

2ND COMPLIANCE REPORT

QUARRY PROJECT OF M/s PALAKKAL
GRANITE PRODUCTS PRIVATE LIMITED

From

Sri P.M Aboobacker
M/s Palakkal Granite Products Pvt Ltd
Managing Director,K P 8/308
Near Sakeena Industries ,Chethukadavu P.O
Kozhikode ,Kerala-673571

To

Ministry of Environment, Forests & Climate Change,
Regional Office
Kendriya Sadan,4th Floor, E&F Wing,
17th Main road,II Block Koramangala
Bangalore – 560034.

Ref: File No: 2439/EC2/2023/SEIAA dated: 14.03.2025

Sub: Regarding Compliance Report submission- June 2026

Respected Sir,

The quarry (Building Stone) Project was accorded Environmental Clearance for 10.1903 Ha by File No: 2439/EC2/2023/SEIAA dated: 14.03.2025 By State Environment Impact Assessment Authority, Kerala. Compliance report to the specific and general conditions of the Environmental Clearance is enclosed herewith.

Thanking you

Your's respectfully

M/s. Palakkal Granite Products Pvt. Ltd

For Palakkal Granite Products Pvt.Ltd.


Mr.P.M Aboobacker

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Annexure 3: Copy of Explosive License
Annexure 4: Copy of Panchayat License
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Annexure 6: Copy of Slope Stability Study
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INTRODUCTION

Granite Building Stone Quarry of M/s Palakkal Granite Products Pvt Ltd represented by its Managing Director Sri.P.M Aboobacker situated in Re Survey Block No -003, Re Survey Nos: 172/1527, 172/1232, 172/1228, 172/1213,1523, 1862, 172/1212, 172/1134, 172/1137, 172/1201, 172/1221, 172/1120, 172/1238, 172/1136, 172/1135, 172/1119, 172/2275, 172/1526, 172/1200, 172/1239, 1240 of Kodiyathur Village &Re Survey Block No - 001, Un Survey Nos: 153/597, 153/598, 153/604, 153/601, 600 of Kumaranellur Village, Kozhikode Taluk, Kozhikode District, Kerala for an area of 10.1903 hectares

Environmental clearance was obtained from SEIAA, Kerala File No: 2439/EC2/2023/SEIAA vide dated 14-03-2025 initially for a period of 5 years from the date of execution of mining lease and then to extend the EC period to cover the project life of 10 years

REFERENCE

As part of general condition No. 48 of Environmental Clearance order, the proponent shall submit Half Yearly Compliance Reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by e-mail) and upload the status of compliance of the stipulated EC conditions, including results of monitored data on their website and shall update the same periodically.

This report contains the compliance of conditions of Environmental Clearance.

SPECIFIC CONDITION

ITEM NO	STIPULATIONS IN EC	STATUS OF COMPLIANCE
S-1	The Project Proponent shall carry out quarrying as per the approved Mining Plan and as per the Specific Conditions mentioned hereafter. The Project Proponent should	The Project Proponent confirms that all activities will be carried out strictly as per approved Mining Plan and in full compliance with Kerala Minor Mineral Concession Rules 2015 and its subsequent amendments.

	strictly follow the Kerala Minor Mineral Concession Rules 2015 and amendments thereby.	
S-2	The EC shall be valid from the date of execution of permit/lease from the Department of Mining and Geology. The copy of the lease order should be provided to the SEIAA before commencing the mining activity.	A copy of executed lease order has been submitted to SEIAA prior to the commencement of mining operations. The mining operations has been started and copy of lease order is attached as annexure 8
S-3	The EC issued will be subject to a review by SEAC after each 5 years through field verification to ensure that mining is carried out sustainably as per the EC conditions.	The EC issued by SEIAA initially for 5 years and will extend the EC period to 10 years subject to review by SEIAA at the end of every 5 years.
S-4	The ultimate depth of mining should be limited to 120 m above MSL so as to prevent formation of any mine pit and impoundment of water on the sloping terrain and the mineable resources shall be reworked accordingly by the Mining and Geology Department while approving the Scheme of Mining / issuing the lease or permit.	A revised mining plan is prepared and approved by limiting the depth of mining to 120 AMSL. The mineable quantity has been reassessed by the Mining and Geology Department by restricting the depth to 120 MSL so as to prevent formation of mine pit and impoundment of water on sloping terrain
S-5	The conditions stated in the NOC from the Irrigation Department should be strictly complied with.	The conditions stated in the NOC from the Irrigation Department should be strictly complied with.
S-6	A buffer of 50m should be maintained between the crusher and project boundary	Buffer of 50m should be maintained between the crusher and project boundary and revised mining plan is submitted adhering to the condition
S-7	Blasting for mining should be in strict compliance to the	Vibration study report conducted by NIT Suratkal,Karnataka is attached as

	recommendations provided in the study report of NIT,Karnataka	annexure
S-8	A detailed study on the health issues if any in the surroundings areas of project within 1 Km radius of the project boundary should be conducted and the inference and recommendations should be uploaded in first half yearly compliance report	There are no health issues to people in the surrounding areas and detailed impact assessment study of 1 Km radius of project boundary is attached as annexure
S-9	The benches should be properly maintained with a 5m height.Correction to the non-provision of benches,wherever required,should be carried out prior to the commencement of regular mining.	The height of each bench will be limited to a maximum of 5 meters, and the width of every bench will be maintained at not less than the bench height, in full compliance with the approved mining plan and safety regulations.
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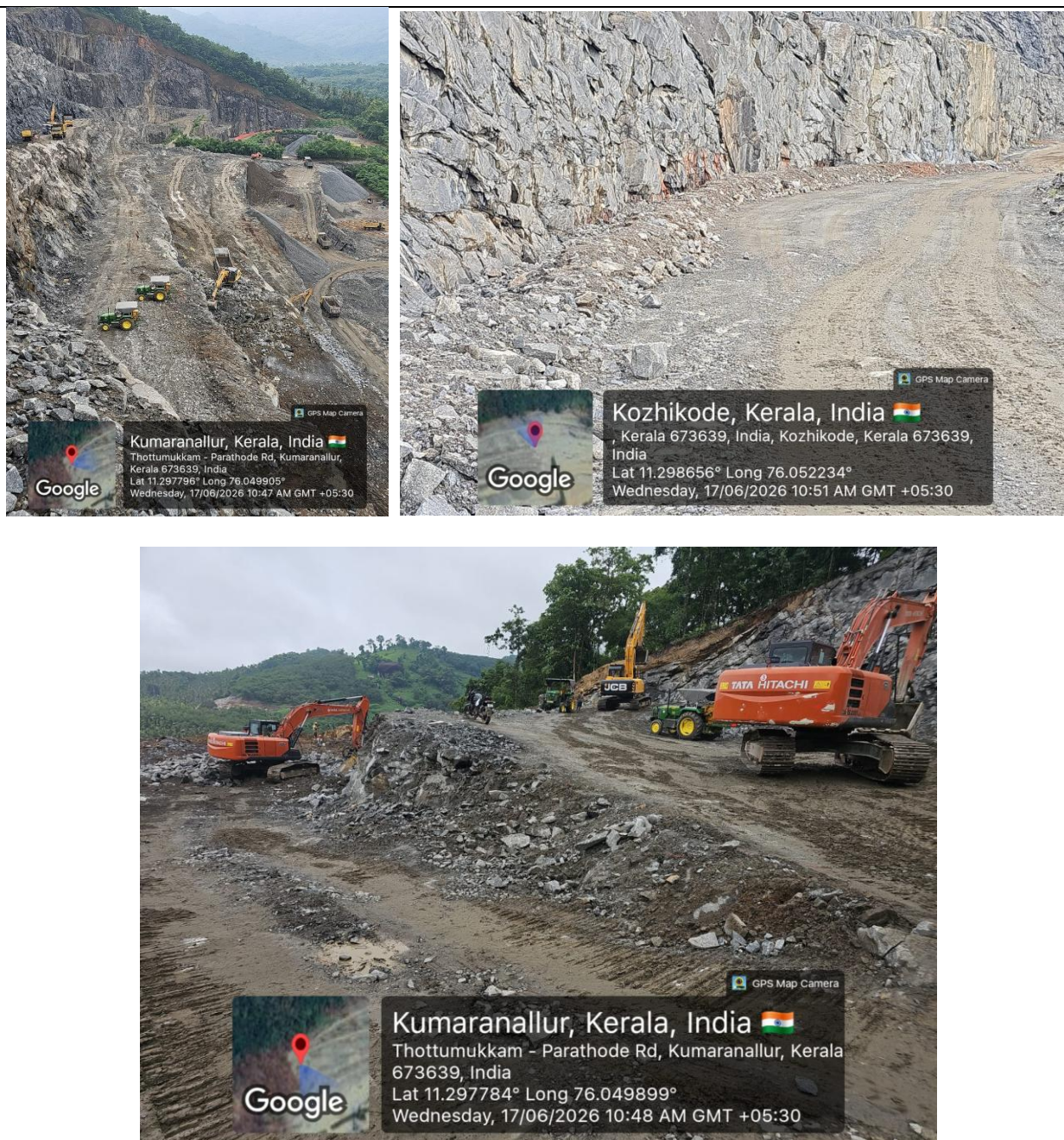
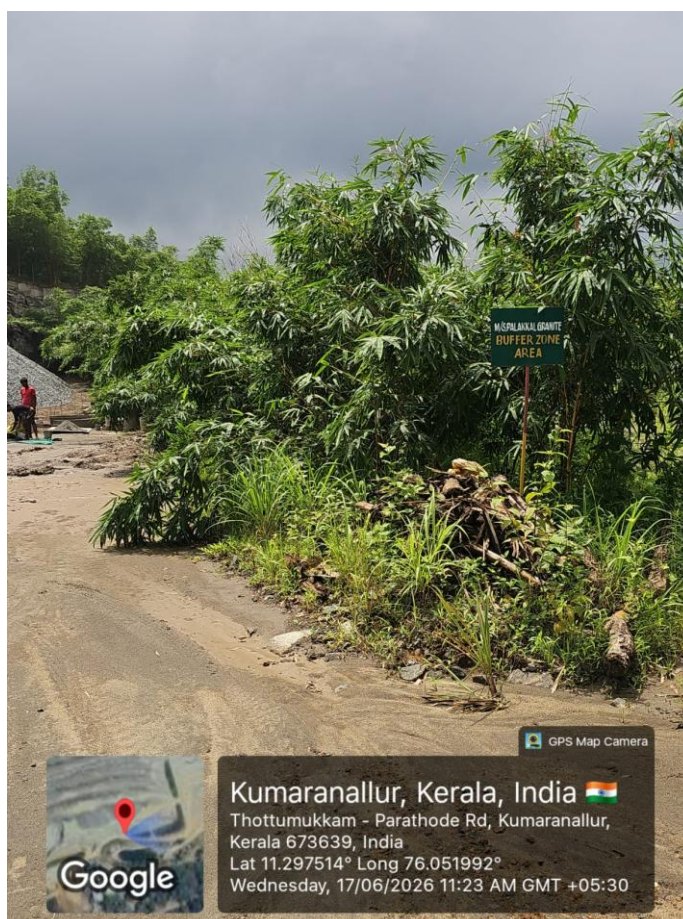


Fig 1: Photograph of benches & mine face

S-10	All the assurances and the mitigation measures with a 5m height. Correction to the non-provision of benches, wherever required, should be carried out prior to the commencement of regular mining	The Bench height 5 m is in full compliance with the approved mining plan and safety regulations.
S-11	Development of green belt should be initiated prior to the	Green belt has been developed across and out side the lease area. The species

commencement of mining using indigenous species. The suggested species are *Phyllanthus emblica* (Nelli), *Syzygium cumini* (Njaval), *Writia tinctoria* (Dhanthapala), *Ficus bengalensis* (Peral), *Ficus racemosa* (Atti), *Bambusa bamboos* (Mullumula), *Dendrocalamus strictus* (Kallan mula), *Strychnos nuxvomica* (Kanjiram), *Terminalia cattappa* (Thanni), *Schleicher oleosa* (Poovam), *Artocarpus hirsutus* (Ayiniplavu) etc.

such as *Phyllanthus emblica* (Nelli), *Bambusa bamboos* (Mullumula), *Dendrocalamus strictus* (Kallan mula), *Artocarpus hirsutus* (Ayiniplavu) etc are planted. Photographs are attached below



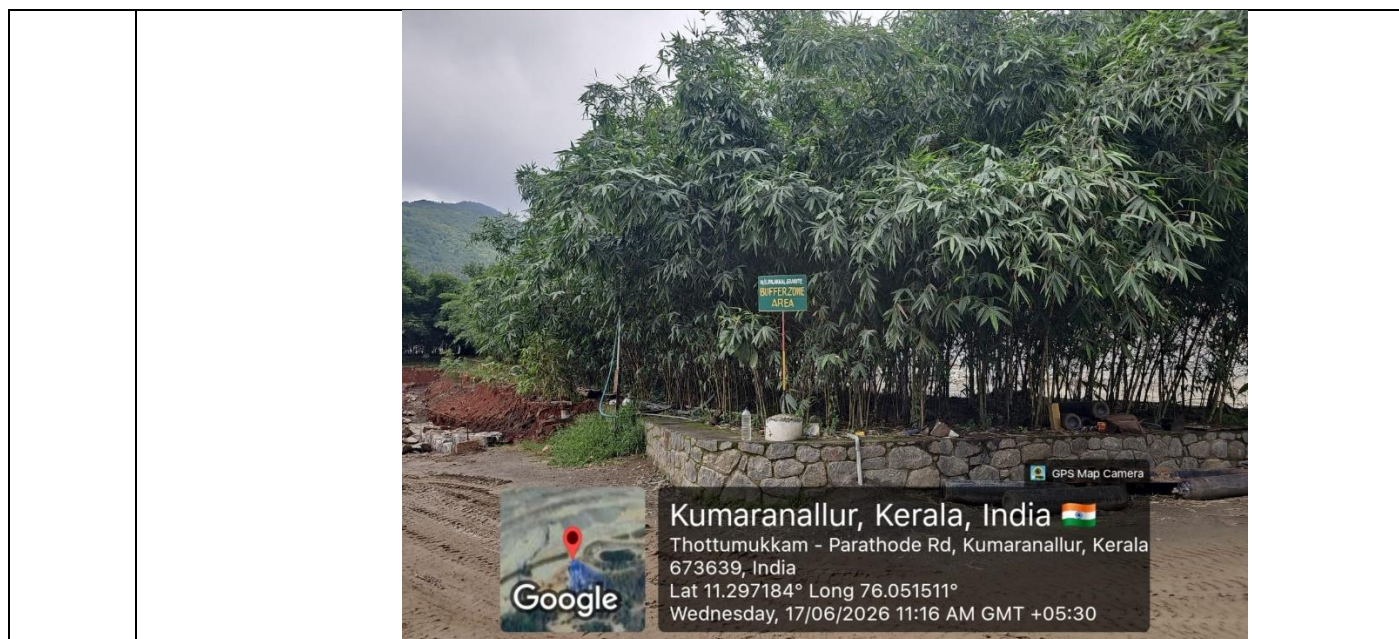
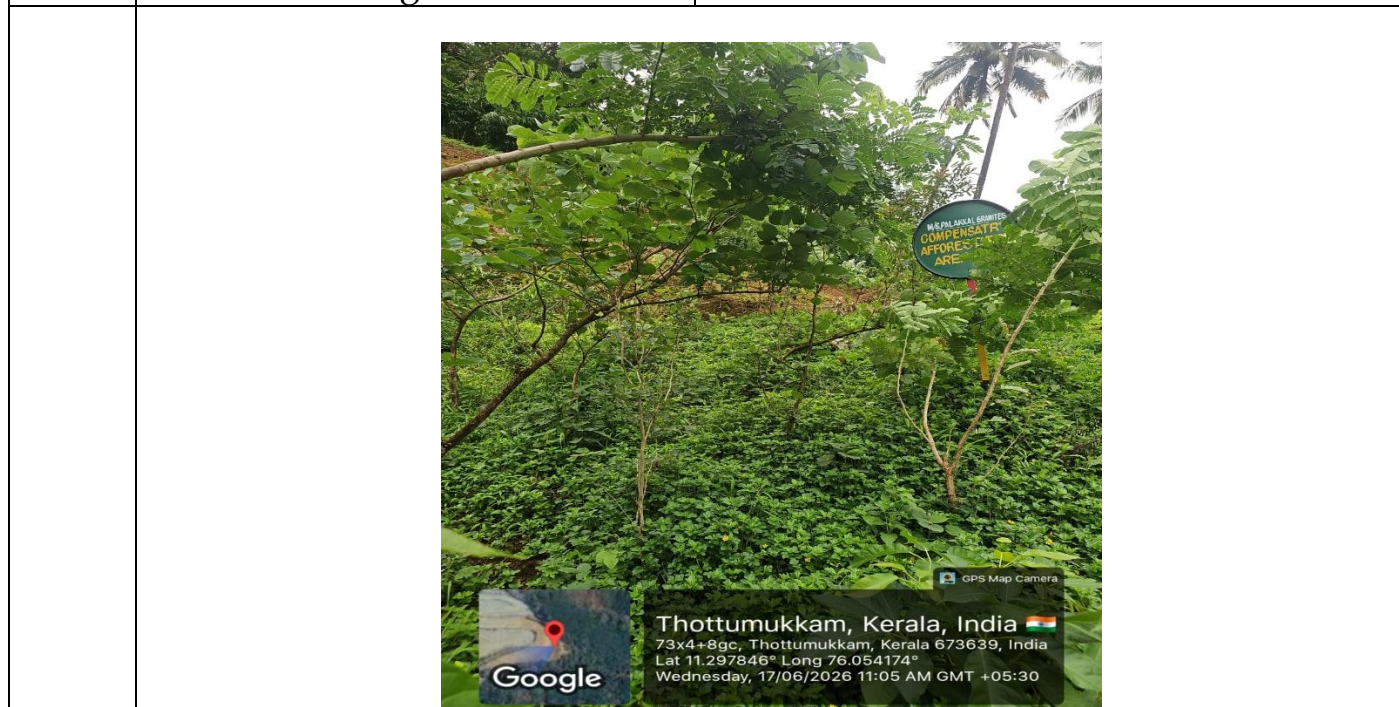


Fig2: Photograph of Green belt

S-12	Compensatory afforestation should be done prior to the commencement of mining by planting local species of trees as proposed.	Compensatory afforestation is done prior to the commencement of mining by planting local species of trees as proposed.
S-13	Geotagged Photographs of the progress of compensatory afforestation should be submitted along with HYCR.	The Photograph of the Compensatory afforestation is attached.



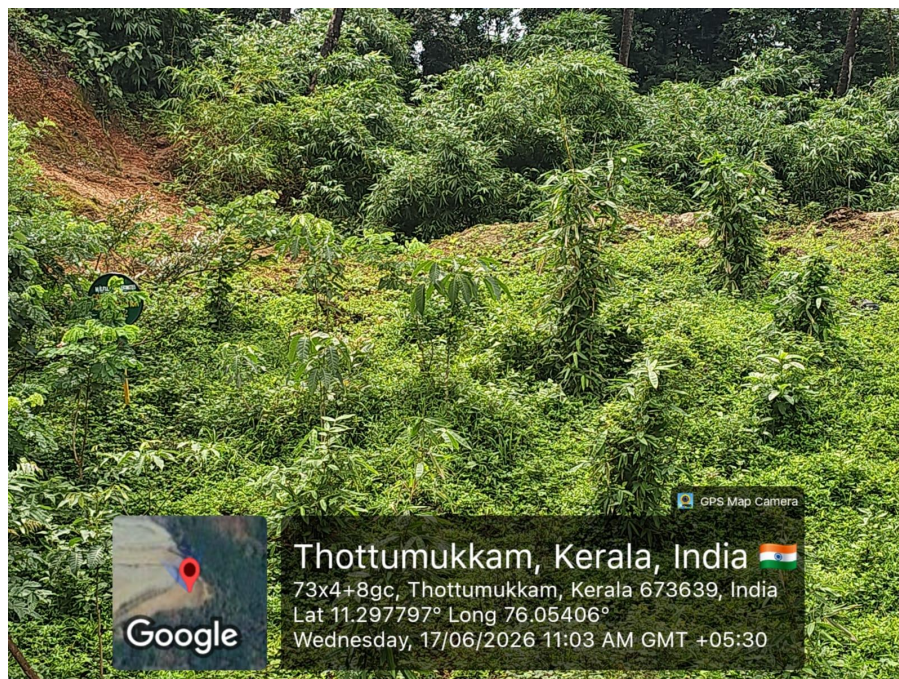
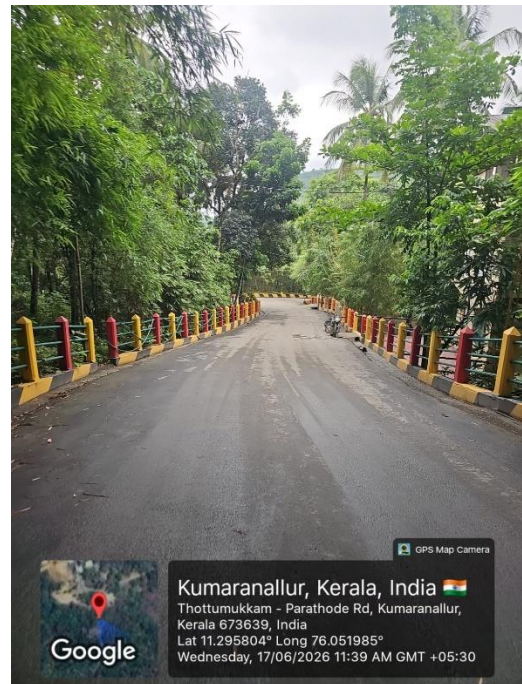


Fig3:Photographs of Compensatory Afforestation

S-14	Adequate number of avenue trees of indigenous species should be planted along both sides of the haulage road.	The project proponent planted different avenue trees either side of the roads, parking area and other areas in the project land. There are natural vegetations including trees, shrubs, herbs and climbers also present.
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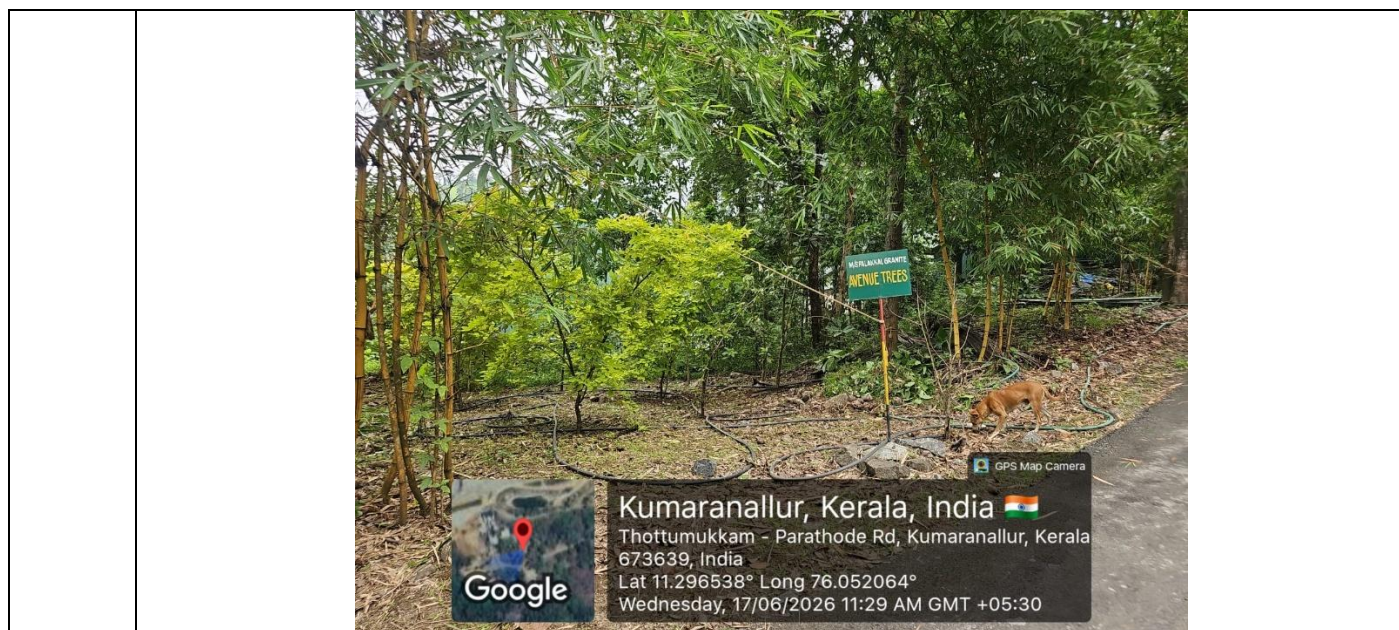


Fig 4: Photograph of Avenue Trees & Plants

S-15	A temporary wall of 5m height should be erected at appropriate locations on the boundary to avoid disturbance and nuisance to the nearby residents	A temporary wall of 5m height is erected at appropriate locations on the boundary to avoid disturbance and nuisance to the nearby residents
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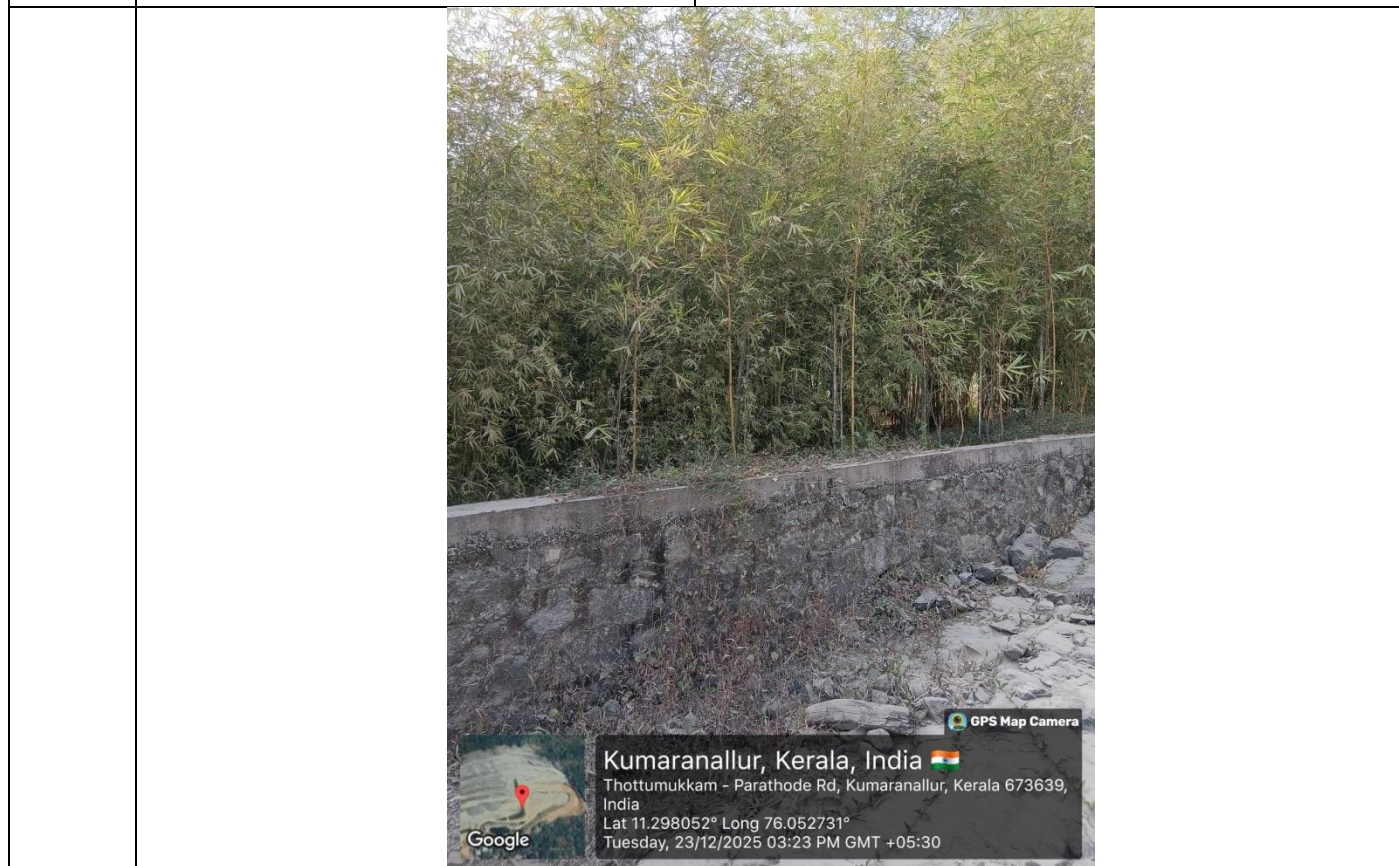
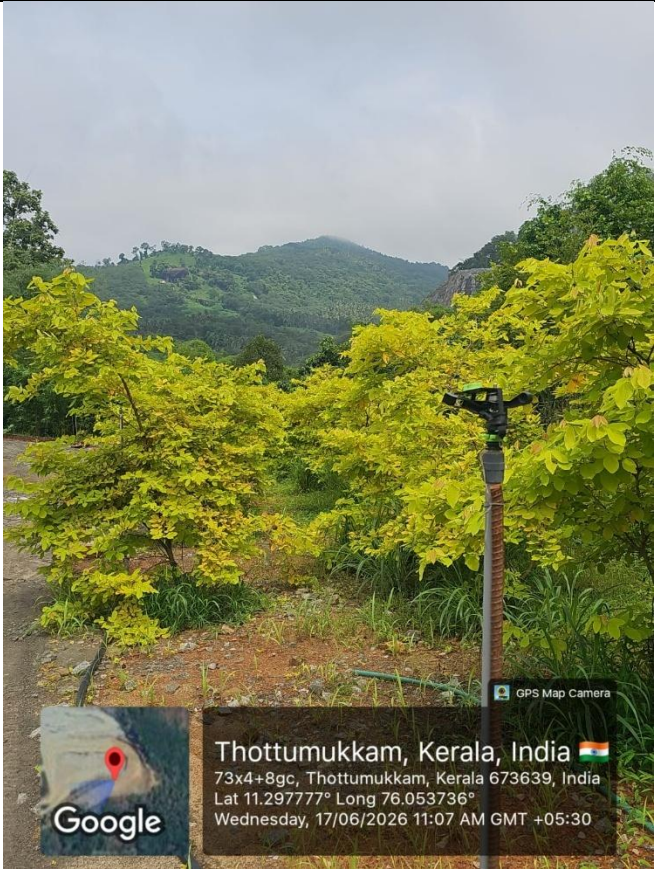


