed in para 4.5.3.1

C. Impact on agriculture land

To reduce the impact on nearby agriculture fields due to mining, following mitigation measures is being/ will be taken:

- Mining activity will be confined to the mineralized zone and pollution control measures is being/ will be adopted to restrict the pollution load within the active zone in order to prevent any negative impact on nearby areas.
- Total area under greenbelt is estimated as 6.0 Ha, out of which 4.0 Ha has already been covered and the rest 1.0 Ha will be completed in the next 1 year, rest 1 Ha is natural plantation and not accessible.
- At the conceptual stage (Lease life), total area under plantation is estimated as 127.65 Ha, out of which 120.65 Ha has already been covered under plantation and the rest will be completed till the Conceptual period (lease life).
- It will act as bio-filter and will help to control and confine the emission within ML boundary.
- Regular Water sprinkling system for haul roads & for mining activities.
- Awareness for new methodologies of agricultural practices viz. mixed farming, crop rotation and agricultural cropping pattern suitable for the study area will also be carried out under EMP to increase the agricultural productivity of the study area.
- Rainwater harvesting practices will be encouraged which will lead to ground water recharge and ultimately increased productivity in the study area.
- Therefore, no adverse impact is envisaged in the study area.

D. Protection measures for NH-154 (Adjacent to lease area in North direction**)**

- As the NH-154 is ~1.1 km from the mining pit limit of Plan Period and ~1.0 km from the Ultimate pit limit so no adverse effect will be there on the road.
- Greenbelt is being/ will be done within 7.5 m lease periphery
- The boundary wall has been made around the lease periphery and safety sign boards is displayed.

4.5.4.4 RECLAMATION PLAN FOR LAND

Existing: At present 58.90 ha area is under mining, 13.37 ha is under Infrastructure (Mine Office, Workshop, Plant, Crusher), 1.05 Ha is already developed as mango orchard, 4.63 Ha is under Road, 4.0 Ha is under Sub grade/waste Stacking followed by plantation, 115.6 ha is under green belt/ Plantation and remaining 29.7 ha is Virgin land.

Conceptual period: At the conceptual stage (Lease life) Total excavated area will be 63.28 Ha, area under Infrastructure and Road is i.e., 13.37 Ha and 4.63 Ha respectively, reclaimed area as mango orchard will be 1.05 Ha, 7.76 ha area under sub grade/waste stacking followed by plantation, 126.6 Ha will be under green belt/ Plantation and the remaining 14.56 ha will be Virgin Land.

Photographs showing Greenbelt/Plantation

4.5.4.5 IMPACT SIGNIFICANCE

Impact significance is given in table below.

Table - 4.19

Impact Evaluation to determine the Significance

Impact Evaluation Element	Change in the land use due to mine activities& operation			
Potential Effect/ Concern	Change in the land use of core zone because of mining activities			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
	√			
Type	***Direct***	Indirect	Cumulative	
	√			
Extent	***Project Area***	***Local***	Zonal	Regional
		√		
Duration	Short – term		Long- term	
			√	
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
				√

Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
			√	

4.5.5 SOCIO-ECONOMIC ENVIRONMENT

Present Status of Socio-economic environment is given in Chapter 3. The potential impact on socio-economic environment due to this mining project is given in following heads.

4.5.5.1 POSITIVE IMPACTS

Employment:

Direct and indirect employment opportunities are being generated during mining operation and other allied activities. ACC Limited has been providing safe working environment for their workers. Preference for employment has been given to the locals based on their eligibility, and suitability. Mining activities has already generated employment for 78 persons. Employment benefits are further detailed in Section 8.2 of Chapter 8.

Community Skills Development:

Local community is being benefitted from the training programmes that had been instituted by ACC to enable the community labor force to work for their livelihood/Self-growth. The training has proved to improve their skill sets that have not only benefit ACC but also the community at large during and after the project life.

Improved Standard of Living:

Employment opportunities created by the project and skill development activities carried out under CSR& EMP, will increase income of local community and therefore improve the overall standard of living in the area.

Economic Exposure and Development:

Implementation of the project has made opportunities for sustainable livelihood, better infrastructure facilities and services available to the people. This project has exposed and introduced the local population to factors of economic development including the banking system, financial services and credit and investment schemes.

Impact on Civic Amenities

The impact of the existing Limestone, Shale and Quartzite project on the civic amenities has been positive. With improved transportation facilities, educational facilities and other recreational facilities etc. there has been improvement in civic amenities. The communication facilities have also improved in the area.

Population Growth

Preference is being given to suitable local people in employment. Hence the project does not aim to contribute significantly in the population influx & only marginal population influx is designated for the existing project.

4.5.5.2 ADVERSE SOCIAL IMPACTS

Health Impacts:

The project may trigger negative health impacts through increased dust, population influx which might introduce new diseases in the area and pressure on sanitation facilities.

Noise and Vibration:

The process of mining will entail drilling, blasting, excavation, and transportation. These activities generate noise and vibration. The impact of noise and vibration from the epicenter of these activities could have effects on the population living around these areas. The excessive vibration could lead to collapse of the structures.

Livelihood Change

Presently livelihood depends on agriculture & industries in the nearby area. Further indirect employment opportunities will be generated due to the existing project which will further improve the economic status & living standard of the people.

Population Growth

This project will not have any substantial impact on the population growth. The project has generated employment opportunities for the people of nearby villages rendering positive impact on the area on the whole.

4.5.5.3 MITIGATION MEASURES

Mitigating Health Impacts:

As mentioned, that the incremental GLCs for various air pollutants has been/ will be restricted within the mining lease area and the impacts will be negligible on the nearby villages after implementation of all mitigation measures. Nevertheless, awareness programmes on health hazards will be conducted to create awareness amongst the employees as well as the local population.

Health Care Facilities

Proper health care facilities have been provided to the employees of existing mine along with their families. The medical facilities in form of primary medical camps will also be extended to local people in the nearby areas under CSR activities.

4.5.5.4 IMPACT ON HUMAN SETTLEMENT

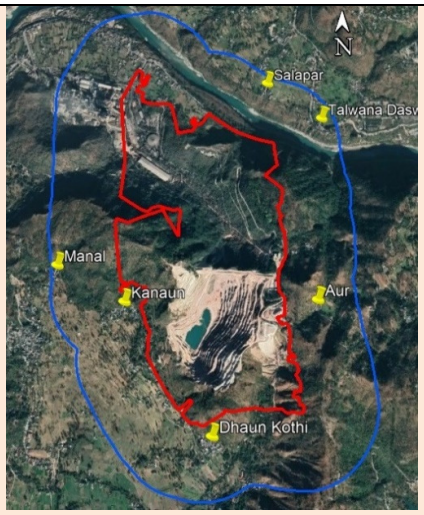
A. <u>OUTSIDE ML AREA</u>

Details are given below:

Table - 4.20

Habitation/Village within 500 m from the ML Boundary

S. No	Village Name	Distance Direction from ML boundary
1.	Habitation of Village Dhaun Kothi	~0.2 km in South
2.	Habitation of Village Manal	~0.5 km in West direction
3.	Habitation of Village Kanaun	Adjacent to ML boundary
4.	Habitation of Village Aur	~0.2 km in East direction
5.	Habitation of Village Talwana Daswar	~0.3 km in NE direction
6.	Habitation of Village Bhatehr	~0.5 km in North direction
7.	Habitation of Village Salapar	~0.4 km in North direction



Legend			
	ML Area		Villages
	500m buffer Area		

Protection Plan for Nearby Habitation

To protect the habitations near to the lease area from blasting and dust pollution, following measures is being/ will be taken into consideration during mining:

- For protection of village habitation, mining is being carried out as per the provisions outlined in mining plan approved by Indian Bureau of Mines (IBM) as well as by abiding to the guidelines of DGMS.
- Mining is being/ will be done with controlled blasting after taking permission from DGMS.
- Controlled blasting is being adopted and optimum use of explosive energy is being/ will be made by optimizing explosive charge per hole and per delay.
- NONEL and bottom hole initiation system is being used to control ground vibrations, noise & fly rocks.
- Blasting is being carried out during day time only & every blast is being/ will be monitored.
- Ambient Air Quality is being maintained within the prescribed standards by adopting the mitigation measures as described in section 4.5.12.9 of this Chapter.
- Ambient Air Quality & Noise Level is being/ will be monitored regularly in nearest villages.
- Best Mining Practices is being adopted for the given mining conditions.
- Adequate number of check dams, retaining walls /structures. Garland drains and settling ponds is being provided in the mining area to arrest the wash-off with rain water in catchment area.
- To keep the boulders used to make Retaining walls/ structures, check dams in their specified place in the slope, bigger boulders are placed at the bottom in such a way that the Shear strength is strong enough to hold them in place.

- In case of any water scarcity in the area, the Company will provide water to the villagers for their use.
- A provision for regular monitoring of water table in open dug wells located in village and by establishing Piezo-meter has been incorporated to ascertain the impact of mining over ground water table and to plan mitigative measures.
- For conducting blasting for mining operations, proper vibration studies shall be carried out well before approaching such habitats or other buildings to evaluate the zone of influence and impact of blasting on the neighbourhood. Within 500 meters of such sites vulnerable to blasting vibrations, avoidance of use of explosives and adoptions of alternative means for mineral extraction shall be practiced wherever practicable. Blasting is being/ will be done within the permissible distance from habitation as permitted by DGMS.
- Provision of monitoring of each blast is being made so that the impact of blasting on nearby habitation and dwelling units could be ascertained.
- No mining operations is being carried out within 50 meters of public works such as public roads and buildings or inhabited sites.
- Main haulage road and other roads is being/ will be regularly wetted with water tankers fitted with sprinklers. Crusher and material transfer points will invariably be provided with Bag filters and or dry fogging system. Belt conveyors is fully covered to avoid air borne dust.
- No road movement has been/ will be undertaken in existing public road network without appropriately increasing the carrying capacity of such roads.
- Socio economic development of the neighbourhood habitats has been planned based on the need-based survey and will be executed as per the recommendation of the plan.

4.5.5.5 PUBLIC HEALTH IMPLICATION

The most common diseases in the region are common cold and cough, stomach disorder, fever, diarrhea etc. which are prevalent amongst the villagers. None of these can be related to the project and allied activities of the project.

The following are some of the significant points for consideration under public health:

- Air quality prediction has been done due to this project and incremental GLC was found within the prescribed limit.
- As per the data, pre-dominant wind direction throughout year was observed from South West.
- Air quality modelling has been carried out & incremental value for PM10 is 3.82 µg/m^3, PM2.5 is 1.46 µg/m^3, SO_2 is 1.79 µg/m^3 and for NO_2 is 1.82 µg/m^3 due to mining operations within the lease area.
- Water quality and level monitoring at mine site and villages is being/ will be carried out and record is being/ will be maintained.
- Peak particle velocity monitoring is being/ will be done in mine site and for nearest habitations
- Green belt/plantation is being done on 120.65 ha area till now and remaining 6.0 ha area will be covered up to conceptual period (Lease period)

- Efforts are being made under improve the hygiene, sanitation, education and infrastructure of the nearby villagers under CSR activities.
- All the employees when inducted is being/ will be medically examined. Further, they will also be medically examined at periodical interval.

4.5.5.6 IMPACT EVALUATION

Table - 4.21

Impact Evaluation to determine the Significance (Socio economic Environment)

Impact Evaluation Element	Impact on socio economics due to the existing mining project			
Potential Effect/ Concern	Employment generation and social development			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
	√			
Type	***Direct***	Indirect	Cumulative	
	√	√		
Extent	***Project Area***	*Local*	Zonal	Regional
		√	√	√
Duration	Short – term		Long- term	
			√	
Intensity	Low		***Medium***	High
			√	
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
				√
Significance of Impact				
Significance	Insignificant	Minor	**Moderate**	Major
				√

4.5.6 IMPACT ON LOCAL TRANSPORT INFRASTRUCTURE

- The total Excavated Limestone, Shale, Quartzite and Sub grade mineral is 16034 TPD (Peak production: 19241 TPD) is being/ will be transported to the crusher located in the ML area via dumpers through haul roads.
- Further crushed limestone is being transported to the Cement Plant through conveyor belt.
- No public road is being used for the purpose of transportation.
- Hence, no effect on local transport infrastructure has been/ will be witnessed during the mining operations.

Mitigation Measures

- No Public Road is being/ will be utilized for transportation of materials to or from the mine site.
- Vehicle with valid PUC is being/ will be used for transportation.
- Overloading of the material is being/ will be avoided.
- Vehicular emission is being/ will be kept under control.
- Regular maintenance of HEMMs & transportation vehicles is being/ will be carried out.
- Regular monitoring of the emission levels.
- Regular water spraying on the haul roads to suppress the fugitive dust emissions.
- Personal protective equipment provided to all workers.

4.5.7 IMPACT ON BIOLOGICAL ENVIRONMENT

Habitat loss, degradation, and fragmentation are important causes of known species-population extinctions. The main cause of degradation and depletion of forests and wildlife are the human activity (anthropogenic pressure). Population explosion, over exploitation of forest resources, urbanization, unscientific management, encroachment of forest land, illicit felling, lack of regeneration of forests and outdated laws are major factors responsible for the degradation and depletion of forests. Details are given in the follow up points.

4.5.7.1 IMPACT ON FLORA

In the Study area, 149 plant species from 85 families were identified. Among them 62 trees, 40 shrubs, 31 herbs, 08 grasses, as well as 07 climber and 01 Bamboo species have been recorded in the study area based on primary observation as well as based on information collected from the

secondary data. The dominant family in the project area is Rosaceae, which has 16 species, followed by Poaceae and Fabaceae, which each have 09 and 08 species respectively.

Authenticated list of flora and fauna has been obtained from Pr. Chief Conservator of Forests (Wildlife)-cum-CWLW, HP Shimla-1 vide letter No WL (Misc)/Mining/613 Himachal Pradesh dated 12.05.2023. **(Annexure X)**

The greenbelt and plantation development will eventually attract micro fauna, birds etc. in the area which will also have positive impact. Support will be taken from local forest and agricultural departments in selection of species of plants so that green coverage could improve fast.

4.5.7.2 IMPACT ON FAUNA

There are no National Park, Wildlife Sanctuary, and Biosphere Reserve, Wildlife Corridors, Tiger/Elephant Reserves etc. within the Core Zone but Bandli Wildlife Sanctuary falls in the Study Areaat an aerial distance of 3.55 km in NE direction and Majhatahal Wildlife Sanctuary at an aerial distance of 10.05 Km in SE direction. Location map has been authenticated from Pr. Chief Conservator of Forests (Wildlife)-cum-CWLW, HP Shimla-1 vide letter No WL (Misc)/Mining/613 Himachal Pradesh dated 12.05.2023. **(Annexure X)**

Among fauna, Total 103 species of faunal species which includes 21 species of mammals, 13 species of reptiles and amphibians and 06 species of Butterfly and Arthropods were recorded from the study area. Among avifauna, 63 species were recorded in the study area.

Total 7 species come in Schedule- I fauna according to (IWPA) Indian Wildlife Protection Act' 1972. Out of these 2 mammals' species i.e., *Panthera pardus fusca* (Leopard), *Prionailurus bengalensis* (Leopard cat), and 1 reptiles' species i.e., *Varanus flavescens* (Yellow Monitor), and 4 Avi-faunal species i.e., *Pavo cristatus* (Peafowl), *Gyps africanus* (White-backed vulture), *Catreus wallichii* (Cheer pheasant) & *Lophura leucomelanos* (kalij pheasant) were recorded in the study area during field survey.

As per IWPA 1972 Conservation status, 07 species of schedule I, 13 speiceis of schedule II, 04 species of Schedule III, 79 species of schedule IV and 02 Species of Schedule V, were reported from primary and secondary survey.

Study on the impact of Mining on Flora and Fauna as well as the Conservation plan for threatened and Schedule-I wildlife species in the Core and Buffer zone (which includes Bandli Wildlife Sanctuary and Majhathal Wildlife sanctuary as well) for Gagal Limestone Mines, has been submitted to Chief Wild Life Warden which is attached with this EIA/EMP study report as ***Annexure XXIV.***

4.5.7.3 GENERAL GUIDELINES FOR GREEN BELT DEVELOPMENT

Vegetation covers in and around the mine workings generally helps in:

- Control of dust.
- Reducing noise.
- Stabilizing erodible slopes to minimize pollution.
- Ground water re-charging

- Enhancement of aesthetic value.
  i. Native plant species is being/ will be planted in consultation with DFO.
  ii. Trees growing up to 5 m or more in height with large canopy cover & leaf area has been/ will be planted.
  iii. Since tree trunks are normally devoid of foliage (up to 3 m), it is appropriate to have shrubbery in form of such trees to give coverage to trunk portion of these trees.
  iv. Fast growing trees with thick perennial foliage will be grown, as it takes many years for trees to grow to their full height.
  v. The seedling of height not less than 2 meters to be selected.

The following characteristics have been taken into consideration while selecting plant species for green belt development and tree plantation.

I. Local, indigenous and drought resistant species.
II. Fast growing and tall trees.
III. Perennial and evergreen.
IV. Thick canopy cover.
V. Stratified layers of Plantation to prevent lateral pollution dispersion.
VI. The trees have been/ will be selected so as to maintain regional ecological balance and to conform to soil and hydrological conditions.
VII. Plantation is being/ will be done as per guidelines.

4.5.7.4 GREENBELT DEVELOPMENT AND PLANTATION PLAN

- Total area under greenbelt is estimated as 6.0 Ha, out of which 4.0 Ha has already been covered and the rest 1.0 Ha will be completed in the next 1 year, rest 1 Ha is natural plantation and not accessible.
- At the conceptual stage (Lease life), total area under plantation is estimated as 127.65 Ha, out of which 120.65 Ha has already been covered under plantation and the rest will be completed till the Conceptual period (lease life).
- Local forest trees (*Acacia catechu, Acacia nilotica, Acacia Senegal, Aeglemarmelos, Albiziaamara, Albizialebbeck, Albiziaodoratissima, Albiziaprocera, Alstoniascholaris, Anogeissuslatifolia, Azadirachtaindica*, etc.) has been used for plantation/greenbelt.
- Density of plantation would be 2500 trees/ha with survival rate 90.0%.
- Plan for greenbelt and plantation up to end of life of mine is given as per below:

Table 4.22

Plan for Greenbelt development on statutory boundaries and plantation on safety

S. No	Particular	Done as on date		To be done		Total	
		Area (Ha)	No of saplings	Area (Ha)	No of saplings	Area (Ha)	No of saplings
A.	**Greenbelt on 7.5 m lease periphery**	4.0	7836	1.0	2500	6.0	10336
B.	**Plantation**						

1.	Plantation on Un-worked area	115.6	227500	5.0	12500	120.6	242500
2.	Mango Orchard on reclaimed area	1.05	2025	-	-	1.05	2025
	Total	**120.65**	**237361**	**6.0**	**15000**	**127.65**	**254861**








Photographs showing Greenbelt/Plantation

4.5.7.5 SPECIES SELECTION FOR PLANTATION/GREEN BELT DEVELOPMENT

The plants and saplings suitable for the existing soil and site conditions have been considered. Preference has been given for fast growing local plant species, which can adapt to the local climate. Indigenous & fruit bearing native species is being/ will be planted by ACC as per CPCB guideline and in consultation with local forest department. Local forest trees *(Acacia catechu, Acacia nilotica, Acacia Senegal, Aeglemarmelos, Albiziaamara, Albizialebbeck, Albiziaodoratissima, Albiziaprocera, Alstoniascholaris, Anogeissuslatifolia, Azadirachtaindica,* etc.) has been used for plantation/greenbelt. The ecological characters of few species planted are given below:

Table - 4.23
Species having ecological characteristics

S. No.	Species Name	Common Name
1.	*Acacia catechu (i)*	Khair
2.	*Acacia nilotica (+) (i)*	Babul. Desibaval
3.	*Acacia Senegal (i)*	Kumat
4.	*Aeglemarmelos (+) (i)*	Bel, BiliPatra,
5.	*Albiziaamara (i)*	Tugli
6.	*Albizialebbeck (+)*	Siris, KaroSirish
7.	*Albiziaodoratissima (i)*	Black Siris
8.	*Albiziaprocera (i)*	White Siris
9.	*Alstoniascholaris (+) (i)*	Satani
10.	*Anogeissuslatifolia (i)*	Dhaura
11.	*Azadirachtaindica(+)*	Neem

The above selected local trees cover species with thick canopy cover, perennial green nature, native origin and a large leaf area index. These species will help in forming an effective barrier between the mines lease area and the surroundings. These species have been planted and will continue to be planted, in and around the mine site to help absorb fugitive emissions and reduce the noise levels. All the open spaces, where tree plantation may not be possible, should be covered with shrubs and grass to prevent erosion of topsoil.

4.5.7.6 BUDGET FOR GREEN BELT DEVELOPMENT AND PLANTATION PROGRAMME

An amount of Rs. 3.06 crore has been spent under greenbelt and plantation as a capital and in future an amount of Rs. 0.60 Crore (Capital cost) and Rs 30 lakh (Recurring cost) have been earmarked for greenbelt & plantation till the end of mine lease period (including plantation and maintenance cost). The budget includes the cost of Saplings, Watering facilities, Labour Charge, Organic manure, Bio-fertilizers, Maintenance, fencing etc., which may vary in due course of time.

4.5.7.7 IMPACT EVALUATION

Table - 4.24
Impact Evaluation for Biological Resources

Impact Evaluation	change in the biological resources of the area due to mine development & operation and

Element	generation of emissions			
Potential Effect/ Concern	Loss of habitat, Impact on health of biological receptors due to area and line sources of air emissions including fugitive dust emissions during limestone mine development & operation activities			
Characteristics of Impacts				
Nature	Positive		***Negative***	Neutral
			√	
Type	***Direct***	Indirect	Cumulative	
		√		
Extent	*Project Area*	*Local*	Zonal	Regional
	√			
Duration	Short – term		**Long- term**	
			√	
Intensity	**Low**		*Medium*	High
	√			
Frequency	Remote (R)	Occasional (O)	Periodic (P)	Continuous (C)
				√
Significance of Impact				
Significance	**Insignificant**	Minor	Moderate	Major
	√			

4.5.8 MEASURES/TECHNOLOGY FOR PREVENTION OF ILLEGAL MINING & PILFERAGE OF MINERAL

Following measures is being/ will be adopted by company for prevention of illegal mining and pilferage of mineral:

- Monthly filing of return based on the quantity of material dispatched.
- Displaying of sign boards mentioning "Dangerous and Prohibited Place" in local language with pictorials.
- Erection of barbed-wire fencing around pithead.
- Static security manning including deployment of armed guards during the night hours.
- GPS to be installed in all hauling units to see their movement.
- CC TV installation at various exit points of the mines.
- Stringent action to be taken against transport vehicles caught in the act of theft or pilferage.
- Training of existing security personnel, refresher training and basic training to new recruits in security discipline will be arranged for strengthening the security set up.
- Horizontal movement of executives with aptitude for security work and inducting qualified security personnel at junior, middle and senior levels.
- Entry/exit points will be manned by establishing proper check posts and barrier where all vehicles are physically checked.
- Surprise checks/raids are conducted by flying squads of company/security department.
- Educating the local habitants and providing them employment as far as possible so that they will not involve in such illegal activities.

4.5.9 OCCUPATIONAL HEALTH AND SAFETY

Occupational health and safety (OHS) is a multidisciplinary field concerned with the safety, health and welfare of people at work. The goal of occupational safety and health programs includes fostering a safe and healthy work environment. OHS may also protect co-workers, family members, employers, customers, and many others who might be affected by the workplace environment.

Occupational Health & Safety is based on the following three aspects: -

- Hazard identification
- Risk assessment
- Determination of applicable controls

A Hazard Identification and Risk Assessment (HIRA) is a systematic way to identify and analyze hazards to determine their scope, impact and the vulnerability of the built environment to such hazards and its purpose is to ensure that there is a formal process for hazard identification, risk assessment and control to effectively manage hazards that may occur within the workplaces. Details regarding occupational health hazards as well as mitigation measures have been discussed as under:

4.5.9.1 OCCUPATIONAL HEALTH AND RELATED DISEASE

Occupational Health and Safety measures result in improving the conditions under which workers are employed. It improves not only their physical efficiency but also provides protection to their life. ACChas adopted the following safety measures:

- Continuous monitoring for compliance of SOPs.
- The mine management has first aid / medical centre for use in emergency situation. All casualties would be registered and will be given first aid. The centre will have facilities for first aid & minor treatment, resuscitation, ambulance and transport.
- Suitable measures for publicity and propaganda for safety and occupational health will be - implemented like posters, safety films, etc.,
- Safety clauses in contract order
- To depute dedicated safety team
- Pre-employment Medical check-upfor fitness as per standards in Form P-1 of Mines Rules 1955.
- Periodical medical examination as per Mines Rule 1955 will be done as per standards laid down in Form P.
- Persons working in dusty environment will be examined every year as per the DGMS circular No. 01 of 21.01.2010.
- All employees will undergo medical examination as per the recommendation of 12th National conference of safety in mines.
- Besides that to avoid any adverse effect on the health of workers due to various pollutants, sufficient measures relating to safety and health will also be practiced.
- Provision of rest shelters for mine workers with amenities like drinking water etc.
- Training of employees for use of safety appliances and first aid in vocational training center.

- Detailed analysis of each and every incident.
- Periodic inspection by internal and external safety experts.
- Celebrations of various safety events for awareness.
- An effective and clearly audible means of giving warning, in case of fire, to every person will be provided at the site. A free passage–way giving access to each means of escape in case of fire will be maintained for the use of all workers.
- Regular maintenance and testing of all equipment as per manufacturers' guidelines.
- Close surveillance of the factors in working environment and work practices which may affect environment and worker's health.
- Working of mine will be done as per approved mining plan and environmental plans.
- Operator cabins in all items of major HEMM equipment will be enclosed.
- Air emission control system such as water sprinkling, green belt development
- All safety measures are being taken which includes the use of safety appliances such as:
  - ✓ Suitable Dust Mask for protection from dust
  - ✓ Ear Muffs
  - ✓ Safety Helmets
  - ✓ Reflective jackets
  - ✓ Safety Belts
  - ✓ Leather Hand Gloves
  - ✓ Safety Shoes
  - ✓ Safety Goggles etc.
- Availability of Medical facilities and First Aid Room equipped with first aid boxers.
- Conduction of internal audits and evaluation of legal compliance.
- In order to ensure adequate implementation of the OHS measures suggested, ACC will adhere to the pre-placement & periodical medical examination program. Details of the same are given as under.

4.5.9.2 PRE-PLACEMENT& PERIODICAL MEDICAL EXAMINATION SCHEDULE

Ideally, the pre-employment medical examination (also referred to as a pre-placement examination) strives to place and maintain employees in an occupational environment adapted to their physiological and psychological capacities. The goal of the pre-employment examination is to determine whether an individual is fit to perform his or her job without risk to himself or others and also to record medical history of the person in case employed. This is also conceptualized within the practice of occupational medicine – it is assumed that the examiner is required to have detailed knowledge of both working and health conditions.

Parameters to be monitored:

New employees will be thoroughly medically examined under initial medical examination and thereafter during continuation of employment. Periodic medical examination will be done as suggested by DGMS. The medical examination includes the following parameters -

- Height, weight, body mass index (BMI)
- Cardiovascular examination (heart check, blood pressure, pulse)

- Full musculoskeletal examination including comprehensive range of movement.
- Central nervous system examination.
- Examination for hernia and other abdominal abnormalities
- Urine examination for diabetes or kidney / bladder disorders
- Respiratory examination
- Vision assessment including color blindness
- Medical fitness to work in mines
- Medical examination of drivers
- Drug and alcohol testing
- Spirometry - (Lung Function Test)
- Audiometry (Hearing Test)
- Urine testing
- Vision tests, color vision
- ECG
- CXR (Chest Radiograph)
- Blood glucose
- Strength and mobility screening

Further, Regular Awareness campaign amongst stuff/ working about AIDS/ Dengue/Malaria will be done, Ambulance and First Aid facility will be provided.

The medical records of the employees are being maintained. Under initial induction, the workers are being given training related to all safety and health aspects pertaining to their vocation and thereafter, special training courses/ awareness programme for Malaria eradication, STDs and health effects on exposure to mineral dust will be organized regularly for employed persons as well as for nearby villagers. Refresher training will also be arranged as per statutes.

Frequency of Medical Examination

a. Pre-Placement Medical examination: Prior to joining
b. Periodical Medical examination:
    - Age of workers < 45 years: After every 5 years
    - Age of workers > 45 years: After every 3 years

Further, ACC has earmarked the occupational health budget for mine workers. The break-up of the OHS budget along with its implementation time period, is given as below:

Table - 4.25

Occupational Health & safety Budget

S. No.	Occupation health surveillance	Budget (Rs.)	Budget allocation (Years)
1.	Training &Occupational health and safety mitigative measures, Purchase of medical instruments	Rs 1.78 lakhs (OHC) +Rs 4.00 lakh appx (Vision Screener)	Y2023-24
Total		**Rs 5.78 Lakhs**	

Table - 4.26

Break-up of Occupational Health & safety Budget

S. No.	Parameters	Amount (INR)/ Year (Workers * Cost)
1	Training on the occupation health and safety	Rs 2.29 Lakhs (Safety Week Expenses / Gate Meetings)
2	Occupational health and safety mitigative measures (Mask, Safety goggle, ear plug etc.)	Rs 6.0 Lakh (PPEs including 2sets of Uniform & single Shoes) + Rs 1.95 Lakh (Safety Material / Hoardings) + Rs 4.5 Lakhs (Safety Mitigative measures)
3	Other (Manpower & patrollers)	-
Sub Total		**Rs 14.74 Lakh**
4	Number of Employees	**78**
5	Initial Medical Examination	**-**
6	Cost of employees to be subjected to Periodical Medical Examination at least once in a five year	**Rs 1.0 Lakh (appx.)**
7	Chest X-Ray, Audiometry, vision test, ECG, PFT, Urine, Lipid profile, etc.	Mentioned above for PME
Sub Total		Rs 1.0 Lakh
Note: - *Once in a five year as per Mine Rule 1955 (Rule 29B Initial & Periodical Medical Examination)		
Environmental and Personnel Monitoring		
1.	Personal Dust Sampling	Rs 0.2 Lakh
2.	Environmental Monitoring	Rs 6.0 Lakh
Sub Total		**Rs 6.2 lakh**
Grand Total		**Rs 21.94 Lakh**

4.5.10 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF ENVIRONMENTAL COMPONENTS

Irreversible commitment of environmental components for the existing mining project will include Land use, topography, geology, soil, human settlement, agriculture for mine lease area.

4.5.11 CONCLUSION

As discussed above, adequate preventive measures will be adopted to contain various pollutants generated due to the existing project within permissible limits. Development of Greenbelt/Plantation around the mining lease boundary & statutory barriers will minimize the environment pollution. Further the development of water reservoir and afforestation will enhance aesthetic beauty of the surrounding area and remain useful for local community.

CHAPTER - 5

ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

5.1 GENERAL

Analysis of alternative site helps in selection of best possible site for the project. On one hand it should be close to the existing infrastructure and on other hand it also helps to minimize the impact of project on environment.

Site for Mining lease is selected on the basis of occurrence of mineral for suitable end use. Occurrence of mineral is site specific in nature and it is proved after necessary survey, prospecting and detailed exploration and after duly obtaining statutory prospecting license and clearances and therefore alternative site analysis after grant of mining lease is not applicable for such projects.

Comparison of alternatives of technology helps to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environment friendly and cost-effective options. Every mine needs to be planned in a way that the mineral is extracted to the maximum extent without causing severe irreversible environmental damages.

5.2 ANALYSIS OF SITE

Gagal Limestone Mine site was selected on the basis of occurrence of mineral for suitable end use. This is an existing mine site; therefore, there is no need for selection of another alternative site.

M/s. ACC Limited has this existing operative captive Gagal Limestone Mine (Area: 231.25 ha.) for Production Capacity 4.5 Million TPA (3.78 MTPA Limestone, 0.64 MTPA Shale & 0.072 MTPA Quartzite) and subgrade mineral stacking 2,50,000 CuM per annum (0.51 Million TPA) (Maximum) with two nos. of existing Crushers having capacity 1000 TPH & 400 TPH at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh.

Mining lease for the mineral Limestone was granted in favor of M/s. ACC limited over an area of 265.97 Ha for a period of 20 years vide letter no. 5-205 / 77–Ind (Glg) -6253 dated 11.08.1978. Lease deed was executed on 10.02.1979 for a period of 20 years. Mining lease area was renewed for the area of 231.25 Ha for the mineral Limestone for a period of 20 years vide letter no. Udyog-Bhu (Khani-4) Major-47 / 98-I-7556 dated 29.01.2003. Renewal lease deed executed on 26.07.2003. Renewal of lease for inclusion of Shale and Quartzite was made vide letter no. Udyog-Bhu (Khani-4) Major 47/98–I-7963 dated 01.03.2004. Supplementary lease deed executed for inclusion of Shale and Quartzite on 01.05.2004. Validity extension of Mining lease as per provision of Section 8A (5) of MMDRA Act and extended up to 09.02.2029 vide letter no. Udyog-Bhu (Khani-4) Major 47/98–I-2540 dated 09.06.2015. Corrigendum in Validity extension to rectify the validity date from 09.02.2029 to 31.03.2030. Supplementary lease deed executed for validity extension on 10.06.2016.

From the nature & extent of the deposit and exploration done in the deposit, adequate reserves of required quality have been proved with adequate degree of reliability. Therefore, the existing project will continue at the existing site.

5.3 ANALYSIS OF TECHNOLOGY

Mining is done using fully opencast mechanised method. Deep hole drilling, blasting, excavation, loading, hauling, crushing, and transportation by closed Conveyor belt are used in all mining operations to ensure maximum mineral conservation and minimal environmental degradation. Excavated limestone is transported to the crusher via haul roads, and crushed limestone is transported to the ACC Cement Plant via covered conveyor belt. The same method and technology will be used in the future.

5.4 CONCLUSION

Alternative site selection is not required for mining projects since the mining is site-specific and the presence of minerals in the area where mining is taking place has been sufficiently established. Additionally, the deposit has excellent access and development infrastructure. The limestone mined from this mine is being/will be used for the manufacturing of cement in its interlinked existing Integrated Cement Plant at Village & PO Barmana, Tehsil Sadar, District Bilaspur, and State: Himachal Pradesh.

Mining is being done as per approved Modified Mining Plan along with Progressive Mine Closure Plan by Indian Bureau of Mines (IBM), Dehradun.

No Change in site and technology is envisaged.

CHAPTER–6

ENVIRONMENTAL MONITORING PROGRAMME

6.1 INTRODUCTION

Post Project Monitoring is an essential part to check the impact of project related activity. Hence monitoring of various environmental parameters is being/will be carried out on a regular basis to ascertain the following.

- Status of Pollution within the mine site and in its vicinity.
- To generate data for predictive or corrective purpose in respect of pollution.
- To examine the efficiency of pollution control system adopted at the site.
- To assess environmental impacts.

Monitoring is being/will be carried out at the site as per the norms of CPCB.

The Environmental Monitoring Programme is being carried out for various environmental components in accordance with the conditions specified in the Environmental Clearance Letter issued by the MoEF&CC and the Consent to Operate issued by the Himachal Pradesh State Pollution Control Board.

Six monthly compliance reports, as well as monitoring reports, are being/will be submitted to all regulatory departments mentioned in the granted EC on an annual basis. On a regular basis, a compliance report for the conditions stipulated in the consent to operate is being/will be submitted to the HPSPCB.

6.2 FORMATION OF ENVIRONMENTAL MANAGEMENT CELL (EMC)

Regular monitoring of various environmental components is required to maintain environmental quality within standards, M/s. ACC Limited has a full-fledged Environmental Management Cell (EMC) for the Limestone, Shale & Quartzite mine's environmental monitoring and management. The EMC team is in charge of pollution monitoring and control measure implementation.

A group of qualified and efficient engineers with technicians delegated for maintenance, upkeep, and monitoring of pollution control equipment to keep it operating at peak efficiency.

6.2.1 RESPONSIBILITIES OF EMC

The responsibilities of the EMC include the following:

- Environmental monitoring of the core and buffer zone and evaluation of results. Keeping of records to track the surrounding environment quality status.
- Procurement and Commissioning of Pollution Control Monitoring Equipments.
- Specification and regulation of maintenance schedules for Pollution Control Equipment.
- Ensuring that prescribed standards are maintained.
- Ensuring optimum water usage.
- Implementation of the mitigation measures suggested in EIA/EMP Report.
- Ensuring greenbelt development/plantation & its maintenance.
- Compliance with guidelines and statutory requirements.

- Coordination with statutory bodies, functional groups of the unit, Corporate Project/Environment & Engineering department etc.
- Interaction with engineering & operation team for implementation of any modification programmes intended to improve the availability/efficiency of pollution control devices/ systems.
- Carry out proactive environmental studies and observe all precautions necessary to avert disasters and emergencies in the mining observations as well as nearby areas.
- Regular environmental review and performance appraisal (Internal) and organizing Environmental / Energy and Water Audits by independent agencies/ 3rd party agencies.
- Coordination with the vendors dealing in waste supplies and disposal
- Ensuring that the waste handling and disposal is carried out as per prescribed conditions
- Conducting regular training programmes on various environmental requirements especially sustainable development, climate change, environmental monitoring etc.
- Reporting of compliances and non–compliances (if any) to management and other stakeholders.
- Implementation of socio-welfare programmes for economic upliftment in coordination with CSR team.
- Implementation of the Environmental Management Plan and assessment of effectiveness of the same.
- To provide periodic health check-up of workers.

6.3 MEASUREMENT METHODOLOGIES

6.3.1 INSTRUMENTS TO BE USED

A laboratory for environmental Monitoring has been established for Limestone mine.

The following instruments are being/ will be used for data collection work in the monitoring schedule:

1. Micro Meteorological Station at plant site (common for plant and mine)
2. Respirable Dust Sampler (RDS)
3. Fine Particulate Sampler (FPS)
4. Dry and Wet Bulb Thermometer
5. Sound Level Meter
6. Water level Indicator/Piezometer Digital Water level recorder
7. Global Positioning System (GPS)
8. Seismograph (Blastmate/Minimate) for blast Ground vibration monitoring
9. Non-Depressive Infrared (NDIR) Spectroscopy
10. Spectrophotometer
11. pH meter
12. TDS / Conductivity meter
13. Turbidity Meter

In addition to the above instruments, data of land use, vegetation and agricultural crops to be collected by the field team by meeting with a large number of local inhabitants in the study area and different government departments/agencies.

6.3.2 MONITORING PROGRAMME

The post project Monitoring will include details of any major/ minor impact in the core zone and area within buffer zone for the following parameters:

- Micro-Meteorological data
- Ambient Air Quality Monitoring
- Fugitive Dust Emission Monitoring
- Noise Level Monitoring
- Ground Vibration Monitoring
- Water quality and level Monitoring
- Medical Check-up of the employees

6.3.3 MONITORING SCHEDULE

Details of Environmental Monitoring schedule, which is being/ will be undertaken for various environmental components are detailed table below:

Table - 6.1
Post Project Monitoring

S. No.	Description	Frequency Of Monitoring
1.	Micro Meteorological Data	Hourly
2.	Ambient Air Quality Monitoring	Twice in a week (Manually)
3.	Crusher Stack Monitoring	Quarterly
4.	Ground Water Quality & Level Monitoring	Quarterly
5.	Noise Level Monitoring	Quarterly
6.	Ground Vibration Monitoring	On every blast
7.	Medical Checkup of employees	3 to 5 Year Interval ➢ Age of workers <45 years: After every 5 years ➢ Age of workers >45 years: After every 3 years

Source: *Standard EC Conditions*

6.3.4 METHODOLOGY ADOPTED

Post project monitoring in being/will be carried out as per conditions stipulated in Environmental Clearance Letter issued by MoEF&CC, Consent issued by HPSPCB 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 where some impacts may be observed on physical and biological environment. In the Buffer zone slight impact may be observed and that too is occasional.

One Wildlife Sanctuary and 30 protected forest lies within the study area. There are habitations which exist within and outside the mine lease boundary; therefore, monitoring stations has been established and Ambient Air Quality, Noise Level, Ground Water Level & Quality is being monitored as per schedule given in table below.

Table - 6.2

Post Project Monitoring Programme

Attributes	Sampling		Measurement Method	Test Procedure
	Network	Frequency		
A. Micro-Meteorology				
Temperature, Relative Humidity, Wind Speed, Wind Direction, Rain fall	Minimum 1 at project site	Regularly in one season by Weather Monitoring Station	-	-
B. Air Environment				
Pollutants • PM_{10}	4 locations in the study area (core zone and buffer zone)	As per Revised National Ambient Air Quality Standards (NAAQS) vide MoEF&CC circular, dated 16.11.2009	Gravimetric method	-
• $PM_{2.5}$			Gravimetric method	-
• SO_2			Modified West & Gaeke method	Absorption in Potassium Tetra Chloromercurate followed by Colorimetric estimation using P-Rosaniline hydrochloride and Formaldehyde (IS: 5182 Part: II).
• NO_2			Modified Jacob & Hochheiser	Absorption in dill NaOH and then estimated colorimetrically with sulphanilamide and N (I-Nepthyle) Ethylene diamineDihydrochloride and Hydrogen Peroxide (CPCB Method).
• PAH's		Yearly	Gas chromatographic (GC) method using flame ionization detector (FID)	-
C. Stack Monitoring				
Pollutants PM	Crusher Stack	Quarterly	Gravimetric method.	As per CPCB Guideline and Indian Standard 11255 (1985).
D. Water Environment				
pH, Turbidity, Colour, Odour, Taste, TDS, Total Hardness, Calcium hardness, Magnesium hardness, Chloride, Fluoride, Sulphate, Nitrates, Alkaliity, Iron, Copper, Manganese, Mercury, Cadmium,	4 locations in the study area (core zone and buffer zone)	Quarterly	As per IS: 10500 – 2012	Samples for water quality should be collected and analyzed as per: IS : 2488 (Part 1-5) methods for sampling and testing of Industrial effluents Standard methods for

Selenium, Arsenic, - Cyanide, Lead, Zinc, Chromium, Aluminum, Boron, Phenolic compounds				examination of water - and wastewater analysis published by American Public Health Association.
E. Noise				
Noise levels at Day & night time	2 locations in the study area (core zone & buffer zone)	Quarterly	As per CPCB norms / As per circular no. Tech. 18 of 1975 and 5 of 1990	As per CPCB norms / As per DGMS norms
F. Ground Vibration				
Vibration monitoring on every blast	Within 500 mtrs	On every blast	As per DGMS Record	-

Besides above, monitoring of greenbelt/plantation in terms of percentage of survival of plants and community development programmers is being/will be done.

6.3.5 LOCATIONS OF MONITORING STATIONS

The location of the AAQ monitoring stations are selected on the basis of prevailing meteorological conditions of the area like; Wind Direction & Wind Speed, Relative Humidity, Temperature, Atmospheric pressure and rainfall and in coordination with Regional Officer of SPCB.

AAQM stations have been selected to assess the ambient air quality of the area. Noise level is also to be measured in core area as well as study area.

Water & Soil monitoring locations are decided on the basis of general slope of the area & drainage pattern. Locations for the post project monitoring stations to be selected as per conditions mentioned in Standard EC/CTO/locations decided by HPSPCB.