	Fig 5: Temporary wall	
S-16	The haulage road should be provided with sprinkling facility to prevent dust pollution	Water sprinklers are provided along the sides of access road and crusher unit, mist water sprinklers near crusher unit and water tanker sprinklers are using in Project site
		

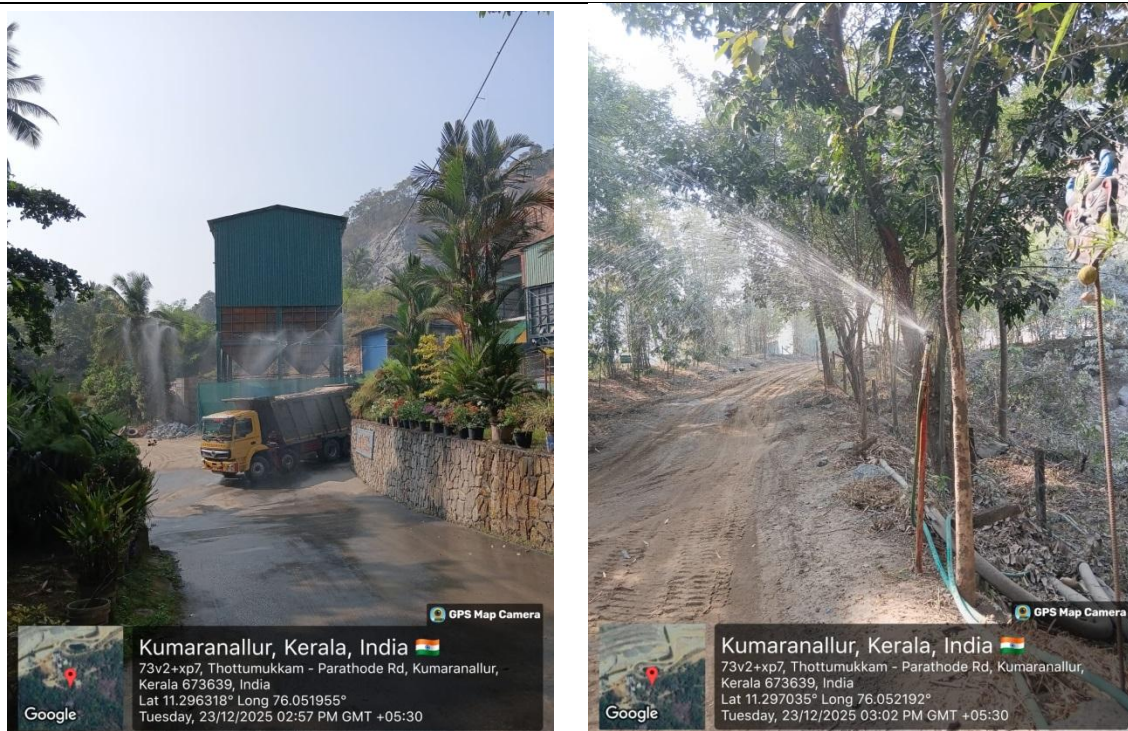


Fig 6: Photograph of Sprinklers

S-17	Drainage system incorporating garland canal, silt traps, siltation pond and outflow channel connecting to a natural drain should be provided prior to the commencement of mining	Proper Drainage system incorporating garland canal, silt traps, siltation pond and outflow channel connecting to a natural drain should be constructed.
S-18	Garland drain, silt-traps, siltation ponds and outflow channel should be desilted periodically and geo-tagged photographs of the process should be included in the half-yearly compliance report (HYCR).	Garland drains, silt traps and outflow channels is properly desilted and Geotagged photographs is attached



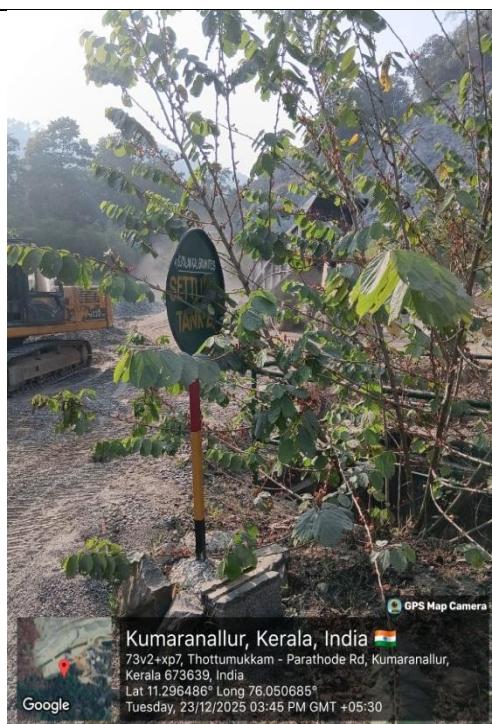


Fig 7: Drainage way

S-19	Overflow water from the siltation pond should be discharged to the nearby natural drain after adequate filtration.	The provision for adequate filtration prior to discharge of overflow water to nearby natural drain will be implemented during the development phase.
S-20	Drainage water should be monitored at different seasons by an NABL accredited lab and clear water should only be discharged into the natural stream. Geotagged photographs of the drainage and sampling site should be submitted along with HYCR.	Drainage water has been monitored at different seasons by an NABL accredited lab and clear water should only be discharged into the natural stream. The detailed lab report is attached as annexure
S-21	Overburden should be stored at the designed place and gabion wall should be provided for the topsoil and overburden storage sites	There is old Quarry in the site for restoration. The overburden materials are stored within the site at designated place. This will be used to restore the exploited area in future. Photograph is attached



Fig 8: OB Dumping

S-22	The impact of vibration due to blasting on the houses and other built structures within 200m distance from the project boundary should be monitored in terms of Peak Particle Velocity and amplitude for maximum charge per delay and included in the Half Yearly Compliance Report.	The impact of vibration due to blasting is conducted by NIT Suratkal and is attached as annexure
S-23	Implementation of CER Plan should be done during the first 2 years of EC period and its operation and maintenance should be done till the completion of the mine closure plan	CER Plan shall be fully implemented within first two years and shall be operated and maintained continuously until the Mine closure plan is executed.
S-24	Transportation of mined material should not be done during the peak hours in the forenoon (8.00am to 10.00am)	Transportation of mined materials is strictly avoided during peak hours in (8.00am to 10.00am) and afternoon (3.30pm to 5 pm) to minimize traffic

	and afternoon (3.30pm to 5 pm).	congestion and safety risks. Scheduling and coordinating with transporters are in place to adhere to this timing restriction.
S-25	Adequate sanitation, waste management and rest room facilities should be provided to the workers	Rest room for workers is provided at site in accordance with the EC conditions. Photograph of Rest Room, Office room and First Aid room is attached.



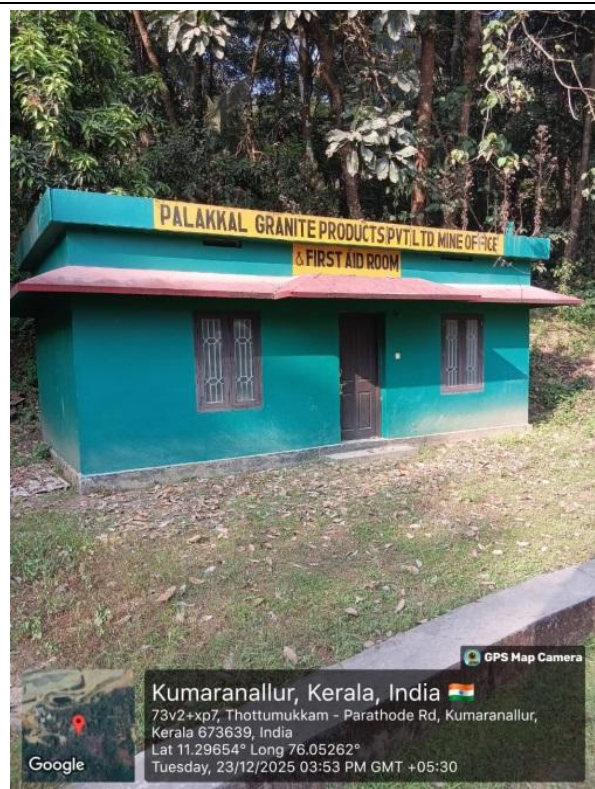


Fig 9: Rest room, Office Room & First aid room

S-26

Adequate energy conservation measures should be implemented including solar power installations.

Energy conservation measures should be implemented including solar power installations





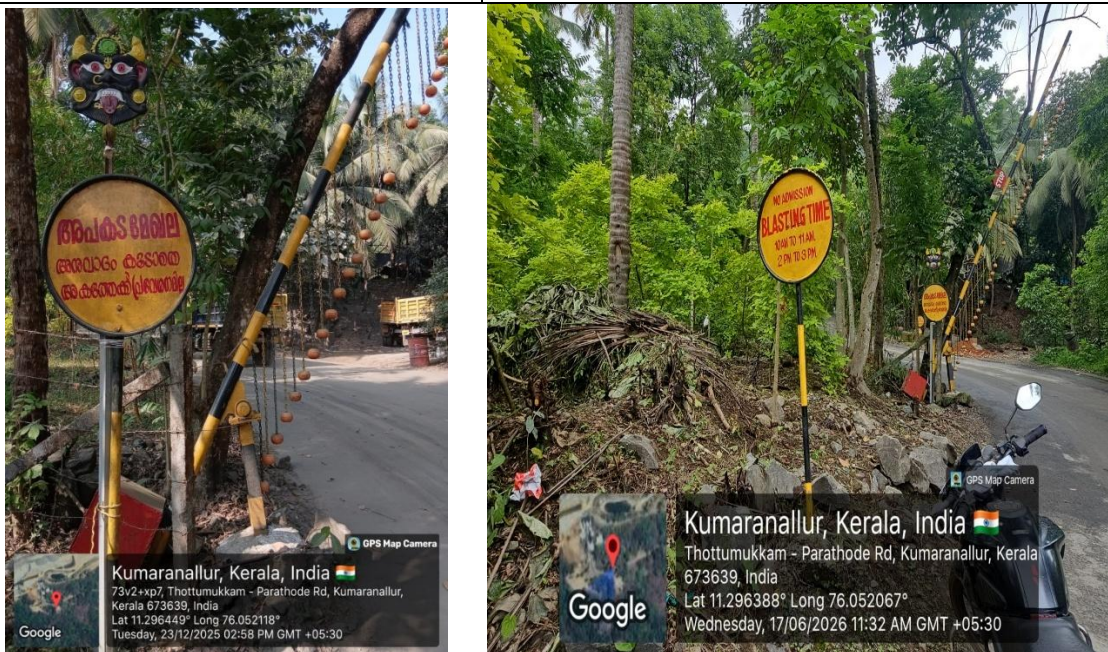
Fig 10: Transformer & Solar

S-27	Environment Management Cell (EMC) should include one subject expert in environment management. The proceedings of the monthly meeting of the EMC should be submitted along with the HYCR.	The Environment Management Cell (EMC) has been constituted and includes one subject expert in environment management.
S-28	Adequate measures should be adopted to harvest the rainwater as per the guidelines issued by the Central Ground water Authority.	Rainwater Harvesting measures are planned and should be implemented as per the guidelines issued by the Central Ground water Authority.



Fig11:Rain water Harvesting

S-29	Blasting mats should be used during rock blasting to contain the blast, prevent fly rocks and suppress dust.	Blasting mats are used during rock blasting to contain the blast, prevent fly rocks and suppress dust.
S-30	In the wake of occurrence of large scale landslides in the state, as per the information provided by the Department of Mining & Geology, it is directed to use only NONEL (Non Electrical) technology for blasting to reduce the vibration of the ground, which is one of the causative factors that triggers landslides, formation of cracks in the surrounding buildings and disturbance to	it is ensured that NONEL (Non-Electrical) blasting technology will be strictly followed during blasting operations. All measures to minimize ground vibration and associated impacts will be implemented in accordance with regulatory directions, and compliance will be documented in the Half-Yearly Compliance Report (HYCR)

	human and wildlife.	
		
	Fig 12 :Sign Board of Blasting Time	
S-31	As per OM no F.No.22-65/2017-IA.III dated 30th September 2020, under Corporate Environmental Responsibility (CER) the Project Proponent should implement the Environment Management Plan (EMP)/CER as directed by SEAC during appraisal, covering the issues to address the environmental problems in the project region, from the beginning of the project, indicating both physical and financial targets year wise. The EMP/CER shall be implemented in consultation with Local Self Govt. Institutions. A copy of the approved EMP/CER shall be made available to the concerned Panchayat for information and	The Corporate Environmental Responsibility (CER) plan has been prepared as per the directives of SEAC and OM F.No.22-65/2017- IA.III dated 30th September 2020. Implementation of the EMP/CER will be carried out in consultation with the Local Self Government Institutions, and a copy of the approved plan has been made available to the concerned Panchayat.

	implementation support. The indicated cost for implementation of CER activities shall be 2% of the project cost.	
S-32	As per the directions contained in the OM F.No.22-34/2018-IA.III dated 16th January 2020 issued by MoEF&CC, in obedience to the directions of the Hon'ble Supreme Court the Project Proponent shall, undertake re-grassing the mining area and any other area which may have been disturbed due to his mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc. The compliance of this direction shall be included in the Half Yearly Compliance Report which will be monitored by SEAC at regular intervals.	The Project Proponent shall undertake re-grassing of the mining area and all other areas disturbed due to mining activities, restoring the land to a condition suitable for the growth of fodder, flora, and fauna, as directed by OM F.No.22-34/2018- IA.III dated 16th January 2020.
S-33	The Project Proponent is directed to install a CCTV camera and take all other essential measures to ensure that mining site is not used by antisocial elements for nefarious antisocial activities which are detrimental for peaceful coexistence in the project region. In case if such complaints are received, the EC given is likely to be cancelled after a police verification.	The Project Proponent has installed CCTV cameras across the project area and the nearby metal crusher unit.

	 Fig 13: Crusher	
S-34	Progressive closure of mined area shall be carried out as per the approved mining plan and closure activities carried out shall be mentioned in the HYCR for the relevant period.	Progressive closure of mined out area will be carried out as per the approved mining plan and closure activities will be discussed during the period of final quarry closure plan preparation
S-35	The abandoned benches may be backfilled and suitable species including fodder grass and other species adapted to such conditions should be planted and maintained.	The abandoned benches will be backfilled and suitable after the final quarry closure and will be maintained properly.
S-36	In the beginning of the last year of the EC period, the final closure plan has to be submitted and approved by the District Geologist within 6 months.	Will follow the directions contained.

S-37	The final closure of the quarry shall be carried out during the last 6 months of mining period and a closure certificate shall be produced to the Authority. No ECs shall be given to Project Proponent for the subsequent mining projects unless the final mine closure certificate issued by the District Geologist is produced for the previous projects, if any.	The final closure of the quarry will be discussed during the last 6 months of mining period.
S-38	The violation of EC condition may lead to cancellation of EC and action under The Environment (Protection) Act 1986.	The Project Proponent acknowledges that any violation of the Environmental Clearance (EC) conditions may lead to cancellation of the EC and attract action under the provisions of the Environment (Protection) Act, 1986. All operations will be carried out in strict compliance with the stipulated conditions to avoid such contingencies.

STANDARD EC CONDITIONS FOR MINING OF MINERALS

1	Air Quality Monitoring And Preservation	
1.1	Vehicular emissions shall be kept under control and regularly monitored. All the vehicles engaged in mining and allied activities shall operate only after obtaining 'PUC' certificate from the authorized pollution testing centres.	Vehicular emissions shall be kept under control and regularly monitored. All the vehicles engaged in mining and allied activities shall operate only after obtaining 'PUC' certificate from the authorized pollution testing centres.
1.2	Applicable labour laws for mining shall be followed. Proper masks and onsite facilities shall	Scrupulously follows the directions contained.

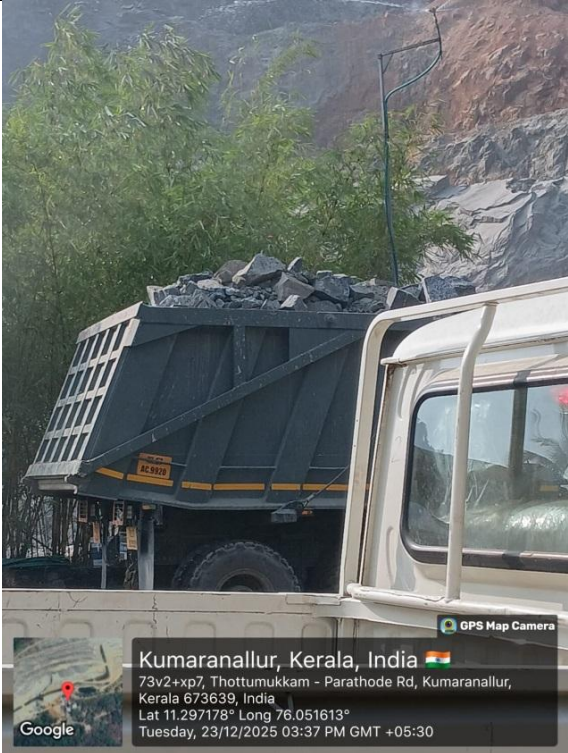
	be provided to the workers. All safety measures shall be followed while cutting laterite using machines	
1.3	The Project Proponent shall monitor the air quality during operation and submit ambient air quality monitoring details along with the HYCRs.	Ambient air quality monitoring details is attached as annexure 10
1.4	Major approach roads shall be black topped and properly maintained .The transportation of the material should be done in covered trucks to contain dust emissions.	Major approach roads are properly maintained .The transportation of the material are be done in covered trucks to contain dust emissions
		



Fig14 : Photograph of trucks covered

1.5	Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution such as haul road, loading and unloading points and transfer points and having high levels of PM10 and PM2.5. Monitoring of Ambient Air Quality to be carried out based on the Notification 2009, as amended from time to time by the Central Pollution Control Board or State Pollution Control Board.	Regular water sprinkling shall be carrying out to prevent dust emission Ambient air quality report is attached as annexure. 10
1.6	Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement at project site, parking area, on haul roads, loading and unloading and at transport points should be provided and properly maintained.	Will be complied. Regular water spraying will be carried out at all dust-generating areas to control fugitive emissions.

1.7	Project Proponent should install wind breaker/shield arrangement along the boundary where there are houses within 100m radius.	Scrupulously follows the directions contained.
1.8	Post environmental closure third party monitoring by reputed institution in air quality, water, land & soil etc shall be carried out and analysed with EMP measures at regular interval. A suitable recommendation in this regard, shall be furnished to IRO, MoEF&CC for compliance. The data used for analysis shall be obtained from continuous AQMS, site specific water regime. Also third party shall analyse the implementation of river diversion, meeting to the requirement of project report.	Scrupulously follows the directions contained.
2	WATER QUALITY MONITORING AND PRESERVATION	
2.1	The effluent discharge (mine waste water, workshop effluent) shall be monitored in terms of the parameters notified under the Water Act, 1974, and other applicable standards as amended from time to time by the Central Pollution Control Board or State Pollution Control Board.	Scrupulously follows the directions contained.
2.2	The monitoring data shall be uploaded on the company's website and displayed at the project site at a suitable location.	Scrupulously follows the directions contained.

	The circular No.J-20012/1/2006-1A.11 (M) dated 27th May, 2009 issued by Ministry of Environment, Forest and Climate Change shall also be referred in this regard for its compliance.	
2.3	Regular monitoring of ground water level and quality shall be carried out in and around the mine lease area by establishing a network of existing wells and constructing new piezometers during the mining operations. The monitoring of ground water levels shall be carried out four times a year i.e. pre-monsoon, monsoon, post-monsoon and winter. The ground water quality shall be monitored once a year, and the data thus collected shall be sent regularly to MOEFCC/IRO.	Scrupulously follows the directions contained. Ground water monitoring details are attached as annexure 10
2.4	Water quality monitoring of upstream and downstream portion of river including ponds, lakes, tanks shall be carried out once in six months and record of monitoring data shall be maintained and submitted to the Ministry of Environment, Forest and Climate Change/Regional Office.	Water quality monitoring of upstream and downstream river including ponds, lakes, tanks shall be carried out and is attached as annexure. 10
2.5	Ground water, excluding mine water, shall not be used for mining operations. Rainwater harvesting shall be implemented for conservation and augmentation of ground water	Scrupulously follows the directions contained.

	resources.	
2.6	The project proponent shall not alter major water channels around the site. Appropriate embankment shall be provided along the side of the river/nallah flowing near or adjacent to the mine. The embankment constructed along the river/nallah boundary shall be of suitable dimensions and critical patches shall be strengthened by stone pitching on the river front side, stabilized with plantation so as to withstand the peak water pressure preventing any chance of mine inundation.	The quarrying operations shall not alter major water channels around the site. There is no river/nallah flowing near or adjacent to the mine.
2.7	Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and OB dumps, to prevent run off of water and flow of sediments directly into the river and other water bodies. The water so collected should be utilized for watering the mine area, roads, and for green belt development etc. The drains shall be regularly desilted and maintained properly, particularly after monsoon.	As the quarry is at the initial stage of development, Catch drains and siltation shall be constructed to prevent run off of water and flow of sediments. There is no river flowing adjacent to the project site
2.8	Garland drains and silt traps are to be provided in the slopes around the core area to channelize storm water. De-silting of Garland canal and silt traps have to be attended on a	Scrupulously follows the directions contained.

	daily basis. A labour has to be specifically assigned for the purpose. The proponent shall ensure the quality of the discharging storm water as per the General Effluent Discharge Standards of CPCB or SPCB.	
2.9	The water pumped out from the mine, after siltation, shall be utilized for industrial purpose viz. watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly.	Scrupulously follows the directions contained
2.10	Adequate groundwater recharge measures shall be taken up for augmentation of ground water. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.	Scrupulously follows the directions contained
2.11	The surface drainage plan including surface water conservation plan for the area of influence affected by the said mining operations shall be prepared, considering the presence of any river/rivulet/pond/lake etc., with impact of mining activities on it, and implemented by the project proponent. The surface drainage plan and/or any diversion of natural water courses shall be as per the provisions of the approved	Scrupulously follows the directions contained

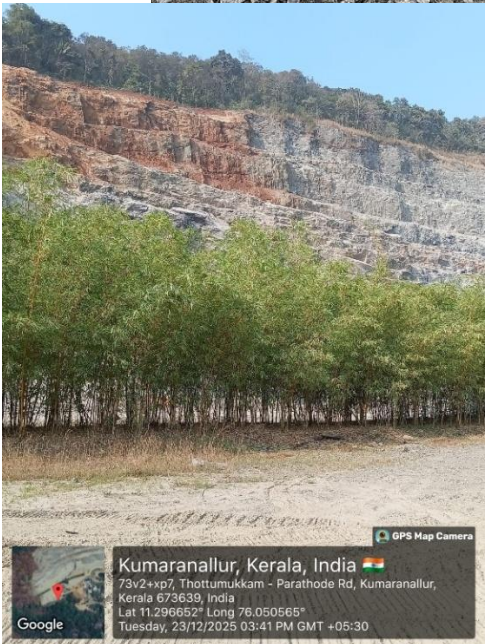
	Mining Plan/ EIA-EMP submitted to this Ministry and the same should be done with due approval of the concerned State/GoI Authority. The construction of embankment to prevent any danger against inrush of surface water into the mine should be as per the approved mining plan and as per the permission of DGMS.	
2.12	Domestic water shall be providing to the residents/villages which are coming under the zone of influence of the project due to ground water extraction by installing a RO plant with proper supply line and taps, if there is any shortage of potable water due to the mining activity.	Scrupulously follows the directions contained
2.13	The project proponent shall take all precautionary measures to ensure the riverine/ riparian ecosystem in and around the mine up to a distance of 5 km. A riverine/riparian ecosystem conservation and management plan should be prepared and implemented in consultation with the irrigation/water resource department in the state government.	Scrupulously follows the directions contained
3	Noise And Vibration Monitoring And Prevention	
3.1	Adequate measures shall be taken for control of noise levels as per Noise Pollution Rules, 2016 in the work environment. Workers engaged in blasting and	Adequate measures has taken for control of noise levels. Adequate awareness programme for users is conducting periodically.

	drilling operations, operation of HEMM, etc shall be provided with personal protective equipments (PPE) like ear plugs/muffs in conformity with the prescribed norms and guidelines in this regard. Adequate awareness programme for users to be conducted. Progress in usage of such accessories to be monitored.	Progress in usage of such accessories is monitored.
3.2	Speed of trucks entering or leaving the mine site is to be limited to moderate speed of 15 kmph to prevent undue noise from empty trucks.	The speed of trucks entering or leaving the mine site shall be restricted to a moderate limit of 15 kmph to minimize noise generated, particularly from empty trucks. Appropriate signboards have been installed within the project area to ensure awareness and compliance.
3.3	Acoustic enclosures should be provided to reduce sound amplifications in addition to the provisions of green belt and hollow brick envelop for crushers so that the noise level is kept within prescribed standard limit indicated by CPCB/KSPCB.	Acoustic enclosures have been installed around crushers to reduce sound amplification, in addition to the development of a green belt and use of hollow brick enclosures. These measures ensure that noise levels are maintained within the prescribed limits set by CPCB/KSPCB
3.4	Measures should be taken for maintaining noise levels below 85 dBA in the work environment.	Measures will be taken to ensure that noise levels in the work environment are maintained below 85 dBA, in accordance with the

		prescribed standards.
3.5	The noise level survey shall be carried out as per the prescribed guidelines to assess noise exposure of the workmen at vulnerable points in the mine premises, and report in this regard shall be submitted to the Ministry/RO on six-monthly basis.	The noise level monitoring report is attached as annexure 10
4	MINING PLAN	
4.1	Mining shall be carried out as per the approved mining plan (including Mine Closure Plan), suggestions from SEAC, KMMC Rules 2015 and amendments thereby and all other statutory rules and orders.	Mining is carried out as per the approved mining plan
4.2	The blasting should be done in a controlled manner using NONEL technique as specified by the regulations of Petroleum and explosive safety organization (GOI) or any other concerned authorized agency. A licensed person should supervise/ control the blasting operations mining activity should not involve blasting.	Blasting will be carried out in a controlled manner using the NONEL technique, strictly as specified by the regulations of the Petroleum and Explosives Safety Organization (PESO), Government of India, or any other concerned authorized agency. A licensed and competent person will supervise and control all blasting operations. Mines manager certificate is attached as annexure 11
4.3	Mining shall be carried out under strict adherence to provisions of the Mines Act 1952 and subordinate legislations	Scrupulously follows the directions Contained.

	made there-under as applicable.	
4.4	The quarrying operation shall be restricted between 7 AM and 5PM.	The quarrying operation has been restricted between 7 AM and 5PM
	 Fig15 :Photograph of Blasting time	
4.5	Maximum depth of mining shall be as per the mining plan and / or as per specific direction of SEAC. The maximum depth of mining should not be deeper than the local ground water table.	The maximum depth of mining will strictly follow the approved mining plan and the specific directions issued by SEAC after field inspection. Mining will not be carried out below the local groundwater table at any stage
4.6	No mining operations should be carried out at places having a slope greater than 45°.	No quarrying activities will be undertaken in areas where the slope exceeds 45°
4.7	As per regulation no. 106(2) of Metalliferous Mines Regulation under Mine Act, the height of any bench shall not exceed five meters and breadth shall not be less than the height.	The height of each bench will be limited to a maximum of 5 meters, and the width of every bench will be maintained at not less than the bench height, in full

		compliance with the approved mining plan and safety regulations.
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Fig 1. Photograph of Benches		

4.8	The top soil, if any, shall be temporarily stored at earmarked place (s) and used for land reclamation and plantation. The over burden (OB) generated during the mining operations shall be stacked at earmarked	There is old Quarry in the site for restoration. The overburden materials are stored within the site at designated place. This will be used to restore the exploited area in future.
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	dump site(s) only. The maximum height of the dumps shall not exceed 8m and width 20m and overall slope of the dumps shall be maintained at 45°. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. At critical points, use of geo textile shall be undertaken for stabilization of the dump. Protective wall or gabions should be made around the dump to prevent erosion / flow of sediments during rains. The entire excavated soil shall be used for backfilling as per mine closure plan.	Photograph is attached
	 Fig 8: Photograph showing topsoil/OB dump	
4.9	All the mining equipment like backhoe loaders and excavators cause pollution and hence shall be serviced regularly & maintained for their efficient	All mining equipment regularly & maintained for their efficient functioning and for reducing pollution

	functioning and for reducing pollution. Disposal of spent oil from diesel engines should be as specified under relevant Rules/Regulations.	
4.10	A minimum buffer distance specified as per existing rules and statutory orders shall be maintained from the boundary of the quarry to the nearest dwelling unit or other structures, and from forest boundaries or any other ecologically sensitive and archeologically important areas or the specific distance specified by SEIAA in EC as per the recommendations of SEAC depending on specific local conditions.	Buffer of 50m should be maintained between the crusher and project boundary and revised mining plan is submitted adhering to the condition
4.11	The lease area shall be fenced with barbed wire to a minimum height of 4ft around, before starting mining. All the boundary indicators (boards, markings, etc) shall be conspicuous and maintained at all times.	The lease area is fenced with barbed wire to the minimum height of 4 ft as required under the EC conditions. All boundary indicators, including boards and markings, are installed and maintained prior to commencement of mining activities.

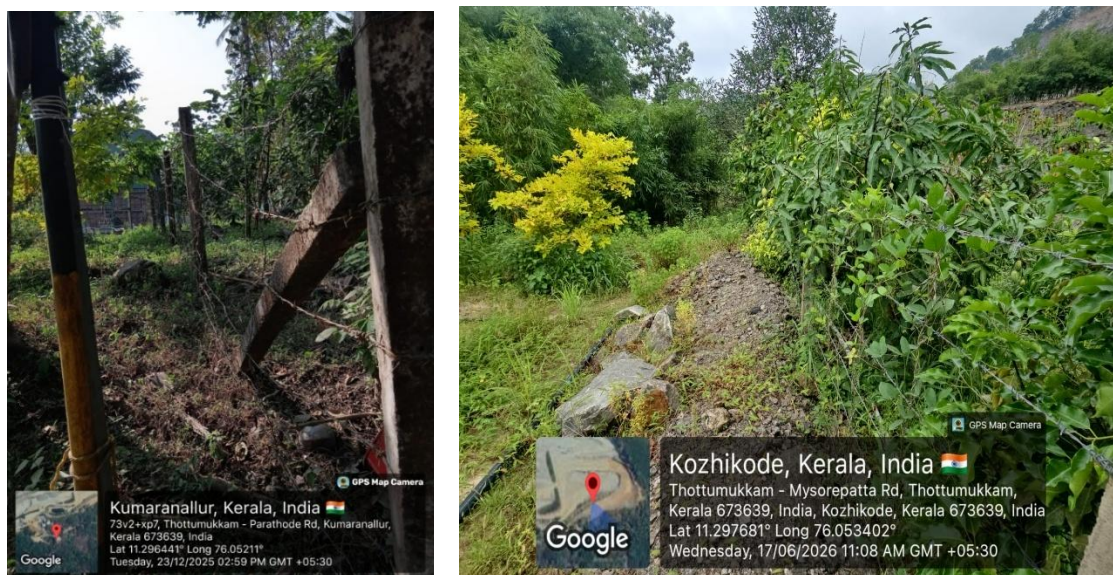


Fig16 .Photographs of Fencing

4.12	Explosives should be stored in magazines in isolated place specified and approved by the Explosives Department. Blasting mats to reduce fly rock blasts to a maximum of 10 PPV should be provided.	Explosives are stored in magazines in isolated Blasting mats are used to reduce fly rock .
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Fig: 17 Photograph of Explosive magazine

4.13	Warning alarms indicating the time of blasting (to be done at	The project proponent has installed warning alarms as
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	specific timings) has to be arranged stipulated by Explosive Department	per the stipulation of Explosive department in the quarry site. The timing of blasting in the quarry is in between 2.00 Pm to 3.00 pm and 5.00pm to 6.00pm on all working days
4.14	Periodical monitoring of the vibration at specified location (preferably at a distance of 50 m and 100 m) to be conducted and records kept for inspection. This could also form a part of the compliance reports.	Vibration levels are periodically monitored at the specified location, and the monitoring and compliance reports are attached.
4.15	The pits in the abandoned quarries and in the mined area shall be used for activities like water harvesting, aqua culture etc. in an eco-friendly manner.	This will be discussed during the preparation of the final quarry closure plan and will be implemented at the end of mining
4.16	Mine has to be closed as per progressive mine closure plan and final mine closure plan.	The final mine closure plan will be prepared and the site will be closed accordingly upon the expiry of the quarrying lease
5	LAND RECLAMATION	
5.1	Regular monitoring of subsidence movement on the surface over and around the working areas and its impact on natural drainage pattern, water bodies, vegetation, structure, roads and surroundings shall be continued till movement ceases completely. In case of observation of any high rate of subsidence beyond the limit prescribed, appropriate effective mitigation measures shall be taken to avoid loss of life and	Scrupulously follows the directions Contained.

	materials. Cracks should be effectively plugged in with ballast and clay soil/suitable material	
5.2	Digital Survey of entire lease hold area/core zone using Satellite Remote Sensing survey shall be carried out at least once in three years for monitoring land use pattern and report in 1:50,000 scale or as notified by Ministry of Environment, Forest and Climate Change(MOEFCC) from time to time shall be submitted to MOEFCC/Regional Office (RO)	Scrupulously follows the directions Contained.
5.3	Appropriate fencing all around the burrowed/excavated pit shall be made to prevent any mishap.	Appropriate fencing is done all around burrowed/excavated pit
5.4	Post-mining land be rendered usable for agricultural/forestry purposes and shall be handed over to the respective State Government, as specified in the Guidelines for Preparation of Mine Closure Plan, issued by the Ministry of Coal dated 27th August, 2009 and subsequent amendments.	After mining, the land will be improved so it can be used for agriculture or forestry.
5.5	The project proponent should plant seedlings at least 5 times of the loss of trees that has occurred while clearing the land for the project and follow planting measures as suggested by SEAC. Suitable avenue trees should be planted along the sides of the approach road and	The project proponent will plant seedlings at a ratio of at least five times the number of trees lost during land clearing, in accordance with the planting measures suggested by SEAC. Plantation in buffer areas

	internal roads and open parking areas, if any. Preference should be given to endemic native and fruit bearing species. Planting in buffer areas should be taken up beforehand. Proper upkeep and maintenance of planted seedlings shall be ensured by the project proponent.	will be initiated in advance. The project proponent will ensure proper upkeep and maintenance of all planted seedlings.
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Fig 18. Plantation in Buffer areas

5.6	The project proponent should ensure that the vegetation in the	The project proponent will ensure that the existing
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	buffer is retained, maintained and strengthened with additions of native broad leaved plants	vegetation in the buffer zone is retained, properly maintained, and further strengthened through the addition of native broad-leaved plant species
5.7	Thorough inspection of the mine lease area for any cracks developed at the surface due to mining activities below ground shall be carried out to prevent inrush of water in the mine.	Scrupulously follows the directions Contained.
5.8	Native tree species shall be selected and planted over areas of greenbelt and compensatory afforestation affected by subsidence.	The proponent has already established a green belt and carried out compensatory afforestation in the designated areas.
5.9	Eco-restoration including the closure of mine as per the progressive closure plan and final closure plan shall be done at the cost of the project proponent. This eco-restoration should follow scientific standards available for restoration, full recovery of the original vegetation and improving the resilience of different ecosystems. Overburden materials should be managed within the site and used for reclamation of mined pit as per mine closure plan / specific conditions.	The eco restoration plan prepared by the project will be executed in a good manner. The project started to plant various saplings in and around the project site. The mine closure plan will be done at the own cost of project proponent as agreed in the proposal .OB materials will be stacked in the designated place for the implementation of the mine closure plan.
5.10	At least 10 percent out of the total excavated pit area should be retained as water storage areas and the remaining area	After mining closure, the site will be reclaimed and developed into a beautiful natural plantation area with a

	should be reclaimed with stacked dumping and overburden and planted with suitable indigenous plant species, if no other specific condition on reclamation of pit is stipulated in the E.C. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining.	rainwater harvesting pit at the centre of the plot.
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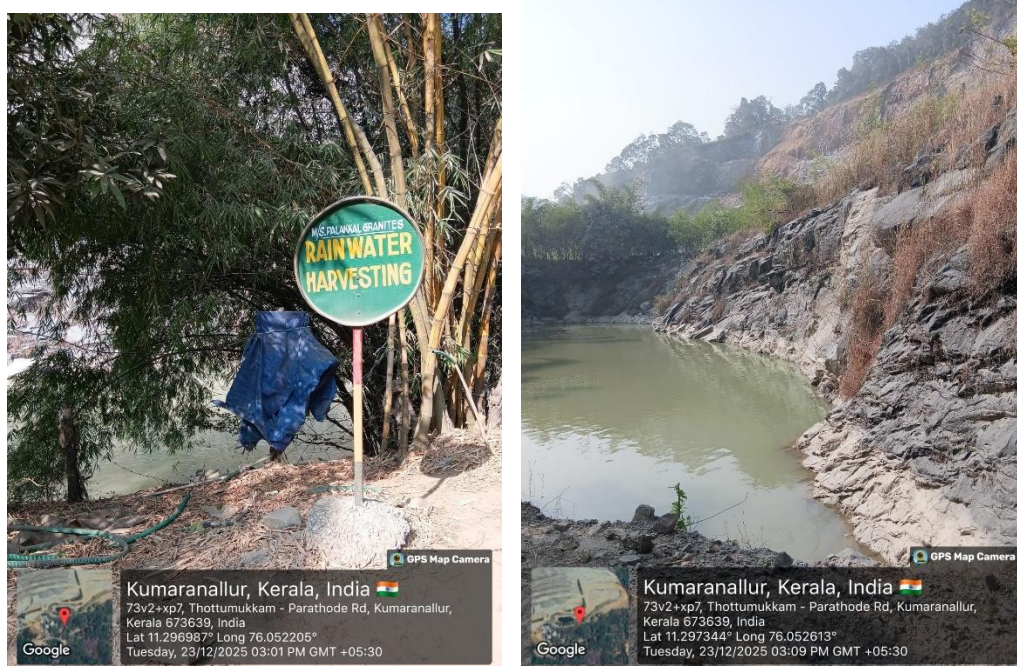


Fig11 .Photograph of Rin water Harvesting Pit

6	PUBLIC HEARING AND HUMAN HEALTH ISSUES	
6.1	Adequate illumination shall be ensured in all mine locations (as per DGMS standards) and monitored.	Scrupulously follows the directions Contained.
6.2	The project proponent shall undertake occupational health survey for initial and periodical medical examination of the personnel engaged in the project and maintain records accordingly as per the	An occupational health surveillance program for workers is being conducted periodically to monitor any health effects due to dust exposure

	provisions of the Mines Rules, 1955 and DGMS circulars. Besides regular periodic health check-up, 20% of the personnel identified from workforce engaged in active mining operations shall be subjected to health check-up for occupational diseases and hearing impairment, if any, as amended time to time.	
6.3	The proponent has to provide insurance protection to the workers in the case of existing mining or provide the affidavit in case of fresh lease before execution of mining lease	The Project proponent agreed to provide insurance protection at the earliest.
6.4	Skill training as per safety norms specified by DGMS shall be provided to all workmen including the outsourcing employees to ensure high safety standards in mines	Scrupulously follows the directions Contained.
6.5	Safeguards shall be adopted against health risks on account of breeding of vectors in the waterbodies created due to burrowing/excavation of laterite building stone.	An occupational health surveillance program for workers is being conducted periodically to monitor any health effects due to dust exposure. Necessary corrective actions are taken promptly when required. Reports from these health surveillance activities are included in the half-yearly compliance reports submitted to the authorities.
6.6	Effective arrangement shall be made to provide and maintain at suitable points conveniently	Arrangement had made to provide and maintain to the directions a sufficient supply

	situated, a sufficient supply of drinking water for all the persons employed.	of drinking water for all the persons employed.
6.7	Implementation of the time bound action plan on the issues raised during the public hearing shall be ensured. The project proponent shall undertake all the tasks/measures as per the time bound action plan submitted with budgetary provisions during the public hearing.	Implementation of the time bound action plan on the issues raised during the public hearing shall be ensured. The project proponent shall undertake all the tasks/measures as per the time bound action plan submitted with budgetary provisions during the public hearing.
6.8	The project proponent shall follow the mitigation measures provided in this Ministry's OM No.Z 11013/5712014-IA.II (M) dated 29th October, 2014, titled 'Impact of mining activities on habitations-issues related to the mining projects wherein habitations and villages are the part of mine lease areas or habitations and villages are surrounded by the mine lease area', if applicable.	Scrupulously follows the directions Contained.
6.9	The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is	The project proponent must ensure that night-time lights and noise do not disturb nearby villages, by directing floodlights away from homes and keeping noise within prescribed limits.

	not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day light/night hours.	
7	CORPORATE ENVIRONMENT RESPONSIBILITY	
7.1	The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements / deviation / Violation of the environmental /forest/wildlife norms / conditions. The company shall have defined system of reporting infringements /deviation/ violation of the environmental/forest/wildlife norms /conditions and /or shareholders / stake holders.	Scrupulously follows the directions Contained.
7.2	The Project Proponent shall implement the EMP and environmental conditions along with CER from the comments of activity. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office/SEIAA along with the Six	Scrupulously follows the directionsContained. Implementation of the EMP/CER will be carried out in consultation with the Local Self Government Institutions, and a copy of the approved plan has been made available to the concerned Panchayat. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office/SEIAA along with the

	Monthly Compliance Report.	Next Compliance Report.
7.3	Corporate Environmental Responsibilities (CER) as prescribed by SEIAA/SEAC should be carried out leading to environmental stability of the project region. The certificates from the beneficiaries, if the CER part is completed should also be submitted to the State Environment Impact Assessment Authority (SEIAA) along with year wise expenditure.	CER activities have already commenced, and the beneficiary letter is attached at the time of submission
7.4	Self-environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.	Scrupulously follows the directions Contained.
7.5	Persons of nearby villages shall be given training on livelihood and skill development to make them employable with its proper records	Persons of nearby villages shall be given training on livelihood and skill development to make them employable with its proper records
8	Miscellaneous	
8.1	The proponent should provide notarized affidavit (indicating the number and date of Environmental Clearance proceedings) that all the conditions stipulated in the EC shall be scrupulously followed.	The Project Proponent has submitted a notarized affidavit indicating the number and date of Environmental Clearance proceedings, affirming that all the conditions stipulated in the EC shall be scrupulously adhered to. Compliance with all EC conditions will be ensured throughout the project period.

8.2	The project authorities shall inform to the Regional Office of the MoEFCC/SEIAA regarding commencement of activity.	Scrupulously follows the directions Contained.
8.3	No further expansion or modifications in the project shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC) or SEIAA, Kerala.	Scrupulously follows the directions Contained.
8.4	In the case of any change(s) in the scope of the project, extent, quantity, process of mining technology involved or in any way affecting the environmental parameters/impacts as assessed, based on which the E.C was issued, the project would require a fresh appraisal by this Authority, for which the proponent shall apply and get the approval of this Authority. In the case of transfer of ECs, the matter shall be intimated and get the approval from the Authority as per the existing norms.	Scrupulously follows the directions Contained.
8.5	All the statutory clearances should be obtained, as applicable, by the project proponent from the respective competent authorities including that for blasting and storage of explosives. Copies of all statutory clearances shall be submitted along with First Half Yearly Compliance Report.	All applicable statutory clearances, including those for blasting and storage of explosives, have been obtained from the respective competent authorities. Copies of the clearances have been submitted along with the First Half- Yearly Compliance Report (HYCR) as required.
8.6	The project proponent shall	The project proponent

	make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which, one shall be in the vernacular language within seven days, and in addition, the EC shall also be displayed on the project proponent's website permanently.	advertising it at least in two local newspapers of the of which, one in malayalam and another one in english. The news paper advertisement is attached as annexure 9
8.7	The project proponent shall send a copy of the EC to concerned Grama Panchayat/ District Panchayat/ Municipality/ Corporation/ Urban Local Body and also to the Local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal.	The Project Proponent has furnished copies of the Environmental Clearance to the concerned Grama Panchayat, District Panchayat, and other relevant local bodies. Panachayat License is attached as annexure 4
8.8	The details of Environmental Clearance should be prominently displayed in a metallic board of 3 ft x 3 ft with green background and yellow letters of Times New Roman font size of not less than 40. Sign board with extent of lease area and boundaries shall be depicted at the entrance of the quarry, visible to the public.	A metallic board displaying the Environmental Clearance details as per specifications (3 ft x 3 ft, green background, yellow Times New Roman letters size 40) has been installed at the quarry entrance. Additionally, signboard showing the extent of the lease area and boundaries is prominently displayed and clearly visible to the public.

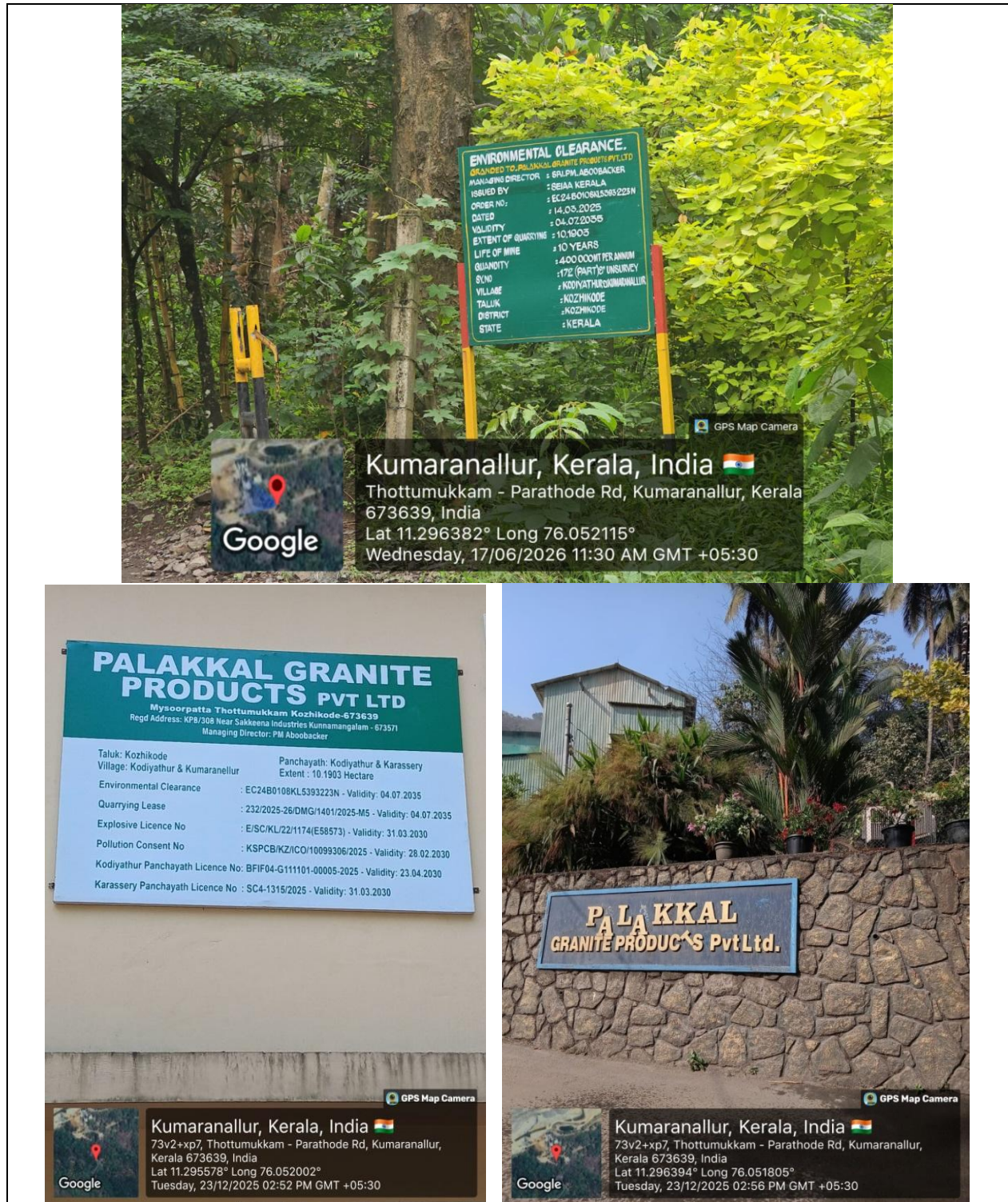


Fig19 : Photograph of details of EC displayed

8.9	The project proponent must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.	The project proponent is obeaying stipulations made by the State Pollution Control Board and the State Government.
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8.10	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, if any, commitment made during Public Hearing, if any and also during their presentation to the State Expert Appraisal Committee.	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report and all other commitments made during Public Hearing.
8.11	The project proponent shall upload the status of compliance with the stipulated environment clearance conditions, including results of monitored data on their website and update the same on a half-yearly basis. The HYCRs shall be uploaded in the PARIVESH Portal to IRO MoEF&CC, Bangalore & SEIAA, Kerala.	These reports are submitted in both hard copy and by email to the respective Regional Office of the Ministry of Environment, Forests and Climate Change, Government of India, and to the State Environment Impact Assessment Authority (SEIAA). Additionally, the compliance status and monitoring data are regularly updated and uploaded on the project's official website. The proponent also submits the annual Environmental Statement in Form V of the Environment (Protection) Rules, 1986, to the State Pollution Control Board by 31st March every year.
8.12	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the PARIVESH portal.	Scrupulously follows the directions Contained.
8.13	The project proponent shall submit the environmental statement for each financial year	Scrupulously follows the directions Contained.

	in Form V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.	
8.14	The Regional Office of the MoEFCC and the SPCB shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office / SPCB or any other officers delegated by the SEIAA, by furnishing the requisite data / information/monitoring reports.	Scrupulously follows the directions Contained.
8.15	If Government land is partly or fully used for mining, the area shall be returned at the end of lease period after mine closure with separate demarcation with suitable survey marks.	In cases where government land is partly or fully used for mining, the area will be returned at the end of the lease period after mine closure. The land will be clearly demarcated with suitable survey marks to ensure proper handover and documentation.
8.16	Any accident occurring in the mined out area after the lease period due to negligence in carrying out safety measures and non-closure, will lead to suspension of all EC obtained for mining by the project proponent.	Strict safety measures are implemented throughout the mining operations to prevent accidents in the mined-out areas both during and after the lease period. The project proponent is committed to timely mine closure to avoid any negligence. Continuous monitoring and adherence to safety protocols aim to

		ensure no accidents occur that could lead to suspension of Environmental Clearance.
8.17	In case of transfer of EC the matter shall be intimated and approval from the Authority shall be obtained as per the existing norms.	In the event of transfer of Environmental Clearance (EC), the project proponent ensures timely intimation to the competent authority and obtains the necessary approval as per the existing norms and regulations.
8.18	The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.	Scrupulously follows the directions Contained.
8.19	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.	The project proponent ensures that all data submitted is factual, accurate, and not fabricated. Full compliance with all stipulated Environmental Clearance (EC) conditions is maintained. The proponent is fully aware that any concealment of facts

		or failure to comply may result in withdrawal of the clearance and action under the Environment (Protection) Act, 1986.
8.20	The EC given will be withdrawn at any time if the area is declared high hazardous by the SDMA.	Aware of the conditions mentioned
8.21	The Environmental Clearance will be subject to the final order of the courts on any pending litigation related to the land or project, in any court of law.	Aware of the conditions mentioned
8.22	The SEIAA, Kerala reserves the right to stipulate additional conditions if found necessary. The Project Proponent in a time-bound manner shall implement these conditions.	The proponent is committed to full compliance with all stipulated conditions and accepts that SEIAA reserves the right to alter, modify, or impose additional conditions in the interest of environmental protection.
8.23	The SEIAA, Kerala reserves the right to revoke or suspend the Environmental Clearance, if implementation of any of the above conditions is not satisfactory.	The project proponent acknowledges that SEIAA may revoke or suspend the Environmental Clearance for non-implementation of any specific or general condition. The proponent is committed to full compliance with all stipulated conditions and accepts that SEIAA reserves the right to alter, modify, or impose additional conditions in the interest of environmental protection.
8.24	The Environmental Clearance shall be liable to be cancelled in case of violation of any of the	The project proponent acknowledges that the Environmental Clearance (EC)

	above conditions.	may be withdrawn at any time if the area is declared highly hazardous by the State Disaster Management Authority (SDMA). The proponent will comply promptly with any directives issued in such cases.
8.25	Any appeal against this Environmental Clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	The project proponent acknowledges that any appeal against this Environmental Clearance (EC) shall lie with the Hon'ble National Green Tribunal (NGT), if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

9	STATUTORY COMPLIANCE	
ITEM NO	STIPULATIONS IN EC	STATUS OF COMPLIANCE
9.1	The Environmental clearance shall be subject to orders of Hon'ble Supreme Court of India, Hon'ble High Courts, NGT and any other Court of Law, from time to time, and as applicable to the project.	Scrupulously follows the directions contained.
9.2	The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.	Not applicable in this case
9.3	The project proponent shall obtain clearance from the National Board for Wildlife,	Not applicable in this case

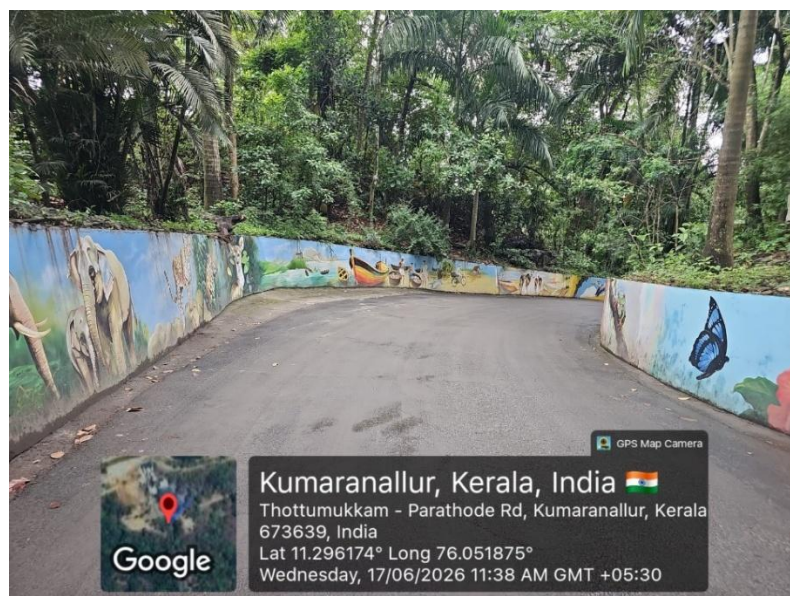
	if applicable.	
9.4	The project proponent shall prepare a Site-Specific Conservation Plan & Wildlife Management Plan and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report (in case of the presence of schedule-I species in the study area).	Not applicable in this case
9.5	The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board/ Committee. A copy of the same shall be included with HYCRs.	The project proponent has obtained Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board/ Committee. (Pollution Control Board is attached as Annexure 2)
9.6	The project proponent shall obtain the necessary permission from the Central / State Ground Water Authority, if the project intersects ground water table.	Not applicable in this case because the project is not intersecting with ground water table at any point

9.7	Solid/hazardous waste generated in the mines needs to addressed in accordance to the Solid Waste Management Rules, 2016/Hazardous & Other Waste Management Rules, 2016.	Scrupulously follows the directions contained.(Explosive license is attached as Annexure 3
9.8	Permission of power supply to be taken from the concerned authority for meeting power demand of the project site.	Scrupulously follows the directions contained.
9.9	The maximum production or peak production at any given time shall not exceed the limit as prescribed in the approved mining plan/scheme of mining.	Scrupulously follows the directions contained.
9.10	Project Proponent should obtain all necessary statutory clearances for mining.	All necessary statutory clearances for mining has been obtained.
9.11	If EC period is more than 6 months, Half Yearly Compliance Report (HYCR) shall be uploaded in the PARIVESH Portal and also submitted to SEIAA, Kerala via email.	Half Yearly Compliance Report (HYCR) will be prepared in every six months and will submit to SEIAA, Kerala via email and will be uploaded in the PARIVESH Portal also.
9.12	The minimum distance norm from the boundary/periphery of other properties buildings/civil structures as prescribed in KMMC Rules and other statutory rules and orders shall be followed.	The Conditions are followed

CONCLUSION

All 38 specific and general conditions are compiled at site. Proof of these is submitted as photographs and all valid statutory licenses like consent to operate, explosive license, panchayath license are enclosed.