Table - 6.3

Locations of Monitoring Stations

Sl. No	Attribute	Parameters to be monitored		Latitude	Longitude	Project Phase in Which Monitoring is Required	Monitoring Agency
1.	**Ambient Air Quality**	PM10, PM2.5, SO2, NO2, PAH's	Mines Office	31°39'99" N	76°85'00" E	Throughout mine life	
			Core Zone	31°39'65" N	76°84'81" E		
			Transformer House	31°41'04" N	76°84'08" E		
			Magazine Point	31°41'20" N	76°84'29" E		
			Quarry Coal Gate	31°41'98" N	76°83'58" E		
2.	**Ambient**	Leq noise	Near Biryahi	31°40'32" N	76°84'99" E	Throughout	

	Noise Quality	levels in dB (A)	Village			mine life	
			Towards Jamthal Village	31°39'65" N	76°84'81" E		
3.	**Water Quality**	Parameters as per IS 10500-2012 (pH, Alkalinity, Hardness, TDS, TSS, COD, BOD, DO, Sulphate etc.)	Dhaun Village, Deep Well	31°23'32" N	76°50'36" E	Throughout mine life	
			Jerkh Village, Deep Well	31°22'38" N	76°50'18" E		
			Near Beri Village, Hand Pump	31°23'52" N	76°49'54" E		
4.	**Soil Quality**	Parameters As per IS 2720/USDA (pH, Conductivity, Soil Texture, Colour, Water Holding Capacity etc.)		31°23'32" N	76°50'36" E	Throughout mine life	
				31°22'38" N	76°50'18" E		
				31°23'52" N	76°49'54" E		
5.	**Fugitive Emission Monitoring**	**Mines Office**		31°39'99" N	76°85'00" E	Throughout mine life	
		Quarry Coal Gate		31°41'98" N	76°83'58" E		
6.	**Stack Emission Monitoring**	Quarry Crusher		31°24'09" N	76°51'00" E	Throughout mine life	

6.4 DATA ANALYSIS

Monitoring data analysis is being/will be done as per CPCB guidelines by laboratory approved under EPA, 1986 & is being/will be submitted to concerned authority (specified in Environment Clearance Letter issued by MoEF&CC and Consent to Establish & Consent to Operate issued by HPSPCB) on regular basis.

6.5 REPORTING SCHEDULE

Environmental Monitoring Program (EMP) is being/will be designed considering conditions stipulated in the Environmental Clearance issued by the MoEF&CC, New Delhi & consent to establish and operate by Himachal Pradesh state Pollution Control Board (HPSPCB).

Six monthly compliance reports are being/will be submitted on regular basis to RO, MoEF&CC on or before 30th of June and 31st of December and displayed on the Company Website.

Quarterly compliance Report & for conditions stipulated in CTO/CTE are being/will be submitted to HPSPCB on regular basis.

6.6 CORRECTIVE & PREVENTIVE ACTION PLAN FOR NON–COMPLIANCE / NON-CONFORMANCES

The company would detail the process for identification of non-Conformances and address these through mid–course corrective action plan. The measures include-

- To identify non–compliance/ non- conformances.
- To record noncompliance/non-conformances.
- To evaluate the non-compliance/non-conformation, to determine specific corrective and preventive action.
- To identify senior responsible person of EMC to address the non-compliance/non-conformances.
- To review the corrective actions by the senior Management for effective implementation.
- Reporting of any statutory non-compliance if any, to board and other stakeholders at regular interval as per Corporate Environment Policy.

6.7 DETAILED BUDGET

The budget proposed for this existing Mining Project is as follows-

- Capital cost of the project (including EMP): Rs. 83.20 Crores
- Capital cost for EMP: Rs. 4.22 Crore/-
- Recurring Cost: Rs. 0.78 Crore/annum

CHAPTER - 7

ADDITIONAL STUDIES

7.1 INTRODUCTION

As per EIA Notification dated 14th September, 2006, as amended on time to time, MoEF&CC, New Delhi has suggested Terms of References (ToRs) for the preparation of the Environmental Impact Assessment (EIA) Report and Environmental Management Plan (EMP) vide F. No. J-11015/130/2003-IA. II (M) dated 25.01.2021.

The following Additional Studies were carried out in reference to the additional Terms of References:

- Hydro-geological Study & Rain Water Harvesting Plan.
- Rehabilitation & Resettlement Plan.
- Risk Assessment & Disaster Management Plan.

7.2 HYDRO-GEOLOGICAL STUDY AND RAINWATER HARVESTING

The total water requirement for mining project is 120 KLD, which is being met through Sutlej River as per agreement with Bhakra Beas Management Board. The mine is storing the surface runoff water stored in the pits during rainy season. This water will be dewatered as that area will be used for mining and the water will be used for dust suppression. Rest of the year there will be no water in the area.

- The Study area has hilly terrain topography. There are Steep high hills to moderate steep low hills and intervening valleys of Siwalik regional. The highest and the lowest elevation in the study area are 431 m and 2343 m above mean sea level.
- The major river that passes through the middle of the district from east to west is Sutlej. The drainage pattern of this area is of dendritic type and the gullies formed out of drainage extend over all the flanks and converging joints in different places in different khads.
- The annual rainfall (2012 to 2021) of the district is 1311.71 mm whereas normal rainfall 1302.34 is a bit lower than average rainfall.
- Depth to water levels ranges 507 to 508 m AMSL (52 to 53 m below ground level)
- Ultimate working depth of the mining operation will be 550 m AMSL during life of mine while at the end of lease life it will be 621 m AMSL. The water table will not be intersected in the conceptual period. NOC from CGWA will not be required. Therefore, no adverse impact on water quality is envisaged due to the existing mining project. Figure 7.1 shows the schematic diagram of mine working details.
- Physio-Chemical analysis of surface & groundwater samples reveals that groundwater near existing mine site is fit for human consumption and other purposes as all the major parameters were found within permissible limits prescribed by Indian Standard: 10500-2012.
- Total recharge of the buffer zone is 24.16 mcm/annum while natural discharge is 2.42 mcm/annum and total ground water extraction is 8.95 mcm/annum. The stage of categorization of Balh Valley Assessment unit is 41.18 % it is categorised as *Safe Unit*.

Detailed Hydro-geological study has been carried for the existing mining project. Report of the same with Rain water harvesting plan has been prepared and annexed as ***Annexure XXIII*** with this Draft EIA/EMP Report.

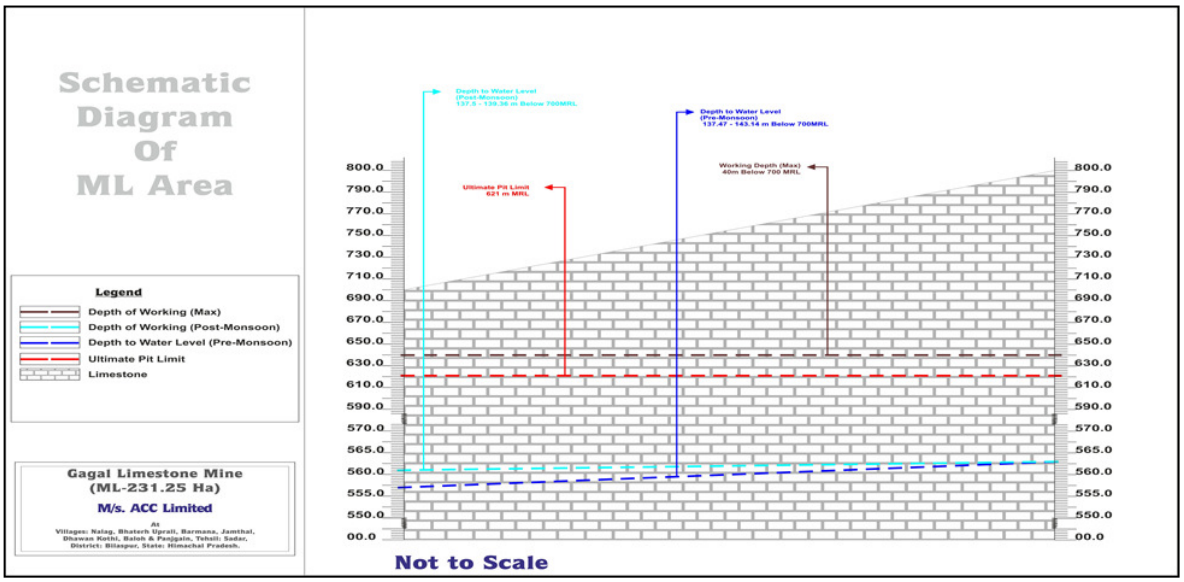


Figure7.1: Schematic Diagram of Mine Working Details. [Source: Mining Plan]

7.3 REHABILITATION & RESETTLEMENT PLAN

Total Mining lease area is 231.25 ha in which 103.02 ha is forest land, 128.23 ha is private land which is owned by M/s. ACC Limited. R&R plan has already been implemented.

7.4 RISK ASSESSMENT

The complete mining operation is being/ will be carried out under the management control and direction of a qualified mine manager holding a First-Class Manager's Certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad. The DGMS have been regularly issuing standing orders, model standing orders and circulars to be followed by the mine management in case of disaster, if any. Moreover, mining staff is being/ will be sent to refresher courses from time to time to keep them alert. However, following natural/industrial hazards may occur during normal operation.

Natural Hazards

- Landslides;
- Flash floods;
- Damage of life and property;
- Disruption of road & telecommunication facilities; and
- Lightening

Industrial Hazards

- Accident due to explosives;
- Accident due to heavy mining equipment; and
- Sabotage in case of magazine.

In order to take care of above hazard/disasters, the following control measures is being/ will be adopted:

- All safety precautions and provisions of Mine Act,1952, metalliferous Mines Regulation, 1961 and Mines Rules,1955 will be strictly followed during all mining operations;
- Entry of unauthorized persons is prohibited;
- Firefighting and first-aid provisions in the mines office complex and mining area;
- Provisions of all the safety appliances such as safety boot, helmets, goggles etc. has been made available to the employees and regular check for their use;
- Training and refresher courses for all the employees working in hazardous premises; Under Mines vocational training rules all employees of mines shall have to undergo the training at a regular interval;
- Working of mine, as per approved plans and regularly updating the mine plans;
- Cleaning of mine faces is being/ will be regularly done;
- Handling of explosives, charging and blasting is being/ will be carried out by competent persons only;
- Provision of magazine at a safe place with fencing and necessary security arrangement;
- Regular maintenance and testing of all mining equipment as per manufacturer's guidelines;
- Suppression of dust on the haulage roads;
- Adequate safety equipment is being/ will be provided at explosive magazine; and
- Increasing the awareness of safety and disaster through competitions, posters and other similar drives.

For any type of above disaster, a rescue team has been formed by training the mining staff with specialized training.

7.4.1 POSSIBLE HAZARDS IN OPEN CAST MINE

There are various factors, which can cause disaster in the mines. The mining activity has several disaster-prone areas. The identification of various hazards is shown in figure-7.1 and the hazards are discussed below:

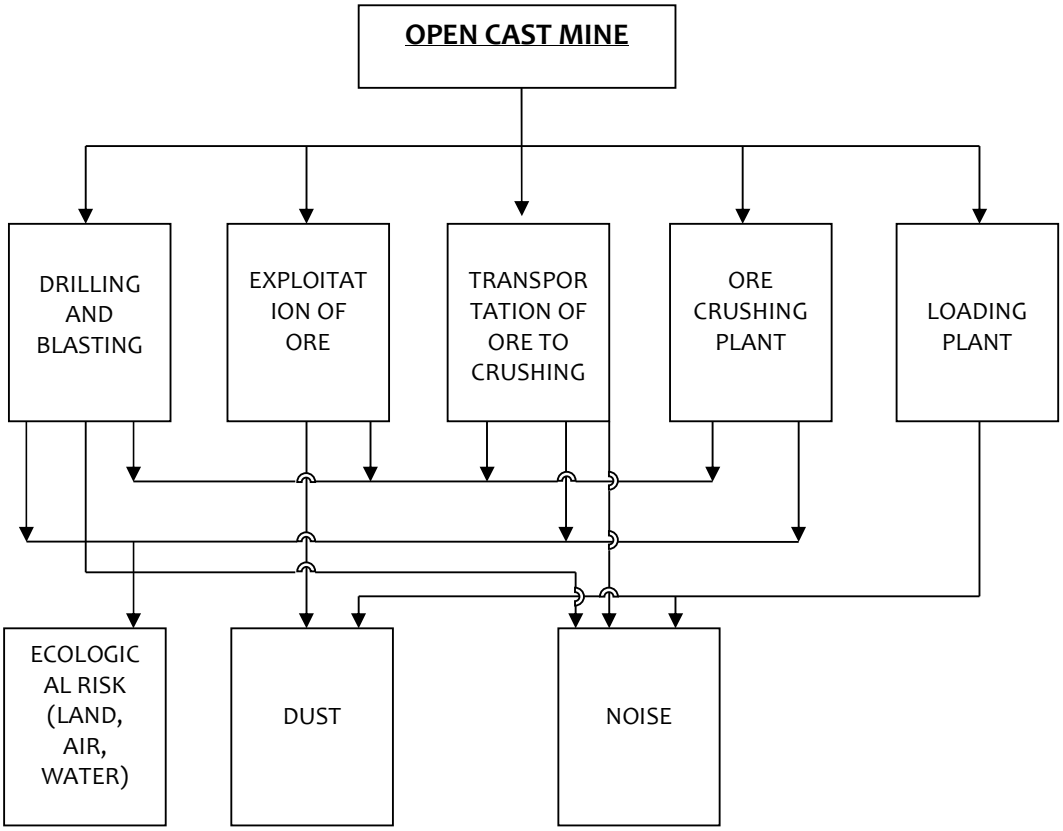


Fig: 7.2 Identification of Hazards in Open Cast Mine

7.4.1.1 BLASTING

Most of the accidents from blasting occur due to the projectiles, as they may sometimes go even beyond the danger zone, mainly due to overcharging of the shot-holes as a result of certain special features of the local ground. Flying rocks are encountered during initial and final blasting operations. Vibrations also lead to displacement of adjoining areas. Dust and noise are also problems commonly encountered during blasting operations. As this region is hilly in nature so there is a possibility of Landslides due to Blasting in the mine.

7.4.1.2 OVERBURDEN

The overburden dumps may cause landslides. High overburden dumps created at the quarry edge may cause sliding of the overburden dump or may cause failure of the pit slope due to excessive loading, thereby causing loss of life and property. Siltation of surface water may also cause run-off from overburden dumps.

As there is no OB dump present so no arrangements are provided regarding this. However, the existing mining project is in Seismic Zone V so Slope Stability analysis study has been done.

7.4.1.3 HEAVY MACHINERY

Most of the accidents during operation of dumpers, excavators and dozers and other heavy vehicles are often attributable to mechanical failures and human errors.

7.4.1.4 STORAGE OF EXPLOSIVES

Explosive magazine storage facility is located within the existing ML area which will cater to the existing mining activities in the same ML area. For the purpose of transportation of explosives, explosive van is present. The main hazard associated with the storage, transport and handling of explosives is fire and explosion. The rules as per the Indian explosive act-1983 and explosive rules-2008 should be followed for handling of explosives, which includes transportation, storage and use of explosives.

7.4.1.5 FUEL STORAGE

Most of the HEMM will operate on diesel and a Diesel Dispensing Pump is available to refill the HEMMs and to cater the minimum requirement. However, no major storage is envisaged at the ML area.

7.4.1.6 WATERLOGGING

The rainwater would flow down the slope of the hills and also along the natural streams. Rain water Harvesting has been proposed and water is being stored in the pit for use.

7.4.1.7 SAFETY MEASURES

SAFETY MEASURES AT THE OPEN CAST MINING PROJECT

- The opencast mines have been planned for working with shovel dumper system which requires proper benching not only for slope stability but also for movement of dumpers and other heavy machinery. The inclination of the quarry sides at the final stage i.e., at the dip most point will not exceed 600 to the horizontal. (This angle is measured between the line joining the toe of the bottom most bench to the crest of the top most bench and the horizontal line)
- Limestone benches, haul roads and ramps has been/ shall be developed and constructed mostly in hard strata and as such loose material slopes are not anticipated. The slopes, whether at faces/ benches or by the side of haul roads shall be in hard strata.
- The gradient of the haul road, access trench is/ will not be steeper than 1 in 25;
- Slope stabilization measures such as diversion drains, retaining walls, crib structures trenches spurs and retards for seasonal streams shall be implemented on highest priority so as to prevent landslides in totality;
- Afforestation is being/ will be done with full thrust particularly in non-forest areas to rejuvenate the eco-system. The tree/shrub/grass species shall be selected as given in table earlier which is most adaptive to the climate and altitude of the area. However as per the mining plan, most of the non-mining area is developed in Green Belt.
- The earthquake occurrences and tectonic activities are quite predominant. This area falls under category v in the seismic map of India. Due to this, all of the building and plant structures shall be designed so as to withstand expected severity of the earthquake. This will be necessary to prevent loss of life and damage to property; and

- All mining operations both within the quarry and outside is being/ will be conducted as per the conditions laid down by DGMS and under the strict supervision of competent persons appointed under metalliferous mines regulation act, 1961.

MEASURES SUGGESTED TO AVOID ACCIDENTS DUE TO BLASTING

- The blasting operation is being/ will be supervised by a competent person appointed for the purpose;
- The blasting operation shall be strictly conducted as per the guideline given in metalliferous mines regulation, 1961;
- Vibrations of each blast is being monitored on day-to-day basis;
- Demarcation of danger zone area falling within a radius of 500 m from the blast site;
- All employee and equipment shall be cleared from the blast area and located to a safe location prior to any scheduled blasting;
- To prevent unauthorized entry, guards shall be posted at all access points leading to the blast area;
- Audible signals such as sirens, whistles, etc. Shall be used to warn employees, visitors and neighbors about the scheduled blasting event;
- Sign boards showing "blasting time" to be exhibited at every entry to the mine.

MEASURES TO PREVENT ACCIDENTS DUE TO TRUCKS AND DUMPERS

- All transportation within the main working area is being/ will be carried out under the direct supervision and control of the management;
- The vehicles must be maintained in good repairs and checked thoroughly at least once a week by a competent person authorized for this purpose by the management;
- Broad signs should be provided at each and every turning point specially for the guidance of the drivers at night;
- To avoid dangers while reversing the trackless vehicles, especially at the embankment and tripping points, all areas for reversing of lorries should, as far as possible, be made man free, and there should be a light and sound device to indicate reversing of trucks; and
- A statutory provision of the fence, constant education, training etc. Will go a long way in reducing the incidence of such accidents.

7.4.2 OBJECTIVES OF DISASTER MANAGEMENT PLAN

The disaster management plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of the disaster management plan, it should be widely circulated and personnel training through rehearsals/drills.

The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

- The objective of onsite disaster management plan for the captive mine is to be a state of perceptual readiness through training, development to immediately control and arrest any emergency situations, so as to avert a full-fledged disaster and the consequence of human

and property damage. In the event of a disaster still occurring & to manage the same so that the risk of the damage to life and property is minimized.

The salient features are elaborated as below:

- Effect the rescue and medical treatment of casualties;
- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Identify any dead;
- Provide for the needs of relatives;
- Provide authoritative information to the news media;
- Secure the safe rehabilitation of affected area; and
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.

In effect, it is to optimize operational efficiency to rescue rehabilitation and render medical help and to restore normalcy.

EMERGENCY ORGANIZATION

It is recommended to setup an Emergency Organization. A senior executive (Mine Manager) who has control over the affairs of the mine would be heading the Emergency Organization. He would be designated as Site Controller. As per the General Organization chart, in the mines, the Mines Manager would be designated as the Incident Controller. The Incident Controller would be reporting to the Site Controller.

Each Incident Controller, for himself, organizes a team responsible for controlling the incidence with the personnel under his control. Shift In-charge would be the reporting officer, who would bring the incidence to the notice of the Incidence Controller and Site Controller.

Emergency coordinators would be appointed who would undertake the responsibilities like firefighting, rescue, rehabilitation, transport and provide essential and support services. For this purposes, Security In-charge, Personnel Department, Essential services personnel would be engaged. All these personnel would be designated as key personnel.

In each shift, electrical supervisor, electrical fitters, pump house in-charge and other maintenance staff would be drafted for emergency operations. In the event of power or communication system failure, some of staff members in the mine offices would be drafted and their services would be utilized as messengers for quick passing of communications. All these personnel would be declared as essential personnel.

Following officers of the mines are responsible for co-ordination in case of emergency situation in any section of the mine. All are based at residential colony of the company at a distance of 6 Km from the mine site. Their organizational position and telephone nos. are as follows:

Table 7.1

Emergency Response Organization

Sl. No	Designation	Responsibility
1	Team Leader	Responsible for planning how to fight an emergency
2	Fire Fighting Group	Up keeping and maintenance of firefighting appliances and firefighting.
3	First- aider group	Rendering first-aid
4	Salvaging Group	Ambulance driving, shifting of injured to hospital

The name, address & phone nos. of key persons in case of emergency is as follows:

Name	Designation	Address	Contact No.
Mr. Pankaj Nayan	Dy. General Manager (Mining) / Mines Manager	Gagal Cement Works ACC limited Barmana- 174013 Bilaspur (H.P.)	9816016842
Mr. Sanjey Vashist	Chief Plant Manager	Gagal Cement Works ACC limited Barmana- 174013 Bilaspur (H.P.)	01978-244069
Mr. Kanchan	Manager Mining	Gagal Cement Works ACC limited Barmana- 174013 Bilaspur (H.P.)	9404619339
Mr Paramveer Singh Khatri	Security Supervisor	Gagal Cement Works ACC limited Barmana- 174013 Bilaspur (H.P.)	+91 7738985182

7.5.2 KEY PERSONNEL AND THEIR RESPONSIBILITY

A. Site Controller

The head of the department/Mine agent shall have on overall responsibility for controlling the incident/accident and directing the personnel.