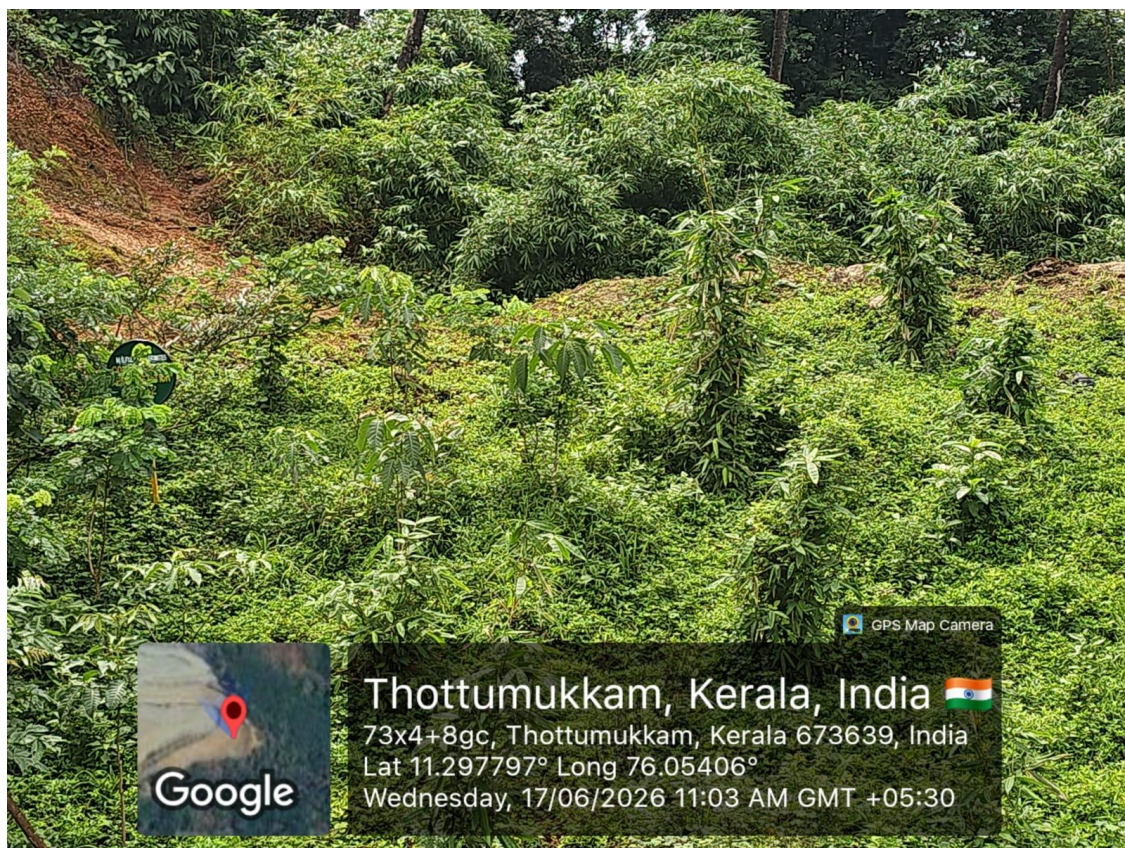
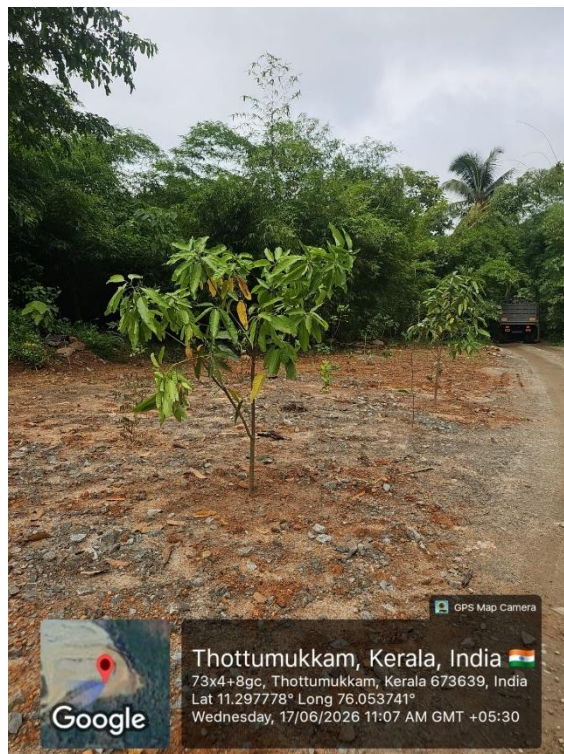
Figure 20 .Phographs of Road

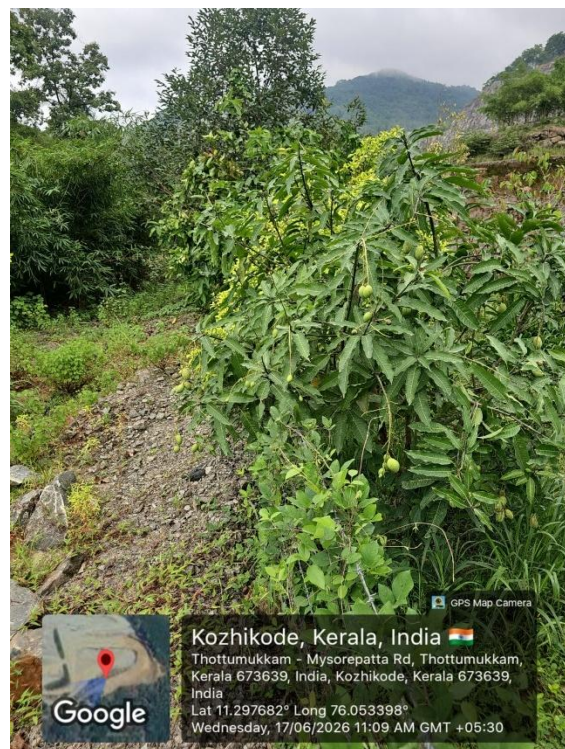
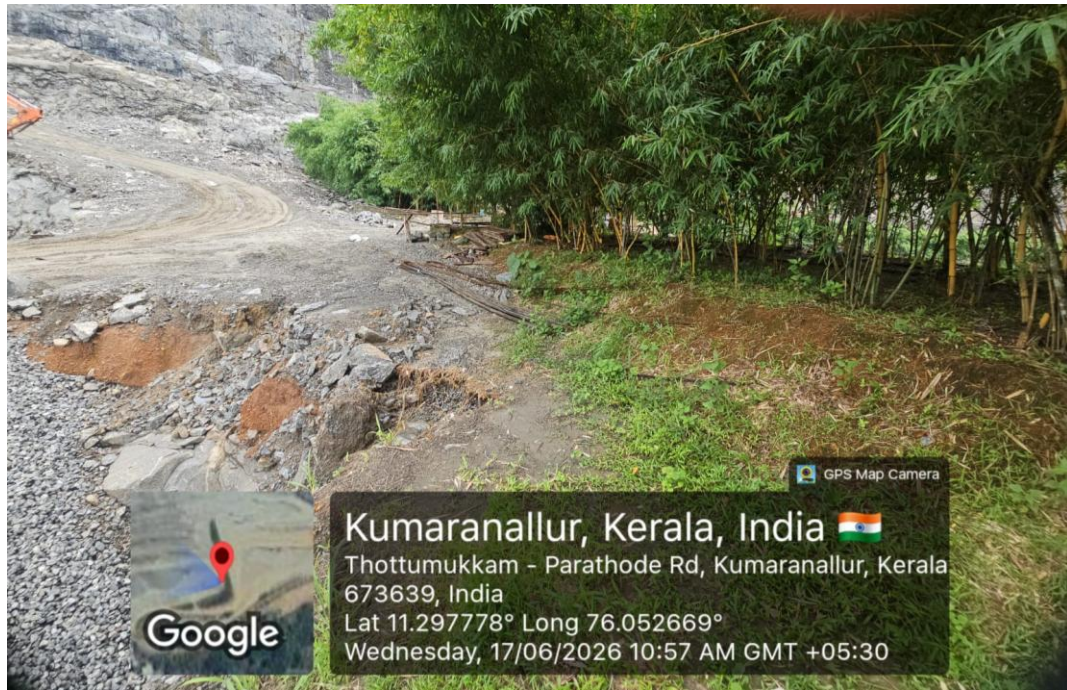




Photos of Plantation

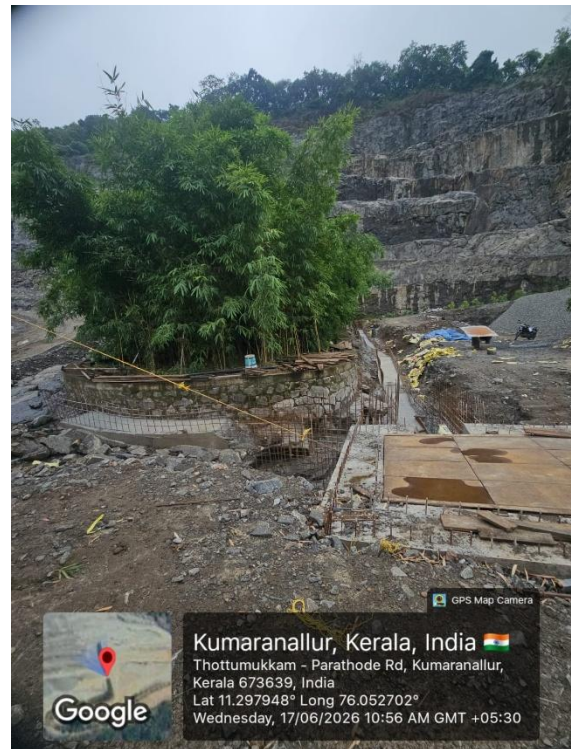






Photos of mine face and Benches







ANNEXURES

ANNEXURE 1

COPY OF ENVIRONMENTAL CLEARANCE



File No.: 2439/EC2/2023/SEIAA

Government of India

Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment
Authority(SEIAA), KERALA)



Dated 14/03/2025



To,

Sri. P. M. Aboobacker
M/s Palakkal Granite Products Pvt. Ltd.
Managing Director, KP 8/308, Near Sakeena Industries, Chethukadavu P.O, Kunnamangalam,
Kozhikode, Kerala - 673571
pmpalakkal57@gmail.com

Subject: Grant of prior Environmental Clearance (EC) to the proposed Mining Project under the provisions of EIA Notification 2006-regarding

Sir/Madam,

This is in reference to your EC application submitted to SEIAA, Kerala vide proposal number SIA/KL/MIN/489757/2024 dated 26/07/2024 for grant of prior Environmental Clearance (EC) to the Granite Building Stone Quarry project under the provision of the EIA Notification 2006-and as amended thereof.

2. The particulars of the proposal are as below :

(i) EC Identification No.	EC24B0108KL5393223N
(ii) File No.	2439/EC2/2023/SEIAA
(iii) Clearance Type	Fresh EC
(iv) Category	B1
(v) Project/Activity Included Schedule No.	1(a) Mining of minerals
(vii) Name of Project	M/s Palakkal Granite Products Pvt Ltd.
(ix) Location of Project (District, State)	Kozhikode, Kerala
(x) Issuing Authority	SEIAA, Kerala
(xii) Applicability of General Conditions	Yes

3. In view of the particulars given in Para above, the project proposal interalia including CAF, Part A, B & C) submitted to the Ministry for an appraisal by the State Environment Impact Assessment Authority (SEIAA), Kerala under the provision of EIA notification 2006 and its subsequent amendments.

4. The above-mentioned proposal has been considered by the State Expert Appraisal Committee (SEAC) in its 179th meeting held on 11th, 12th & 13th February 2025 and the State Environment Impact Assessment Authority

(SEIAA) in its 155th meeting held on 28th February, 2025. The minutes of the meeting and all the application and documents submitted (viz., CAF, Part A, Part B, Part C Mining Plan, EMP) are available on PARIVESH portal which can be accessed by scanning the QR Code above.

5. The brief about project details, the Environmental Management Plan and Corporate Environment Responsibility (CER) to be implemented or followed are annexed to this EC.
6. The SEAC, in its 179th meeting, based on information, field inspection report & clarifications provided by the project proponent deliberated the proposal in detail, and recommended the grant of an EC for the project life of 10 (Ten) years, subject to stipulation of specific and general conditions as detailed in Annexure (1).
7. The SEIAA examined the proposal in its 155th meeting in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto, and after accepting the recommendations of the State Expert Appraisal Committee, decided to grant EC for the instant proposal of M/s. Palakkal Granite Products Pvt. Ltd, under the provisions of EIA Notification, 2006 and as amended thereof.
8. The Authority noted that for the sustainable management of quarry operations, the approved mining plan is revised every five years till the project life of mine as per KMMC Rules, incorporating a scheme of activities to be carried out for the next 5 years. Authority is of the opinion that it is essential to match these procedures and timelines followed in the Department of Mining and Geology with the timelines ECs issued for the sustainable management of quarry operations and protection of the environment in the project region.
9. **Environmental Clearance is hereby accorded to M/s. Palakkal Granite Products Pvt. Ltd., KP 8/308, Near Sakeena Industries, Chethukadavu P.O., Kunnamangalam, Kozhikode for the Granite Building Stone Quarry project for an area of 10.1903 Ha at Re-Sy Block No. 003, Re-Sy Nos: 172/1527, 172/1232, 172/1228, 172/1213, 1523, 1862, 172/1212, 172/1134, 172/1137, 172/1201, 172/1221, 172/1120, 172/1238, 172/1136, 172/1135, 172/1119, 172/2275, 172/1526, 172/1200, 172/1239, 1240 in Kodyathur Village & Re Sy Block No. 001, Un-Sy Nos: 153/597, 153/598, 153/604, 153/601, 600 in Kumaranallur Village, Kozhikode Taluk, Kozhikode, initially for a period of 5 years from the date of execution of mine lease / permit and then to extend the EC period to cover the project life of 10 (Ten) years, subject to the review by SEAC at the end of every five years, to verify whether the Project Proponent has violated any of the EC conditions and thereby caused any damage to the environment in the project region, for the quantity reassessed by the Mining and Geology Department by restricting the depth of mining to 120m above MSL so as to prevent formation of mine pit and impoundment of water on the sloping terrain.**
10. The Environmental Clearance issued will also be subject to full and effective implementation of all the undertakings given in the Application Form, mitigation measures as assured in the Environment Management Plan, and mining features including the Progressive Mine Closure Plan as submitted with the application. The above undertakings and the conditions and the undertakings of the Mining Plan in (Mining), (Blasting), (Mines Drainage), (Stacking of mineral rejects and disposal of waste), (Environment Management Plan) & (Progressive Mine Closure Plan) as submitted will be deemed to be part of this Proceedings as conditions, as if incorporated herein. Also the General Conditions for projects stipulated for mining, mentioned below will be applicable and have to be strictly adhered to.
11. Validity of the Environmental Clearance will be initially for a period of **5 years** from the date of execution of mine lease / permit and then to extend the EC period to cover the project life of **10 (Ten) years**, subject to the review by SEAC at the end of every five years, , or an earlier review in case of violation or non-compliance of conditions or genuine complaints from residents within the security area of the quarry.
12. Violation of any of the Specific & General Conditions, as applicable to the particular case will entail cancellation of the Environmental Clearance, in addition to legal action under the provisions of the Environment (Protection) Act, 1986. Non-compliance, if any shall be reported to the District Collector, Kozhikode or SEIAA, Kerala.
13. The Ministry / SEIAA reserves the right to modify and/or stipulate additional conditions, if found necessary.
14. The EC to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as

applicable, to the project.

15. This issues with the approval of the Competent Authority.

Copy To

MoEF Regional Office, Southern Zone, Kendriya Sadan, 4th Floor, E&F Wing, II Block, Koramangala, Bangalore-560034.(through e-mail: rosz.bng-moefcc@gov.in)

The Secretary, Environment Department, Government of Kerala

The Member Secretary, Kerala State Pollution Control Board, Thiruvananthapuram

The District Collector, Kozhikode

The Director, Mining & Geology, Thiruvananthapuram

The District Geologist, Kozhikode

The Environmental Engineer, KSPCB, Kozhikode

The Tahsildhar, Kozhikode Taluk, Kozhikode

The Secretary, Kodyathur Grama Panchayath, Kozhikode

The Secretary, Karassery Grama Panchayath, Kozhikode

Website

Annexure 1

Specific EC Conditions for (Mining Of Minerals)

1. Site Specific Conditions

S. No	EC Conditions
1.1	The Project Proponent shall carry out quarrying as per the approved Mining Plan and as per the Specific Conditions mentioned hereafter. The Project Proponent should strictly follow the Kerala Minor Mineral Concession Rules 2015 and amendments thereby.
1.2	The EC shall be valid from the date of execution of permit/lease from the Department of Mining and Geology. The copy of the permit / lease order should be provided to the SEIAA before commencing the mining activity.
1.3	The EC issued will be subject to a review by SEAC after every 5 years through field verification to ensure that mining is carried out sustainably as per the EC conditions.
1.4	The depth of mining should be limited to 120m above MSL so as to prevent formation of mine pit and impoundment of water on the sloping terrain. and the mineable resources shall be reworked accordingly by the Mining and Geology Department while approving the Scheme of Mining / issuing the lease or permit.
1.5	The conditions stated in the NOC from Irrigation Department should be strictly complied with.
1.6	A buffer of 50m should be maintained between the crusher and project boundary.
1.7	Blasting for mining should be in strict compliance to the recommendations provided in the study report of NIT, Karnataka.
1.8	A detailed study on the health issues, if any, in the surrounding areas of the project within 1 km radius of the project boundary should be conducted and the inference and recommendations should

S. No	EC Conditions
	be uploaded in the first half-yearly compliance report
1.9	The benches should be properly maintained with a 5m height. Correction to the non-provision of benches, wherever required, should be carried out prior to the commencement of regular mining.
1.10	All the assurances and the mitigation measures committed by the Project Proponent as per the minutes of public hearing should be complied with and submit the report along with HYCR.
1.11	Development of green belt should be initiated prior to the commencement of mining using indigenous species. The suggested species are Phyllanthus emblica (Nelli), Syzygium cumini (Njaval), Writia tinctoria (Dhanthapala), Ficus bengalensis (Peral), Ficus racemosa (Atti), Bambusa bamboos (Mullumula), Dendrocalamus strictus (Kallan mula), Strychnos nuxvomica (Kanjiram), Terminalia cattappa (Thanni), Schleicheria oleosa (Poovam), Artocarpus hirsutus (Ayiniplavu) etc.
1.12	Compensatory afforestation should be done prior to the commencement of mining, by planting local species of trees as proposed.
1.13	Geotagged photographs of the progress of compensatory afforestation should be submitted along with HYCR.
1.14	Adequate number of avenue trees of indigenous species should be planted along both sides of the haulage road.
1.15	A temporary wall of 5m height should be erected at appropriate locations on the boundary to avoid disturbance and nuisance to the nearby residents.
1.16	The haulage road should be provided with sprinkling facility to prevent dust pollution.
1.17	Drainage system incorporating garland canal, silt traps, siltation pond and outflow channel connecting to a natural drain should be provided prior to the commencement of mining.
1.18	Garland drain, silt-traps, siltation ponds and outflow channels should be desilted periodically and geo-tagged photographs of the process should be included in the half-yearly compliance report (HYCR).
1.19	Overflow water from the siltation pond should be discharged to the nearby natural drain after adequate filtration.
1.20	Drainage water should be monitored at different seasons by an NABL accredited lab and clear water should only be discharged into the natural stream. Geotagged photographs of the drainage and sampling site should be submitted along with HYCR.
1.21	Overburden should be stored at the designed place and gabion wall should be provided for the topsoil and overburden storage sites.
1.22	The impact of vibration due to blasting on the houses and other built structures within 200m distance from the project boundary should be monitored in terms of Peak Particle Velocity and amplitude for maximum charge per delay and included in the Half Yearly Compliance Report.

S. No	EC Conditions
1.23	Implementation of CER Plan should be done during the first two years of the EC period itself and its operation and maintenance should be done till the completion of mine closure plan.
1.24	Transportation of mined material should not be done during the peak hours in the forenoon (8.00am to 10.00am) and afternoon (3.30pm to 5.00 pm).
1.25	Adequate sanitation, waste management and restroom facilities should be provided to the workers.
1.26	Adequate energy conservation measures should be implemented including solar power installations. At least 40% of the energy requirement shall be met from the solar power.
1.27	The Environment Management Cell (EMC) should include one subject expert in environment management and local ward member. The proceedings of the monthly meeting of the EMC should be submitted along with the HYCR.
1.28	Adequate measures should be adopted to harvest the rainwater as per the guidelines issued by the Central Groundwater Authority.
1.29	Blasting mats should be used during rock blasting to contain the blast, prevent fly rocks and suppress dust.
1.30	In the wake of occurrence of large scale landslides in the state, as per the information provided by the Department of Mining & Geology, it is directed to use only NONEL (Non Electrical) technology for blasting to reduce the vibration of the ground, which is one of the causative factors that triggers landslides, formation of cracks in the surrounding buildings and disturbance to human and wildlife.
1.31	As per OM no F.No.22-65/2017-IA.III dated 30th September 2020, under Corporate Environmental Responsibility (CER) the Project Proponent should implement the Environment Management Plan (EMP)/CER as directed by SEAC during appraisal, covering the issues to address the environmental problems in the project region, from the beginning of the project, indicating both physical and financial targets year wise. The EMP/CER shall be implemented in consultation with Local Self Govt. Institutions. A copy of the approved EMP/CER shall be made available to the concerned Panchayat for information and implementation support. The indicated cost for implementation of CER activities shall be 2% of the project cost.
1.32	As per the directions contained in the OM F.No.22-34/2018-IA.III dated 16th January 2020 issued by MoEF&CC, in obedience to the directions of the Hon'ble Supreme Court the Project Proponent shall, undertake re-grassing the mining area and any other area which may have been disturbed due to his mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc. The compliance of this direction shall be included in the Half Yearly Compliance Report which will be monitored by SEAC at regular intervals.
1.33	The Project Proponent is directed to install a CCTV camera and take all other essential measures to ensure that mining site is not used by antisocial elements for nefarious antisocial activities which are detrimental for peaceful coexistence in the project region. In case if such complaints are received, the EC given is likely to be cancelled after a police verification.
1.34	Progressive closure of mined area shall be carried out as per the approved mining plan and closure

S. No	EC Conditions
	activities carried out shall be mentioned in the HYCR for the relevant period.
1.35	The abandoned benches may be backfilled and suitable species including fodder grass and other species adapted to such conditions should be planted and maintained.
1.36	In the beginning of the last year of the EC period, the final closure plan has to be submitted and approved by the District Geologist within 6 months.
1.37	The final closure of the quarry shall be carried out during the last 6 months of mining period and a closure certificate shall be produced to the Authority. No ECs shall be given to Project Proponent for the subsequent mining projects unless the final mine closure certificate issued by the District Geologist is produced for the previous projects, if any.
1.38	The violation of EC condition may lead to cancellation of EC and action under The Environment (Protection) Act 1986.

Standard EC Conditions for (Mining of minerals)

1. Air Quality Monitoring And Preservation

S. No	EC Conditions
1.1	Vehicular emissions shall be kept under control and regularly monitored. All the vehicles engaged in mining and allied activities shall operate only after obtaining 'PUC' certificate from the authorized pollution testing centres.
1.2	Applicable labour laws for mining shall be followed. Proper masks and onsite facilities shall be provided to the workers. All safety measures shall be followed while cutting laterite using machines.
1.3	The Project Proponent shall monitor the air quality during operation and submit ambient air quality monitoring details along with the HYCRs.
1.4	Major approach roads shall be black topped and properly maintained .The transportation of the material should be done in covered trucks to contain dust emissions.
1.5	Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution such as haul road, loading and unloading points and transfer points and having high levels of PM10 and PM2.5. Monitoring of Ambient Air Quality to be carried out based on the Notification 2009, as amended from time to time by the Central Pollution Control Board or State Pollution Control Board.
1.6	Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement at project site, parking area, on haul roads, loading and unloading and at transport points should be provided and properly maintained.
1.7	Project Proponent should install wind breaker/shield arrangement along the boundary where there are houses within 100m radius.

S. No	EC Conditions
1.8	Post environmental closure third party monitoring by reputed institution in air quality, water, land & soil etc shall be carried out and analysed with EMP measures at regular interval. A suitable recommendation in this regard, shall be furnished to IRO, MoEF&CC for compliance. The data used for analysis shall be obtained from continuous AQMS, site specific water regime. Also third party shall analyse the implementation of river diversion, meeting to the requirement of project report.

2. Water Quality Monitoring And Preservation

S. No	EC Conditions
2.1	The effluent discharge (mine waste water, workshop effluent) shall be monitored in terms of the parameters notified under the Water Act, 1974, and other applicable standards as amended from time to time by the Central Pollution Control Board or State Pollution Control Board.
2.2	The monitoring data shall be uploaded on the company's website and displayed at the project site at a suitable location. The circular No.J-20012/1/2006-IA.11 (M) dated 27th May, 2009 issued by Ministry of Environment, Forest and Climate Change shall also be referred in this regard for its compliance
2.3	Regular monitoring of ground water level and quality shall be carried out in and around the mine lease area by establishing a network of existing wells and constructing new piezometers during the mining operations. The monitoring of ground water levels shall be carried out four times a year i.e. pre-monsoon, monsoon, post-monsoon and winter. The ground water quality shall be monitored once a year, and the data thus collected shall be sent regularly to MOEFCC/IRO.
2.4	Water quality monitoring of upstream and downstream portion of river including ponds, lakes, tanks shall be carried out once in six months and record of monitoring data shall be maintained and submitted to the Ministry of Environment, Forest and Climate Change/Regional Office.
2.5	Ground water, excluding mine water, shall not be used for mining operations. Rainwater harvesting shall be implemented for conservation and augmentation of ground water resources.
2.6	The project proponent shall not alter major water channels around the site. Appropriate embankment shall be provided along the side of the river/nallah flowing near or adjacent to the mine. The embankment constructed along the river/nallah boundary shall be of suitable dimensions and critical patches shall be strengthened by stone pitching on the river front side, stabilized with plantation so as to withstand the peak water pressure preventing any chance of mine inundation.
2.7	Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and OB dumps, to prevent run off of water and flow of sediments directly into the river and other water bodies. The water so collected should be utilized for watering the mine area, roads, and for green belt development etc. The drains shall be regularly desilted and maintained properly, particularly after monsoon.
2.8	Garland drains and silt traps are to be provided in the slopes around the core area to channelize storm water. De-silting of Garland canal and silt traps have to be attended on a daily basis. A labour has to be specifically assigned for the purpose. The proponent shall ensure the quality of the discharging storm water as per the General Effluent Discharge Standards of CPCB or SPCB.

S. No	EC Conditions
2.9	The water pumped out from the mine, after siltation, shall be utilized for industrial purpose viz. watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly.
2.10	Adequate groundwater recharge measures shall be taken up for augmentation of ground water. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.
2.11	The surface drainage plan including surface water conservation plan for the area of influence affected by the said mining operations shall be prepared, considering the presence of any river/rivulet/pond/lake etc., with impact of mining activities on it, and implemented by the project proponent. The surface drainage plan and/or any diversion of natural water courses shall be as per the provisions of the approved Mining Plan/ EIA-EMP submitted to this Ministry and the same should be done with due approval of the concerned State/GoI Authority. The construction of embankment to prevent any danger against inrush of surface water into the mine should be as per the approved mining plan and as per the permission of DGMS.
2.12	Domestic water shall be providing to the residents/villages which are coming under the zone of influence of the project due to ground water extraction by installing a RO plant with proper supply line and taps, if there is any shortage of potable water due to the mining activity.
2.13	The project proponent shall take all precautionary measures to ensure the riverine/ riparian ecosystem in and around the mine up to a distance of 5 km. A riverine/riparian ecosystem conservation and management plan should be prepared and implemented in consultation with the irrigation/water resource department in the state government.

3. Noise Monitoring And Prevention

S. No	EC Conditions
3.1	Adequate measures shall be taken for control of noise levels as per Noise Pollution Rules, 2016 in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with personal protective equipments (PPE) like ear plugs/muffs in conformity with the prescribed norms and guidelines in this regard. Adequate awareness programme for users to be conducted. Progress in usage of such accessories to be monitored.
3.2	Speed of trucks entering or leaving the mine site is to be limited to moderate speed of 15 kmph to prevent undue noise from empty trucks.
3.3	Acoustic enclosures should be provided to reduce sound amplifications in addition to the provisions of green belt and hollow brick envelop for crushers so that the noise level is kept within prescribed standard limit indicated by CPCB/KSPCB.
3.4	Measures should be taken for maintaining noise levels below 85 dBA in the work environment.
3.5	The noise level survey shall be carried out as per the prescribed guidelines to assess noise exposure of the workmen at vulnerable points in the mine premises, and report in this regard shall be submitted to the Ministry/RO on six-monthly basis.

4. Mining Plan

S. No	EC Conditions
4.1	Mining shall be carried out as per the approved mining plan (including Mine Closure Plan), suggestions from SEAC, KMMC Rules 2015 and amendments thereby and all other statutory rules and orders.
4.2	The blasting should be done in a controlled manner using NONEL technique as specified by the regulations of Petroleum and explosive safety organization (GOI) or any other concerned authorized agency. A licensed person should supervise/ control the blasting operations mining activity should not involve blasting.
4.3	Mining shall be carried out under strict adherence to provisions of the Mines Act 1952 and subordinate legislations made there-under as applicable.
4.4	The quarrying operation shall be restricted between 7 AM and 5PM.
4.5	Maximum depth of mining shall be as per the mining plan and / or as per specific direction of SEAC. The maximum depth of mining should not be deeper than the local ground water table.
4.6	No mining operations should be carried out at places having a slope greater than 45°.
4.7	As per regulation no. 106(2) of Metalliferous Mines Regulation under Mine Act, the height of any bench shall not exceed five meters and breadth shall not be less than the height.
4.8	The top soil, if any, shall be temporarily stored at earmarked place (s) and used for land reclamation and plantation. The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site(s) only. The maximum height of the dumps shall not exceed 8m and width 20m and overall slope of the dumps shall be maintained at 45°. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. At critical points, use of geo textile shall be undertaken for stabilization of the dump. Protective wall or gabions should be made around the dump to prevent erosion / flow of sediments during rains. The entire excavated soil shall be used for backfilling as per mine closure plan.
4.9	All the mining equipment like backhoe loaders and excavators cause pollution and hence shall be serviced regularly & maintained for their efficient functioning and for reducing pollution. Disposal of spent oil from diesel engines should be as specified under relevant Rules/ Regulations.
4.10	A minimum buffer distance specified as per existing rules and statutory orders shall be maintained from the boundary of the quarry to the nearest dwelling unit or other structures, and from forest boundaries or any other ecologically sensitive and archeologically important areas or the specific distance specified by SEIAA in EC as per the recommendations of SEAC depending on specific local conditions.
4.11	The lease area shall be fenced with barbed wire to a minimum height of 4ft around, before starting mining. All the boundary indicators (boards, markings, etc) shall be conspicuous and maintained at all times.
4.12	Explosives should be stored in magazines in isolated place specified and approved by the Explosives Department. Blasting mats to reduce fly rock blasts to a maximum of 10 PPV should be provided.

S. No	EC Conditions
4.13	Warning alarms indicating the time of blasting (to be done at specific timings) has to be arranged stipulated by Explosive Department.
4.14	Periodical monitoring of the vibration at specified location (preferably at a distance of 50 m and 100 m) to be conducted and records kept for inspection. This could also form a part of the compliance reports.
4.15	The pits in the abandoned quarries and in the mined area shall be used for activities like water harvesting, aqua culture etc. in an eco-friendly manner.
4.16	Mine has to be closed as per progressive mine closure plan and final mine closure plan.

5. Land Reclamation

S. No	EC Conditions
5.1	Regular monitoring of subsidence movement on the surface over and around the working areas and its impact on natural drainage pattern, water bodies, vegetation, structure, roads and surroundings shall be continued till movement ceases completely. In case of observation of any high rate of subsidence beyond the limit prescribed, appropriate effective mitigation measures shall be taken to avoid loss of life and materials. Cracks should be effectively plugged in with ballast and clay soil/suitable material.
5.2	Digital Survey of entire lease hold area/core zone using Satellite Remote Sensing survey shall be carried out at least once in three years for monitoring land use pattern and report in 1:50,000 scale or as notified by Ministry of Environment, Forest and Climate Change(MOEFCC) from time to time shall be submitted to MOEFCC/Regional Office (RO).
5.3	Appropriate fencing all around the burrowed/excavated pit shall be made to prevent any mishap
5.4	Post-mining land be rendered usable for agricultural/forestry purposes and shall be handed over to the respective State Government, as specified in the Guidelines for Preparation of Mine Closure Plan, issued by the Ministry of Coal dated 27th August, 2009 and subsequent amendments
5.5	The project proponent should plant seedlings at least 5 times of the loss of trees that has occurred while clearing the land for the project and follow planting measures as suggested by SEAC. Suitable avenue trees should be planted along the sides of the approach road and internal roads and open parking areas, if any. Preference should be given to endemic native and fruit bearing species. Planting in buffer areas should be taken up beforehand. Proper upkeep and maintenance of planted seedlings shall be ensured by the project proponent.
5.6	The project proponent should ensure that the vegetation in the buffer is retained, maintained and strengthened with additions of native broad leaved plants
5.7	Thorough inspection of the mine lease area for any cracks developed at the surface due to mining activities below ground shall be carried out to prevent inrush of water in the mine
5.8	Native tree species shall be selected and planted over areas of greenbelt and compensatory afforestation affected by subsidence.