- To prepare a full proof plan for control of accident like, landslides, control subsidence, flood and other natural calamities.
- To inform statutory bodies of the State and Central Govt.
- To inform communication officer about the emergency, control centre and assembly point.
- To provide all assistance and call for fire Squad, Security officer and other service required for removing/ control of danger.
- To ensure that all necessary personnel assemble at assembly point.
- Make arrangements for medical treatment to the personnel injured seriously.

B. Accident controller/Mines Manager

- Mock rehearsal of management plan prepared for accident.
- To withdraw men/ machines from the affected area with priority for safety of personnel, minimize damage to the machines, environment and loss of material.
- To act as an accident controller to all the later arrived.
- To make a report based on the facts and figure and submit to the site controller.
- To provide first aid treatment and communicate to the shift in charge.

C. Capability of lessee: Following facilities shall be made available at cement plant and associated mines:

- Public address system
- Telephones/ Mobile handsets
- Runners/messenger
- Emergency alarm
- Firefighting equipment and accessories trained manpower
- Occupational Health Centre
- Training centre
- Fire tender
- Ambulance van
- Jeeps

D. Facilities available outside

- As per Risk Assessment Studied the possibility of 'Offsite' emergency Situation in ruled out as this mine is not likely to pose any offsite emergency hence does not call for preparation of an offsite emergency plan.

Further the residential quarters and living area are far from the mine.

However, considering extreme situation, district authority including police would be informed about any offsite emergency if situation so arises.

In case of any temporary discontinuance due to court order or due to statutory requirement or any other unforeseen circumstances, following measures for care and maintenance and monitoring of status shall be taken.

- Notice of temporary discontinuance of work in mine shall be given to the controller of Mines and the Reginald controller of Mines and DGMS, JDMS as per the Rules of MCDR 2017 and Reg, 6 MMR, 1961 respectively.
- All the mining machinery shall be shifted to a safe place.
- Entrance to the mines or part of the mines to be discontinued shall be fenced off and security Guards shall be posted for the safety and to restrict any unauthorized entry to the area. Fencing shall be as per the circular 11/1959 from DGMS.
- Competent persons shall inspect the area regularly.
- Air, water and other environmental monitoring shall be carried out.
- Care and upkeep of plantation done shall be carried out on regular basis
- Status of the working and status monitoring for re-opening of the mines shall be discussed in weekly meeting on last working day of the week.

In case of discontinuance due to any natural calamities mining operation will be restarted as early as possible after completing rescue work restoring safety and security repairs of road.

7.5.3 OFF-SITE EMERGENCY PLANNING

7.5.3.1 INTRODUCTION

The off-site emergency plan is an integral part of any hazard control system. It would be based on those accidents identified by the works management, which could affect people and the

environment outside the works. Thus, the off-site plan follows logically from the analysis that took place to provide the basis for the on-site plan and the two plans should, therefore, complement each other. The key feature of a good off-site emergency plan is flexibility in its application to emergencies other than those specifically included in the formation of the plan. The roles of the various parties that may be involved in the implementation of an off-site plan are described below. The responsibility for the off-site plan will be likely to rest either with the works management or with the local authority.

Either way, the plan must identify an emergency coordinating officer who would take overall command of the off-site activities. As with the on-site plan, an emergency control center will be required within which the emergency coordinating officer can operate. An early decision will be required in many cases on the advice to be given to people living "within range" of the accident – in particular whether they will be evacuated or told to go indoors. Consideration of evacuation may include the following factors:

a. In the case of a major fire but without explosion risk (e.g. an oil storage tank), only houses close to the fire are likely to need evacuation, although a severe smoke hazard may require this to be reviewed periodically. Though there is no houses in the vicinity of oil storage tank.

b. But if the fire escalates it might be necessary to evacuate people nearby, but only if there is time; if insufficient time exists, people would be advised to stay indoors and shield themselves from the fire while measures are taken by those outside to douse fire.

7.5.3.2 ASPECTS TO BE INCLUDED IN AN OFF-SITE EMERGENCY PLAN

Some of the aspects to be included in off-site emergency plan are as follows:

a) Organization

Details of command structure, warning systems, implementation procedures, emergency control centers, name and appointments of incident controller, site main controller, their deputies and other key personnel.

b) Communications

Identification of personnel involved, communication center, call signs, network, list of telephone numbers.

c) Special Emergency Equipment

Details of availability and location of heavy lifting gear, bulldozers, specified fire-fighting equipment, fireboats.

d) Voluntary Organizations

Details of organizers, telephone numbers, resources, etc.

e) Meteorological information

Arrangements for obtaining details of weather conditions prevailing at the time and weather forecasts will be made.

f) Humanitarian Arrangements

Transport, evacuation centers, emergency feeding, treatment of injured, first aid, ambulances, temporary mortuaries.

g) Public Information

Arrangements for: -

(i) Dealing with the media-press office

(ii) Informing relatives, etc.

h) Assessment

Arrangements for: -

(i) Collecting information on the causes of the emergency

(ii) Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

7.5.3.3 ROLES OF MAJOR HAZARD MANAGEMENTS

Where the local authority has the organization to formulate the plan, the role of management in off-site emergency planning has/ will establish liaison with those preparing the plans and to provide information appropriate to such plans. This will include a description of possible on-site accidents with potential for off-site harm, together with their consequences and an indication of the relative likelihood of the accidents.

Advice should be provided by works managements to all the outside organizations which may become involved in handling the emergency off-site and which will need previously to have familiarized themselves with some of the technical aspects of the works activities, e.g. emergency services, medical departments, etc.

7.5.3.4 ROLE OF THE EMERGENCY COORDINATING OFFICER

The various emergency services are coordinated by an Emergency Coordinating Officer (ECO) who is likely to be a senior police officer but, depending on the circumstances, could be a senior fire officer. The ECO is liaise closely with the site main controller. Again, depending on local arrangements, for very severe incidents with major or prolonged off-site consequences, the external control may pass to a senior local authority administrator or even an administrator appointed by the Central or State Government.

7.5.3.5 ROLE OF THE LOCAL AUTHORITY

In some places the duty to prepare the off-site plan lies with the local authorities. They have appointed an emergency planning officer (EPO) to carry out all this duty as part of the EPO's roles in preparing for a whole range of different emergencies within the local authority area. The EPO is need to obtain the information to provide the basis for the plan.

Rehearsals for off-site plans are important for the same reasons as on-site plans and is being/will need to be organized by the EPO.

7.5.3.6 ROLE OF THE POLICE

The police normally assume the overall control of an emergency, with a senior officer designated as emergency coordinating officer. Formal duties of the police during an emergency include protecting life and property and controlling traffic movements. The functions include controlling bystanders, evacuating the public, identifying the dead and dealing with casualties and informing relatives of dead or injured.

7.5.3.7 ROLE OF THE FIRE AUTHORITIES

The control of a fire is normally the responsibility of the senior fire brigade officer who would take over the handling of the fire from the site incident controller on arrival at the site. The senior fire brigade officer also have a similar responsibility for other events. Fire authorities having major hazard works in their area is familiarize themselves with the location on site of all stores of flammable materials, water and foam supply points and fire-fighting equipment.

7.5.3.8 ROLE OF THE HEALTH AUTHORITIES

Health authorities, including doctors, surgeons, hospitals, ambulances and so on, have a vital part to play following a major accident and they form an integral part of any emergency plan.
For major fires, injuries are the result of the effects of thermal radiation to a varying degree and the knowledge and experience to handle this in all, but extreme, cases may be generally available in most hospitals.

7.5.3.9 ROLES OF THE GOVERNMENT SAFETY AUTHORITY

The Inspectors of Director General of Mines Safety may want to satisfy themselves that the organization responsible for including the off-site plan has made adequate arrangements for handling emergencies of all types including major emergencies.
In the event of an accident, local arrangements regarding the role of the factory inspector is apply. In the aftermath, factory inspectors may wish to ensure that the affected areas are rehabilitated safely.

7.5.3.10 CARE AND MAINTENANCE DURING TEMPORARY DISCONTINUANCE

When the mine will be temporarily discontinued due to any unforeseen circumstances, the following care and maintenance will be carried out.

- Notice of temporary discontinuance of work in mine will be given to the Controller General, Controller of Mines and the Regional Controller of Mines, IBM, DGMS & DMG, State Govt. officials under Rule 24 of MCDR 1988 and Reg. 6 of MMR 1961 respectively
- All mining machineries will be shifted to a safe place.
- Entrance to the mines or part of the mines to be discontinued will be fenced off as per DGMS Circular and security Guards will be posted for the safety and to restrict any unauthorized entry to the area.
- Competent persons will inspect the area regularly.
- Air, water and other environmental monitoring will be carried out.
- Care for plantation done will be carried out on a regular basis.

All rules and regulations will be followed in case of any temporary discontinuance of mine.

Detailed site-specific management plan is enclosed as **Annexure XXII** with this Draft EIA/EMP Report

CHAPTER - 8

PROJECT BENEFITS

8.1 INTRODUCTION

M/s ACC Limited has been actively contributing to the social and economic development of the communities in the nearby areas. In doing so, it plays a key role in building a better, sustainable way of life for the weaker sections of society and raises the country's Human Development Index. The company defines its principle of working in a socially responsible, ethical and environmentally friendly manner.

ACC believes holistic socioeconomic development of the local community is the need of the hour. It truly believes that a company's prosperity is linked with that of its neighboring communities.

8.2 PROJECT BENEFITS

Project benefits are attributed in various ways as under:

1) Environment Benefits
2) Employment Potential
3) Economic Benefits
4) Social Benefits

The company is conscious of its obligations to society at large & contribute in overall socio-economic development of the area by increasing its efforts for overall development of the study area.

8.2.1 ENVIRONMENTAL BENEFITS

- Total Mining lease area is 231.25 Ha.
- At the conceptual stage (Lease life) Total excavated area will be 63.28 Ha, area under Infrastructure and Road is i.e., 13.37 Ha and 4.63 Ha respectively, reclaimed area as mango orchard will be 1.05 Ha, 7.76 ha area under sub grade/waste stacking, 126.6 Ha will be under green belt/ Plantation and the remaining 14.56 ha will be Virgin Land.

8.2.2 EMPLOYMENT- BENEFITS

The company has employed mostly local workers in unskilled and semiskilled category for the mining / plant operation and other miscellaneous jobs:

- About 70% of the permanent employees and contractual manpower are from local nearby areas. areas.
- Engaging around average 8 workmen per day for miscellaneous jobs like greenbelt/plantation, Housekeeping, etc.

Preference is being/ will be given to the locals as per their eligibility. As the mine is a captive mine hence the limestone is being/will be produced & transported to its interlinked cement plant of ACC.

Apart from the above, various indirect employment opportunities are envisaged by way of transportation, workshops, petty contractors; shopkeepers, network of retailers (cement stockists) throughout the state and in its marketing regions.

Mining activities also result in numerous indirect employment avenues for the people such as truck owners, drivers, repair shops, tea–stalls etc.

Some skilled manpower may be required from the nearby area to the extent available while remaining unskilled/ semi- skilled manpower will be sourced from the local.

The Company is organizing vocational training, entrepreneur development programmes for the locals including women members and is providing advice for starting suitable small scale industry.

8.2.3 ECONOMIC BENEFITS

The Mining sector is one of the important sectors in India's economy.

The existing project will contribute additional revenue to the State and Central Govt. in the form of royalty, cess and other taxes etc.

TABLE – 8.1

Economic Benefits of the Project (During Mining Lease Period)

S.NO.	DESCRIPTION	INR Crore per Annum
1.	Royalty @ Rs 80/- Per Ton of Limestone (Present / prevailing Rate)	30.24
2.	Royalty @ Rs 60 /- Per Ton of Shale (Present / prevailing Rate)	3.84
3.	Royalty @ Rs 60 /- Per Ton of Quartzite (Present / prevailing Rate)	0.43
Total Royalty Generated		**34.51**
4.	District Mineral Foundation @ 30% of the Royalty	10.353
5.	National Mineral Exploration Trust@ 2 % of the Royalty	0.690
Total		**11.043**

Revenue generation per year (@ 3.78 MTPA Limestone, 0.64 MTPA Shale & 0.072 MTPA Quartzite) is Rs 45.553 Crore.

8.2.4 SOCIAL BENEFITS

Existing project results in growth of the surrounding areas by increased direct and indirect employment opportunities in the region including ancillary development and supporting infrastructure. Besides this, Royalty and other taxes are additional benefit, particularly in the form of contribution to the District Mineral Foundation fund (DMF), National Mineral Exploration Trust etc. are/ would be additional benefits and are being/ will be utilized by local administration for the development of socio-economic infrastructure and wellbeing of the local population.

The company will continue to undertake various community development activities for the social upliftment of community as under:

- ✓ Health & Sanitation
- ✓ Education & Cultural activities
- ✓ Sustainable Livelihood
- ✓ Drinking Water
- ✓ Environmental Care
- ✓ Community Infrastructure Development

8.2.4.1 CSR ACTIVITIES AND EXPENDITURE

ACC has spent about Rs.575.32 Lakh within last 3 years (from year Y 2020 to March of Y 2023,) for the upliftment of the living standards and development of nearby areas through CSR activities carried out in project vicinity area and nearby villages which has benefited many beneficiaries.

Communities around our operation are one of our key stakeholders. We, at ACC believe that engaging and involving them is very much important for the overall growth of our business. Our Corporate Social Responsibility, CSR intervention starts with a participatory rural approach technique to get a picture of basic needs of the community around which we operate. An assessment is also made of the available resources and the basic structure and the hierarchy of the officials running the village. A detailed action plan is then developed in consultation with the community which sets out how we will achieve our action plan gets continually monitored and reviewed. It is a flexible and evolving plan that responds to the needs of our communities.

- Effort is important but where to apply is more important.
- GAGAL CEMENT WORKS of late, had reviewed its approach and decided to take a step further in our partnership with the key stakeholders. We initiated this change through needs assessment studies at Gagal using Participatory rural appraisal tools such as focus group discussion, resource mapping by villagers, issue prioritization etc. The assessments helped us to understand the context in which communities articulate their needs and the impacts of our actions, especially in the areas of health, education and infrastructure development around the communities over the years. It also helped us realign ourselves to key concerns of the communities around us. These studies were facilitated through our internal cross functional teams, and NGOs. Target area: 4 surrounding Gram Panchayats of Barmana, Dhaun Kothi, Panjgain, Beri. Total Population: 12500
- The programs can be clustered under four broad thrusts as below:
    1. Providing Education for Society's Future
    2. Supporting sustainable community development
    3. Building community infrastructure
    4. Charity and Donations for social cause.
    5. Livelihood

Education support / Literacy:

Education is the key to empowerment of people. We believe that if we are able to create an opportunity for the communities around to have access to good quality education, the children will grow up to become a responsible citizen and a competent workforce.

Improvement in Quality of Education in 4 Govt. Schools:-

Project "ACC VIDYA UTKARSH"

- Four schools in our operational area have been targeted under our CSR project. ILFS have been engaged to provide education by K-Yan (Smart Class device) contents.
- With the help of our teacher's team, we could create a good education environment in the govt. schools as a result of it some of the students have taken admission in the village govt. schools those were studying in private schools.
- Mathematics English Science such major subjects which we are focusing on.
- On different festivals our team teaches different models to the students and it is also a way to create school environment more interesting.
- Apart from the ongoing subsidy support to schools with which ACC has an agreement, we also support other government schools around our operations. Infrastructure strengthening in terms of buildings, grounds safety walls, desks, computers, scientific equipment is regular feature.
- Concept of Smart classes is introduced and computer learning stations have been installed.
- Special days of national importance are celebrated in schools by organizing competitions among students.
- Individual Accounts have been opened in bank to inculcate the habit of saving from childhood.
- Since 2010 literacy drive was initiated for wives of our contract labour mostly from other states.
- GAGAL CEMENT WORKS is continuing its association with the ITI Bilaspur. This has resulted in ITI Bilaspur being ranked 7th in the country and 2nd in the state. All passed out students have been taken by Industry.
- A training hall and computers with latest specifications has been provided to Local Panchayat Barmana to educate local youths on IT.
- Swablamban project for farmers, women, youths with (NGO).
- Vocational center for girls through ACC AHEAD.
- Education project for quality improvement with SEEDS (ILFS).

Strengthening infrastructure in villages with Gram Panchayats like Footpaths, school buildings, Crematorium, flood protection work, fencing of agricultural lands.

- Launched Vidya Saarthi (Scholarship for Bilaspur District) at 4 Govt. Schools.

Barmana, Panjgain, Laghat, Dhaun Kothi 600 (students) for Improvement in Quality of Education in 4 Govt Schools; Our project area is limited for conducting CSR activities, it is generally for villages coming under 4-5 km radius of our plant and mines. ACC Vidya Saarathi is one of its kind scholarship programme run by any corporate which is dedicated for district in which our plant is situated. It is a digital platform on which students in four categories can apply for getting financial support i.e Graduation, ITI Diploma and Engineering. Total 102 scholarships have been assigned for our Gagal Plant out of which 70 have been disbursed after verification of physical documents for the CSR activities PAN ACC

- Scholarships to 70 students have been provided
- 40 Graduate students,
- 20 ITI
- 7 Engineering & 3 Diploma students

Total 8.7 Lakh have been given under this project. Also, ACC will provide a certificate to the students for the scholarships.

- Teaching through Audio-Visual mode K-Yan and interactive tool Kits
- Setting up of Library and use of BALA (Building as Learning Aid)
- Providing supplementary teachers

Community Support

GAGAL CEMENT WORKS has been supporting the community around plant in the promotion of their culture, women empowerment, health, means of livelihood, protection of environment, sports in a focused and sustainable manner. Though most of the families around plant have benefited directly or indirectly by plant operations people need to be exposed to other means of livelihood also.

Women Empowerment:

- A Vocational centre has been started to train women in cutting, tailoring and embroidery, Centre is being run by ACC AHEAD volunteers.
- Village women being trained in beautician course & Self-Help Groups are created.
- Seminars and trainings organized for women to know about various govt. schemes, their rights and importance of education, saving and innovative techniques, safety etc.
- Recently we have collaborated for production of a short video "Muskaan" on burning issue of "Save Girl Child" & Gender Equality in collaboration with Bilaspur Dist. Administration & launched & uploaded at U-Tube by Directorate of Women & Child Development, HP. It was released by the Hon'ble Chief Minister of Himachal Pradesh at Shimla.

Details of Expenditure done by the company in last 3 years under CSR activities carried out in project vicinity area and nearby villages are given below:

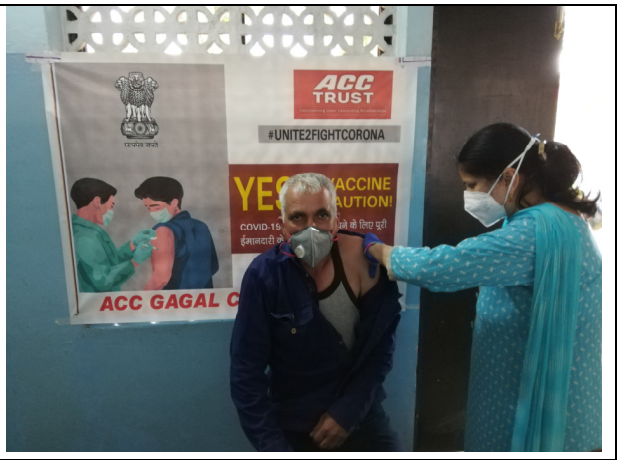
Table - 8.2

CSR Expenditure since year Y 2020 to FY2022-23 (Rs. in Lakh)

Sl	Theme	2020- 21	2021-22	2022-23	Total
1	**Social Inclusion** (Education, Health, Water & Sanitation, Cultural activities, Sports)	122.55	167.9	55.2	345.65
2	**Community infrastructure (**Construction of Footpath, Community Hall, retaining walls, Solar lights)	50.74	21.36	33.09	105.19
3	**Sustainable livelihood** (Upliftment of women, Youth employability program)	21.49	23.43	79.56	124.48
	Total CSR Expenses (In Lakhs)	**194.78**	**212.69**	**167.85**	**575.32**

CSR ACTIVITIES UNDER EDUCATION

CSR ACTIVITIES UNDER HEALTH



Health Checkup

CSR ACTIVITIES DONE UNDER SUSTAINABLE LIVLIHOOD

CSR ACTIVITIES DONE UNDER SOCIAL WELFARE

Figure 8.1: Photographs showing various CSR Activities

8.2.5 PROPOSED ACTION PLAN FOR SOCIO-ECONOMIC DEVELOPMENT

As per MoEF&CC OM dated 30.09.2020 & 20.10.2020, it is directed that commitments made by the project proponent to address the concerns rose during the public consultation and prescribe specific condition(s) in physical terns while recommending the proposal, for grant of prior

environment clearance instead of allocation of funds under Corporate Environment Responsibility (CER).

The ongoing CSR activities will be continued. However, the issues which will be raised during the public hearing or any other need-based activities shall also be taken by ACC into account and will be considered in the budget under EMP.

8.3 CONCLUSION

Due to the existing mining project local economy has received a boost due to employees spending and services generated by company. Overall effect has improved the buying power of employees and thus a higher standard of living viz. better education, improved health and sanitation facilities, housing and acquisition of consumer durables. Housing, transport, medical, educational and other civic amenities will continue to improve in the future as well. This will envisage as a major positive benefit.

CHAPTER–9
ENVIRONMENTAL COST BENEFIT ANALYSIS

9.1 ENVIRONMENTAL COST BENEFIT ANALYSIS

As per EIA Notification dated September 14, 2006, 'Environmental Cost Benefit Analysis' is applicable only if the same is recommended at the Scoping stage.

As per the ToR points issued by MoEF&CC, New Delhi vide letter no letter no. 23-224/2018-IA.III (V) dated 25.01.2021 and ToR Amendment dated 27.07.2021 for the mining project activity, the 'Environmental Cost Benefit Analysis' is not required.

CHAPTER - 10

ENVIRONMENTAL MANAGEMENT PLAN

10.1 INTRODUCTION

The Environmental Management Plan (EMP) is required to minimize adverse environmental impacts by implementing suggested mitigation measures with timelines and responsibilities during the project life cycle.

EMP consists of a set of mitigation, management and institutional measures to be taken up during implementation and operation of a project to eliminate adverse environmental impacts or reduce them to an acceptable level. Chapter 4 dealt with environmental impacts of this project and proposed mitigative measures to minimize adverse impacts as well as to improve the existing environment quality. This chapter mainly discusses the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness is monitored after approval of EMP. It comprises of Corporate Environment Policy (CEP) of company, establishment of an Environment Management Cell (EMC) and developing mechanism of reporting of non compliances, if any to company board, conduct root cause analysis of non-compliances and propose appropriate mitigation measures to ensure avoidance of adverse Penal action arising out of environment and other statutory regulation.

Good practices of EMP will be ensured to keep all the environmental parameters of the project w.r.t. air, water quality, soil, biological diversity of the area socio economic improvement, biological diversity of the area within statutory limits and sustainable manner.

10.2 ELEMENTS OF EMP

EMP includes four major elements: -

1. **Planning**: This includes identification of environmental impacts, legal requirement, commitments and policies, setting environmental objectives and environment, health, safety and social compliance requirements;
2. **Implementation**: This comprises of resources available for the project, accountability of employees , contractors and documentation of measures to be taken;
3. **Checking**: Measurement & Evaluation: This includes regular inspection, audits, monitoring corrective actions and record keeping ; and
4. **Management Review**: Actions are taken to continually improve the environment, health, safety, and social performance of the organization.

The following Policy & programs have been developed to ensure proper implementation of EMP for the existing mining project:

- Formulating Corporate Environment Policy (CEP)
- Formation of Environment Management Cell (EMC)
- Greenbelt Development/plantation programme
- Occupational Health and Safety
- Budgeting of Environmental mitigation measures

10.3 CORPORATE ENVIRONMENT POLICY

The importance of environmental management has been recognized by ACC management very early and company has taken necessary steps to identify environmental aspects and mitigate those aspects which generate pollution at the sites, respond to impacts of its own population and also in the peripheral areas. It has adopted a two-pronged strategy to abate pollution as given below:

- Provision of state of the air pollution control equipment at the design stage itself through clean technology initiatives.
- By developing a strong monitoring and inspection setup for statutory compliances.

Corporate Environment Policy (CEP) has been formulated and adopted by the Board of Directors of ACC to provide a framework to become an environmentally sustainable company. The hierarchical system or administrative order of the company to deal with the environmental issues and for ensuring compliance with the EC conditions etc. has been given in the Corporate Environmental Policy of the company.

10.4 FORMATION OF ENVIRONMENTAL MANAGEMENT CELL (EMC)

In order to maintain the environmental quality, regular inspections, audits & monitoring of various environmental components is necessary. M/s. ACC Limited (ACC) has a full-fledged Environmental Management Cell (EMC) for environmental monitoring and control. The EMC team will be responsible for pollution monitoring aspects and implementation of control measures as discussed in Chapter 2 & 4 of this Draft EIA/EMP Report.

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

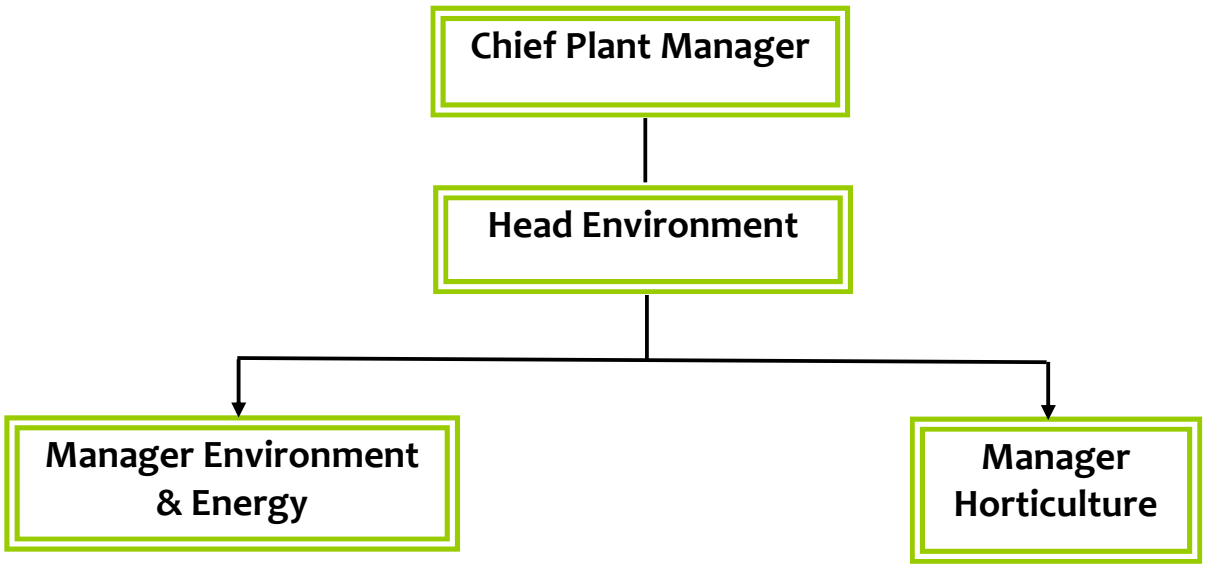


Figure: 10.1 Organisational Structure of EMC

For effective implementation of environment policy, ACC will:

- Conduct all operations in an environmentally responsible manner that is better than statuary environment compliances and applicable standards.
- Continuously assess our environmental impacts and measure and improve our environmental performance by adopting best practices for prevention and control of pollution.
- Make continuous efforts to increase the use of non-carbonaceous raw material, renewable energy and fuels and co-processing of wastes to reduce our greenhouse gases (GHG) footprint as part of our Climate Change mitigation initiative.
- Assess biodiversity quality in all our extraction sites and strive to create a positive impact.
- Invest 1n research and development of environmentally sustainable products which have a low ecological footprint.
- Implement and continually improve the Environmental Management System across all our operations.
- Adhere and report our environmental performance to all our stakeholders

10.5 CORPORATE ENVIRONMENTAL AUDITING

Independent Audit/ evaluation of working of the Policy is being done by the Internal Auditor at least once a year and report the same to the Chief Financial Officer and Whole Time Director, being designated by the Board of Directors as responsible Director for the preparation and implementation of the Corporate Environmental Policy. It is imperative for the Head of business /occupier to ensure avoidance of adverse penal action arising out of Environment and other statutory regulation. Therefore, third party Corporate Environment Compliance Audit (CECA) is conduct to assess and quantify the environmental performance/compliance of the project with following scope:

- To check any major or minor non-compliances/non-conformities occurring in respect of the statutory clearances
- To check with the compliance status of the conditions stipulated in the Environment Clearance letter/Consent to Operate/other statutory permissions
- Evaluation of performance of OHS Policy Implementation
- Verify selected parameters and methods for internal ACC policies and established environmental performance levels
- Conduct root cause analysis of non-compliances/deviation and propose appropriate mitigation measures prioritizing the findings as high, medium or low based on potential risk to the organization.

Detailed Corporate Environment Policy along with organizational structure of EMC is given below:

ACC

adani Cement

CORPORATE ENVIRONMENT POLICY

As an integral part of our business philosophy, ACC Limited is part of Adani Group is committed to contribute towards ensuring a clean and sustainable environment by continually improving our environmental performance.

To achieve this goal, we wholeheartedly and proactively commit ourselves to:

- Conduct all our operations in an environmentally responsible manner that is better than statutory environment compliances and applicable standards.
- Continuously assess our environmental impacts and measure and improve our environmental performance by adopting best practices for prevention and control of pollution.
- Adopt environmentally safe mining and process technologies along with best operating practices for prevention & control of risks and adverse effects of the release of our pollutants to the environment (air, water, and soil) so as to protect health and safety of our employees, contract employees, and community.
- Comply with applicable legal and other requirements including clearances of environment, forest and wildlife, consents, permits, licenses, standards, and leading industry initiatives.
- Make continuous efforts to increase the use of non-carbonaceous raw material, renewable energy and fuels and co-processing of wastes to reduce our greenhouse gases (GHG) footprint as part of our Climate Change mitigation initiative.
- Make continuous efforts to reduce water intensity and fresh water usage by increased use of harvested and recycled water in our operations.
- Assess biodiversity quality in all our extraction sites and strive to create a positive impact.
- Invest in research and development of environmentally sustainable products which have a low ecological footprint.
- Implement and continually improve the Environmental Management System across all our operations

Adhere and report our environmental performance to all our stakeholders.

Sukuru Ramarao
Chief Operating Officer

Ajay Kapur
Chief Executive Officer

1st April, 2023

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Figure: 10.2: Corporate Environment Policy

10.5.1 RESPONSIBILITIES OF EMC

The EMC shall oversee and implement the various functions to ensure that environmental status of the area remains within the statutory standard of MoEF&CC and MPPCB.

The responsibilities of the EMC include the following:

- Environmental monitoring of the core and buffer zone and evaluation of results. Keeping of records to track the surrounding environment quality status.
- Procurement and commissioning of Pollution Control/Monitoring Equipment
- Specification and regulation of maintenance schedules for pollution control equipment.
- Ensuring that prescribed standards are maintained.
- Ensuring optimum water usage.
- Implementation of the mitigation measures suggested in EIA/EMP Report.
- Ensuring greenbelt development/plantation & its maintenance.
- Compliance with guidelines and statutory requirements.
- Coordination with statutory bodies, functional groups of the unit, Corporate Project/Environment & Engineering department etc.
- Interaction with engineering & operation team for implementation of any modification programmes intended to improve the availability/efficiency of pollution control devices/ systems.
- Carry out proactive environmental studies and observe all precautions necessary to avert disasters and emergencies in the mining observations as well as nearby areas.
- Regular environmental review and performance appraisal (Internal) and organizing Environmental / Energy and Water Audits by independent agencies/ 3rd party agencies.
- Coordination with the vendors dealing in waste supplies and disposal
- Ensuring that the waste handling and disposal is carried out as per prescribed conditions
- Implementation of the mitigation measures suggested in EIA/EMP Report.
- Conducting regular training programmes on various environmental requirements especially sustainable development, climate change, environmental monitoring etc.
- Reporting of compliances and non–compliances (if any) to management and other stakeholders.

The EMC also co-ordinates with other departments like Occupational Health, Safety Management, Project Engineering, Horticulture, CSR, Water Supply Department etc. and also do the liaison work with external agencies like State & Central Pollution Control Boards as well as other related departments. EMC is/ will be sending six monthly progress reports in the prescribed format, as per the prevailing practice to concerned agencies. Any new regulations considered by State/Central Pollution Control Board for the Industry is being/ will be taken care of by EMC of the plant. Also, half yearly compliance reports is being/ will be sent to MoEF&CC as per the guideline.

10.6 PERSONS RESPONSIBLE FOR IMPLEMENTATION OF EMP

Details of persons responsible for implementation of EMP along with their role/responsibilities are given in table below:

Table – 10.1

Persons responsible for implementation of EMP

S. No.	Designation	Numbers	Roles & Responsibilities
1.	Manager-Mines	1	As per MMR
2.	Asst. Manager	1	Assessment & Implementation of protective measures
3.	Geologist	1	Plantation, Environment Awareness Programs etc.
4.	Environment Engineer	1	Monitoring of Air, Water, Noise, Soil and other related parameters

Source: *ACC Limited*

10.1.1 CORRECTIVE AND PREVENTIVE ACTION PLAN FOR NON – COMPLIANCE / NON-CONFORMANCES

The company has a well laid down process for identification & prevention of non- Conformances. In the eventuality of any non-compliance/ Non conformances, it is addressed on priority through mid – course corrective action plan along with appropriate recording & reporting to Stake holders in line with the Company Policy duly adopted by the board.

10.7 DETAILED BUDGET FOR EMP

The budget for implementation of the pollution control & impact mitigation measures as suggested for this revalidation project is given as under:

- Capital cost of the project (including EMP): Rs. 83.20 Crores
- Capital cost for EMP: Rs. 4.22 Crore/-
- Recurring Cost: Rs. 0.78 Crore/annum

Detailed breakup of EMP budget existing and proposed is given below:

Table – 10.2

Detailed Existing Cost Breakup for Environment Protection (Rs. In Lakh)

S. No.	Activities	Existing	
		Capital	Recurring
EMP for Pollution Control & Monitoring			
Mitigative Measures			
1.	Greenbelt on 4.0 ha (7.5 m lease periphery) and plantation on 116.65 ha (Mango orchard & Un-worked area) with 237361 no of species	297	36
2.	Water tankers for sprinkling on haul roads and mining areas/activities (Existing one tanker)	20	5.70
3.	Dozer Operation for haul road maintenance - Existing mine,	-	10.0
4.	Pollution Control Device (at transfer points) Equipment and its installation Cost, Operation & Maintenance Capex Cost of two bag filters and Dust Suppression system at both crushers and its hoppers including permanent water sprinkling system and mist canon	236	-
5.	Sprinkling system at crusher hopper and transfer points (Existing 900 TPH Capacity)		
6.	Provision of Garland Drains: Already provided (L*W*D = 18 m x 4 m x 6 m) and (L*W*D = 65 m x 2 m x 5 m)	40.0	10.0

7.	Construction of Check dams @ Rs. 40,000/ Check Dam	23.2	0.50
8.	Construction of Retaining Wall (L*W*H = 78 m x 6 m x 4 m) and (L*W*D = 65 m x 2 m x 5 m)	25.0	1.5
9.	Oil-water separator (1 No)	10.0	0.20
10.	Controlled blasting for minimizing ground vibration, fly rock, air pressure/ noise, etc. by Using Nonel and Exel	-	50.0
11.	Providing Ear muffs/plugs to workers working in high noise area	-	2.0
	Sub total	**651.2**	**115.9**
Monitoring			
1.	Display Board at main gate for display of Ambient, Air, Noise and Hazardous waste monitoring data.	2.0	0.40
2.	Ambient Air Quality Monitoring Station (4 No)	2.40	0.60
3.	Weather monitoring Station with civil work (1 No)	5.0	0.80
4.	Noise monitoring device	1.09	-
5.	Installation of piezometers along the periphery in the premises	2.0	-
6.	➢ Water quality and level monitoring at mine site and villages (3 locations). ➢ Monitoring of River and nallah (Flow and quality-inlet & outlet). ➢ Workshop Waste water quality analysis	-	2.0
7.	Wildlife conservation plan	60.0	-
	Sub total	**72.49**	**3.8**
Grand total		**723.69**	**119.7**

Source: *Approved Review of Mining Plan with Progressive Mine Closure Plan*

Table 10.3

Breakup of Proposed EMP Budget (Rs in Lakhs)

Sl. No.	Activities	Proposed budget	
		Capital	Recurring
A.	**Mitigative Measures**		
1.	Water tankers for sprinkling on haul roads and mining areas/activities	50	10
2.	Greenbelt on remaining 1.0 ha with 2500 trees till 2024-2025	6.25	5
3.	Plantation over an area of 5.0 ha (12500 trees) till 2030	31.25	25
4.	Protection for Plantation (Fencing around area)	30	0.30
5.	Rain water harvesting structure near Mines office	5	0.3
6.	Provision of Garland Drains around OB dumps: (L*W*D = 360 m x 3 m x 1.5 m)	15	1.0
7.	Construction of Retaining Wall around OB dumps (L*W*D = 660 m x 0.45 m x 1.5 m) till 2030	85	5.0
8.	Controlled blasting for minimizing ground vibration, fly rock, air pressure/ noise, etc. by Using Nonel and Exel	-	10
9.	10 nos. of fog canon/mist sprayer of at least 40 m throw shall be installed at various locations in the mine lease area.	30.0	2.0
10.	Vaccum suction hoods and dry fogging system in Wobbler	30.0	0.5

11.	Providing Ear muffs/plugs to workers working in high noise area	-	1.0
	Sub Total	**282.5**	**59.1**
B.	**Monitoring**		
1.	Installation of continuous Ambient Air Quality Monitoring Station (1 nos)	80	15
2.	Five Ambient Air Quality Monitoring Station at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain,	7.00	0.50
3.	Air monitoring Equipment for PM10 & PM2.5	1.70	1.50
4.	Work Place Noise Level Monitoring (4 no. of locations & quarterly frequency)	-	0.10
5.	Monitoring of River and nallah (Flow and quality-inlet & outlet).	-	1.50
	Sub Total	**88.7**	**18.6**
C.	**Wildlife conservation Plan for 7 schedule I species**	**50**	**-**
	Total	**421.2**	**77.7**

Table 10.4

Combined Breakup of EMP Budget for existing as well as for proposed (In Lakhs)

Sl. No.	Activities	Existing Cost		Proposed Cost		Total Cost	
		Capital	Recurring	Capital	Recurring	Capital	Recurring
1.	Mitigative Measures	651.20	115.90	282.50	59.10	933.70	175.00
2.	Monitoring	12.49	3.80	88.70	18.60	101.19	22.40
3.	Wildlife Conservation	60.00	-	50.00	-	110.00	-
	Total	**723.69**	**119.70**	**421.20**	**77.70**	**1144.89**	**197.40**

CHAPTER - 11

SUMMARY & CONCLUSION

11.1 INTRODUCTION

M/s. ACC Limited has an existing operative captive Gagal Limestone Mine (Area: 231.25 ha.) for Production Capacity 4.5 Million TPA (Limestone, shale & Quartzite) and subgrade mineral stacking 2,50,000 CuM per annum (0.51 MTPA) (Maximum) with two nos. of existing Crushers having capacity 1000 TPH & 400 TPH at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh.

As per EIA Notification dated September 14, 2006, as amended from time to time; the project falls under Category "B", Project or Activity 1 (a) but due to presence of Bandli Wildlife Sanctuary at a distance of 3.55 km in NE direction from mine site, General Condition is applicable for this project. Hence this project is being dealt at MoEFCC. ToR for the project has been granted by MoEF&CC, New Delhi vide letter F. No. J11015/130/2003-IA.II (M) dated 25.01.2021 and ToR Amendment was granted on 27.06. 2022.

11.2 JUSTIFICATION FOR THE PROJECT

- M/s. ACC limited has its existing operative captive Limestone Mine (Area: 231.25 ha.) for Production Capacity 4.5 Million TPA (Limestone, shale & Quartzite) and sub-grade mineral stacking 2,50,000 CuM per annum (0.51 MTPA) (Maximum) with two nos. of existing Crushers having capacity 1000 TPH & 400 TPH at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh.
- Limestone produced from this mine is being used in existing Integrated Cement Plant at ACC Gagal Cement Works (Unit-I 2.0 MTPA & Unit-II 2.64 MTPA-Cement) at Village & PO Barmana, Tehsil Sadar, District Bilaspur, State Himachal Pradesh.
- This would not only help in bridging the demand-supply gap of cement in the region, the project will bring about gains in gross domestic product which will add to the gains in the GDP/GSDP. The mine shall be contributing around Rs. 45.553 Cr/year to the State & Central Govt. exchequers by way of mining revenue (Royalty, Premium, DMF, NMET, welfare cess/GST/ SGST).

11.3

Total of 78 persons has been employed directly in this mine. Various direct-indirect employment opportunities are also envisaged & various means as source for local people from this mine as well as its interlinked cement plant.