S. No	EC Conditions
5.9	Eco-restoration including the closure of mine as per the progressive closure plan and final closure plan shall be done at the cost of the project proponent. This eco-restoration should follow scientific standards available for restoration, full recovery of the original vegetation and improving the resilience of different ecosystems. Overburden materials should be managed within the site and used for reclamation of mined pit as per mine closure plan / specific conditions.
5.10	At least 10 percent out of the total excavated pit area should be retained as water storage areas and the remaining area should be reclaimed with stacked dumping and overburden and planted with suitable indigenous plant species, if no other specific condition on reclamation of pit is stipulated in the E.C. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining.

6. Public Hearing And Human Health Issues

S. No	EC Conditions
6.1	Adequate illumination shall be ensured in all mine locations (as per DGMS standards) and monitored.
6.2	The project proponent shall undertake occupational health survey for initial and periodical medical examination of the personnel engaged in the project and maintain records accordingly as per the provisions of the Mines Rules, 1955 and DGMS circulars. Besides regular periodic health check-up, 20% of the personnel identified from workforce engaged in active mining operations shall be subjected to health check-up for occupational diseases and hearing impairment, if any, as amended time to time.
6.3	The proponent has to provide insurance protection to the workers in the case of existing mining or provide the affidavit in case of fresh lease before execution of mining lease.
6.4	Skill training as per safety norms specified by DGMS shall be provided to all workmen including the outsourcing employees to ensure high safety standards in mines.
6.5	Safeguards shall be adopted against health risks on account of breeding of vectors in the waterbodies created due to burrowing/excavation of laterite building stone.
6.6	Effective arrangement shall be made to provide and maintain at suitable points conveniently situated, a sufficient supply of drinking water for all the persons employed
6.7	Implementation of the time bound action plan on the issues raised during the public hearing shall be ensured. The project proponent shall undertake all the tasks/measures as per the time bound action plan submitted with budgetary provisions during the public hearing.
6.8	The project proponent shall follow the mitigation measures provided in this Ministry's OM No.Z-11013/5712014-IA.II (M) dated 29th October, 2014, titled 'Impact of mining activities on habitations-issues related to the mining projects wherein habitations and villages are the part of mine lease areas or habitations and villages are surrounded by the mine lease area', if applicable
6.9	The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages

S. No	EC Conditions
	located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day light/night hours.

7. Corporate Environment Responsibility

S. No	EC Conditions
7.1	The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental/forest/wildlife norms/conditions. The company shall have defined system of reporting infringements/deviation/violation of the environmental/forest/wildlife norms/conditions and/or shareholders/ stake holders.
7.2	The Project Proponent shall implement the EMP and environmental conditions along with CER from the comments of activity. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office/SEIAA along with the Six Monthly Compliance Report.
7.3	Corporate Environmental Responsibilities (CER) as prescribed by SEIAA/SEAC should be carried out leading to environmental stability of the project region. The certificates from the beneficiaries, if the CER part is completed should also be submitted to the State Environment Impact Assessment Authority (SEIAA) along with year wise expenditure.
7.4	Self-environmental audit shall be conducted annually. Every three years third party environmental audit shall be carried out.
7.5	Persons of nearby villages shall be given training on livelihood and skill development to make them employable with its proper records.

8. Miscellaneous

S. No	EC Conditions
8.1	The proponent should provide notarized affidavit (indicating the number and date of Environmental Clearance proceedings) that all the conditions stipulated in the EC shall be scrupulously followed.
8.2	The project authorities shall inform to the Regional Office of the MoEFCC/SEIAA regarding commencement of activity.
8.3	No further expansion or modifications in the project shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC) or SEIAA, Kerala.
8.4	In the case of any change(s) in the scope of the project, extent, quantity, process of mining technology involved or in any way affecting the environmental parameters/impacts as assessed, based on which the E.C was issued, the project would require a fresh appraisal by this Authority, for

S. No	EC Conditions
	which the proponent shall apply and get the approval of this Authority. In the case of transfer of ECs, the matter shall be intimated and get the approval from the Authority as per the existing norms.
8.5	All the statutory clearances should be obtained, as applicable, by the project proponent from the respective competent authorities including that for blasting and storage of explosives. Copies of all statutory clearances shall be submitted along with First Half Yearly Compliance Report.
8.6	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which, one shall be in the vernacular language within seven days, and in addition, the EC shall also be displayed on the project proponent's website permanently.
8.7	The project proponent shall send a copy of the EC to concerned Grama Panchayat/ District Panchayat/ Municipality/Corporation/Urban Local Body and also to the Local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal.
8.8	The details of Environmental Clearance should be prominently displayed in a metallic board of 3 ft x 3 ft with green background and yellow letters of Times New Roman font size of not less than 40. Sign board with extent of lease area and boundaries shall be depicted at the entrance of the quarry, visible to the public.
8.9	The project proponent must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.
8.10	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, if any, commitment made during Public Hearing, if any and also during their presentation to the State Expert Appraisal Committee.
8.11	The project proponent shall upload the status of compliance with the stipulated environment clearance conditions, including results of monitored data on their website and update the same on a half-yearly basis. The HYCRs shall be uploaded in the PARIVESH Portal to IRO MoEF&CC, Bangalore & SEIAA, Kerala.
8.12	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the PARIVESH portal.
8.13	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.
8.14	The Regional Office of the MoEFCC and the SPCB shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office / SPCB or any other officers delegated by the SEIAA, by furnishing the requisite data / information/monitoring reports.
8.15	If Government land is partly or fully used for mining, the area shall be returned at the end of lease period after mine closure with separate demarcation with suitable survey marks

S. No	EC Conditions
8.16	Any accident occurring in the mined out area after the lease period due to negligence in carrying out safety measures and non-closure, will lead to suspension of all EC obtained for mining by the project proponent.
8.17	In case of transfer of EC the matter shall be intimated and approval from the Authority shall be obtained as per the existing norms.
8.18	The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.
8.19	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.
8.20	The EC given will be withdrawn at any time if the area is declared high hazardous by the SDMA.
8.21	The Environmental Clearance will be subject to the final order of the courts on any pending litigation related to the land or project, in any court of law.
8.22	The SEIAA, Kerala reserves the right to stipulate additional conditions if found necessary. The Project Proponent in a time-bound manner shall implement these conditions
8.23	The SEIAA, Kerala reserves the right to revoke or suspend the Environmental Clearance, if implementation of any of the above conditions is not satisfactory.
8.24	The Environmental Clearance shall be liable to be cancelled in case of violation of any of the above conditions.
8.25	Any appeal against this Environmental Clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

9. Statutory Compliance

S. No	EC Conditions
9.1	The Environmental clearance shall be subject to orders of Hon'ble Supreme Court of India, Hon'ble High Courts, NGT and any other Court of Law, from time to time, and as applicable to the project.
9.2	The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.
9.3	The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.
9.4	The project proponent shall prepare a Site-Specific Conservation Plan & Wildlife Management Plan

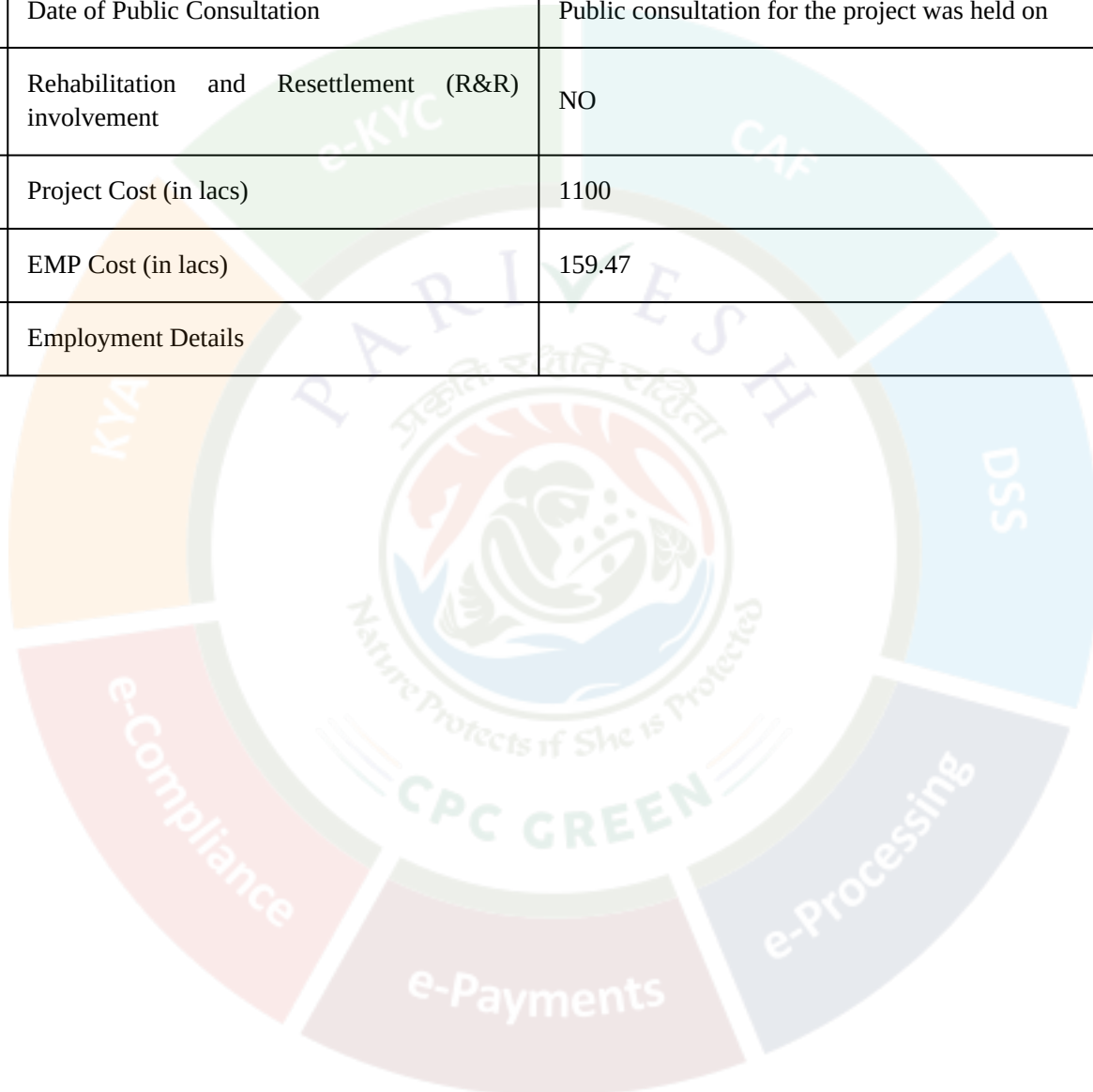
S. No	EC Conditions
	and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report (in case of the presence of schedule-I species in the study area).
9.5	The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board/ Committee. A copy of the same shall be included with HYCRs.
9.6	The project proponent shall obtain the necessary permission from the Central / State Ground Water Authority, if the project intersects ground water table.
9.7	Solid/hazardous waste generated in the mines needs to addressed in accordance to the Solid Waste Management Rules, 2016/Hazardous & Other Waste Management Rules, 2016.
9.8	Permission of power supply to be taken from the concerned authority for meeting power demand of the project site.
9.9	The maximum production or peak production at any given time shall not exceed the limit as prescribed in the approved mining plan/scheme of mining.
9.10	Project Proponent should obtain all necessary statutory clearances for mining.
9.11	If EC period is more than 6 months, Half Yearly Compliance Report (HYCR) shall be uploaded in the PARIVESH Portal and also submitted to SEIAA, Kerala via email.
9.12	The minimum distance norm from the boundary/periphery of other properties buildings/civil structures as prescribed in KMMC Rules and other statutory rules and orders shall be followed.

Annexure 2

Details of the Project

S. No.	Particulars	Details	
a.	Details of the Project	M/s Palakkal Granite Products Pvt Ltd.	
b.	Latitude and Longitude of the project site	11.2961194444,76.0489888889 11.3004388889,76.0527777778	
c.	Land Requirement (in Ha) of the project or activity	Nature of Land involved	Area in Ha
		Non-Forest Land (A)	0

S. No.	Particulars	Details	
		Nature of Land involved	Area in Ha
		Forest Land (B)	
		Total Land (A+B)	10.1903
d.	Date of Public Consultation	Public consultation for the project was held on	
e.	Rehabilitation and Resettlement (R&R) involvement	NO	
f.	Project Cost (in lacs)	1100	
g.	EMP Cost (in lacs)	159.47	
h.	Employment Details		



I. PROJECT DETAILS

Sl. No.	Particulars	Details
1.	Name & Address of the Project Proponent	Sri. P.M. Aboobacker, Managing Director, M/s. Palakkal Granite Products Pvt. Ltd., KP 8/308,, Near Sakeena Industries, Chethukadavu P.O., , Kunnamangalam, Kozhikode - 673 571
2.	Block No.	003 (Kodiyathur Village) 001 (Kumaranellur Village)
3.	Re- Sy No.	172/1527, 172/1232, 172/1228, 172/1213, 1523, 1862, 172/1212, 172/1134, 172/1137, 172/1201, 172/1221, 172/1120, 172/1238, 172/1136, 172/1135, 172/1119, 172/2275, 172/1526, 172/1200, 172/1239, 1240 (Kodiyathur Village) 153/597, 153/598, 153/604, 153/601, 600 (Kumaranellur Village)
4.	Village	Kodiyathur Village & Kumaranellur Village
5.	Taluk	Kozhikode
6.	District	Kozhikode
7.	Location	
8.	Extent (in Hectare)	10.1903
9.	Project Cost	11.00 Crore
10.	Mineable Reserve	The Mining & Geology Department shall re-assess the mineable quantity by <i>limiting the depth of mining to 120m AMSL to prevent formation of mine pit and impoundment of water on the sloping terrain.</i>
11.	Validity of EC	10 (Ten) years, from the date of issuance of mine permit, from the Mining and Geology Department

II. EMP Details

Sl. No.	Activities	Capital Cost	Recurring Cost
Air & Noise Environment			
1.	Personal Protective Equipment (PPEs) to workers (Uniforms, Ear muffs, Helmets, Boots)	2,80,000.00	2,80,000.00
2.	Blast mats	1,50,000.00	1,00,000.00
3.	Portable- Automatic Dust Suppression System (Mist Canister) of 60m range 3-5 Hp Pump) - 01 No	4,00,000.00	20,000.00

4.	Provision of Fixed Sprinklers- Dust Suppression System for haulage Road including 20 no's of Fixed Water Sprinklers with pipes and accessories	3,09,799.00	40,000.00
5.	Wetting of Roads on residential and sensitive areas at least 3 times per day during non-monsoon/rainy days (8 am to 9 am, 11 am to 12 pm, 2 pm to 3 pm).	4,37,500.00	4,37,500.00
Sub Total		15,77,299.00	8,77,500.00
Public Information System			
1.	Blasting Siren, Notice Boards and Warning Signs	1,15,000.00	1,15,000.00
Sub Total		1,15,000.00	1,15,000.00
Runoff Water Management & Conservation of water			
1.	Garland Drains, Silt Traps with desiltation tanks & check dam to be implemented (modernization and size enhancement of existing facility)	6,50,000.00	1,25,000.00
2.	Withdrawal of water from Rainwater Harvesting Pond- Existing pit near to the site could be utilized (Cost for pumps & piping's from pond to storage tank at site)	1,85,000.00	18,000.00
3.	Seasonal cleaning and maintenance of garland drain, silt traps, desiltation tanks, check dam and entire drainage system of 1st order connectivity	--	3,60,000.00
4.	Strengthening of the drainage from the check dam to the natural drain (80 m)	1,10,000.00	25,000.00
Sub Total		9,45,000.00	5,28,000.00
Ecological/ Biological Environment			
1.	Green Area development in buffer of 1.1270 ha area, 2818 nos of plantation is proposed (563 no's per year) for 5 years	7,04,500.00	2,81,800.00
2.	Compensatory Afforestation outside the lease area, land owned by the proponent and proposed about 450 trees to be planted for 5 years (or in association with social forestry dept. by providing fund for the same)	1,12,500.00	22,500.00
3.	Reclamation Cost (20794 plants are proposed in the Backfilled area) The cost for the reclamation shall be allocated separately as a fixed deposit/ savings by about Rs. 5,19,850/ year for 10 years of mine life.	51,98,500.00	5,19,850.00
4.	Salary for Gardner & other miscellaneous	0	2,00,000.00
Sub Total		60,15,500.00	10,24,150.00

Solid Waste Management			
1.	Topsoil& Overburden Dumping Area Yard development	2,50,000.00	--
2.	Boulders management, provision of additional fencing and trenches with wire meshes	3,00,000.00	--
3.	Waste management and segregation by providing waste bins for collection and disposal of recyclable wastes through vendors and biowaste management by used as manure. Installation of composting tank for biologically degradable wastes from canteen.	1,50,000.00	80,000.00
4.	Construction of side protection wall/ retaining wall around the dumping site and provision of garland drains	6,50,000.00	1,00,000.00
5.	Used Oil Management including provision of MS drum and sand bed	50,000.00	30,000.00
Sub Total		14,00,000.00	2,10,000.00
Soil & Slope Stabilization Management			
1.	Fixing of Geomat at the Buffer zone & topsoil dumps	3,00,000.00	25,000.00
Sub Total		3,00,000.00	25,000.00
Monitoring Cost			
1.	Implementation of Monitoring Stations including Platform and Electricity Connection	1,50,000.00	20,000.00
2.	Blasting & Vibration monitoring studies	2,00,000.00	--
3.	Environmental / Compliance Monitoring during Operation phase (Plan Period) in every six months (Monitoring Cost (5 Air& Noise, 6 Water and 2 Soil)	--	2,05,000.00
Sub Total		3,50,000.00	2,25,000.00
Construction of Roads, Safety Measures including Transportation Management			
1.	Development of Haul Roads and Internal Access Roads	6,40,000.00	4,80,000.00
2.	Installation of road safety signs/ mirrors, speed breakers before joins/ connect to the main roads and major turnings, shoulders of roads with pedestrian way, maintenance of pedestrian way such as cutting or clearing of bushes/ wildy spreading climbers/ unused crops associating /consulting with local body	3,50,000.00	1,25,000.00
Sub Total		9,90,000.00	6,05,000.00

Energy Conservation measures			
1.	1Kw solar panel installed for the office Administration, rest room and canteen & proposed for an additional 1Kw solar system with all accessories and cables	3,50,000.00	25,000.00
Sub Total		3,50,000.00	25,000.00
Environment Management Cell for effective implementation of site-specific EMP			
1.	Constitution of Site-specific Environment Management Cell (EMC) for the effective implementing and monitoring of Regional Environmental Management Plan (EMP)	1,50,000.00	1,20,000.00
Sub Total		1,50,000.00	1,20,000.00
Total		1,21,92,799.00	37,54,650.00
Grand Total		1,59,47,449.00	

III.CER Details

Activities	Cost
Provide swimming pool facility to Govt. UP School Thottumukkam for the training & to improve the personal growth of students (Civil & MEP Works including filers, equipment and all accessories)	24,00,000.00

ANNEXURE 2
COPY OF CONSENT FROM KSPCB

FILE NO : KSPCB/KZ/ICO/10099306/2025

Date of issue : 26-03-2025



KERALA STATE POLLUTION CONTROL BOARD

CONSENT TO

OPERATE/AUTHORISATION/REGISTRATION

ISSUED UNDER

The Water (Prevention & Control of Pollution) Act, 1974

The Air (Prevention & Control of Pollution) Act, 1981

and

The Environment (Protection) Act, 1986

As per Application No. : 10099306

Dated : 21-03-2025

To

**PALAKKAL GRANITE PRODUCT PRIVATE LIMITED
MYSOORPATTA, THOTTUMUKKAM POST, KOZHIKODE**

Consent No. : KSPCB/KZ/ICO/10099306/2025

Valid Upto : 28-02-2030

1. GENERAL

1.1. This integrated consent is granted subject to the power of the Board to withdraw consent, review and make variation in or revoke all or any of the conditions as the Board deems fit

1	VALIDITY	28-02-2030
2	Name and Address of the establishment	PALAKKAL GRANITE PRODUCT PRIVATE LIMITED MYSOORPATTA, THOTTUMUKKAM POST, KOZHIKODE E-Mail : palakkalgranitepvt@gmail.com Contact Number : 9497348725
3	Occupier Details	ABOOBACKER P M PALAKKAL MEETHAL HOUSE, KUNNAMANGALAM P.O., KOZHIKODE-673571 E-Mail : palakkalgranitepvt@gmail.com Contact Number :
4	Local Body	KODIYATHUR PANCHAYAT AND KARASSERY PANCHAYAT
5	Survey Number	172/1527,1232,1228,1213,1523,1862,1212,1134,1137, 1201,1221,1120, 1238, 1136, 1135, 1119, 2275,1526, 1200, 1239, 1240, of Kodyathur Village153/597, 598, 604, 601, 600 of Kumaranellur Village
6	Village	Kodiyathur
7	Taluk	Kozhikode
8	District	KOZHIKODE
9	Capital Investment(Rs in Lakhs)	1100.0854
10	Scale	Large
11	Category	RED
12	Annual fee(Rs)	78000.0
	Total Fee remitted(Rs)	429000.0

13	Activity	QUARRYING IN AN AREA OF 10.1903Ha in RS No,172/1527, 1232, 1228, 1213, 1523, 1862, 1212, 1134, 1137, 1201, 1221, 1120, 1238, 1136, 1135, 1119, 2275, 1526, 1200, 1239, 1240 of Kodyathur village and Unsurvey No.153/597, 598, 604, 601, 600 of Kumaranellur Village, Kozhikode Taluk
14	Machinery details	NA

SPECIFIC CONDITIONS

- 1 .This Integrated Consent to Operate is granted subject to the power of the Board to review and make variation in all or any of the conditions laid hereunder.
2. For renewal of the consent in case of continuance of discharge/operation of the industry, application in the prescribed form shall be submitted through the web portal of the Board for Online Consent Management & Monitoring System 2 months prior to the date of expiry. Late application will be accepted only with fine.
3. Any change in particulars furnished in the application and/or in the identity of the occupier/ authorized agent is to be intimated to the Board forthwith.
- 4 .The applicant shall comply with all instructions that the Board may issue from time to time regarding prevention and control of air, water, land and sound pollution
- 5 .The quarry should not be operated between 6.00 p.m. and 6.00 a.m.
6. Noise measured 1 m outside the boundary of the premises shall not exceed the limit specified for the area under the Ambient Air Quality Standards in respect of noise.
- 7 .The concentration of particulate matter PM 10 and PM 2.5 at the boundary of the premise shall not exceed 100 microgram/m³ and 60 microgram/m³ respectively.
8. Permanent fence made of wire mesh shall be provided and maintained along the boundary of the approved quarry area.
9. The applicant shall put up a 6 ft. x 4 ft. signboard near entrance to the quarry for displaying the name of the quarry and owner, production details and time of the day when blasting is permitted to be undertaken.
10. Location and extent of quarry shall be as per the approved site plan attached.
11. After completion of quarrying, the land may be reclaimed as per the mining plan approved by the Department of Mining and Geology.
12. Quarrying operations shall be started only after obtaining the all the statutory clearances required, which shall be valid throughout the period of operation.
- 13 . This consent is issued based on Ec.NO. EC24B0108KL5393223N Dated 14/03/2025 and valid for 5 years starting from the date of issue of Mining permit from the kozhikode District department of mining and geology
14. This consent is granted on the basis of the site plan and affidavit and Location sketch from village officer furnished by the applicant is liable to be revoked if any statement is found false on verification.
15. A minimum distance of 50 m shall be kept from the boundary of quarry area to residential buildings, places of worship, public buildings, public road having vehicular traffic, river or lake, railway line and bridges.
16. The depth of excavation below the highest point shall not exceed 6m. Bench cutting shall be practiced.
17. Blasting shall be done at specified time with prior signals to avoid accidents.
- 18.No other machineries shall be operated without prior Consent of the Board.
19. Quarrying operations shall be started only after obtaining Mining permit/lease from Mining & Geology Department and D & O License under the Kerala Panchayat Raj Act from the concerned Local Self Government.
- 20 . Proper fencing/barriers shall be provided and maintained all around the abandoned deep quarry pits to avoid accidents
21. Blasting and quarrying shall be done without causing any nuisance or damage to occupants of adjoining or neighbouring land or building or posing damage to health, life or property.
22. The applicant shall submit copies of all relevant permits/lease/certificate/licences periodically to this office to ensure the validity of this consent and this consent is issued based on following documents.
Reference: - 1. Environmental clearance No. EC24B0108KL5393223N issued on 14/03/2025 and valid for a period of 5 years from the date of execution of mine lease / permit
2.Explosive licence E/SC/KL/22/1174(E58573) dated 0/01/2025 valid up to 31/03/2030

3. Mining and Geology letter no:1459/M3/2018 ,dated 23.03.2018.

3. Letter of intend NO.5794/ M3/2020 dated 09.02.2021.

SIGNATURE OF ISSUING AUTHORITY

ENVIRONMENTAL ENGINEER



To

M/s PALAKKAL GRANITE PRODUCT PRIVATE LIMITED
MYSOORPATTA, THOTTUMUKKAM POST, KOZHIKODE

E-Mail : palakkalgranitepvt@gmail.com

Contact Number : 9497348725

1.This digitally signed document is legally valid as per the Information Technology Act 2000

2. For verifying this document please go to www.keralapcbonline.com and search using Certificate Number/name of the unit/Application Number in “Certificate Verification” link in the home page of the Board’s Phoenix website.

A1 8059/2020

SURVEY MAP 228/2020

335/2020

DISTRICT KOZHIKODE
TALUK KOZHIKODE
VILLAGES KODIYATHUR & KUMARANELLUR
RE SURVEY No 172 & UNSURVEY
RE SURVEY BLOCK No - 003 & 001

APPLIED AREA 7.7827 HECTARE & 2.4076 HECTARE

TOTAL APPLIED AREA 10.1903 HECTARE

SCALE 1CM 25M

LEGEND	
	MINING AREA
	MOSQUE
	SCHOOL
	CRUSHER
	SURVEY BOUNDARY
	BUFFER ZONE
	ROCK MARK
	SURVEY STONE
	HOUSE
	CHURCH
	ROAD
	CULVERT
	ALREADY EXTRACTED AREA
	BOUNDARY PILLAR
	EXISTING Q.L. AREA

Site plan submitted by the applicant countersigned
after inspection as such

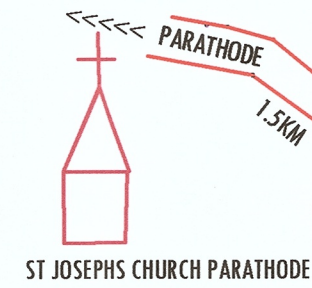
Environmental Engineer

ALREADY EXTRACTED AREA 47660.0 M²AREA DETAILS
KODIYATHUR VILLAGE

SL No	D O C No	R S No	TOTAL AREA	APPLIED AREA	NAME
1	1773/2007	172/1527	1.2104 HECTARE	0.8588 HECTARE	HASEENA
2	571/2007	172/1232	0.2828 HECTARE	0.1617 HECTARE	AJMILA
3	4462/2006	172/1228	0.2428 HECTARE	0.2428 HECTARE	AJMILA
4	1465/2014	172/1213,1523,1862	0.9064 HECTARE	0.9064 HECTARE	AHAMMEDKABEER, AJMILA HASEENA, HAIRUNNEESA & ANEESHA
5	1470/2014	172/1212	0.1107 HECTARE	0.1107 HECTARE	ABOUBACKER
6	3964/2006	172/1134	0.8093 HECTARE	0.6650 HECTARE	ABOUBACKER
7	3965/2006	172/1137	0.6869 HECTARE	0.6471 HECTARE	ABOUBACKER
8	577/2007	172/1201	0.4046 HECTARE	0.4046 HECTARE	AHAMMEDKABEER
9	1774/2007	172/1221	0.2023 HECTARE	0.2023 HECTARE	AJMILA
10	3969/2006	172/1120	0.7688 HECTARE	0.1016 HECTARE	T P AISHA
11	572/2007	172/1238	0.4046 HECTARE	0.2389 HECTARE	HASEENA
12	3966/2006	172/1136	0.4046 HECTARE	0.1466 HECTARE	ABOUBACKER
13	3967/2006	172/1135	0.4046 HECTARE	0.4046 HECTARE	ABOUBACKER
14	4185/2006	172/1119	0.1224 HECTARE	0.1224 HECTARE	T P AISHA
15	712/2010	172/2275	1.2141 HECTARE	0.8127 HECTARE	ALAVUDHEEN
16	575/2007	172/1526	1.0728 HECTARE	0.8906 HECTARE	HASEENA
17	119/2007	172/1200	0.6006 HECTARE	0.5748 HECTARE	AHAMMEDKABEER
18	1769/2007	172/1239,1240	1.2138 HECTARE	0.2911 HECTARE	HASEENA
TOTAL			11.0625 HECTARE	7.7827 HECTARE	

KUMARANELLUR VILLAGE

19	2797/2007	153/597	0.5261 HECTARE	0.5261 HECTARE	AHAMMEDKABEER
20	3329/2014	153/598	0.8094 HECTARE	0.8094 HECTARE	AHAMMEDKABEER
21	3313/2009	153/604	0.8701 HECTARE	0.4958 HECTARE	ALEEMA
22	1677/2015	153/601,600	0.6880 HECTARE	0.5763 HECTARE	HAIRUNNEESA
TOTAL			2.8936 HECTARE	2.4076 HECTARE	
GRAND TOTAL			13.9561 HECTARE	10.1903 HECTARE	