11.4 PROJECT DETAILS

Table - 11.1

Project Details

S. No.	Particulars	Details
A.	**Nature of the Project**	Fully Mechanized Opencast Limestone Shale & Quartzite Mine
B.	**Size of the Project**	

S. No.	Particulars	Details	
1.	Area	231.25 Ha	
2.	Production capacity	**Limestone**	3.78 Million TPA
		Shale	0.64 Million TPA
		Quartzite	0.072 Million TPA
		Subgrade Stacking	0.51 Million TPA
		Total Excavation	5.01 Million TPA
		Crusher Capacity	1000 TPH & 400 TPH
C.	**Location Details**		
1.	Villages	Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain.	
2.	Tehsil	Sadar	
3.	District	Bilaspur	
4.	State	Himachal Pradesh	
5.	Latitude	31° 23' 30.3 " N to 31° 24' 57.50" N	
6	Longitude	76° 50' 15.5" E to 76° 51' 8" E	
7.	Survey of India Toposheet No.	**Core:** H43E15 **Buffer:** H43E15, H43E11, H43F15, H43E14	
D	**Environmental Setting Details *(with approx. aerial distance & direction from the mining lease boundary)***		
1.	Nearest Village	Barmana, Baloh	
2.	Nearest Town/City	Bilaspur (~ 10.0 km in South West direction)	
3.	National Highway	➢ NH-154 (Adjacent in NE direction) ➢ MDR-34 (~1.5 km in SW direction) ➢ NH-103 (~4.5 km in WSW direction)	
4.	Railway Station	Kiratpur Sahib (~35.5 Km in South West Direction)	
5.	Nearest Airport	Jubber Hatti (Shimla) (~40 Km in SE direction)	
6.	National Park, Wild Life Sanctuaries, Biosphere Reserves, Wildlife corridors, Tiger/Elephant Reserves etc. within 10 km radius study area	1. Bandli Sanctuary at a aerial distance of 3.55 kms for which we have clearance from National Board for Wildlife vide letter # 6-147/2015 WL (36th Meeting) dated 9th November 2015. 2. Eco sensitive zone & Boundary of Majathal Wildlife Sanctuary ~10.05 km in SE direction.	
7.	Reserve/Protected Forest within 10 km radius study area	➢ Sangan PF (~1.0 km in East direction) ➢ Chamyon PF (~1.5 km in South direction) ➢ Salapar Kangu PF (~2.0 km in NNE direction) ➢ Ain Sanwali Shisham PF (~2.5 km in SE direction) ➢ Ghamohu PF (~2.5 km in NNE direction) ➢ Buryans PF (~3.0 km in WSW direction)	

S. No.	Particulars	Details
		➢ Aina Sanwali PF (~3.5 km in SE direction) ➢ Bhawana PF (~3.5 km in NNE direction) ➢ Dhawahal PF (~3.5 km in ENE direction) ➢ Barpat PF (~4.0 km in NE direction) ➢ Maliawar PF (~4.5 km in NNW direction) ➢ Mandihali PF (~4.5 km in ENE direction) ➢ Dartak PF (~5.0 km in North direction) ➢ Gudidhar PF (~5.5 km in NNW direction) ➢ Mungrani PF (~6.0 km in SSW direction) ➢ Umri PF (~6.0 km in NNW direction) ➢ Gaiharu PF (~6.0 km in East direction) ➢ Sungal PF (~6.5 km in WSW direction) ➢ Bandli PF (~7.0 km in NE direction) ➢ Baila PF (~7.0 km in NNE direction) ➢ Harlog PF (~7.0 km in WNW direction) ➢ Bajarial PF (~7.0 km in ESE direction) ➢ Samtiari PF (~7.0 km in SE direction) ➢ Ghan PF (~7.5 km in NW direction) ➢ Dhanu PF (~8.0 km in NW direction) ➢ Petidhar PF (~8.0 km in WNW direction) ➢ Manj Khad (~8.5 km in NNW direction) ➢ Bishna PF (~8.5 km in NNE direction) ➢ Dhanu PF (~9.5 km in NNW direction) ➢ Chauri PF (~9.5 km in ESE direction) ➢ Khatrul PF (~9.5 km in SE direction)
8.	Water Bodies within 10 km radius study area	➢ Sutlej River (1.5 km in North direction) ➢ Rao of Jal Khad (~1.5 km in SSW direction) ➢ Bumka Nala (~3.5 km in NNE direction) ➢ Bahna Khad (~4.0 km in NNW direction) ➢ Bahairari Khad(~5.0 km in NE direction) ➢ Suin Khad (~5.5 km in ESE direction) ➢ Ali khad (~6.5 km in WSW direction) ➢ Seri Khad (~7.5 km in ENE direction) ➢ Govind Sagar (~8.5 km in WNW direction) ➢ Manwal Khad (~8.5 km in ESE direction)
9.	Seismic Zone	Zone V as per IS:1893 (Part -1 :2016)

S. No.	Particulars	Details
D	**Cost Details**	
1.	Total estimated Project Cost	Rs. 84.86 Crore
2.	Cost of EMP	➢ Rs. 5.85 Crore ➢ Recurring Cost: Rs. 1.0 Crore/annum

Source: *Site Visit & Pre- Feasibility Report*

11.5 MINING DETAILS

Table - 11.2
Mining Details

S. No.	Particulars	Details	
1)	Mining Method	Fully Mechanized Opencast Method	
2)	Production Capacity (Million TPA)	Limestone	3.78
		Shale	0.64
		Quartzite	0.072
		Subgrade Stacking	0.51
		Total Excavation	5.01
		Crusher Capacity (TPH)	1000
3)	Geological Resources (Million Tonnes) (As on 01.08.2022)	Limestone	461.29
		Shale	45.22
		Quartzite	0.94
4)	Mineable Reserves (Million Tonnes) (As on 01.08.2022)	Limestone	159.1
		Shale	12.22
		Quartzite	0.94
5)	Life of Mine	Limestone	42 years
		Shale	20 years
		Quartzite	14 years
6)	Bench Parameters	Height - 10 m; Width – 15 m	
7)	Bench Slope	75°	
8)	Ultimate pit slope	45°	
9)	Site Elevation Range	545 m -900 m AMSL	
10)	General Ground level	560 m AMSL	
11)	Ground Water Level	507 to 508 m AMSL (52 to 53 m below ground level	
12)	Existing Working Depth	690 m AMSL (130 m above ground level)	
13)	Working Depth during Plan Period	660 m AMSL (100 m above ground level)	
14)	Ultimate Pit Depth	621 m AMSL (61 m above ground level) (Lease life) 550 m AMSL (10 m bgl) (Life of mine)	
15)	Number of Working days	300	

16)	Number of Working Shifts	02 Shifts (6 hours each)
17)	Stripping Ratio	1:00 (no waste Generation)

Source: *Approved, Reviewed and Updated Mining Plan with Progressive Mine Closure Plan*

11.6 DESCRIPTION OF THE ENVIRONMENT

11.6.1 WIND PATTERN OF THE AREA

The nearest IMD stations to the mine site is located in Sundernagar (~12.0 km in NNE direction). Based on the previous IMD data [Climatological Normals (1981-2010)], the pre-dominant wind direction (seasonal as well as annual) was considered. As per the data, pre-dominant wind direction throughout year was observed from South West, according to which, the locations for ambient air quality monitoring were selected.

11.6.2 MICRO-METEOROLOGY OF THE AREA

Meteorological station was set-up at project site to record surface meteorological parameter during Post Monsoon Season (Oct to Dec, 2022) Summary of the micro-meteorology condition near to the site is given in table 11.3:

Table – 11.3
Meteorology at Site (Study Period: Post Monsoon Season (Oct to Dec, 2022))

Month	Temperature (^{O}C)		Relative Humidity (%)		Wind Speed (m / sec.)	
	Max.	Min.	8:30 hrs	17:30 hrs	Max.	Min.
Oct, 2022	28.33	0.72	99.88	16.19	5.48	0.12
Nov, 2022	22.19	8.35	75.94	23.38	5.32	0.15
Dec, 2022	21.12	0.72	88.94	16.19	5.46	0.17

Source: *Meteorological Station at Site*

11.6.3 PRESENTATION OF RESULTS (AIR, NOISE, WATER AND SOIL)

The monitoring for Air, Noise, Water and Soil has been carried out within the 10 km radius study area from the existing captive mine in Post Monsoon Season (Oct to Dec, 2022). The summary of the baseline Study is given below table 11.4:

Table – 11.4
Summary of Air, Noise, Water and Soil Parameters

Parameters	Number of locations	Description	Standards
Ambient Air Quality Monitoring	09 Locations	**PM10** – 42.8 to 78.1 µg/m^3	100 µg/m^3 (24 hours)
		PM2.5 - 22.4 to 44.6 µg/m^3	60 µg/m^3 (24 hours)
		SO2 - 5.4 to 11.8 µg/m^3	80 µg/m^3 (24 hours)
		NO2 - 11.2 to 24.1 µg/m^3	80 µg/m^3 (24 hours)
		PAH- BDL (DL: 0.5ng/m^3)	-

		All other parameters were also found within the permissible limit as per the NAAQS 2009.	
Noise Level Monitoring	09 Locations	Noise Level During Day Time - 51.7 to 65.2 Leq dB (A)	75 Leq dB (A)
		Noise Level During Night Time – 41.6 to 50.4 Leq dB (A)	70 Leq dB (A)
Surface Water	09 Locations	pH- 7.04 to 7.66	
		Total Hardness -- 118.8 to 193.1 mg/l	
		Total Dissolved Solids -- 132 to 258 mg/l	
Ground Water Sampling	08 Locations	**pH** – 7.24 to 7.73	6.5 to 8.5
		Total Hardness – 287.1 to 430.6 mg/l	600 mg/l
		Fluoride – 0.18 to 0.44 mg/l	1 to 1.5
		TDS – 350 to 588 mg/l	2000 mg/l
Soil Sampling	08 Locations	**Soil nature –** Neutral to slightly alkaline **pH** – 6.82 to 8.24 **Organic Matter** – 0.75 % to 1.14 % **Available Nitrogen** – 160.94 to 268.24 kg/ha **Phosphorous** – 62.77 to 104.61 kg/ha **Potassium** – 168.19 to 296.14 kg/ha	-

11.6.4 BIOLOGICAL ENVIRONMENT

Flora Diversity:

During the surveys, an inventory of the various plant groupings discovered in the study region was created. In the Study area, 149 plant species from 85 families were identified. Among them 62 trees, 40 shrubs, 31 herbs, 08 grasses, as well as 07 climber and 01 Bamboo species have been recorded in the study area based on primary observation as well as based on information collected from the secondary data. The dominant family in the project area is Rosaceae, which has 16 species, followed by Poaceae and Fabaceae, which each have 09 and 08 species respectively.

As per the field survey and List of Flora by ENVIS, MoEF&CC; no endemic, endangered and rare species of flora have been observed under threatened status in the study area.

Fauna Diversity:

Among fauna, Total 110 species of faunal species which includes 21 species of mammals, 13 species of reptiles and amphibians and 06 species of Butterfly and Arthropods were recorded from the study area. Among avifauna, 67 species were recorded in the study area.

As per IWPA 1972 Conservation status, 18 species of schedule I, 54 species of schedule II, 0 species of Schedule III & 2 species of schedule IV were reported from primary and secondary survey.

Schedule-I faunal species-

Total 7 species come in Schedule- I fauna according to THE WILD LIFE (PROTECTION) AMENDMENT ACT, 2022 dated 19th December 2022. Out of these 09 mammals' species i.e., *Vulpes*

bengalensis (Indian fox), *Canis aureus* (Jackal), *Felis chaus* (Jungle cat), *Martes flavigula* (Himalayan yellow throated marten), *Naemorhedus goral* (Himalayan Goral *Paguma larvata*), (Himalayan palm civet), *Panthera pardus* (Leopard), *Prionailurus bengalensis* (Leopard Cat), *Rusa unicolor* (Sambhar) and 04 reptiles' species i.e., *Naja naja (Indian cobra)* and *Chamaeleon zeylanicus* (Indian chameleon), *Ptyas mucosa* (Rat snake), *Varanus bengalensis* (Common Indian Monitor). 06 species of Avi-faunal i.e., *Accipiter nisus* (Sparrow hawk), *Bubo bubo* (Eurasian eagle owl), *Catreus wallichii* (Cheer pheasant), *Gyps bengalensis* (White-rumped Vulture), *Lophura leucomelanos* (Kalij pheasant), *Pavo cristatus* (Peafowl), were recorded in the study area during field survey.

List of threatened fauna of the project study area was prepared based on the primary field data, secondary data and referring to the schedule I of THE WILD LIFE (PROTECTION) AMENDMENT ACT, 2022 dated 19th December 2022 and the International Union for Conservation of Nature and Natural Resource (IUCN) Red List (IUCN 2016).

As per THE WILD LIFE (PROTECTION) AMENDMENT ACT, 2022 dated 19th December 2022 Conservation status, 19 species of schedule I, 65 species of schedule II and 05 species of schedule IV were reported from primary and secondary survey.

Study on the impact of Mining on Flora and Fauna as well as the Conservation plan for threatened and Schedule-I wildlife species in the Core and Buffer zone (which includes Bandli Wildlife Sanctuary and Majhathal Wildlife sanctuary as well) for Gagal Limestone Mines, has been submitted to Chief Wild Life Warden.

11.6.5 SOCIO-ECONOMIC ENVIRONMENT

The 10 km radius study area from mine site, comprises of District Bilaspur, is covered under 10 km radius. Total no. of villages observed within the 10 km radius from the project area is 172.

The population as per 2011 Census records is 71125 (for 10 km radius buffer zone). Total no. of household is 3554, 4940 and 6391 respectively, in primary, secondary and outer zone. Sex ratio is 957, 984 and 976 (females per 1000 males) observed in primary, secondary and outer zone respectively. SC population distribution is 3482, 6036 and 8623 respectively in primary, secondary and outer zone. ST population distribution is 25, 710 and 193 respectively in primary, secondary and outer zone respectively. Average household size is 5 which is the standard family size in India. The 10 km radius study area demonstrates a literacy rate of 83.23 % as per census 2011. The male literacy rate works out to be 90.46 % whereas the female literacy rate, which is an important factor for social change, is observed to be 75.89% in the study area.

11.7 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

11.7.1 IMPACT ON AIR ENVIRONMENT

The key air emissions from the mining activities (drilling, excavation, bench forming, loading, unloading, transportation of material by dumper, crushing of limestone and transportation of crushed material via covered conveyor belt) are Particulate Matter, Oxides of Nitrogen (NOx) and Sulphur dioxide (SO_2). Gaseous emissions will be generated from HEMMs & transportation of vehicles. Impact on ambient air quality in the study area after the implementation of project were predicted which includes the cumulative effects of the existing mine operation. To indicate

incremental due to this project based on emission modelling is done. As per the prediction, the impact of the existing project has been found to be within the prescribed limits of CPCB/MoEF&CC. The maximum predicted incremental value s of various pollutants are given in table 11.5:

Table – 11.5

Predicted Incremental & Ground Level Concentration (GLC)

S. No.	Particular	PM10	PM2.5	SO_2	NO_2
1.	Predicted incremental Max concentrations (In µg/m^3)	3.82	1.46	1.79	1.82
2.	Monitored Baseline concentrations (In µg/m^3)	76.9	44.6	11.7	23.8
3.	Resultant Maximum concentrations (In µg/m^3)	80.72	46.06	13.49	24.90
4.	**NAAQS (dated 2009)**	**100**	**60**	**80**	**80**

11.7.2 MITIGATION MEASURES AND SUGGESTED EMP

The following mitigation measures is being/ will be adopted to mitigate air pollution generated due to the mining activities:

During Drilling Operation

- Dust generation is reduced by using sharp teeth of shovels.
- Providing dust extractors to drilling units.
- Personal protective equipment's is being provided to drill operators and his helpers.

During Blasting Operation

- Proper stemming in blast holes.
- Avoiding blasting during unfavourable condition.
- Use of Rock Breaker to avoid blasting in ridges.

During loading operation

- Latest generation loading equipment's like hydraulic excavators is being/ will be used and operated by skilled operators to load dumpers.
- Water tanker arranged for water sprinkling on active mining area haul roads and permanent rain guns are provided on permanent haul roads.
- Propagation of this dust is/ will be confined to loading point only and does not affect any person nearby. Both the operators of excavator and dumpers present at that point operate the machine from a closed cabin.

During Crushing

- Crusher hoppers & conveyor systems to be totally enclosed and provided with water sprayers.
- Completely covered shed are provided at crusher.
- Water sprinkling system has been installed at crusher.

During Transport operation

- Water tanker has been in operation for regular water sprinkling on haul roads for dust suppression.
- To control the gaseous emission, all mine machineries are maintained in proper order/as per OEM through routine checklist.

- Crushed mineral is being/ will be transported to interlinked cement plant via Covered conveyor belt.
- Strict speed limit (20-25 km/hr) of vehicles is /will be implemented.
- Proper covering of transported material and stored raw material.
- Regular maintenance of HEMMs & transportation vehicles.
- Measures will be taken to reduce the diesel consumption during transportation.

Plantation work

- Total area under greenbelt is estimated as 6.0 Ha, out of which 4.0 Ha has already been covered under Green belt and the rest 1.0 Ha will be completed in next 1 year rest 1 Ha is natural plantation and not accessible.
- Total area under plantation is estimated as 122.86 Ha, out of which 108 Ha has already been covered under plantation and the rest will be completed till the Conceptual period.
- Local forest trees (*Acacia catechu, Acacia nilotica, Acacia Senegal, Aegle marmelos, Albizia amara, Albizia lebbeck, Albizia odoratissima, Albizia procera, Alstonia scholaris, Anogeissus latifolia, Azadirachta indica,* etc..) has been used for plantation/greenbelt.

Monitoring

- Three ambient air quality stations have been established in the core and buffer area respectively for SPM, RPM, CO, NOx & SO2.
- The ambient air quality monitoring locations are: (Source: Environment Plan; Plate XII)
  - Crusher
  - Diesel Pump Store
  - Core Zone Deforested Area
  - Buffer Zone
- Ambient air quality monitoring is being carried out on Quarterly basis and the same is submitted to Authorities on regular basis.

11.7.3 IMPACT ON WATER ENVIRONMENT AND MITIGATION MEASURES WITH EMP

- Total water requirement of the project is 120 KLD which will be sourced from Sutlej River.
- Ground water is not being used to fulfill the requirements of the existing mine.
- Due to absence of toxic substance in the mining mineral i.e. Limestone, Shale and Quartzite; ground water won't get polluted.
- Working depth at the end of Plan period and Conceptual period won't intersect the ground water level. Details regarding the same has been mentioned in Detailed HG Report. Detailed Hydro-geological study has been conducted for the project

Safety Measures for Water Reservoir at Conceptual Stage

- Construction of wire fencing along the periphery of the reservoir.
- Plantation will be done between the mining pits and the periphery of lease.
- Conduct geo-technical stability studies involving expert agencies.

Management of Waste Water generated at mine site

- No waste water is being/ will be discharged outside lease boundary.

- 5 KLD Domestic waste water generated is being/ will be disposed off in Soak pit.
- 15 KLD Workshop waste water is treated and reuse for washing purpose after passing through Oil & Grease Separator oil.

11.7.4 IMPACT OF NOISE & VIBRATION AND MITIGATION MEASURES WITH EMP

The following control measures is being/ will be adopted to keep the ambient noise levels within the limits:-

- When conventional drilling, use of sharp drill bits to achieve optimum drilling performance and to reduce noise generation at source.
- Avoiding the secondary blasting.
- Adoption of control blasting with proper spacing, burden and stemming.
- Blasting is to be carried out during favourable atmospheric conditions and low human activity timing.
- Use of proper designed machinery, maintained properly.
- Crusher is totally enclosed in a covered building to minimize sound propagation.
- Sound insulated chambers for the workers deployed on the machineries producing higher level of noise like dozers, drills etc.
- Regular maintenance, oiling and greasing of machines at regular intervals is being/ will be done to reduce generation of noise.
- All employees and operators have been/ will be provided with protective equipment, earmuffs and earplugs as a protective measure from the high noise level generated near the machinery.
- Noise Monitoring is carried out in core zone and buffer zone by NABL accredited laboratory.

11.7.5 IMPACT ON LAND ENVIRONMENT AND MITIGATION MEASURES WITH EMP

This is an existing mining project. The total mining lease area is 231.25 ha, out of which 103.02 Ha is Forest Land and 128.23 Ha is non-Forest land (Waste Land) owned by ACC Limited.

- This is an existing mine; no additional land is required for the purpose of construction as facilities are already available in the lease area.
- The land use of the lease area will alter due to mining activities such as formation of pits, greenbelt, etc.
- At present 58.90 ha area is under mining, 13.37 ha is under Infrastructure (Mine Office, Workshop, Plant, Crusher), 1.05 Ha is already developed as mango orchard, 4.63 Ha is under Road, 4.0 Ha is under Sub grade/waste Stacking followed by plantation, 115.6 ha is under green belt/ Plantation and remaining 29.7 ha is Virgin land.
- At the conceptual stage (Lease life) Total excavated area will be 63.8 Ha, area under Infrastructure and Road is i.e., 13.37 Ha and 4.63 Ha respectively, reclaimed area as mango orchard will be 1.05 Ha, 7.76 ha area under sub grade/waste stacking followed by plantation, 126.6 Ha will be under green belt/ Plantation and the remaining 14.56 ha will be Virgin Land.

11.7.6 WASTE MANAGEMENT AND MITIGATION MEASURES

No waste is being generated from the mining operations, so no dumping of waste is required. But sub-grade limestone is being generated; and stacking of the same will be done.

Liquid waste

- 5 KLD of Domestic waste water generated from mine office is being disposed to Soak pit.
- 15 KLD of Workshop waste water is treated and reuse for washing purpose by installing gravity separation method to separate water & oil.
- A small quantity of used oil is being generated, part of which is being re-used for lubrication of external parts of machine, lubrication of drill machine hammers, etc. and balance is being sold to Authorized Recyclers.

11.7.7 GREEN BELT DEVELOPMENT & PLANTATION

- Total area under greenbelt is estimated as 6.0 Ha, out of which 4.0 Ha has already been covered and the rest 1.0 Ha will be completed in the next 1 year, rest 1 Ha is natural plantation and not accessible.
- At the conceptual stage (Lease life), total area under plantation is estimated as 129.41 Ha, out of which 120.65 Ha has already been covered under plantation and the rest will be completed till the Conceptual period (lease life).
- Local forest trees (*Acacia catechu, Acacia nilotica, Acacia Senegal, Aegle marmelos, Albizia amara, Albizia lebbeck, Albizia odoratissima, Albizia procera, Alstonia scholaris, Anogeissus latifolia, Azadirachta indica, etc.*) has been used for plantation/greenbelt.

11.8 POST PROJECT ENVIRONMENTAL MONITORING PROGRAMME

Details of the environmental monitoring schedule/frequency, which will be undertaken for various environmental components, as per conditions of EC / CTE / CFO are given below table no 11.6:

Table – 11.6

Post Project Monitoring

S. No.	Description	Frequency Of Monitoring
1.	Micro Meteorological Data	Hourly
2.	Ambient Air Quality Monitoring	Twice in a week (Manually)
3.	PAH's Monitoring	Yearly
4.	Crusher Stack Monitoring	Quarterly
5.	Ground Water Quality & Level Monitoring	Quarterly
6.	Noise Level Monitoring	Quarterly
7.	Ground Vibration Monitoring	On every blast
8.	Medical Checkup of employees	3 to 5 Year Interval ➢ Age of workers <45 years: After every 5 years ➢ Age of workers >45 years: After every 3 years

11.9 ADDITIONAL STUDIES

Hydro-geological Study & Rain Water Harvesting Plan, Risk and Disaster Management have also been prepared along with this EIA/EMP Report.

11.10 PROJECT BENEFITS

- **Employment:**

  The company has employed mostly local workers in unskilled and semiskilled category for the mining / plant operation and other miscellaneous jobs:

  - About 70% of the permanent employees and third-party contractual workers are from local and nearby areas;
  - Engaging around average 8 workmen per day for miscellaneous jobs like greenbelt/plantation, Housekeeping, etc.

  Preference is being/ will be given to the locals as per their eligibility. As the mine is a captive mine hence the limestone is being/will be produced & transported to its interlinked cement plant of ACC.

  Apart from the above, various indirect employment opportunities are envisaged by way of transportation, workshops, petty contractors; shopkeepers, network of retailers (cement stockists) throughout the state and in its marketing regions.

  Mining activities also result in numerous indirect employment avenues for the people such as truck owners, drivers, repair shops, tea–stalls etc.

  Some skilled manpower may be required from the nearby area to the extent available while remaining unskilled/ semi- skilled manpower will be sourced from the local.

  The Company is organizing vocational training, entrepreneur development programmes for the locals including women members and is providing advice for starting suitable small scale industry.

- **Economic Benefit:**

  The project activity will help in meeting the growing demand of cement & hence help in the economic growth of the country. The mine shall be contributing around Rs 45.553 Cr/year to the State & Central Govt. exchequer by way of mining revenue (Royalty, DMF, NMET etc.).

- **Environmental Benefit:**

  At the conceptual stage (Lease life) Total excavated area will be 63.8 Ha, area under Infrastructure and Road is i.e., 13.37 Ha and 4.63 Ha respectively, reclaimed area as mango orchard will be 1.05 Ha, 7.76 ha area under sub grade/waste stacking followed by plantation, 126.6 Ha will be under green belt/ Plantation and the remaining 14.56 ha will be Virgin Land.

  114 Ha of Greenbelt/ plantation area has already been developed out of 128.86 Ha. Rest area will be covered till conceptual period.

- **Social Benefits**

  Existing project results in growth of the surrounding areas by increased direct and indirect employment opportunities in the region including ancillary development and supporting infrastructure. Besides this, Royalty and other taxes are additional benefit, particularly in the

form of contribution to the District Mineral Foundation fund (DMF), National Mineral Exploration Trust etc. are/ would be additional benefits and are being/ will be utilized by local administration for the development of socio-economic infrastructure and wellbeing of the local population.

The company will continue to undertake various community development activities for the social upliftment of community

11.11 ENVIRONMENT MANAGEMENT PLAN

The suggested mitigation measures along with Environment Management Plan are elaborated above in section 11.5 along with impacts.

11.12 CONCLUSION

The EIA/ EMP study was prepared in compliance of ToR issued by MoEF&CC. Baseline data of land, air, water, noise, biological and socio-economic environment was duly assessed by conducting field investigation as well as by having an access to the available secondary information. The prediction of impacts was identified & evaluated and EMP is suggested to mitigate the environmental concerns arising from the existing project.

The community has been a key stakeholder in business and environmental issues have always been the matter of utmost priority for the company. The Management believes to being catalyst in the transformation of the communities around its business operations through partnership with local communities, Government, NGO's and other stake holders. Cumulative impacts of the existing project along with its interlinked cement plant may add to Gross Domestic Product. With the development in & around the area, there will be supporting facilities/infrastructure eventually leading to the development of the area. The existing project along with its interlinked cement plant will continue to generate much needed employment (direct & indirect) to the local people. Economy of the area has seen a rise in overall development of the region in terms of education, health, training, transport, automobile, industry is anticipated to further improve in the future. Thus, the project will continue to contribute towards Social, Environmental and Economic benefit of the local people and region.

CHAPTER - 12
DISCLOSURE OF CONSULTANTS ENGAGED

12.1 DISCLOSURE OF CONSULTANTS ENGAGED

J.M. EnviroNet Pvt. Ltd. (JMEPL), one of the companies of JM Group, was established in the year 1993. 'JM' in the name of the Company is derived from the name of 'Lord Shiva' - the Temple of 'Jharkhand Mahadev' (JM). The Temple is located at Queens Road, Vaishali Nagar, Jaipur.

The Registered Office of JMEPL is at Jaipur Centre, 403, 4th Floor, B2 Bye Pass, Tonk Road, Jaipur, 302018 (Rajasthan). Its Delhi-NCR Corporate office is at Emmar Digital Greens, Tower – B, Unit No. 1517, Golf Course Ext. Road, Sector – 61, Gurugram, Haryana – 122011.

J.M. EnviroNet Pvt. Ltd. is accredited with ISO-9001: 2015 for EIA Division. EIA Division is also approved by National Accreditation Board for Education & Training (NABET) formerly NRBPT (Quality Council of India), Certificate no. NABET/EIA/2023/SA 0172, dated 16th Aug., 2022 which is valid up to 07.08.2023.

JMEPL is offering Environmental Consultancy Services in various sectors viz Industrial Projects / Chemical Industries / Cement Plants / Thermal Power Plants / Mining Projects/ Coal Washery Projects/ Real Estate Projects / Distilleries / Steel Plants/Chemical Fertilizers/Mineral Beneficiation plants etc.

In the Mining sector, JMEPL have covered mines of minerals viz. Limestone, Bauxite, Chromite, Coal, Zinc Ore, Copper ore, Gypsum, Soapstone, Iron & Manganese ore, Clay, Silica Sand, Bajri, Khanda, Gitti, boulders, Feldspar, Quartz, lignite, magnesite and few other minor minerals etc.

JMEPL has a highly qualified team of Subject Experts. As faculty Heads of the EIA Division, we have Retd. General Managers of the Reputed Cement Companies, Ex-Head EIA Division of big Business Group, STP & ETP Designing Experts, Retd. Mining & Geology Experts with vast experience in their respective fields.

JM Group's business is spread over 22 States viz. Andhra Pradesh, Kerala, Gujarat, Maharashtra, Orissa, Tamil Nadu, Goa, Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Delhi, Rajasthan, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Assam, West Bengal, Karnataka, Jharkhand, Bihar & Uttarakhand.

The JM Group has its own Environmental Laboratory at Gurgaon (Haryana) approved under EPA (Environment Protection Act) by the Ministry of Environment & Forests, Govt. of India, and New Delhi and by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India (NABL).

Besides this, its MoEF and NABL approved Environmental Laboratory of JM Group is also providing Analytical as Laboratory Services of various elements and environmental parameters.

Annual monitoring per MoEF / CPCB / SPCB guidelines, Risk Assessment and Disaster Management Plan, consultancy for Rain Water Harvesting Plan, detailed Hydro-geological Study, preparation of Environmental Statement Reports (Environmental Clearance Compliance Conditions) etc. are amongst the various other consultancy services offered by the Company.

CHAPTER - 13

REMEDIATION PLAN AND NATURAL & COMMUNITY RESOURCE AUGMENTATION PLAN (NCRAP)

13.1 INTRODUCTION

M/s. ACC Limited has an existing operative captive Gagal Limestone Mine (Area: 231.25 ha.) for Production Capacity 4.5 Million TPA (3.78 MTPA Limestone, 0.64 MTPA Shale & 0.072 MTPA Quartzite) and subgrade mineral stacking 2,50,000 CuM per annum (0.51 Million TPA) (Maximum) with two nos. of existing Crushers having capacity 1000 TPH & 400 TPH at Villages Nalag, Bhaterh Uprali, Barmana, Jamthal, Dhawan Kothi, Baloh & Panjgain, Tehsil Sadar, District Bilaspur, Himachal Pradesh., upon receiving Environmental Clearance vide MOEF letter ref. No. J.11015/130/2003-IA.II(M) dated 21st April, 2005 with capacity to produce 10000 TPD Clinker and 4.64 MTPA cement.

Limestone produced from this mine is being used in existing Integrated Cement Plant at ACC Gagal Cement Works (Unit-I 4500 TPD & Unit-II 5500 TPD -Clinker, Unit-I 2.0 MTPA & Unit-II 2.64 MTPA-Cement) at Village & PO Barmana, Tehsil Sadar, District Bilaspur, State Himachal Pradesh.

As per EIA Notification dated September 14, 2006, as amended from time to time; the project falls under Category "A", Project or Activity 1(a) as general condition is applicable.

13.2 BRIEF DETAILS OF VIOLATION

The company applied for the expansion of Production of Limestone and Shale; from 1.5 MTPA of Limestone to 4.5 MTPA of Limestone and Shale in the name of M/s ACC Limited, whereas the EC was granted for the expansion & production of Limestone only and company started producing Limestone along with Shale. Shale Production started from the year (2003-04 to 2020-2021) but no excessive production was done w.r.t. 4.5 MTPA.

13.3 SITE SPECIFIC FEATURES

Site specific features/criteria and mining operations considered for assessment of Ecological Damage are given below: -

- Company owned & maintained service road of length (~3.5 km), is passing through ML area which connects Village Barmana and Khatehr with NH 154 in the NW part of the Lease area, which is around 500 m from the ultimate pit limit and 60m from the pit limit of Plan period so no impact on the road will be there.
- Due to the hilly terrain and dendritic drainage pattern small depressions carry the rainwater from higher level to lower level. One of this kind of seasonal nallah is there within the ML area which is around 400m away from the Ultimate pit limit and check dams are present near the nallah in order to arrest the silts.
- One transmission line of 440 KV is passing through the lease area in the SE part of the Lease area, where mining won't be done and is around 100m away from the Ultimate pit limit.
- No human habitation within lease area.
- The topography is a hilly terrain.
- The Project does not fall in CRZ zone.

- Schedule – I Species (Fauna) is present in the 10 km radius of the existing project - Conservation Plan for Schedule-I species submitted for approval to State Forest dept

13.4 MINING OPERATIONS

Mining is done using fully opencast mechanised method. Deep hole drilling, blasting, excavation, loading, hauling, crushing, and transportation by closed Conveyor belt are used in all mining operations to ensure maximum mineral conservation and minimal environmental degradation. Excavated limestone is transported to the crusher via haul roads, and crushed limestone is transported to the Gagal Cement Works via covered conveyor belt. The same method and technology will be used in the future too.

13.5 INTRODUCTION TO DAMAGE ASSESSMENT

The purpose of the Damage Assessment Report is to comply with the violation notification S.O. 804 (E) dated 14.03.2017 and to compile an assessment report of environmental damage, a remediation strategy, and a natural and community resource augmentation plan. As a result, data on relevant environmental parameters has been collected and examined in this chapter. The air, water, noise, soil, land environment, and other important data have been examined to determine the overall impact of mining operations during operation.

13.5.1 REMEDIATION PLAN

A remediation plan is a guideline that offers a sequence of engineering and geological processes to execute pollution cleaning measures over a certain time period. When pollution exists on a property at levels that necessitate clean-up, it is critical to devise the best plan of action for carrying out the environmental remediation procedure. The proposal's measures are part of an intrinsic strategy that would satisfy agency regulators' criteria, achieve property owner aims, and assure worker safety.

The objectives of remediation plan is to identify mitigation and control measures and its cost.

13.5.2 NATURAL & COMMUNITY RESOURCE AUGMENTATION

Augmentation plan includes various activities which will be done for augmentation of Natural Resources like water, land, vegetative cover, etc. Activities considered for augmentation of community resources has been mentioned below:

- It may be physical structure or place –as a school, hospital, library or recreation center or others.
- It may be a community service that makes life better for majority of community members - public transportation, early childhood education center, community recycling facilities, cultural organization, etc. (or)
- It may be an activity that provides jobs and supports the local economy.

Impact Assessment Pathway is shown in Figure No.13.1

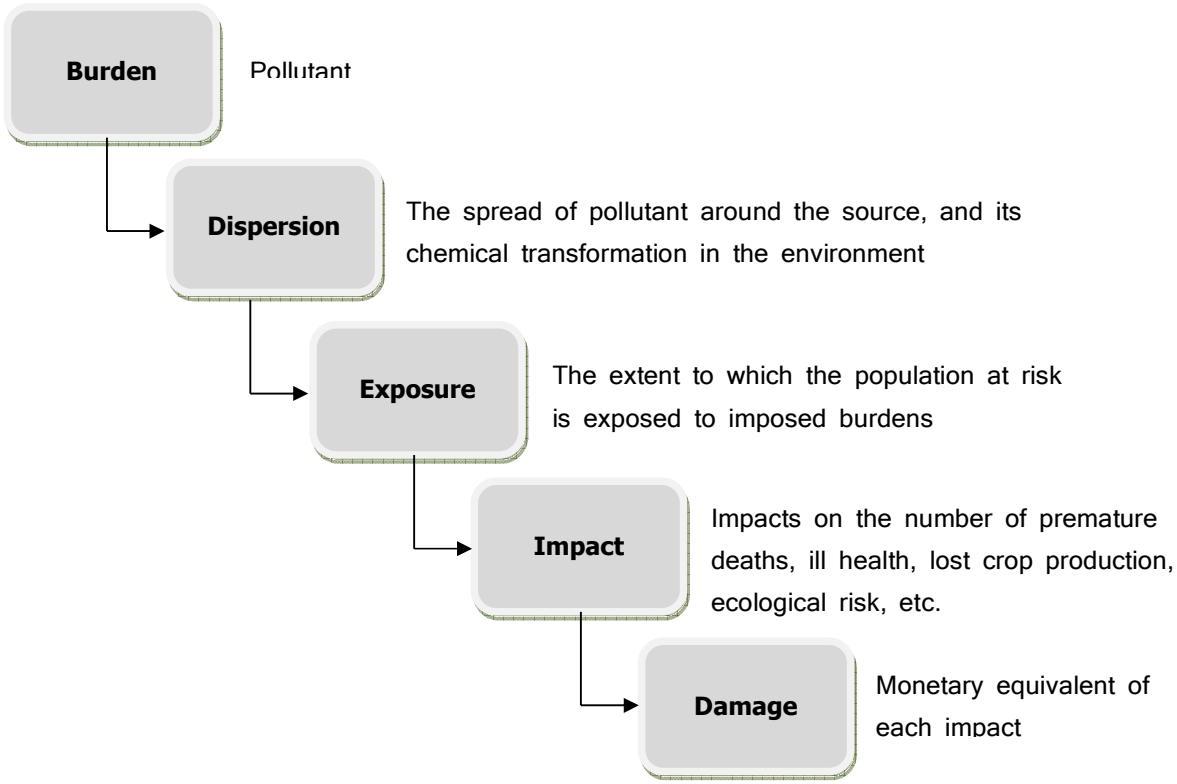

Fig 13.1 Impact Assessment Pathway

Source: *"Cost for Air Pollution from European industrial facilities 2008-12" – an updated assessment EEA Technical report/ No 20/2014: ISSN 1725.2237*

13.5.3 ASSESSMENT OF DAMAGE COST

The following environment attributes are considered for assessment of damage cost:

a) Damage due to change in Land use/Land cover.
b) Damage due to Loss of Vegetation/Plant Cover.
c) Damage to Surface Water Resources**.**
d) Damage to Ground Water Resources.
e) Damage due to Air Pollution.
f) Damage due to Noise and Vibration
g) Damage to Health and Safety of Workers
h) Damage due to Solid Waste.
i) Damage to Crops and quality of Soil.
j) Damage due to Transportation of Mined Mineral.
k) Implementation of Safety Sign Boards.

A) Damage due to change in Land Use/ Land Cover

The mining operations have led to change in land use/land cover (LULC) of the Mining Lease Area. Different technique/procedure have been used for Assessment of change in LULC.

Google Images has been utilized to compare before and after Violation period of project site.

Google image of Project area (2003)

Google image of Project area (2022)

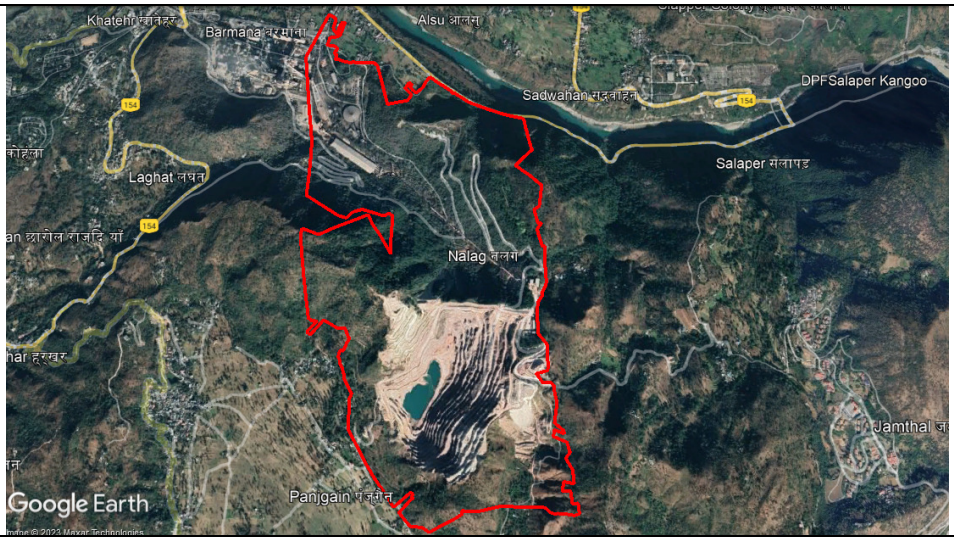

Figure 13.2 Satellite images and Land use of the project area

Land damage can be estimated using mathematical concept referred to production of minerals.

Due to the hilly slope the land area utilized for mineral excavation will vary in accordance to the mRL, height, width and length of benches formed during extraction of mineral.

During the Violation period, mining was carried out within the ML Area. Total quantity of Limestone and Shale extracted and the Economic benefits derived due to excess production is given in the table below:

Table 13.1

Economic Benefits Derived due to Excess Production

Sl. No.	Year	EC capacity (MTPA) (Limestone)	Actual Production in TPA			Excess Production more than EC capacity (TPA)			NET benefit of excess production (In Crore Rs.)		
			Limestone	Shale	Total	Limestone	Shale	Total	Limestone	Shale	Total
1	2005-06	4.5	3338447	135700	3474147	0	135700	135700	0	0.90	0.90
2	2006-07		3276500	135600	3412100	0	135600	135600	0	0.90	0.90
3	2007-08		3844700	166590	4011290	0	166590	166590	0	1.11	1.11
4	2008-09		3889650	217450	4107100	0	217450	217450	0	1.45	1.45
5	2009-10		3850200	285800	4136000	0	285800	285800	0	1.91	1.91
6	2010-11		3901500	320800	4222300	0	320800	320800	0	2.14	2.14
7	2011-12		3929800	403250	4333050	0	403250	403250	0	2.69	2.69
8	2012-13		3521200	404200	3925400	0	404200	404200	0	2.69	2.69
9	2013-14		3320450	488050	3808500	0	488050	488050	0	3.25	3.25
10	2014-15		3578800	553800	4132600	0	553800	553800	0	3.69	3.69
11	2015-16		3548682	532405	4081087	0	532405	532405	0	3.55	3.55
12	2016-17		3334254	478605	3812859	0	478605	478605	0	3.19	3.19
13	2017-18		3670813	531201	4202014	0	531201	531201	0	3.54	3.54
14	2018-19		3728492	286205	4014697	0	286205	286205	0	1.91	1.91
15	2019-20		3154900	341700	3496600	0	341700	341700	0	2.28	2.28
16	2020-21		3084550	344350	3428900	0	344350	344350	0		
Total			**56972938**	**5625706**	**62598644**	**0**	**5625706**	**5625706**	**1057963.9**	**0**	**35.21**

*The above net profit is arrived by taking a notional amount of Rs.100 per ton as net profit for cement sales. (Assuming 1.5 T Limestone/ Shale is required for production of 1 T cement).

*M/s ACC has violated by producing a total of 5.44 MTPA of ore during 16 years. Total net profit gained due to excess production is INR 35.21 Crore, 3% of the total net profit of INR 1.06 Crore will be contributed towards remediation plan cost.

*Whereas 10.6 Lakh ton of Subgrade Mineral stacking was done since operation of mines during the Violation Period.

DAMAGE COST

Total net profit gained due to excess production is INR 35.21 Crores and 3% of the total net profit i.e., 1.06 Crores will be contributed towards remediation plan cost.

B) Damage due to Loss of Vegetation/Plant Cover

- The area has 10 Schedule I species and WLCP for the same has been obtained from Pr. CCF (WL) H.P. Shimla vide letter no Nil dated 31.10.2015. The amount of Rs 60 lakh was accounted and spent under the Conservation plan of Scheduled Species.
- Primary information was collected on the vegetation from core zone. However, phyto-sociological attributes, namely - density, frequency, abundance, Shannon-Weiner diversity index and Simpson's dominance index are carried out.
- Having said the above, the vigorous plantation initiative has turned the area into a green cover.
- The details of Plantations given in Table no 13.2. Reclaimed area is shown in Figure No.13.4.

Table 13.2
Details of Plantation

As per EMP			Actual		
Year wise	Area		Year wise plantation done (nos.)	Plants Survived (nos.)	Survival Rate (%)
	Proposed	Actual			
2005-06	1.0	1.0	1000	700	70
2006-07	1.0	1.0	1000	750	75
2007-08	1.0	1.0	1800	1260	70
2008-09	1.0	1.0	2500	1875	75
2009-10	1.0	1.0	2500	1750	70
2010-11	1.0	1.0	1200	900	75
2011-12	1.0	1.0	3200	2400	75
2012-13	3.0	3.5	6550	4585	70
2013-14	1.0	1.5	3660	2745	75
2014-15	1.0	1.70	4025	3020	75
2015-16	3.0	2.5	5900	4425	75
2016-17	2.0	2.0	5150	3605	70
2017-18	1.0	1.5	1890	1420	75
2018-19	2.0	1.8	4385	3290	75
2019-20	2.0	1.5	3660	2745	75

As per EMP			Actual		
Year wise	Area		Year wise plantation done (nos.)	Plants Survived (nos.)	Survival Rate (%)
	Proposed	Actual			
2020-21	1.0	1.0	1625	1220	75
2021-22	1.0	1.0	1800	1350	75
2022-23	1.0	1.0	2100	1575	75

DAMAGE COST

- Since Surplus plantation is done in both core and ML boundary areas, which has helped to mitigate the loss due to ecological degradation or loss of biodiversity.