ST JOSEPHS CHURCH PARATHODE

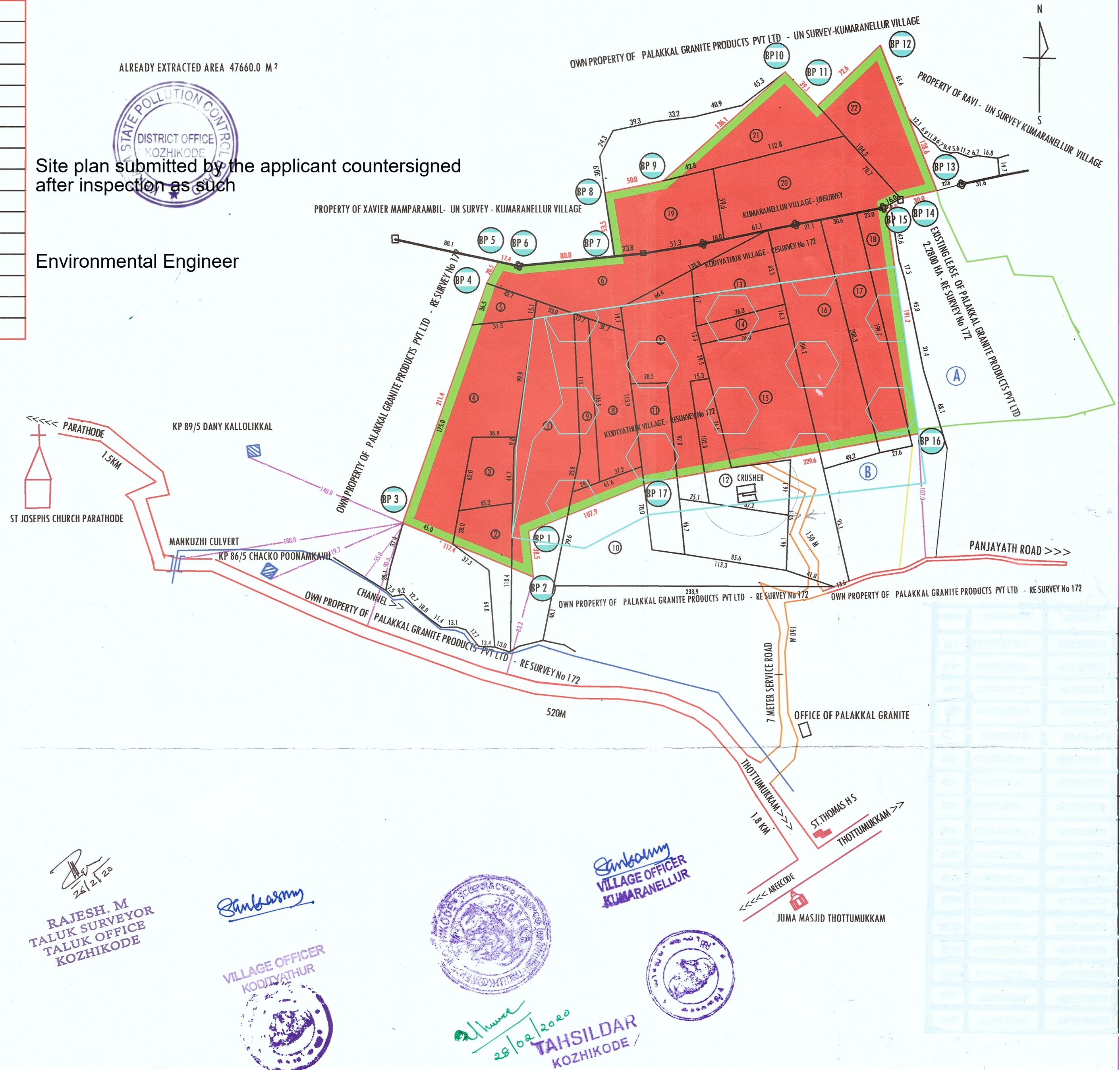
RAJESH. M
TALUK SURVEYOR
TALUK OFFICE
KOZHIKODE

VILLAGE OFFICER
KODIYATHUR



TAHSILDAR
KOZHIKODE

VILLAGE OFFICER
KUMARANELLUR



ANNEXURE 3
COPY OF EXPLOSIVE LICENSE



भारत सरकार | Government of India
वाणिज्य और उद्योग मंत्रालय | Ministry of Commerce & Industry
पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन (पेसो) | Petroleum & Explosives Safety Organisation (PESO)
पूर्व नाम- विस्फोटक विभाग | Formerly- Department of Explosives
केन्द्रीय भवन, ब्लॉक सी-2, तीसरी मंजिल | Kendriya Bhavan, Block C-2, 3rd Floor
CSEZ पी.ओ.कक्कनाड कोच्ची | CSEZ PO Kakkanad Dist. Ernakulam Ernakulam 682037
फोन (Phone):- 2427286 | फैक्स (Fax):- 2427276

संख्या (No.): E/SC/KL/22/1174(E58573)

दिनांक (Date): 12/11/2025

सेवा में | To,

Shri.P.M.Aboobacker, Managing Director, Palakkal Granite products private ltd,
KP 8/308, Near Sakeena Industries, Chethukadavu, Kunnamangalam Post, Kozhikode District-673571, Kerala, Town/Village - Kunnamangalam
District-KOZHIKODE, State-Kerala, Pincode - 673571

विषय : Survey No.R.S.No.172, ग्राम Pannikkode Desam in Kodyathoor village Kozhikode, जिला KOZHIKODE, राज्य Kerala में मेसर्स **Shri.P.M.Aboobacker, Managing Director, Palakkal Granite products private ltd** द्वारा विस्फोटक के मैगजीन में उपयोग के लिए कब्जा हेतु विस्फोटक नियम, 2008 के अंतर्गत LE-3 में जारी अनुज्ञप्ति सं E/SC/KL/22/1174(E58573) के संशोधन संदर्भ में।
(विस्फोटक की मात्रा / मासिक खरीद सीमा में परिवर्तन)

Subject: **Possession for Use of of Explosives from magazine situated at Survey No.:R.S.No.172, Pannikkode Desam in Kodyathoor village Kozhikode, Dist. KOZHIKODE, Kerala -Licence No.: E/SC/KL/22/1174(E58573) granted in Form LE-3 of Explosives Rules, 2008 - (Amendment of Quantity of Explosives/Monthly Purchase Limit).**

महोदय | Sir,

आपका उपर्युक्त विषय पर पत्र संख्या 171776 दिनांक 08/11/2025 का संदर्भ ग्रहण करें।
Please refer to your letter no. 171776 dated 08/11/2025.

अनुज्ञप्ति संख्या E/SC/KL/22/1174(E58573) **विस्फोटक की मात्रा / मासिक खरीद सीमा में परिवर्तन** के संदर्भ में यथा संशोधित कर भेजी जा रही है।
The Licence No.: E/SC/KL/22/1174(E58573) is forwarded herewith duly amended in respect of followings ;

Quantity of Explosives/Monthly Purchase Limit

किसी भी एक समय में लाइसेंस क्षमता निम्नलिखित वर्ग तथा मात्रा से अधिक नहीं होगी।

The licence capacity at any one time shall not exceed the kinds and quantities mentioned below ;

संख्या No	विस्फोटक Explosive(s)	वर्ग Class	प्रभाग Div	उप-प्रभाग Sub Div	क्षमता Capacity	इकाई Unit
1	Safety Fuse	6	1	0	2000	Mtrs
2	Nitrate Mixture	2	0	0	150	Kg.
3	Non Electric (Nonel) detonators	6	3	0	3000	Nos.
4	Ordinary Detonator	6	3	0	2000	Nos.

किसी एक कलेंडर मास में खरीदे जाने वाले विस्फोटक की मात्रा (अनुच्छेद 3 (ख) और (ग) के अधीन अनुज्ञप्ति के लिए लागू) : **26 गुना**
Quantity of explosives to be purchased in a calendar month[applicable for licence under article 3(b) and (c)] : **26 times as above.**

यह अनुज्ञप्ति दिनांक **31 मार्च 2030** तक प्रवृत्त रहेगी।
This Licence shall remain valid till **31st day of March 2030.**

अनुज्ञप्ति के आगामी नवीकरण हेतु कृपया विस्फोटक नियम, 2008 के नियम 112 के अंतर्गत प्रक्रिया का पालन करें। कृपया पावती दें।
For further revalidation(if required), please follow the procedure under Rule 112 of Explosives Rules, 2008. Receipt of this letter may please be acknowledged.

भवदीय | Your's faithfully

(दीपक कुमार | Deepak Kumar)

विस्फोटक नियंत्रक | Controller of Explosives

कृते उप मुख्य विस्फोटक नियंत्रक | For Dy. Chief Controller of Explosives

कोच्ची | Ernakulam

प्रतिलिपि प्रेषित | Copy Forwarded to:

- District Magistrate, KOZHIKODE, Kerala with reference to his Noc No: D5/34331/2010/Rdis Dated: 06/12/2010
- Superintendent of Police, KOZHIKODE, Kerala.

कृते उप मुख्य विस्फोटक नियंत्रक | For The Dy. Chief Controller of Explosives,
कोच्ची | Ernakulam

(अधिक जानकारी जैसे आवेदन की स्थिति, शुल्क आदि के लिए हमारी वेबसाइट <http://peso.gov.in> देखें.)
(For more information regarding status, fees and other details please visit our website <http://peso.gov.in>)

Note :- This is system generated document does not require physical signature. Applicant may take printout for their records.

अनुज्ञापि प्ररूप एल. ई.-3 | LICENCE FORM LE-3

(विस्फोटक नियम, 2008 की अनुसूची 4 के भाग 1 के अनुच्छेद 3(क) से (घ) देखिए।)
(See article 3(a) to (d) of Part 1 of Schedule IV of Explosives Rules, 2008)

(ग) उपयोग के लिए एक समय पर वर्ग 1,2,3,4,5 या वर्ग 7 के विस्फोटक या किसी मैगजीन में वर्ग 6 के विस्फोटक रखने के लिए अनुज्ञापि
Licence to possess : (c) for use,explosives of class 1, 2,3,4,5,6 or 7 in a magazine

अनुज्ञापि सं. (Licence No.) : E/SC/KL/22/1174(E58573)

वार्षिक फीस रुपए (Annual Fee Rs): 2400/-

1. Licence is hereby granted to

Shri.P.M.Aboobacker, Managing Director, Palakkal Granite products private ltd (अधिभोगी / Occupier : Shri M.Aboobacker Managing Director), KP 8/308, Near Sakeena Industries, Chethukadavu, Kunnamangalam Post,Kozhikode District-673571, Kerala, Town/Village - Kunnamangalam, District-KOZHIKODE, State-Kerala, Pincode - 673571



को अनुज्ञापि अनुदत्त की जाती है।

2. अनुज्ञापिधारी की प्रास्थिति | Status of licensee : **Company**

3. अनुज्ञापि निम्नलिखित प्रयोजनों के लिए विधिमन्य है।

Licence is valid only for the following purpose.

: possess for use of **Safety Fuse, Nitrate Mixture, Non Electric (Nonel) detonators, Ordinary Detonator**, - के उपयोग के लिए

4. अनुज्ञापि विस्फोटकों के निम्नलिखित किस्मों, प्रकार और मात्रा के लिए विधिमन्य है।

Licence is valid for the following kinds and quantity of explosives: -- (क) (a)

क्र Sr. No.	नाम और विवरण Name and Description	वर्ग और प्रभाग Class & Division	उप-प्रभाग Sub-division	मात्रा किसी एक समय में Quantity at any one time
1.	Nitrate Mixture	2 ,0	0	150 Kg.
2.	Non Electric (Nonel) detonators	6 ,3	0	3000 Nos.
3.	Ordinary Detonator	6 ,3	0	2000 Nos.
4.	Safety Fuse	6 ,1	0	2000 Mtrs

(ख) किसी एक कलेंडर मास में खरीदे जाने वाले विस्फोटक की मात्रा [अनुच्छेद 3(ख) और (ग) के अधीन अनुज्ञापि के लिए]

(b) Quantity of explosives to be purchased in a calendar month[applicable for licence under article 3(b) and (c)] :

**26 times
as above.**

5. निम्नलिखित रेखाचित्र (रेखाचित्रों) से अनुज्ञापि परिसर की पुष्टि होती है।

The licensed premises shall conform to the following drawing(s): .

रेखाचित्र क्र. (Drawing No.) E/SC/KL/22/1174(E58573)

दिनांक (Dated) 12/11/2025

6. अनुज्ञापि परिसर निम्नलिखित पते पर स्थित हैं। The licensed premises are situated at following address:

Survey No. R.S.No.172 , ग्राम (Town/Village) : **Pannikkode Desam in Kodivathoor village Kozhikode**
पुलिस थानी (Police Station) : **Mukkam**

जिला (District)	KOZHIKODE	राज्य (State)	Kerala	पिनकोड (Pincode)	673571
दूरभाष (Phone)	9447120751	ई. मेल (E-Mail)		फैक्स (Fax)	

7. अनुज्ञापि परिसर में निम्नलिखित सुविधाएं अंतर्विष्ट हैं।

The licensed premises consist of following facilities.

: **pucca magazine of stone masonry construction**

8. अनुज्ञापि समय - समय पर यथासंशोधित विस्फोटक अधिनियम, 1884 और उनके अधीन विरचित विस्फोटक नियम, 2004 के उपबंधों, शर्तों और अतिरिक्त शर्तों और निम्नलिखित उपाबंधों के अधीन रहते हुए अनुदत्त की जाती है।

The licence is granted subject to the provision of Explosives Act 1884 as amended from time to time and the Explosives Rules, 2008 framed there under and the conditions, additional conditions and the following Annexures.

1. उपर्युक्त क्रम सं. 5 में यथा कथित रेखाचित्र (स्थान, सन्निर्माण संबंधी और अन्य विवरण दर्शित करते हुए)।

Drawings (showing site, constructional and other details) as stated in serial No. 5 above.

2. अनुज्ञापि प्राधिकारी द्वारा हस्ताक्षरित इस अनुज्ञापि की शर्तों और अतिरिक्त शर्तों।

Conditions and Additional Conditions of this licence signed by the licensing authority.

3. दूरी प्ररूप DE-2 | Distance Form DE-2.

9. यह अनुज्ञापि तारीख **31 मार्च 2015** तक विधिमन्य रहेगी। This licence shall remain valid till **31st day of March 2015**.

यह अनुज्ञापि, अधिनियम या उसके अधीन विरचित नियमों या अनुसूची V के भाग 4 के प्रति निर्दिष्ट सेट-VII के अधीन तथा उपवर्णित इस अनुज्ञापि की शर्तों का अधिक्रमण करने या यदि अनुज्ञापि परिसर योजना या उससे संलग्न उपबंध में दर्शित विवरण के अनुरूप नहीं पाए जाने पर निलंबित या प्रतिसंहत की जा सकती है, जहां वह लागू हो।

This licence is liable to be suspended or revoked for any violation of the Act or Rules framed there under or the conditions of this licence as set forth under Set VIII, wherever applicable, referred to in Part 4 of Schedule V or if the licensed premises are not found conforming to the description shown in the plans and Annexure attached hereto.

तारीख | The Date - 04/03/2011

संयुक्त मुख्य विस्फोटक नियंत्रक | Joint Chief Controller of Explosives
South Circle, Chennai

Amendments :

- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 02/01/2014
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 06/04/2017
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 16/01/2020
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 12/11/2025

नवीनीकरण के पृष्ठांकन के लिए स्थान
Space for Endorsement of Renewal

नवीकरण की तारीख Date of Renewal	समाप्ति की तारीख Date of Expiry	अनुज्ञापन प्राधिकारी के हस्ताक्षर और स्टाम्प Signature of licensing authority and stamp
20/01/2025	31/03/2030	Sd/- Dy. Chief Controller of Explosives, Ernakulam

कानूनी चेतावनी : विस्फोटकों को गलत ढंग से चलाने या उनका दुरुपयोग विधि के अधीन गंभीर दंडिक अपराध होगा।

Statutory Warning : Mishandling and misuse of explosives shall constitute serious criminal offence under the law.

Note :- This is system generated document does not require physical signature. Applicant may take printout for their records.

Form DE-2
(See rule 113 of the Explosives Rules, 2008)
(Distance Form to be attached to the licence)

Safety distances required to be kept clear around magazine for high explosives or fire works or factory licence number E/SC/KL/22/1174(E58573) in form LE-3 granted to Shri.P.M.Aboobacker, Managing Director, Palakkal Granite products private ltd, KP 8/308, Near Sakeena Industries, Chethukadavu, Kunnamangalam Post,Kozhikode District-673571, Kerala, Kerala-673571 .

Type of Structure(s)		Safety distances meters	
Inside Safety Distances(ISD)		M	UM
1	Room or Workshop used in Connection with the Magazine	13	19
2	Any other Explosives Magazine or store House or Factory of the Applicant		
3	Magazine Office		
Middle Safety Distances(MSD)			
4	Magazine Keeper's or Chowkidar's Dwelling house		
5	Railway including Minerals and Private Railways		
6	Canal (in active use) or other navigable water		
7	Dock or Pier or Jetty		
8	Public Highway or Public Road		40
9	Private Road which is PRINCIPAL means of access to a Temple, Mosque, Church, Gurudwara or other places of worships, Hospital, College, School or Factory		
10	River Embankment or Sea Embankment or Public Well		
11	Reservoir or Bounded tank/rope way		
12	Windmillor or Solar panel for Power Generation		
Outside Safety Distances(OSD)			
13	Dwelling House		
14	Govt. and Public Building		
15	Temple, Mosque, Church or Gurudwara or other Places of Worships		
16	Shops, Market place, Public recreation and Sports Ground, College, School, Hospital, Theater, Cinema or other Building where the public are accustomed to assemble		
17	Factory		
18	Buildings or Works used for the Storage in Bulk of Petroleum, Sprit, gas, or other inflammable or hazardous substances		
19	Building or Works used for Storage and Manufacture of Explosives or of articles which contain Explosives		45
20	Aerodrome		
21	Furnace, Kiln or Chimney		
22	Quarry or mine pit head		
23	Power House or Electric Substation		
24	Wireless Station		
25	Warehouse or other Storage Building		
26	Any other Protected works		
Overhead Electric lines			
27	Electric Power over head Transmission Lines above 440V		45
28	Electric Power over head Transmission Lines upto 440V		15

The Date : 04/03/2011

For Joint Chief Controller of Explosives
South Circle, Chennai

Amendments :

- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 02/01/2014
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 06/04/2017
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 16/01/2020
- Amendment of Quantity of Explosives/Monthly Purchase Limit dated : 12/11/2025

Note :- This is system generated document does not require physical signature. Applicant may take printout for their records.

मैगजीन में वर्ग 1,2,3,4,5,6, और 7 के विस्फोटकों को बिक्री या प्रयोग हेतु रखने के लिए प्ररूप एल.ई. 3 | अनुच्छेद 3 (ख) से (ग) में मुख्य विस्फोटक नियंत्रक या विस्फोटक नियंत्रक द्वारा प्रदान किए जाने वाले अनुज्ञप्ति सं. E/SC/KL/22/1174(E58573) की शर्तें निम्नलिखित हैं।

The following are the conditions of licence number E/SC/KL/22/1174(E58573) to possess for sale or use, explosives of Class 1,2,3, 4, 5, 6 and 7 in a magazine in Form LE-3 (articles 3(b) to (c)) granted by Chief controller of Explosives or Controller of Explosives.

- परिसर में किसी भी समय विस्फोटकों की मात्रा अनुज्ञापन योग्य सामर्थ्य से अधिक नहीं होगी।
The quantity of explosives on the premises at any one time shall not exceed the licensable capacity.
- विस्फोटकों के भंडारण के लिए प्रयुक्त होने वाली मैगजीन अनुसूची III और अनुज्ञप्ति के उपाबंध में विनिर्दिष्ट सुरक्षा दूरी बनाए रखना होगा।
The magazine used for storage of explosives shall maintain safety distance specified in Schedule III and annexure to the licence.
- मैगजीन का प्रयोग उन सभी विस्फोटकों के, जो इस अनुज्ञप्ति में विनिर्दिष्ट है, रखे जाने के लिए और ऐसे रखे जाने से संबद्ध आधान या औजार या उपकरणों के रखे जाने के लिए ही किया जाएगा; अन्यथा नहीं।
The magazine shall be used only for keeping all explosives specified in this licence and of receptacles for, or tools or implements for work connected with the keeping of such explosives.
- पैकजों को खोलने का कार्य और विस्फोटकों को तौलने तथा पैक करने का कार्य मैगजीन में नहीं किया जाएगा।
The opening of packages and the weighing and packing of explosives shall not be carried on in the magazine.
- दो या दो से अधिक वर्णन के विस्फोटकों को, जिन्हें मैगजीन में रखे जाने की अनुज्ञा दी जा सकती है, मैगजीन में तभी रखे जाएंगे जब उनमें से प्रत्येक को, ऐसे पदार्थ या स्वरूप का कोई मध्यवर्ती विभाजक लगाकर या उनके बीच ऐसा मध्यवर्ती स्थान छोड़कर, परस्पर पृथक कर दिया जाए कि किसी वजह से विस्फोटक में लगने वाली आग या होने वाला विस्फोट किसी अन्य वर्णन के विस्फोटक तक न पहुंच सके : परंतु –
(घ) 2 (नाइट्रेट मिश्रण), वर्ग 3 (नाइट्रो योगिक) के विभिन्न विस्फोटक, वर्ग 6 प्रथम प्रभाग के अंतर्गत आने वाले सुरक्षा पलीते और वर्ग 6 प्रभाग 2 के अंतर्गत आनेवाले विस्फोटक प्रेरक पलीते, जिनमें कोई खुला लोहा या इस्पात नहीं है, एक दूसरे के साथ बिना किसी मध्यवर्ती विभाजक या स्थायन के रखे जा सकते हैं।
(ङ) वर्ग 6 प्रभाग 3 के अंतर्गत आनेवाले विस्फोटक प्रेरक अलग रखे जाएंगे।
(च) वर्ग 1 के अंतर्गत आने वाले बारूद को अलग रखा जाएगा।
Two or more description or explosives which may be permitted to be kept in the magazine shall be kept only if they are separated from each other by an intervening partition of such substance or character, or by such intervening space, as will effectually prevent explosion or fire in the one communicating with the other; Provided that—
(d) the various explosives of Class 2 (nitrate-mixture), Class 3 (nitro-compound), safety fuses belonging to Class 6 Division 1 and detonating fuses belonging to Class 6 Division 2 as do not contain any exposed iron or steel, may be kept with each other without any intervening partition or space ;
(e) Detonators belonging to Class 6 Division 3 shall be kept separately.
(f) Gun powder belonging to Class 1 shall be kept separately.
- वर्ग 3 (नाइट्रो योगिक) के विस्फोटकों को, उनके विनिर्माण की तारीख से एक वर्ष बीत जाने के पश्चात सिवाय अनुज्ञापन प्राधिकारी की विशेष मंजूरी के मैगजीन में नहीं रखा जाएगा।
Explosives of Class 3 (nitro compound) shall not be kept in the magazine after the expiration of one year from the date of their manufacture except with the special sanction of licensing authority.
- वर्ग 3 (नाइट्रो योगिक) के विस्फोटकों को, उनके विनिर्माण की तारीख से एक वर्ष बीत जाने के पश्चात मैगजीन में तभी रखा जाएगा जब कि किसी विस्फोटक नियंत्रक ने इसके लिए विशेष मंजूरी दे दी हो।
(i) जब ऐसी मंजूरी दे दी गई हो तो प्रत्येक निरीक्षण पर किसी विस्फोटक नियंत्रक से ऐसा लिखित प्रमाणपत्र अभिप्राप्त कर लिया जाए जिसमें दी गई मंजूरी के अंतर्गत आनेवाली अवधि दर्शित की गई हो और ऐसे प्रमाणपत्र के अनुज्ञापिधारी अपने पास रखेगा और मांग की जाने पर प्रस्तुत करेगा।
(ii) जब कोई विस्फोटक मानक शुद्धता का न रह जाने के कारण या द्रवणीकरण या नाइट्रो ग्लाइसीन या द्रव नाइट्रो योगिक के निकल जाने के चिन्ह प्रकट होने के कारण मैगजीन में भण्डारित किए जाने के उपयुक्त नहीं रह जाता है तो अनुज्ञापिधारी अपने ही व्यय पर ऐसे विस्फोटक के निपटारे के लिए ऐसे निदेशों का अनुपालन करेगा जो मुख्य नियंत्रक या विस्फोटक नियंत्रक जारी करें।
Explosives of Class 3 (nitro compound) shall not be kept in the magazine after the expiration of one year from the date of their manufacture except with the special sanction of the Controller of Explosives.
(i) When such sanction has been given, a written certificate showing the period covered by the sanction shall be obtained from the Controller of Explosives at each inspection, and shall be kept by the licensee and produced on demand.
(ii) When an explosive owing to its being no longer of standard purity or owing to signs of liquefaction or of exuded nitro-glycerin or liquid nitro-glycerin or liquid nitrocompound is no longer fit for storage in the magazine or store house the licensee shall comply, at his own expense, with such directions as to its disposal as the Chief Controller or Controller of Explosives may issue.
- मैगजीन के भीतरी भाग या उसमें लगी बेंचें, शेल्फों और उसकी फिटिंग का इस प्रकार सन्निर्माण किया जाएगा या उन्हें इस प्रकार अंतरित या अवतरित किया जाएगा कि विस्फोटक का किसी लोहे या इस्पात के साथ संपर्क रोका जा सके। भीतरी भाग में लगी बेंचें, शेल्फें और फिटिंग यथासाध्य ग्रिट से मुक्त एवं साफ रखे जाएंगे तथा ऐसे विस्फोटक, जो जल से खतरनाक रूप में प्रभावित हो सकते हैं, इस बाबत सम्यक सावधानी बरती जाएगी कि वहां कोई जल मौजूद न रहे : परंतु किसी लोहे या इस्पात के खुले होने के विरुद्ध सावधानी से संबंधित इस शर्त का वह भाग ऐसे किसी भवन में बांधेकर नहीं होगा जिसमें वर्ग 6 (गोला बारूद) के प्रथम के विस्फोटक से भिन्न कोई विस्फोटक रखा गया है।
The interior of the magazine and the benches, shelves and fittings therein shall be so constructed or so lined or covered as to prevent the exposure of any iron or steel contact with the explosives. Such interior, benches, shelves and fittings shall so far as is reasonably practicable, be kept free from grit and shall otherwise be clean; and in the case of any explosives liable to be dangerously affected by water, due precautions shall be taken to exclude water there from; Provided that so much of this condition as relates to precautions against the exposure of any iron or steel shall not be obligatory in a building in which no explosive other than explosive of the 1st Division 6th (Ammunition) Class is kept.
- यदि तडित चालक का परीक्षण विस्फोटक नियंत्रक करता है तो अनुज्ञापिधारी ऐसे परीक्षण के लिए विहित फीस का संदाय करेगा यदि परीक्षण असमाधानकारी साबित होता है तो उतनी ही फीस अनुज्ञापिधारी द्वारा पश्चात्कर्त्त प्रत्येक परीक्षण के लिए तब तक दी जाती रहेगी जब तक कि परीक्षण अधिकारी तडित चालक को समाधानप्रद घोषित नहीं कर देता :
परंतु किसी एक परीक्षण के लिए देय फीस किसी एक दिन के दौरान किसी चालक के किए गए सभी परीक्षणों के लिए प्रभार्य होगा :
परंतु यह और कि यदि दो या अधिक तडित चालक एक ही मैगजीन से संबद्ध हैं तो ऐसे सभी चालकों के परीक्षण के लिए फीस ऐसी किसी फीस से अधिक नहीं होगी जो किसी एक तडित चालक के परीक्षण के लिए हर स्थिति में विहित की गई है।
If the lighting conductor is tested by the Controller of Explosives, the licensee shall pay the fees prescribed for test. In the even of the test proving unsatisfactory, the same fees shall be payable by the licensee for each subsequent test until the lighting conductor is passed by the testing officer as satisfactory:
Provided that the fees payable for a single test shall be charged for all tests made on a conductor during any one day :
Provided further that where two or more lighting conductors are attached to one and the same magazine, the fee for the testing of all such conductors shall not exceed the fee prescribed in this condition for testing a single lighting conductor.
- उपयुक्त तथा जब रहित कार्यकरण वस्त्रों, उपयुक्त जूतों के प्रयोग द्वारा तथा तलाशी लेकर या अन्यथा अथवा ऐसे किन्हीं साधनों द्वारा इस बाबत सम्यक उपबंध किया जाएगा कि फैक्ट्री परिसर में अग्नि, दियासलाई अथवा ऐसी कोई वस्तुएं या पदार्थ, जिससे विस्फोट हो सकता है या आग लग सकती हो, किन्तु इस शर्त के कारण ऐसी संरचना, स्थिति या स्वरूप में किसी कृत्रिम बत्ती का प्रवेश वर्जित नहीं है जिससे आग लगने या विस्फोट होने का खतरा न हो :
परंतु इस शर्त का वह भाग, जो लोहे या इस्पात के अपवर्जन को लागू होता है, ऐसे किसी भवन के संबंध में बाध्य कर नहीं होगा जिससे भिन्न कोई विस्फोटक नहीं रखा गया है।
Due provisions shall be made, by the use of suitable working clothes without pockets, suitable shoes and by searching or otherwise or by such means, for preventing the introduction into danger area of the factory premises of fire, Lucifer matches or any substance or article likely to cause explosion or fire, but this condition shall not prevent the introduction of an artificial light of such construction, position or character as not to cause any danger of fire or explosion:
Provided that so much of this condition as applies to the exclusion of iron or steel, shall not be obligatory in a building in which no explosive other than an explosive of the 1st Division of the 6th (Ammunition) Class is kept.

11. अनुज्ञापितधारी प्ररूप आर.इ.-3 और आर.इ.-4 या आर.इ.-5, जैसी स्थिति हो, में सभी विस्फोटकों का अभिलेख और लेखा रखेगा और विस्फोटक नियम, 2008 के अधीन प्राधिकृत किसी भी अधिकारी के समक्ष उसके द्वारा ऐसा करने की मांग की जाने पर स्टॉक पुस्तक और अभिलेख प्रस्तुत करेगा। स्टॉक पुस्तक विहित प्रोफार्मा में पृष्ठ संख्यांकित होगी।
The licensee shall keep records and accounts of all explosives in Forms RE-3 and RE-4 or RE-5, as the case may be, and exhibit the stock books and records to any of the officers authorised under the Explosives Rules, 2008 whenever such officer may call upon him to do so. The stock books in the prescribed proforma shall be page numbered.
12. परिसरों में कोई परिवर्तन या तबदीली अनुज्ञापन प्राधिकारी के पूर्वानुमोदन बिना नहीं की जाएगी और अनुज्ञापितधारी ऐसी किसी शर्त का अनुपालन करेगा जो इस निमित्त अनुज्ञापन प्राधिकारी विनिर्दिष्ट करें।
No changes or alterations shall be carried out to the premises without prior approval of the licensing authority and the licensee shall comply with any condition that may be specified by the licensing authority in this behalf.
13. मैगजीन सभी समयों पर अच्छी मरम्मत की स्थिति में बनाई रखी जाएगी (या अच्छी हालत में बनाई रखी जाएगी)। यदि किसी कारणवश किसी विस्फोटक के भण्डारण के लिए मैगजीन अनुपयुक्त हो जाती है तो अनुज्ञापितधारी इस बात की सूचना अनुज्ञापन प्राधिकारी को तुरंत देगा।
Magazine shall at all times be kept in state of good repair (or maintained in good condition). The licensee shall report to licensing authority forthwith, if the magazine becomes unfit for storage of any explosives for any reason whatsoever.
मैगजीन का अनुज्ञापितधारी इन नियमों के नियम 24 के उप-नियम 3 के अनुसार त्रैमासिक विवरणी प्रस्तुत करेगा।
The licensee of the magazine shall submit quarterly return as per sub-rules (3) and (4) of rule 24 of these rules.
14. यदि सुरक्षा दूरी का कोई अधिक्रमण होता है तो उसकी सूचना अनुज्ञापन प्राधिकारी को आवश्यक सलाह और कार्यवाही के लिए तुरंत दी जाएगी।
Any encroachment of the safety distance shall be immediately communicated to the licensing authority for necessary advice and action.
15. यदि कोई विस्फोटक विनष्ट हुआ अथवा अनुपयोगी जाया जाता है तो उसकी सूचना अनुज्ञापन प्राधिकारी को, सलाह प्राप्त करने के लिए, तुरंत दी जाएगी।
The licensing authority shall be immediately informed for advice if any explosive is found deteriorated or unserviceable.
16. विस्फोटकों के पैकेटों के चट्टे इस प्रकार लगाए जाएंगे कि कम से कम एक व्यक्ति भण्डार किए गए सभी पैकेजों की हालत की जांच करने और प्रत्येक पैकेज की विनिर्माण विशिष्टियों को पढ़ने के लिए उनके बीच से होकर आ जा सके।
The explosive packages shall be stocked in such a way so as to allow movement of at least one person to check the condition of all packages stored and to read the manufacture particulars of each package.
तड़ित चालकों की भूमि के लिए प्रतिरोध यथासंभव न्यूनतम होगा और किसी भी दशा में 10 ओह्म से अधिक नहीं होगा।
The resistance of the lightning conductor to earth shall be as low as possible and in no case be more than 10 ohms.
17. विस्फोटक के चारों ओर 15 मीटर की दूरी के अंतर्गत कोई शुल्क घास या झाड़ी या ज्वलनशील सामग्री नहीं रहने दी जाएगी।
A distance of 15 meters surrounding the magazine or store house shall be kept clear of dried grass or bush or flammable materials.
18. विस्फोटकों के प्रत्येक पैकेट की, जब उसे मैगजीन के भीतर लिया जा रहा हो, ठीक दशा जानने के लिए परीक्षा की जाएगी।
Every package of explosive at the time of bringing inside the magazine shall be examined for its sound condition.
19. किसी मैगजीन / भंडारगृह में किसी एक समय में चार व्यक्तियों से अधिक को नहीं रहने दिया जाएगा।
Not more than 4 persons shall be allowed inside the magazine or store house at any one time.
20. विस्फोटकों के खाली पैकेजों को शीघ्रतिथीय वहां से हटा दिया जाएगा और नष्ट कर दिया जाएगा।
Empty packages of the explosives shall be removed at the earliest and destroyed.
21. अनुज्ञापितधारी और कर्मचारियों को परिसर के भीतर आपातकाल के दौरान की जाने वाली प्रक्रियाओं से अवगत होना चाहिए।
The licensee and the employee shall be conversant with procedure to be taken during the emergency within the premises.
22. निरीक्षण या नमूना अधिकारी को सभी युक्तियुक्त समयों पर अनुज्ञापन परिसर में अबाध रूप से पहुंचने दिया जाएगा और यह सुनिश्चित करने के लिए कि अधिनियम और इन नियमों के उपबंधों और सुरक्षा स्थितियों को सम्यक्तः अनुपालन किया जा रहा है, अधिकारी को प्रत्येक सुविधा प्रदान की जाएगी।
Free access to the licensed premises shall be given at all reasonable times to any inspecting or sampling officer and every facility shall be afforded to the officer for ascertaining that the provisions of the Act and these rules and the safety conditions are duly observed.
23. यदि अनुज्ञापन प्राधिकारी या विस्फोटक नियंत्रक अनुज्ञापितधारी को अनुज्ञापन परिसरों या मशीनरी, टूल या उपकरण में ऐसी कोई मरम्मत या परिवर्धन या परिवर्तन करने या सिफारिशों को लागू करने को लिखित रूप में सूचित करता है जो परिसर के अंदर या बाहर या व्यक्तियों की सुरक्षा के लिए आवश्यक है, अनुज्ञापितधारी सिफारिशों को निष्पादित करेगा और विनिर्दिष्ट अवधि के भीतर अनुपालन रिपोर्ट ऐसे प्राधिकारी को देगा।
If the licensing authority or a Controller of Explosives informs in writing, the holder of the licence to execute any repairs or to make any additions or alterations to the licensed premises or machinery, tools or apparatus or carry out recommendations, which are in the opinion of such authority may pose unacceptable risk and so necessary for the safety of either on-site or off-site of the premises or persons, the holder of the license shall execute the recommendations and report compliance within the period specified by such authority.
24. अनुज्ञापितधारी मैगजीन में रखने और बिक्री के लिए प्राधिकृत विस्फोटक सूची में उल्लिखित अनुज्ञापन फैक्टरी या कंपनी से प्राधिकृत विस्फोटक / आतिशबाजी या सुरक्षा पल्लोते खरीदेगा।
The licensee shall purchase authorised explosives/ fireworks or safety fuse as mentioned in the list authorised explosives from a licensed factory or company for possession and sale from the magazine.
25. निम्न से अधिक ध्वनि स्तर उत्पादित करने वाले आतिशबाजियों पटाखों की बिक्री और रखने के लिए –
(क) जो फटने की जगह से चार मीटर की दूरी पर है, 125 डी.बी.(ए1) या 145 डी.बी.(सी)पी.के. प्रतिबंधित होंगे;
(ख) श्रृंखला (जुड़े हुए पटाखे) को गठन करने वाले व्यक्तिगत पटाखों के लिए उपर्युक्त उल्लिखित सीमा 5 लॉग₁₀(एन) डी.बी. (सी) पी.के. प्रतिबंधित होंगे;
The possession and sale of fire-crackers generating noise level exceeding;
a) 125 dB(A) or 145 dB(C)pk at 4 meters distance from the point of bursting shall be prohibited;
b) For individual fire-cracker constituting the series (joined fire-crackers), the above mentioned limit be reduced by 5 log₁₀ (N) dB, where N = number of crackers joined together.
26. आग या विस्फोट द्वारा दुर्घटना या नुकसान पटाखों की कमी या चोरी, तुरंत पास के पुलिस थाने और अनुज्ञापन प्राधिकारी और अनुज्ञापन प्राधिकारी के स्थानीय कार्यालय को रिपोर्ट की जाएगी।
Accidents by fire or explosion and losses, shortage or theft of explosives shall be immediately reported to the nearest police station and the licensing authority and local office of the licensing authority.

अतिरिक्त शर्तें / Additional Conditions :

1. अनुज्ञापितधारी विदेशी मूल के आतिशबाजी को न प्रदर्शित करेगा, न रखेगा और न ही उसकी बिक्री करेगा। The licensee shall not exhibit, possess and sell fireworks of foreign origin.

कृते संयुक्त मुख्य विस्फोटक नियंत्रक
For Joint Chief Controller of Explosives
दक्षिणांचल, चेन्नै | South Circle, Chennai

Note :- This is system generated document does not require physical signature. Applicant may take printout for their records.

ANNEXURE 4
COPY OF PANCHAYAT LICENSE



കാരശ്ശേരി ഗ്രാമപഞ്ചായത്തിൽ നിന്നും

1994ലെ കേരള പഞ്ചായത്ത് രാജ് ആക്ട് (1994ലെ 13) 232, 233, 234, 254 എന്നീ വകുപ്പുകളും

അതേ തുടർനുള്ള ചട്ടങ്ങളും അനുസരിച്ച്

ഫാക്ടറികൾ, വ്യാപാരങ്ങൾ, സംരംഭങ്ങൾ, മറ്റു സേവനങ്ങൾ എന്നിവയ്ക്കായി നൽകുന്ന

ലൈസൻസ്

നമ്പർ : SC4-1315/2025

തീയതി : 29/03/2025

ലൈസൻസിയുടെ പേരും മേൽവിലാസവും	M/s പാലക്കൽ ഗ്രാനൈറ്റ് പ്രൊഡക്ട്സ് പ്രൈവറ്റ് ലിമിറ്റഡ്, മാനേജിംഗ് ഡയറക്ടർ, പി.എം. അബൂബക്കർ	
സ്ഥാപനത്തിന്റെ പേരും സ്ഥലനാമവും	പാലക്കൽ ഗ്രാനൈറ്റ് പ്രൊഡക്ട്സ് പ്രൈവറ്റ് ലിമിറ്റഡ്	
ലൈസൻസ് നൽകിയിട്ടുള്ള പ്രവർത്തനങ്ങൾ	ജിയോളജി പെർമിറ്റ് പ്രകാരം പാറ പൊട്ടിച്ച് സംഭരിച്ച് വില്പന നടത്തുന്നതിന്	
കെട്ടിടത്തിന്റെ നമ്പരും വാർഡ് നമ്പരും	കുമാരനെല്ലൂർ വില്ലേജിൽ അൺ സർവ്വേ നം. 153/597,153/598,153/604,153/601,600ൽ പെട്ട 2.4076 ഹെക്ടർ സ്ഥലം	
ലൈസൻസ് കാലയളവ്	01/04/2025 മുതൽ 31/03/2030വരെ	
ഇടപാടാക്കിയ ലൈസൻസ് ഫീസ്	50000 /- രൂപ	രസീത് നം:1240105849 തീയതി: 28/03/2025
തൊഴിൽക്കരം	1250 /- രൂപ	രസീത് നം: 1240105849 തീയതി: 28/03/2025
ലൈസൻസ് അനുവദിക്കുന്നതിനായി ഹാജരാക്കിയ നിരാക്ഷേപപത്രങ്ങളുടെ വിശദാംശങ്ങൾ (നമ്പർ, തീയതി, കാലയളവ്, നൽകിയ അധികാരസ്ഥാനം)	1.Environmental Clearance No. 2439/EC2/2023/SEIAA dtd 14/03/2025,EC Identification Number DC24B0108KL5393223N 2 .Letter of Intent No.5794/M3/2020 dtd 9/2/2021 from Director of Mining and Geology 3.PCB consent No.KSPCB/KZ/ ICO/10099306/2025 dtd 26/03/2025 valid upto 28/02/2030 4. Explosive Licence No.E/SC/KL/22/ 1174(E58573) dtd 20/01/2025 Valid upto31/03/2030 5 Possession Certificate No.152/25 dtd 25/02/2025,138/25 dtd25/2/2025 , 149/2025 dtd 25/02/2025, 142/2025 dtd 25/02/2025 of Village Officer Kumaranellur 6.Mining Mates Certificate of Competency of Anand Shankar Naik 7. Non Assignment certificate no. 146/2025 dtd 25/02/2025 of Village Officer Kumaranellur 8.NOC from Electrical Sub Division Thiruvambady dtd 11/03/2025 9.NOC no. E5 890/2025 dtd 18/03/2025 from EE irrigation Division, KKD മേൽ പറഞ്ഞ സാക്ഷ്യപത്രങ്ങളുടെ കാലാവധി അവസാനിക്കുന്ന മുറയ്ക്ക് പുതുക്കി നൽകേണ്ടതാണ്.അല്ലാത്ത പക്ഷം ലൈസൻസ് കാലാവധി അവസാനിക്കുന്നതാണ്.	



സെക്രട്ടറി
 കാരശ്ശേരി ഗ്രാമപഞ്ചായത്ത്
 KARASSERY GRAMA PANCHAYAT
 PH: 0495 2297172

ലൈസൻസി താഴെപ്പറയുന്ന വ്യവസ്ഥകൾ അനുസരിക്കേണ്ടതാകുന്നു.

1. കേരള പഞ്ചായത്ത് രാജ് ആകും അതേത്തുടർന്നുള്ള ചട്ടങ്ങളും ബൈലോകളും അനുസരിച്ചു പ്രവർത്തിക്കേണ്ടതാകുന്നു.
2. തൊഴിൽസ്ഥലവും അതിലുള്ള സാധനസാമഗ്രികളും പഞ്ചായത്ത് അധികാരികൾക്കോ / സെക്രട്ടറി അധികാരപ്പെടുത്തുന്ന മറ്റ് ഉദ്യോഗസ്ഥർക്കോ പരിശോധിക്കുന്നതിന് ലൈസൻസി വേണ്ട സൗകര്യങ്ങൾ നൽകേണ്ടതും അവർ ആവശ്യപ്പെട്ടാൽ ഈ ലൈസൻസ് കാണിക്കേണ്ടതാകുന്നു.
3. ഏതു സ്ഥലത്തിന്റെ കാര്യത്തിൽ ലൈസൻസ് നൽകിയിരിക്കുന്നുവോ ആ സ്ഥലത്ത് എല്ലാവരും കാണത്തക്കവിധത്തിലുള്ള ഒരു ഭാഗത്ത് ലൈസൻസി തന്റെ പേരും ലൈസൻസിന്റെ നമ്പരും ഉദ്ദേശ്യവും കാണിക്കുന്ന ഒരു അടയാളപ്പെലക വെച്ചിരിക്കേണ്ടതാണ്.
4. പഞ്ചായത്തിൽനിന്നും അനുവാദം സിദ്ധിച്ച ശേഷമല്ലാതെ തൊഴിൽസ്ഥലം മാറ്റാൻ പാടില്ലാത്തതും തൊഴിൽ നിർത്തുന്ന പക്ഷം വിവരം മുൻകൂട്ടി പഞ്ചായത്തിൽ അറിയിക്കേണ്ടതാകുന്നു.
5. തൊഴിൽസ്ഥലവും പരിസരങ്ങളും വൃത്തിയായും സാംക്രമികരോഗാണുക്കൾ ഉണ്ടാകാത്തവിധത്തിലും പൊതുജനോപദ്രവമാകാത്ത വിധത്തിലും വ്യാപാരത്തിനു വെച്ചിട്ടുള്ള ഭക്ഷണപദാർത്ഥങ്ങൾ ഈച്ച, അണുക്കൾ, പൊടി മുതലായവയുടെ ശല്യം ഉണ്ടാകാത്ത വിധത്തിലും സൂക്ഷിക്കേണ്ടതാണ്.
6. ഏതൊരു പ്രവൃത്തിദിവസത്തിന്റെയും ഒടുവിൽ സ്ഥലം വൃത്തിയാക്കേണ്ടതാണ്.
7. ആ സ്ഥലത്തിന്റെയോ പരിസരത്തിന്റെയോ ഏതെങ്കിലും ഭാഗത്ത് വീഴുകയോ നിക്ഷേപിക്കപ്പെടുകയോ ചെയ്യുന്ന ചപ്പുചവറോ മൃഗങ്ങളുടെ അവശിഷ്ടങ്ങളോ മറ്റു പദാർത്ഥമോ ശേഖരിച്ച് സെക്രട്ടറിക്ക് തൃപ്തികരമായ രീതിയിൽ നീക്കം ചെയ്യിക്കേണ്ടതാണ്.
8. ലൈസൻസി ഏതൊരു കെട്ടിടത്തിന്റെയും ചുമരുകളുടെ അകവശത്തിന്റെ ഏതൊരു ഭാഗവും മേൽപ്പറഞ്ഞ പരിസരത്തിലുള്ള തറയും നടപ്പാതയും അവിടെ തെറിപ്പിച്ചിഴാനിടയുള്ള ഏതെങ്കിലും ദ്രാവകമോ, മാലിന്യമോ ചപ്പുചവറോ അസഹ്യവും ഉപദ്രവകരവുമായ ഏതെങ്കിലും പദാർത്ഥമോ അവിടെ ലയിക്കുന്നത് തടയത്തക്കവിധം എപ്പോഴും നന്നായി കേടുപാടു തീർത്തു നിലനിർത്തേണ്ടതാണ്.
9. ലൈസൻസി മേൽപ്പറഞ്ഞ സ്ഥലത്തോ, പരിസരത്തോ അതോടുചേർന്നുള്ള ഏതൊരു ഓവുചാലും അഴുക്കുജലം കളയുന്നതിനുള്ള ഉപകരണവും എപ്പോഴും നന്നായി കേടുപാടുതീർത്തും വെപ്പിക്കേണ്ടതാണ്.
10. അയിത്തം ആചരിക്കുന്ന കടകളുടെ ലൈസൻസ് റദ്ദ് ചെയ്യുന്നതാണ്.
11. ഏതെങ്കിലും തരത്തിലുള്ള ത്വക്ക് രോഗമോ കഷ്യരോഗമോ, വ്രണമോ പകർച്ചവ്യാധികളോ ഉള്ള യാതൊരാളും കച്ചവടം നടത്തുന്നതിന് ഉപയോഗിക്കുന്ന സ്ഥലത്തും പരിസരത്തും പ്രവർത്തിക്കുവാൻ പാടില്ലാത്തതാകുന്നു.
12. നിരോധിത പ്ലാസ്റ്റിക് ഇനങ്ങൾ ഉൽപ്പാദിപ്പിക്കുകയോ ശേഖരിക്കുകയോ വിൽക്കുകയോ കൈകാര്യം ചെയ്യുകയോ പാടില്ല.
13. സ്ഥാപനത്തിന്റെ ബോർഡിൽ സ്ഥലനാമം മലയാളത്തിലും ഇംഗ്ലീഷിലും രേഖപ്പെടുത്തേണ്ടതാണ്.
14. 20 സീറ്റിൽ കൂടുതലുള്ള എല്ലാ ഹോട്ടലുകൾക്കും റെസ്റ്റോറന്റുകൾക്കും ടോയിലെറ്റ് സൗകര്യം ഏർപ്പെടുത്തേണ്ടതാണ്.
15. നിരോധിത ഉൽപ്പന്നങ്ങളായ പാൻമസാല, ഗുഡ്ക തുടങ്ങിയവ സംഭരിച്ചു വെക്കുവാനോ വിൽക്കുവാനോ പാടില്ല.
16. ബാലവേല അനുവദിക്കുവാൻ പാടില്ല.
17. മുകളിൽ കാണിച്ചിരിക്കുന്ന വ്യവസ്ഥകളുടെ ലംഘനം ഈ ലൈസൻസ് റദ്ദ് ചെയ്യുന്നതിന് കാരണമാകാവുന്നതാണ്.
18. പൊതുരേണവകുപ്പിന്റെ 13-06-2020ലെ സ.ഉ. (സാധാ) 1877/2020/പൊ.ഭ.വ. ഉത്തരവു പ്രകാരമുള്ള കോവിഡ് പ്രൊട്ടോക്കോൾ പാലിക്കണം.
19. തദ്ദേശ സ്വയം ഭരണ വകുപ്പിന്റെ 22-07-2017ലെ സ.ഉ.(സാധാ) 2511/2017/ത.സ്വ.ഭ.വ. പ്രകാരമുള്ള ഉറവിട മാലിന്യ സംസ്കരണ സംവിധാനം സ്ഥാപിക്കണം.
20. മറ്റ് വകുപ്പുകളിൽ നിന്നും അനുവദിച്ചിട്ടുള്ള പെർമിഷൻ, ലൈസൻസ്, മറ്റ് ക്ലിയറൻസുകൾ എന്നിവ അതത് സമയങ്ങളിൽ പുതുക്കേണ്ടതാകുന്നു. അല്ലാത്ത പക്ഷം പഞ്ചായത്ത് അനുവദിച്ചിട്ടുള്ള ലൈസൻസ് സ്വമേധയാ റദ്ദാകുന്നതാണ്.

21.



(ഒപ്പ്)
സെക്രട്ടറി
കാരശ്ശേരി ഗ്രാമപഞ്ചായത്ത്

NB. ഈ ലൈസൻസ് ഡിജിറ്റലായി ഒപ്പ് വെച്ചിട്ടുള്ളതാണ് ആയതിനാൽ പ്രത്യേകമായ ഒപ്പും സീലും ആവശ്യമില്ല. ഈ ലൈസൻസ് അവസാനിക്കുന്ന തീയതിക്ക് മുമ്പുള്ള ദിവസത്തിനകം ലൈസൻസ് പുതുക്കുന്നതിനുള്ള അപേക്ഷ സമർപ്പിക്കേണ്ടതാണ്.



KODIYATHUR GRAMA PANCHAYAT

CERTIFICATE OF IFTE & OS LICENSE

(Issued under Section 232 of the Kerala Panchayath
Raj Act 1996)

License No : BFIF04-G111101-00005-2025

1. Licensee Details

[ലൈസൻസ് എടുക്കുന്ന വ്യക്തിയുടെ പേരും വിലാസവും]

Licensee/Organization Name

P M ABOOBACKER MANAGING DIRECTOR P
ALAKKAL GRANITE PRODUCTS PRIVATE LIM
TED

Name in Local Language

Licensee Address

Licensee Contact Details

Phone :

Email :



2. Licensing Place Details

[ലൈസൻസിങ് യൂണിറ്റ് സ്ഥലവും]

Licensing Unit ID/Type

Individual

Details of Licensing Place -

Building no. / Survey no

5 -

003/172/1527,1232,1228,1213,1523,1862,1212,1134,1137,1201,
(1221,1120,1238,1136,1135,1119,2275,1526,1200,1239,1240)

Licensing Unit Name

PALAKKAL GRANITE PRODUCTS PRIVATE LIMITED

**Licensing Unit Name in Local
Language**

പാലക്കൽ ഗ്രാനൈറ്റ് പ്രൊഡക്ട്സ് പ്രൈവറ്റ് ലിമിറ്റഡ്

Licensing Unit Address

THOTTUMUKKAM, THOTTUMUKKAM, 673639

Contact Information

Phone : 8848895014

Email :

3. Licensing Business Activity Details

SI No	Business Category	Type	Sub Type
1	Quarrying, Mining & Extraction	Construction Materials	Granite Quarrying

4. License Validity & Renewal Period

License valid From	License valid to	Renewal period of License	License Fee
24-04-2025	23-04-2030	25-03-2030 - 23-04-2030	75000.00



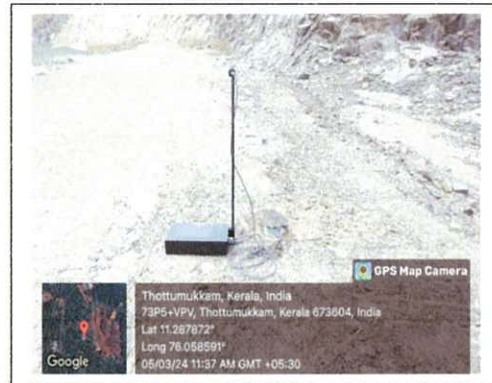
The Govt. vide G.O.(Ms) No.202/2012/LSGD dated 25/07/2012 has approved this certificate as a valid document for all official purposes.
The License No. is unique to each license. Authenticity of this certificate can be verified at www.ksmart.lsgkerala.gov.in
See overleaf for license terms and conditions.

ലൈസൻസ് നിബന്ധനകൾ

1. കേരളാ പഞ്ചായത്ത് രാജ് ആക്ടിലെ ലൈസൻസ് സംബന്ധിച്ചുള്ള വ്യവസ്ഥകളും മറ്റു പൊതു വ്യവസ്ഥകളും അതത് സമയങ്ങളിലെ ചട്ടങ്ങളും, പഞ്ചായത്തിന്റെ ബൈലോയിലെ നിബന്ധനകളും ഉത്തരവുകളും ലൈസൻസി പാലിക്കേണ്ടതാണ്.
2. ലൈസൻസ് സർട്ടിഫിക്കറ്റ് സ്ഥാപനത്തിൽ പ്രദർശിപ്പിച്ചിരിക്കേണ്ടതാണ്.
3. സ്ഥാപനത്തിന്റെ ബോർഡിൽ സ്ഥലനാമം ഇംഗ്ലീഷിലും മലയാളത്തിലും രേഖപ്പെടുത്തേണ്ടതാണ്.
4. സ്ഥാപനവും പരിസരവും ശുചിയായി സൂക്ഷിക്കേണ്ടതാണ്.
5. സ്ഥാപനത്തിൽ ഉണ്ടാകുന്ന മാലിന്യങ്ങൾ തരം തിരിച്ചു സൂക്ഷിക്കേണ്ടതും ജൈവ മാലിന്യങ്ങൾ സംസ്കരിക്കുന്നതിന് സ്വന്തമായി സംവിധാനങ്ങൾ ഒരുക്കുകയോ പഞ്ചായത്ത് ഏർപ്പെടുത്തുന്ന ഏജൻസിക്ക് കൈമാറുകയോ ചെയ്യേണ്ടതും, അജൈവ മാലിന്യങ്ങൾ ഹരിത കർമ്മ സേനയ്ക്കോ, പഞ്ചായത്ത് ഏർപ്പെടുത്തുന്ന മറ്റു ഏജൻസിക്കോ കൈമാറേണ്ടതുമാണ്.
6. മനുഷ്യാപയോഗത്തിനുള്ള ഭക്ഷണ പദാർത്ഥങ്ങളിൽ മാത്രം ചേർക്കുകയോ, മനുഷ്യാരോഗ്യത്തിന് ഹാനികരമായതും പഴകിയതും മനുഷ്യാപയോഗ യോഗ്യമല്ലാത്തതുമായ ഭക്ഷണ പദാർത്ഥങ്ങൾ വില്പനയ്ക്കായി സൂക്ഷിക്കുകയോ, മാലിന്യങ്ങൾ കലരുന്ന വിധത്തിൽ അനാരോഗ്യകരമായ സാഹചര്യത്തിൽ ഭക്ഷണ പദാർത്ഥങ്ങൾ സൂക്ഷിക്കുകയോ ചെയ്യാൻ പാടില്ലാത്തതാണ്.
7. ഭക്ഷണ പദാർത്ഥങ്ങൾ കൈകാര്യം ചെയ്യുന്നവർക്ക് നിർബന്ധമായും ഹെൽത്ത് കാർഡ് ഉണ്ടായിരിക്കേണ്ടതാണ്.
8. പകർച്ചവ്യാധികൾ പിടിപെട്ടവരെ സ്ഥാപനത്തിൽ ജോലിക്കായി നിയോഗിക്കാൻ പാടില്ലാത്തതാണ്.
9. നിരോധിത പ്ലാസ്റ്റിക് ഉത്പന്നങ്ങൾ സ്ഥാപനത്തിൽ സൂക്ഷിക്കുകയോ വിൽക്കുകയോ ചെയ്യാൻ പാടില്ലാത്തതാണ്.
10. ജീവനക്കാർക്കും പൊതുജനങ്ങൾക്കും പ്രാഥമിക ആവശ്യങ്ങൾക്കുള്ള നിയമപരമായ സൗകര്യങ്ങൾ സ്ഥാപനത്തിൽ ഏർപ്പെടുത്തേണ്ടതാണ്.
11. സെക്രട്ടറിയോ സെക്രട്ടറി ചുമതലപ്പെടുത്തുന്ന ഉദ്യോഗസ്ഥനോ ഏതു സമയത്തും സ്ഥാപനം പരിശോധിക്കുന്നതിന് സൗകര്യം ഒരുക്കേണ്ടതാണ്.
12. വിദ്യാഭ്യാസ സ്ഥാപനങ്ങൾക്ക് നൂറു വാർ ചുറ്റളവിൽ പുകയില ഉത്പന്നങ്ങൾ വിൽക്കാൻ പാടില്ലാത്തതാണ്. പുകയില നിരോധന നിയമ (COTPA 2003) പ്രകാരമുള്ള എല്ലാ നിബന്ധനകളും ലൈസൻസി പാലിക്കേണ്ടതാണ്.
13. മലിനീകരണ നിയന്ത്രണ ബോർഡിന്റെയും മറ്റു ഏജൻസികളുടെയും ഡിപ്പാർട്ട് മെന്റുകളുടെയും അനുമതികളിൽ നിർദ്ദേശിച്ചിട്ടുള്ള വ്യവസ്ഥകൾ പാലിച്ചു മാത്രമേ സ്ഥാപനം പ്രവർത്തിപ്പിക്കുവാൻ പാടുള്ളൂ.
14. ലൈസൻസ് അനുവദിക്കുന്നതിനായി സമർപ്പിച്ചിട്ടുള്ള വിവിധ ഡിപ്പാർട്ട്മെന്റുകളുടെ നിരാക്ഷേപ പത്രങ്ങൾ, അനുമതികൾ എന്നിവ യഥാസമയം പുതുക്കേണ്ടത് ലൈസൻസിയുടെ ഉത്തരവാദിത്വം ആയിരിക്കുന്നതും അപ്രകാരം പ്രവർത്തിക്കാത്ത പക്ഷം ലൈസൻസിന് നിയമ സാധുത ഉണ്ടായിരിക്കുന്നതുമല്ല.
15. ലൈസൻസ് അവസാനിക്കുന്ന തീയതിക്ക് മുമ്പായി ലൈസൻസ് പുതുക്കുന്നതിനുള്ള അപേക്ഷ ഓൺലൈൻ ആയി സമർപ്പിക്കേണ്ടതാണ്.
16. കാലാകാലങ്ങളിൽ കേന്ദ്ര-സംസ്ഥാന പ്രാദേശിക ഗവൺമെന്റ് ഏർപ്പെടുത്തുന്ന നിരോധനങ്ങളും നിയമങ്ങളും നിർദ്ദേശങ്ങളും ലൈസൻസി അനുസരിക്കേണ്ടതാണ്.
17. ലൈസൻസ് വ്യവസ്ഥകൾ ലംഘിക്കുന്ന പക്ഷം കേരളാ പഞ്ചായത്ത് രാജ് ആക്ട് സെക്ഷൻ 232, 233 പ്രകാരവും, മറ്റു ബന്ധപ്പെട്ട വകുപ്പുകൾ പ്രകാരവും, 1996- ലെ കേരള പഞ്ചായത്ത് രാജ് (വ്യവസായങ്ങൾക്കും ഫാക്ടറിശ്ശിക്കും വ്യാപാരങ്ങൾക്കും സംരംഭക പ്രവർത്തനങ്ങൾക്കും മറ്റു സേവനങ്ങൾക്കും ലൈസൻസ് നൽകൽ) ചട്ടങ്ങൾ പ്രകാരവും സ്ഥാപനത്തിന്റെ പ്രവർത്തനം നിർത്തി വയ്ക്കുന്നതിനോ ആയതു പരിഹരിക്കുന്നതിന് ആവശ്യമായ നടപടികൾ സ്വീകരിക്കുന്നതിനോ സെക്രട്ടറി ആവശ്യപ്പെടുന്ന പക്ഷം ആയതു ലൈസൻസി അനുസരിക്കേണ്ടതാണ്. അല്ലാത്തപക്ഷം സ്ഥാപനം ഡിപ്പാർട്ട്മെന്റിൽ ആയി അടച്ചു പൂട്ടുന്നതാണ്. കൂടാതെ പ്രോസിക്യൂഷൻ നടപടിക്ക് വിധേയൻ ആകുന്നതിനോ സെക്രട്ടറി ചുമത്തുന്ന പിഴ ഒടുക്കുന്നതിനോ ലൈസൻസി ബാധ്യസ്ഥൻ ആയിരിക്കുന്നതാണ്.