However, 3% of total cost submitted against WLCP will be accounted under cost saved during violation years for non-submission of WLCP cost. The cost for same is Rs.60 Lakhs/- (Note: The total amount of Wildlife Conservation plan is 60 lakh)

C) Damage to Surface Water Resources

Due to the hilly terrain and dendritic drainage pattern small depressions carry the rainwater from higher level to lower level. One of this kind of seasonal nallah is there within the ML area which is around 400 m away from the Ultimate pit limit and check dams are present near the nalla in order to arrest the silts.

The mine workings are being undertaken well above the water table. There is no accumulation of water in the mine. However during rains the water flows out on hill slopes and the company has construct 60 check dams and earthen bunds at the bottom periphery of the hill (where mining is going on) to arrest silt load reaching to downstream nalas.

There is no perennial watercourse in the area. So there will be no adverse impact on surface water body due to mining.

Total water requirement for the project is 120 KLD which is being pumped through Sutlej River as per the agreement with Bhakra Beas Management Board.

Table 13.3

Details of water usage (KLD)

(Monsoon & Non-Monsoon season)

S. No.	Activities	Requirement (KLD)
1.	Water Sprinkling in Haul Road	60
2.	Water Sprinkling in Crusher	35
3.	Washing of Vehicle and House Keeping	15
4.	Drinking Water / Canteen Requirement	5
5.	Greenbelt/ Plantation	5
Total		**120**

Source: *Approved Review of Mining Plan and Progressive Mine Closure Plan, pg. no 64*

Considering the availability of surface water in the area vis-à-vis the consumption, the impact of withdrawal of surface water for various uses mentioned above will be insignificant.

IMAGES OF EXISTING SURFACE WATER MANAGEMENT MEASURES

Figure 13.3 Images of run-off prevention structures and Settling Pond




Check Dams

DAMAGE COST

No Damage cost envisaged.

D) Damage to Ground Water Resources

There is no intersection with ground water table nor will it intersect till conceptual period as the pit limit at conceptual period is 621 mRL and Ground water table in Post monsoon is 561.8 - 559.64 m AMSL and in Pre-Monsoon is 562.53 - 555.86 m AMSL. So, it is clear from the above figures that water table hasn't been or will be intersected till the conceptual period.

Monitoring of Ground water was done at 8 locations in the Study area and there is no sign of contamination and impact on Ground water due to mining activities, details regarding the same has been incorporated in Chapter 3 of this EIA/ EMP report.

DAMAGE COST

No Damage cost envisaged.

POSITIVE IMPACTS ON WATER ENVIRONMENT (GROUND WATER & SURFACE WATER)

- The effluent what ever is generated due to the washing of Dumpers from the workshop is being sent to Oil Separator from which the separated water is being recycled for washing of dumpers..
- Domestic sewage is being treated in septic tank followed by soak pit.
- As per GEC-2015, this area is categorized as 'Safe'.

E) Damage due to Air Pollution

The impact of pollutant emission into the air atmosphere is assessed for the operation period of 2003-04 to 2019-20. Environmental Clearance was obtained from MoEF&CC for a rated capacity of 4.5 MTPA Limestone production in 2005. The excess production from the granted capacity is considered as violation. But in this current project production of mineral without proper permission/ grant is considered as violation.

For the assessment, the difference of excess production from 4.5 MTPA as per existing EC is taken and corresponding value is considered as violation. The emissions are quantified based on the activity involved during the production as mentioned below,

- Drilling & blasting in ore
- Excavation
- Handling, loading & unloading of ore
- Transportation of ore
- Use of machinery
- Wind erosion from dumps/stockyard

Table 13.4
Summarized Details of Air Pollutant Emission into Environment for Excess production

EMISSION FROM VARIOUS ACTIVITIES WITH CONTROL MEASURES (KG/DAY)					
	YEAR	**PM 2.5**	**PM 10**	**So_x**	**No_x**
Ore					
- **ACTIVITY-** Drilling in Ore - **EMISSION FACTOR REFERENCE –*** - **CONTROL MEASURE -** 80% Emissions Controlled Due to Water Sprinkling & Pit retention	**2005-06**	0.012653	0.06959	**NA**	**NA**
	2006-07	0.012643	0.069538		
	2007-08	0.015533	0.085431		
	2008-09	0.020275	0.111513		
	2009-10	0.026648	0.146564		
	2010-11	0.029911	0.164513		
	2011-12	0.037599	0.206795		
	2012-13	0.037688	0.207282		
	2013-14	0.045506	0.250282		
	2014-15	0.051636	0.284		
	2015-16	0.049641	0.273028		
	2016-17	0.044625	0.245438		
	2017-18	0.049529	0.272411		
	2018-19	0.026686	0.146772		
	2019-20	0.03186	0.175231		
- **ACTIVITY-** Blasting in Ore - **EMISSION FACTOR REFERENCE –** CMPDI (HQ) Study Report (EE- 27)* - **CONTROL MEASURE –** NA	**2005-06**	0.001	0.006	**NA**	**NA**
	2006-07	0.001	0.006		
	2007-08	0.001	0.009		
	2008-09	0.002	0.014		

EMISSION FROM VARIOUS ACTIVITIES WITH CONTROL MEASURES (KG/DAY)					
	YEAR	**PM 2.5**	**PM 10**	**So_x**	**No_X**
	2009-10	0.004	0.023		
	2010-11	0.005	0.028		
	2011-12	0.007	0.042		
	2012-13	0.007	0.042		
	2013-14	0.010	0.059		
	2014-15	0.012	0.074		
	2015-16	0.012	0.069		
	2016-17	0.010	0.057		
	2017-18	0.011	0.069		
	2018-19	0.004	0.023		
	2019-20	0.005	0.031		
ACTIVITY- Loading & Unloading of Ore **EMISSION FACTOR REFERENCE –** CMPDI (HQ) Study Report (EE- 27)***** **CONTROL MEASURE –** NA	**2005-06**	0.152	1.187	**NA**	**NA**
	2006-07	0.152	1.187		
	2007-08	0.187	1.458		
	2008-09	0.244	1.903		
	2009-10	0.321	2.501		
	2010-11	0.360	2.807		
	2011-12	0.452	3.528		
	2012-13	0.453	3.537		
	2013-14	0.547	4.270		
	2014-15	0.621	4.846		
	2015-16	0.597	4.659		
	2016-17	0.537	4.188		
	2017-18	0.596	4.648		
	2018-19	0.321	2.504		
	2019-20	0.383	2.990		
ACTIVITY- Transport to CRUSHER via haul roads **EMISSION FACTOR REFERENCE –** CMPDI (HQ) Study Report (EE- 27) ***** **CONTROL MEASURE -** 70% & 50% Emissions Controlled for PM 2.5 & 10 and So_x & No_X respectively Due to Water Sprinkling	**2005-06**	2.070	24.062		
	2006-07	2.067	24.027		
	2007-08	3.120	36.264		
	2008-09	5.316	61.787		
	2009-10	9.183	106.734		
	2010-11	11.570	134.477		
	2011-12	18.282	212.484		
	2012-13	18.368	213.487		
	2013-14	26.779	311.248		
	2014-15	34.480	400.760		
	2015-16	31.868	370.392	NA	NA

EMISSION FROM VARIOUS ACTIVITIES WITH CONTROL MEASURES (KG/DAY)					
	YEAR	**PM 2.5**	**PM 10**	**So_x**	**No_X**
	2016-17	25.753	299.318		
	2017-18	31.724	368.719		
	2018-19	9.209	107.037		
	2019-20	13.127	152.570		
ACTIVITY- Emissions from machinery (Excavator & Dozer) **CONTROL MEASURE –** 50% controlled emission for Excavator and dozer	**2005-06**	NA	-	-	-
	2006-07		-	-	-
	2007-08		-	-	-
	2008-09		-	-	-
	2009-10		-	-	-
	2010-11		-	-	-
	2011-12		-	-	-
	2012-13		-	-	-
	2013-14		-	-	-
	2014-15		-	-	-
	2015-16		-	-	-
	2016-17		-	-	-
	2017-18		-	-	-
	2018-19		-	-	-
	2019-20		-	-	-
ACTIVITY- Emissions from sizing in crusher (Primary + Secondary) **CONTROL MEASURE –** 99% controlled emission for enclosure with dust extraction	**2005-06**	0.12	0.81	NA	NA
	2006-07	0.12	0.81		
	2007-08	0.15	0.99		
	2008-09	0.20	1.30		
	2009-10	0.26	1.70		
	2010-11	0.29	1.91		
	2011-12	0.36	2.40		
	2012-13	0.36	2.41		
	2013-14	0.44	2.91		
	2014-15	0.50	3.30		
	2015-16	0.48	3.17		
	2016-17	0.43	2.85		
	2017-18	0.48	3.17		
	2018-19	0.26	1.71		
	2019-20	0.31	2.04		

From the above table, it can be observed that there is minor damage on air environment due to excess production. Further the following environmental measures were in place for controlling the emission.

CONTROL MEASURES IMPLEMENTED IN ML AREA

- Water tanker arranged for water sprinkling on haul roads and Loading Point.
- Regular water sprinkling on crusher hopper, transfer points and at blasting location.
- Wet drilling and controlled blasting is being practised.
- Two nos. high efficiency Bag filters are installed at Crushers and dust suppression at transfer points.
- Covered acker and reclaimer shed are provided at crusher.
- Greenbelt/ Plantation done within and in the periphery of the ML Area in order to arrest the dust within the Lease area.

MONETARY VALUE OF AIR POLLUTANTS EMISSION DUE TO EXCESS PRODUCTION

Table13.5
Damage Cost for Emission of Pollutants during Excess Production

YEAR	TOTAL EXCESS EMISSION FROM VARIOUS ACTIVITIES (KG/DAY)				COST PER KG OF EMISSION (INR)				TOTAL WORKING DAYS	DAMAGE COST PER ANNUM (INR)
	PM 2.5	PM 10	SO_x	NO_x	PM 2.5	PM 10	SO_x	NO_x		
2003-04	2.358	26.134	-	-	524	340	165	96	312	₹ 31,57,803.95
2004-05	2.355	26.097	-	-						₹ 31,53,347.58
2005-06	3.473	38.809	-	-						₹ 46,84,695.65
2006-07	5.778	65.111	-	-						₹ 78,51,583.26
2007-08	9.791	111.108	-	-						₹ 1,33,86,945.30
2008-09	12.252	139.388	-	-						₹ 1,67,89,428.81
2009-10	19.141	218.665	-	-						₹ 2,63,25,263.86
2010-11	19.229	219.682	-	-						₹ 2,64,47,577.79
2011-12	27.820	318.737	-	-						₹ 3,83,59,880.13
2012-13	35.663	409.265	-	-						₹ 4,92,45,249.17
2013-14	33.004	378.567	-	-						₹ 4,55,54,151.06
2014-15	26.773	306.661	-	-						₹ 3,69,07,712.56
2015-16	32.857	376.875	-	-						₹ 4,53,50,707.50
2016-17	9.818	111.417	-	-						₹ 1,34,24,116.87
2017-18	13.854	157.803	-	-						₹ 1,90,04,647.52
2018-19	2.358	26.134	-	-						₹ 34,96,43,111.01
2019-20	2.355	26.097	-	-						₹ 31,57,803.95
									TOTAL DAMAGE COST	₹ 702444025.97

**Cost is based on various Case studies of European Environmental Agency Air emission penalty paid for environmental damage and only 20% of cost is taken as per Indian currency value compared with Euro*

F) Damage due to Noise and Vibration

The major source of noise and vibration due to mining and its allied activities are as listed below.

- Drilling and Blasting
- Heavy Machinery
- Movement of transportation vehicles.

Existing Control Measures:

- Controlled blasting is being practiced.
- Blasting is being done at specific time and care is being taken that no person is present in the vicinity during the time of blasting.
- Noise proof AC cabins were provided to all equipment and workmen who are susceptible to heavy noise exposure have been provided with ear muffs and sound proof operator cabins.

The Ambient noise levels monitored in the baseline period has been incorporated in Chapter 3 of this EIA/ EMP report.

There is no significant damage due to noise resulted due to mining activities. As no permanent structure exists near the working faces of the mine, there is no significant damage from vibration (Vibration Study report has been incorporated in this EIA/ EMP report). Therefore, this impact has been considered as low.

DAMAGE COST

No Damage cost envisaged. However, Mitigation Measures adopted includes provision of PPE noise kits to workers.

Cost of PPE kits @Rs 2000/worker for 78 workers = Rs. 1, 56,000/Year, Same cost is included in the EMP plan.

G) Damage to Health and Safety of Workers

The mining activity involves the occupation risk of accidents and safety of workers which requires Implementation of proper precautionary measures by adopting occupational safety and health standards

As per the information made available, there was no occur of accidents during the violation period.

Silica present in very low levels in the mineral at the mine site. The particulate matter due to wind drift can be experienced which workers might have got exposed to. All mine workers were provided with following mandatory, personal protection equipment

a. Helmets

b. Gloves

c. Goggles

d. Shoes

e. Safety Jacket

f. Nose Masks

No health issues were reported.

However, to monitor the impact of mining on the health of mining workers regular medical check-up is required which was carried out timely at company's Health Centre.

DAMAGE COST

No Damage cost envisaged.

REMEDIATION COST

Regular Medical check-up is being done & will be done for all employee and workers.

Cost of Medical check-up is being accounted and booked in Health Centre Operation Cost.-

H) Damage due to Solid Waste

As per mining plan and production parameters the mining activities does not involve generation of Mine waste.

- No Municipal waste dumps were made. However, Solid waste generated like oil soaked cotton waste and paper waste is co processed in Kiln. Spent Oil is sent to HPSPCB authorized Solid waste Management Vendor.
- No chemicals are used, except for blasting material.
- There is no waste generation from the mine and no disposal areas are involved
- No damage is there as Limestone is a stable material existing and the contamination due to percolation of disturbed material is not there.
- No damage is caused. The product i.e., limestone is a stable material and not reactive
- Material offers no known environmental hazard as per Material Data Sheets.
- No damage as no dumps is formed.
- No recovery of waste products from the mine as both high- and low-grade minerals are sold and inter-burden waste spread over the exhausted benches.

However, there is stacking of Subgrade mineral present in the ML area and emission due to that has been covered in Air Damage cost.

DAMAGE COST

No Damage cost envisaged.

I) Damage to Crops and Quality of Soil

The nearest agricultural field from mine site is located at the distance of 200 M towards East direction from the Ultimate pit limit. There is no direct discharge from the mining activities impacting agricultural fields. The air pollutant in the form of PM 2.5 & PM10 will get dispersed in very small quantities due to the presence of hills.

The soil samples exhibits Light Brownish, Dark Brownish and Reddish Brown which indicates moderate organic matter level and iron oxides in the soil samples. The organic matter (0.75 % to 1.14 %) and organic carbon (0.44 % to 0.66 %) present in the soil observed to be appropriate for the plant growth. The texture of the soil samples were Silty Loam and Silt. All soil samples are in the

range of neutral to slightly alkaline having pH ranging from 6.82 to 8.24 which is an optimal range for most the plant to thrive and grow.

All the essential nutrients were Nitrogen (160.94 to 268.24 kg/ha), Phosphorous (62.77 to 104.61 kg/ha), Potassium (168.19 to 296.14 kg/ha), Magnesium (309.17 to 544.37 mg/kg), Calcium (1344.21 to 2366.83 mg/kg). Higher calcium values in the soil sample is due to the presence of slightly alkaline soil in nature within the area, thus would positively affect the plant growth. These results indicate that the soil quality within the study area is of a good quality and contains sufficient macronutrients which is vital for healthy plant life.

These results shows that there is a need to replenish phosphorus to improve the productivity of the agricultural land in the study area and should be taken care in green belt development.

Hence, no damage is envisaged to crops and soil due to excess production.

DAMAGE COST

No Damage cost envisaged.

J) Damage due to Transportation of Mined Mineral

The mined out mineral is being transported to crusher via dumpers through haul roads and from the crusher to cement plant via covered conveyor belt.

Emission of particulate matter has been included in the damage due to Air pollution and damage due to extra conveyance due to excess production has been included in the machinery emission.

- There was no accident reported during transportation of mined material.
- Haulage road and wherever required water sprinkling was carried out on the transportation route.

Hence no extra load is envisaged.

DAMAGE COST

No Damage cost envisaged.

K) Implementation of Safety Sign Boards

Safety sign board are provided at various locations of the Mines during the violation period.

DAMAGE COST

No Damage cost envisaged.

13.6 IMPACT ON SOCIO-ECONOMIC ENVIRONMENT

There is no direct adverse impact that can be observed due to violation activity on the socio-economic status of nearby villages. The total population and demographic profile of nearby villages is given in Table 13.16 and 13.17 respectively.

Table 13.6

Demographic Profile

Particular	No. of Villages	Total Household	Total Population	Total SC Population	Total ST Population	Total Literacy Rate	Workers			Non-Worker
							Main	Marginal	Total	
Primary Zone (0 - 3 Km)	30	3554	16063	3482	25	85.97	4406	2445	6851	9212
Secondary Zone (3 - 7 Km)	59	4940	24148	6036	710	81.54	4935	6010	10945	13203
Outer Zone (7 - 10 Km)	84	6391	30914	8623	193	83.13	6787	10382	17169	13745
Total	**173**	**14885**	**71125**	**3482**	**25**	**83.23**	**16128**	**18837**	**34965**	**36160**

13.6.1 CSR ACTIVITIES

CSR activities are carried out continuously. More emphasis of CSR is in drinking water, infrastructure, sanitation, education, skill development, social empowerment, water management, environment, sports and health.

Table-13.7

The amount spent for CSR in RG area is as follows:

ACC Limited - Gagal Cement Works										
Sl	**Theme**	**2014** Amount spent (In INR lakhs)	**2015** Amount spent (In INR lakhs)	**2016** Amount spent (In INR lakhs)	**2017** Amount spent (In INR lakhs)	**2018** Amount spent (In INR lakhs)	**2019** Amount spent (In INR lakhs)	**2020** Amount spent (In INR lakhs)	**2021** Amount spent (In INR lakhs)	**2022-23** Amount spent (In INR lakhs)
1	**Social Inclusion** (Education, Health, Water & Sanitation, Cultural activities, Sports)	169.52	160.67	97.15	99.88	97.38	124.43	122.55	167.9	55.2
2	**Community infrastructure** (Construction of Footpath, Community Hall, retaining walls, Solar lights)	87.98	78.6	29.77	32.08	28.77	35.03	50.74	21.36	33.09
3	**Sustainable livelihood** (Upliftment of women, Youth employability program)	40.81	69.45	49.76	37.86	21.43	26.64	21.49	23.43	79.56
	Total CSR Expenses (In Lakhs)	**298.31**	**308.72**	**176.68**	**169.82**	**147.58**	**186.1**	**194.78**	**212.69**	**167.85**

13.7 ECONOMIC BENEFITS ACCRUED DUE TO VIOLATION

13.7.1 PART A: EMP COST OF THE PROJECT

- The project is ongoing and violation is for excess production only. The cost allocated for EMP is implemented as per plan and details are available in EIA.
- The company had made necessary provisions for Continuous Environmental monitoring program, hence No EMP Cost was saved during the violation period of 15 years.

13.7.2 PART B: PROFIT ACCRUED DURING VIOLATION PERIOD

Table-13.8

Profit accrued during violation period:

Sl. No.	Year	EC capacity (MTPA)			Actual Production in TPA			Excess Production more than EC capacity (TPA)			NET benefit of excess production (In Crore Rs.)		
		Limestone	Shale	Total	Limestone	Shale	Total	Limestone	Shale	Total	Limestone	Shale	Total
	2005-06	4.5	0	4.5	3338447	135700	3474147	0	135700	135700	0	0.90	0.90
	2006-07				3276500	135600	3412100	0	135600	135600	0	0.90	0.90
	2007-08				3844700	166590	4011290	0	166590	166590	0	1.11	1.11
	2008-09				3889650	217450	4107100	0	217450	217450	0	1.45	1.45
	2009-10				3850200	285800	4136000	0	285800	285800	0	1.91	1.91
	2010-11				3901500	320800	4222300	0	320800	320800	0	2.14	2.14
	2011-12				3929800	403250	4333050	0	403250	403250	0	2.69	2.69
	2012-13				3521200	404200	3925400	0	404200	404200	0	2.69	2.69
	2013-14				3320450	488050	3808500	0	488050	488050	0	3.25	3.25
	2014-15				3578800	553800	4132600	0	553800	553800	0	3.69	3.69
	2015-16				3548682	532405	4081087	0	532405	532405	0	3.55	3.55
	2016-17				3334254	478605	3812859	0	478605	478605	0	3.19	3.19
	2017-18				3670813	531201	4202014	0	531201	531201	0	3.54	3.54
	2018-19				3728492	286205	4014697	0	286205	286205	0	1.91	1.91
	2019-20				3154900	341700	3496600	0	341700	341700	0	2.28	2.28
	2020-21												
Total					**53888388**	**5281356**	**59169744**	**0**	**5281356**	**5281356**	**1057963.9**	**0**	**35.21**

- M/s ACC Limited has violated the granted EC by producing shale without prior permission. Total 5.44 Million Tonnes of Shale was produced in 15 years from 2005-06 to 2019-20. Total net profit gained due to excess production is INR 35.21 Crore, 3% of the total net profit of INR 1.06 Crore will be contributed towards Remediation Plan.

13.8 CONCLUSION

Detail of Remediation Plan, Natural Resource Augmentation Plan and Community Resource Augmentation Plan along with budget and action plan is given above. Calculation of bank guarantee amount as per Notification No. S.O. 804(E), dated 14-03-2017 shall be Rs. 1.06 Crore (after approval of EAC) as per details given here-in-above. The Bank guarantee shall be given for a period of 3 years, with the Himachal Pradesh Pollution Control Board which will be released after successful implementation of the remediation plan and natural and community resource augmentation plan and after recommendation by Regional Office of the Ministry and approval of EAC.