ANNEXURE 5
COPY OF VIBRATION REPORT

A REPORT
ON
ASSESSMENT OF EFFECT BLAST INDUCED GROUND
VIBRATIONS FROM BUILDING STONE QUARRY OF M/s.
PALAKKAL GRANITE PRODUCTS PRIVATE LIMITED IN
KODIYATHUR & KUMARANELLUR VILLAGES, KOZHIKODE –
TALUK & - DISTRICT OF KERALA ON THE SURROUNDINGS
(CONSULTANCY PROJECT CODE: NITK/MN/2023-24/0019)



SUBMITTED TO:
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March 22, 2024

Recipient of : IE (India) Young Engineer Award,
MGMI Engineering Gold Medal
MEAI-SRG IT Award,

ISTE –SGSITS Young Teacher Award,
IE-NDRF-National Design Award
MEAI- Smt. Kiran Devi Singhal Memorial Award

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ABSTRACT

Palakkal Granite quarry is being operated by Sri. P.M. Aboobacker in Re Survey Block No. 003, Re Survey Nos. 172/1527, 172/1232, 172/1228, 172/1213, 1523, 1862, 172/1212, 172/1134, 172/1137, 172/1201, 172/1221, 172/1120, 172/1238, 172/1136, 172/1135, 172/1119, 172/2275, 172/1526, 172/1200, 172/1239, 1240 of Kodiyathur Village & Re Survey Block No: 001, Un Survey Nos: 153/597, 153/598, 153/604, 153/601, 600 of Kumaranellur Village, Kozhikode -Taluk & Dist, Kerala, with a total lease area of 10.1903 Ha. Hard rock formation has to be excavated in this stone quarry using drilling and blasting methodology. Mr. Aboobacker has approached National Institute of Technology Karnataka (NITK) Surathkal (under Ministry of Education, Govt. of India) with a request to conduct the vibration study as the State Environment Impact Assessment Authority (SEIAA) has asked the quarry management to submit a report on blast vibration studies to evaluate the zone of influence and impact of blasting on the neighborhood.

Entire quarry area and surroundings were inspected. There is a house owned by Mr. Chacko Poonamkavil house at a distance of 105m from lease boundary in south west direction and another house owned by Ms. Nabeesa in south east direct at a distance 150 from lease boundary, other structures are at a longer distance than these. There is an office building and workmen quarters belongs to the quarry owner only. As per Director General of Mines Safety (DGMS) guidelines (DGMS Circular No: 07/1997 Dt: 29-08-1997), such structures / houses can be assigned a permissible Peak Particle Velocity (PPV) of 5 mm/s which are not belonging to the owner and 10 mm/s which are belonging to the owner, irrespective of frequency.



Blastholes of 32mm diameter drilled by hand held Jackhammer drills for the studies. Depth of Blastholes was 5feet (1.5m) in all blast rounds with 1.22m burden and 1.22m spacing. Number of blastholes per round varied from 10 to 32, covering different locations in the quarry lease area. 25mm diameter cartridged explosives are used as explosive charge. Explosive charge per hole varied from 375 to 500gm. NONEL based shocktube detonators are used for inhole as well as surface initiation. Maximum charge per delay is same is charge per hole as each hole is provided with individual delay. Total explosive charge varied from 3.75kg to 16.0kg during the scientific study.

In total, 6 blasts were conducted and ground vibrations & noise levels were recorded for all the blasts using 4 instruments covering 24 locations. The highest Peak Particle Velocity (PPV) recorded was 3.50mm/s at a distance of 50m in Blast No. 6 and at a distance of 60m in Blast No. 1 also the same PPV was recorded. The next highest PPV was 3.44mm/s at a distance of 55m in Blast No. 5. The remaining all the values are less than 3mm/s, in fact all the PPV values are less than 1mm/s beyond 100m except in one case (Blast No: 5). No vibration was recorded at the crusher unit as well as at the houses.

The highest noise level recorded is 118.4dB at a distance of 80m in Blast No. 2, the second highest was 116.6dB in Blast No. 6 at a distance of 50m from blast location. At many locations the noise level was less than 100dB, which is insignificant. Fly Rock is observed upto a distance of 30 to 40m from blast site within quarry area only and it was within the blast vicinity of 10m with muffling arrangement using sand bags. Fragmentation was also found to be uniform, no excessive breakage of the rock mass and no damage to the rock mass. The study revealed that there is no effect of blasting on the existing structures around the quarry.



1. INTRODUCTION

Mr. P.M. Aboobacker – Managing Director of M/s. Palakkal Granite Products Private Limited is operating a Granite Quarry in Re Survey Block No. 003, Re Survey Nos. 172/1527, 172/1232, 172/1228, 172/1213, 1523, 1862, 172/1212, 172/1134, 172/1137, 172/1201, 172/1221, 172/1120, 172/1238, 172/1136, 172/1135, 172/1119, 172/2275, 172/1526, 172/1200, 172/1239, 1240 of Kodyathur Village & Re Survey Block No: 001, Un Survey Nos: 153/597, 153/598, 153/604, 153/601, 600 of Kumaranellur Village, Kozhikode -Taluk & Dist, Kerala, with a total lease area of 10.1903 Ha. Mr. Aboobacker has approached National Institute of Technology Karnataka (NITK) Surathkal (under Ministry of Education, Govt. of India) with a request to conduct the vibration study as the State Environment Impact Assessment Authority (SEIAA) has asked the quarry management to submit a report on blast vibration studies to evaluate the zone of influence and impact of blasting on the neighbourhood. In view of this, the study is taken up with the following objectives.

Objectives

It is proposed to conduct the scientific study with the following objectives:

- a. To carry out preliminary reconnaissance survey in and around the quarry.
- b. To inspect the surrounding structures.
- c. To conduct blasts at different locations.
- d. To monitor the intensity of ground vibrations due to blasting operations at different distances / important structures.
- e. To analyze the data generated during field investigations and to assess the effect of blasting operations on the surroundings.
- f. To suggest suitable recommendations for safe blasting operations,



To achieve the above objectives, the following methodology is followed.

Methodology

- A preliminary reconnaissance survey was done.
- A pre-blast survey was carried out
- Six blasts were conducted at different locations in the quarry with different blast configurations.
- Ground vibrations generated from blasting operations were monitored with four units of ground vibration monitors at different locations.
- The data was analyzed and conclusions were drawn based on the field investigations.

2. ROCK BLASTING

Explosive energy is the most common form of energy used for fragmenting the hard rock mass in mines and quarries, which is in general called as 'Rock Blasting'. Usage of explosive energy, in addition to fragment and displace the intact rock mass, is always associated with some adverse side effects like ground vibrations, air blast and fly rock. Ground vibrations cause damage to structures and annoyance to residents in neighbouring areas, in case the intensity is above threshold values. Threshold value of ground vibration varies for different types of structures. Noise caused due to blasting operations may cause rattling and breaking of window panes if the intensity is above threshold levels. Fly rock is another major problem associated with blasting operations. Fly rock may cause damage to structures in the vicinity and may also result in serious accidents if proper care is not taken. In some cases, fly rock problem may lead to the closure of mining operations as well, due to the dangers involved. Necessary care must



be taken by the mine/quarry management in executing the blasting operations to control these side effects.

Ground Vibrations

When an explosive charge is detonated in a blasthole, strain waves are generated in the surrounding rock mass carrying huge quantity of energy. This energy generates cracks and fractures in the strata due to various breakage mechanisms such as crushing, radial cracking, reflection breakage etc. Combined, the crushed and fractured zones encompass a certain volume of permanently deformed rock. When the intensity of strain waves diminishes to the level where no permanent deformation occurs in the rock mass, i.e., beyond the fragmentation zone, strain waves propagate through the strata in the form of elastic waves. These waves in the elastic zone are known as ground vibrations. Two groups of seismic waves are generated by the detonation of explosive charges in blastholes. They are classified as body waves and surface waves. Body waves travel through the interior of earth. Ground vibration waves are of two types, Primary (P-wave) and Secondary (S-wave). Surface waves generate when the radiating body waves impinge on a stress-free plane, like surface or any discontinuity. These waves travel along the surface and discontinuities. Rayleigh waves are the best-known surface waves and include both dilation and distortion of the medium. Surface waves carry maximum percentage of the radiated energy and are predominant at longer distances from the blast source, since their attenuation rate is slower than body waves. In addition, the frequency of surface waves is lower than body waves and frequently found to be in the range most favourable for structural response (Holloway et al., 1983). All these waves are characterized by exponential decrease in particle oscillation amplitude as distance from energy source increases (Taqueddin, 1982). Fig. 2.1 shows the effect of ground vibration waves on the structures.



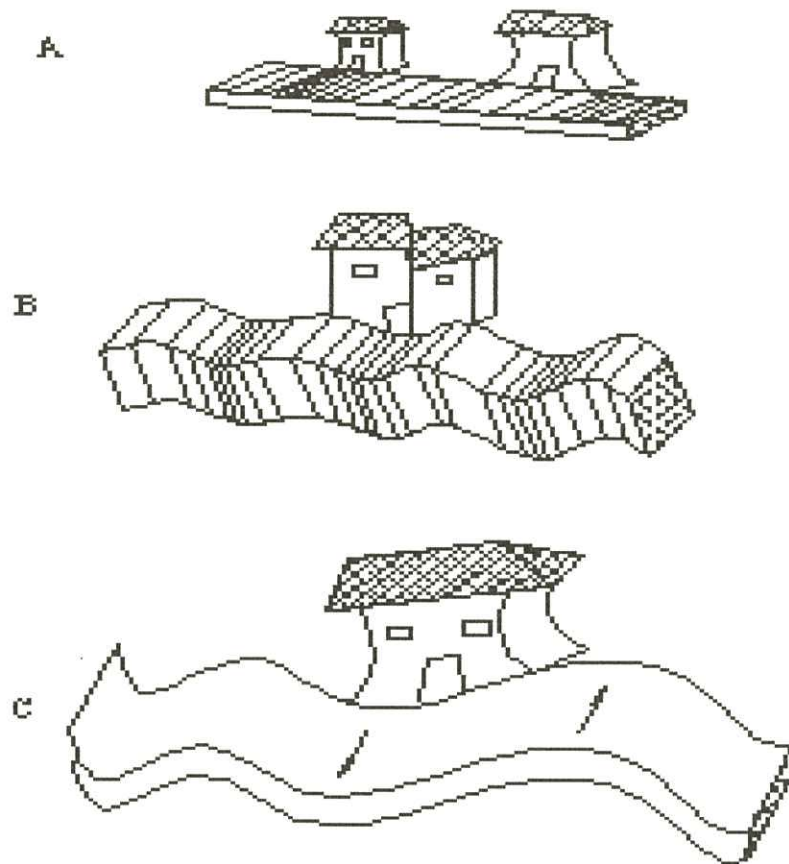


FIG. 2.1 EFFECT OF BODY WAVES AND SURFACE WAVES

- a. Longitudinal wave
- b. Rayleigh wave
- c. Transverse wave

Parameters and Propagation

Whenever blast vibration occurs, it vibrates the ground/soil particle with certain velocity and imparts to it certain amount of acceleration. Intensity of ground vibrations is, therefore, quantified as displacement that varies with time (in terms of 'mm'), acceleration (in terms of 'g') and/or particle velocity (in terms of 'mm/s') at particular ground locations (Duvall and Fogelson, 1962). Wiss and Linehan (1978) made extensive studies to evaluate the influence of 14 blast variables considered to be having an influence on the amplitude of

ground vibrations. They found that charge weight per delay and length of delay to be having the most significant influence on the intensity of ground vibrations (Table – 2-1).

Various other researchers have studied the influence of various parameters on the performance of blast in general and on ground vibrations in particular. Ram Chandar (2010) found that the influence of initiation system along with blast pattern also plays a major role on blast performance, which is a combination of two parameters.

TABLE – 2.1 PARAMETERS INFLUENCING GROUND VIBRATIONS
(Wiss and Linehan, 1978)

Parameter	Influence on PPV		
	Significant	<i>Moderately Significant</i>	Insignificant
A. Controllable Variables			
1. Charge Weight per Delay	✓		
2. Length of Delay	✓		
3. Burden and Spacing		✓	
4. Stemming Amount		✓	
5. Type of Stemming			✓
6. Charge Length and Diameter			✓
7. Angle of Borehole			✓
8. Direction of Initiation		✓	
9. Charge Weight per Blast			✓
10. Charge Depth			✓
11. Bare Vs. Covered Detonating Cord			✓
B. Uncontrollable Variables			
1. General Surface Terrain			✓
2. Type and Depth of Overburden		✓	✓
3. Wind			✓



Damage Levels

In India, the Directorate General of Mines Safety (Government of India) suggested safe limits of ground vibrations for different categories of structures, with frequencies of <8Hz, 8-25Hz and >25 Hz, respectively. Details of the permissible ground vibration standards given by DGMS are given in Table – 2.2.

TABLE – 2.2 PERMISSIBLE PPV LEVELS RECOMMENDED BY DGMS, INDIA
(Anon, 1997)

Type of Structure	Dominant Excitation Frequency		
	<8Hz	8-25 Hz	>25 Hz
A. Buildings/Structures not belonging to the owner			
Domestic Houses/ Structures / Kuchha Brick & Cement)	5	10	15
Industrial Buildings (RCC and framed structures)	10	20	25
Objects of Historical Importance & Sensitive Structures	2	5	10
B. Buildings/structures belonging to the owner with limited span of life			
Domestic Houses/Structures (kuchha, brick & cement)	10	15	25
Industrial Buildings (RCC & framed structures)	15	25	50

Human Response to Ground Vibrations

Human beings are far more sensitive to ground vibrations and noise than the structures. People tend to complain about ground vibrations even below the accepted damage levels because of many reasons. In fact, the threshold of a complaint for an individual depends on his health, fear of damage, relationship with mine management, frequency of blasting, duration of vibration



etc. Informing neighbours about the blasting operations, time schedule and necessity, often results in an increase in the tolerance levels and fewer complaints. *As a matter of fact, the human perception of ground vibrations is as low as 1mm/s.* It is reported that if the attitude of local people is hostile towards mine management, the tolerance level could be well below 2.5mm/s, much below the accepted level of damage. This is due to the fact that human beings are far more sensitive to ground vibrations than the structures. It is, therefore, essential to clarify the actual situation to the people in the neighbourhood by real time monitoring of the ground vibrations.

Air Over-Pressure / Noise

Noise generated due to the blasting operations is known as air over-pressure / air blast. Noise is the audible part of the air blast, whose frequency ranges between 22 to 20 kHz. Whenever an explosive charge is detonated in a blasthole, rapidly expanding gases apply pressure to the surrounding air medium resulting in a shock wave. This shock wave travelling into the atmospheric air is known as air blast / noise. Air blast is generated in several ways – by venting of gas energy into atmosphere as the rock mass breaks, blowing out of stemming material, displacement of rock face, displacement of strata around blastholes, ground vibration and the explosive in the trunklines.

The impact of air blast / noise on the surroundings, human beings and other structures or buildings depends on the intensity and duration of air blast incidence at the receiving end. Normally at air blast levels below 130dB, the typical structural response is a clearly audible rattle. This rattling effect mainly is from windows, doors and other objects standing on shelves. When the intensity increases to about 152dB, window breakage may begin. Most of the glass



window panes may break at an intensity of 172dB and structural damage may occur at a noise level of 182 dB or greater. However, the noise generated due to properly conducted blasting operations does not exceed 120dB at a distance of 150-200m. Application of effective initiating systems like shock tube system further reduces the noise levels.

The glass window panes may break at much lower pressures of about 1.0 psi than needed for structural damage such as cracking of plaster (>2.0 psi). Therefore, the glass damage is a prior indication of structural damage. US Bureau of Mines (Nicholls et al., 1971) suggested an over pressure of 164 dB as a safe limit for glass breakage. Later, Siskind and Summer (1974) summarized their results of air blast studies as shown in Table-2.3.

Air blast / Air Over-pressure can do no damage if the intensity is within limits as indicated above. The effects of air blast could be categorized into two zones – Near Field and Far Field. In near field zone, the sound is transmitted directly from the blast site to target. The potential for damage is limited. Good planning of the blast round and use of shock tube system of initiation minimizes the damage potential. Under temperature inverse conditions, the sound may concentrate or focus in a far field narrow region and produce much higher sound levels than in adjacent regions on either side of which may even have no sound, due to the presence of denser air near ground. Wind can be a significant factor in air blast focusing. On the downward side, the wind velocity will add to the velocity effect produced by inversion and further increases the sound velocity. On upward side, the wind velocity will oppose inversion velocity effect and decreases the sound velocity. Air blast focusing can result from the combination of an atmospheric temperature inversion and wind. In normal atmospheric conditions, the temperature decreases with height and the sound waves have a tendency to



travel upwards faster. The intensity may be similar to the variation with horizontal distance under inverse atmospheric conditions.

TABLE – 2.3 EFFECT OF AIR BLAST ON ORDINARY STRUCTURES

Over Pressure Level		Air Blast Effect
dB	kPa	
177	14.00	All windows break
170	6.30	Most windows break
150	0.63	Some windows break
140	0.20	Some large plate glass windows may break, disks and loose windows rattle
136	0.13	USBM interim limit of allowable air blast
128	0.05	Complaints likely

It is a fact that in most of the cases, complaints about blasting operations are lodged based on the sound generated, rather than due to the ground vibrations. Even feeble sound felt by a person causes psychological impact about blasting operations, as the activity is associated with explosives and explosive means something to do with danger. Necessary care should be taken to minimize the noise levels near the nearby villages in order to avoid complaints.



3. FIELD INVESTIGATIONS

This section gives the details of quarry, pre-blast survey and the details of the blasts conducted etc.

About the Quarry

Building Stone Quarry of M/s. Palakkal Granite Products Private Limited is located in Re Survey Block No. 003, Re Survey No. 172/1527, 172/1232, 172/1228, 172/1213, 1523, 1862, 172/1212, 172/1134, 172/1137, 172/1201, 172/1221, 172/1120, 172/1238, 172/1136, 172/1135, 172/1119, 172/2275, 172/1526, 172/1200, 172/1239, 1240 of Kodyathur Village & Re Survey Block No: 001, Un Survey Nos: 153/597, 153/598, 153/604, 153/601, 600 of Kumaranellur Village, Kozhikode -Taluk & Dist, Kerala, with a total lease area of 10.1903 Ha. A field visit was made in the first week of March. 2024 and first reconnaissance survey was made. A broad view of the quarry is shown in Fig. 3.1. Hard granite is being extracted using benching method. A close view of the quarry is shown in Fig. 3.2.

Pre- Blast Survey

Entire quarry area and surroundings were inspected. There is a house owned by Mr. Chacko Poonamkavil house at a distance of 105m from lease boundary in south west direction (Fig. 3.3) and another house owned by Ms. Nabeesa in south east direction at a distance of 150m from lease boundary (Fig. 3.4), other structures are at a longer distance than these. There is an office building and workmen quarters belongs to the quarry owner only. 500m radius plan from the lease boundary is shown in Fig. 3.5. The structures are at different elevations compared to blast locations, i.e., there is considerable level difference between the blast locations and structures. As per Director General of Mines Safety (DGMS) guidelines, such



structures / houses can be assigned a permissible Peak Particle Velocity (PPV) of 5 mm/s which are not belonging to the owner and 10 mm/s which are belonging to the owner, irrespective of frequency.



FIG. 3.1 A BROAD VIEW OF THE QUARRY



FIG. 3.2 (A)

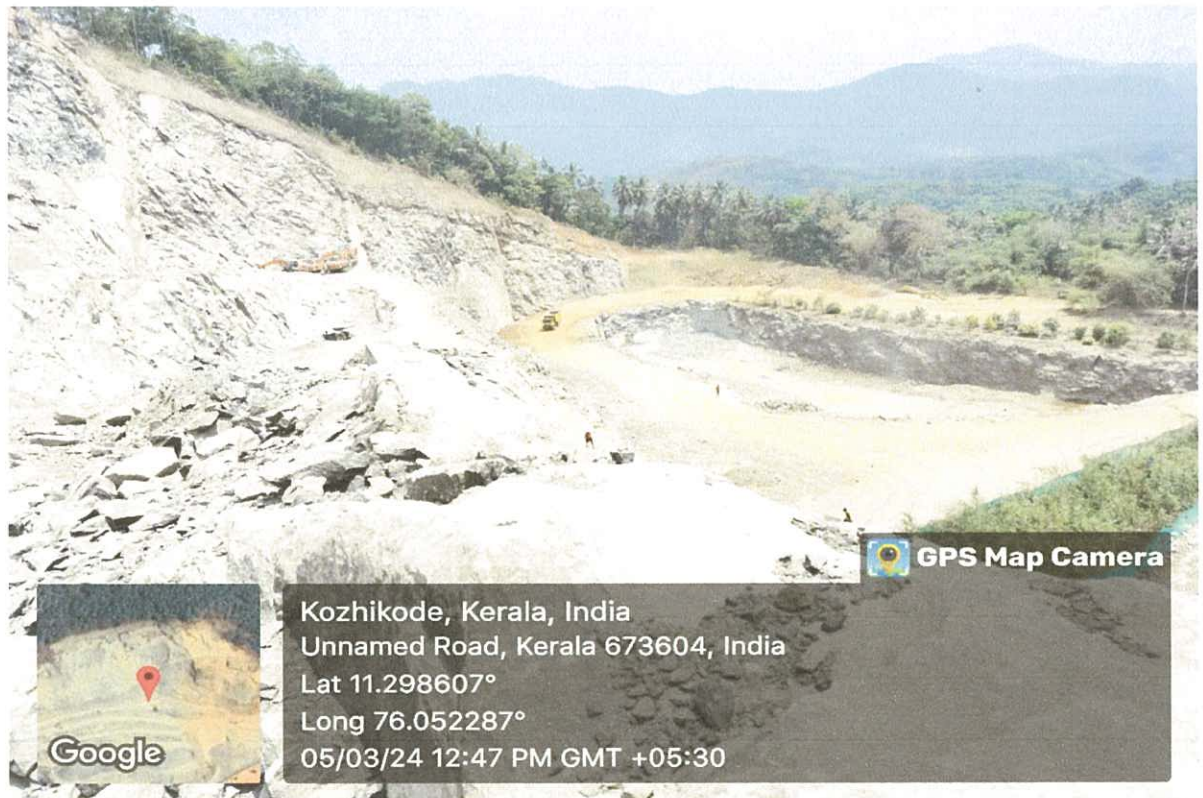


FIG. 3.2 (B)

FIG. 3.2 A CLOSE VIEW OF THE ROCKMASS IN THE QUARRY



FIG. 3.3 A VIEW OF HOUSE OF MR. CHACKO JOSEPH POONAMKAVIL



FIG. 3.4 A VIEW OF HOUSE OF MS. NABEESA

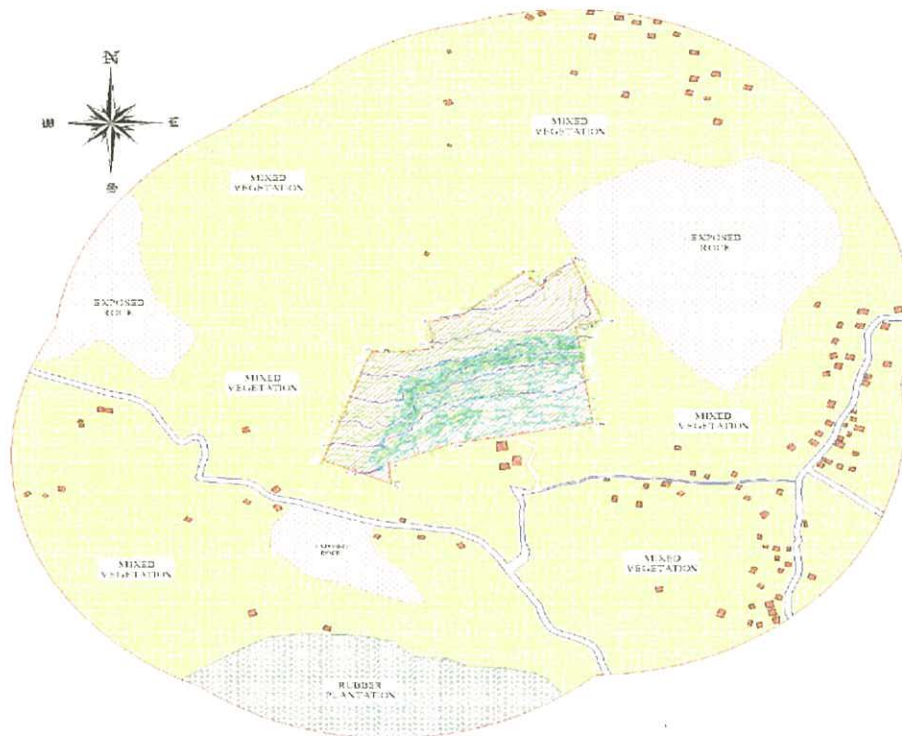


FIG. 3.5 SURFACE PLAN SHOWING THE QUARRY AREA AND THE SURROUNDINGS UPTO 500m FROM THE LEASE BOUNDARY

Blasting Operations

Field investigations are carried out to assess the intensity of ground vibrations generated due to blasting operations and their impact on the nearby structures. Blasts are planned in different locations of the quarry. 32mm diameter holes are drilled with jackhammer for a depth of 1.52m (5 feet) with varied burden and spacing 1.22.x 1.22m (4feet x 4 feet). Once the blastholes are ready, these holes are charged with 25mm diameter explosive cartridges, weighing 125gm each (Fig. 3.6). NONEL based Shocktube detonators are used as in hole as well as for trunk line delay initiation (Fig. 3.7). Required number of cartridges are placed in the blasthole along with shocktube (Fig. 3.8) and the remaining depth is filled with inert material and effective stemming is done (Fig. 3.9). Muffling arrangement with sand bags is shown in Fig. 3.10, which reduces the fly rock drastically. Fragmented material from a typical blast is shown in Fig. 3.11.



FIG. 3.6 A VIEW OF EXPLOSIVES USED IN THE QUARRY



FIG.3.7 A VIEW OF NONEL BASED SHOCKTUBE DETONATORS



FIG.3. 8 A VIEW OF CHARGING OF THE BLAST HOLE



FIG. 3.9 A VIEW OF STEMMING OF THE BLAST HOLE



FIG. 10 MUZZLING ARRANGMENT WITH SAND BAGS



FIG. 3.11 FRAGMENTED MATERIAL FROM A TYPICAL BLAST

Ground Vibration Monitoring

Instruments Used:

Ground vibrations & Noise generated from different blasts were monitored using One unit of Micromate, one unit of Minimate Plus of Instancel, Canada, One unit of Real Wave Analyser-SV Corporation- South Korea and one unit of SViB1 Vibrometer. Geophone of these blast vibration monitors records the ground vibrations in three mutually orthogonal directions - Longitudinal, Transverse and Vertical. Geophones of these instruments were set to their minimum trigger level (0.51mm/s). This indicates that the instrument will start monitoring ground vibrations if the intensity is more than the trigger level, which is its lowest possible measuring value.

Monitoring:

Geophone of the ground vibration monitors was glued to the ground effectively using Plaster of Paris (PoP) powder. Microphone attached to the same unit will measure the noise levels. Intensity of ground vibrations and noise was measured at different locations and at different directions from the blasts location (Fig. 3.12). One instrument was fixed at the crusher unit but no vibration was recorded (Fig. 3.13). Monitoring was also done at the house of Mr. Chacko Poonamkavil (Fig. 3.14) and at the house of Ms. Nabeesa (Fig. 3.15), no vibration was recorded at both the houses. There is a deep valley of around 20m between the quarry lease and the house of Mr. Chacko Poonamkavil so vibration propagation cannot not reach the house. This valley is all around the lease boundary in south and south east directions. Location of blasts along with monitoring points are shown in Fig. 3.16. Details of all the blasts conducted are given in



Table-3.1. Summary of the blasts monitored are given in Table-3.2. Layouts of all the blasts are given in Appendix- III and Blast event sheets are given in Appendix- IV.

Post Blast Survey

As no vibration was recorded at the structures/houses, so there is no possibility of any damage to any structures which were mentioned in pre-blast survey.



FIG. 3.12 (A)



FIG. 3.12 (B)



FG. 3.12 (C)



FIG. 3.12 (D)

FIG. 3.12 GROUND VIBRATION & NOISE MONITORING AT DIFFERENT LOCATIONS WITHIN THE QUARRY AREA



FIG. 3.13 GROUND VIBRATION MONITORING NEAR THE CRUSHER UNIT/SHED

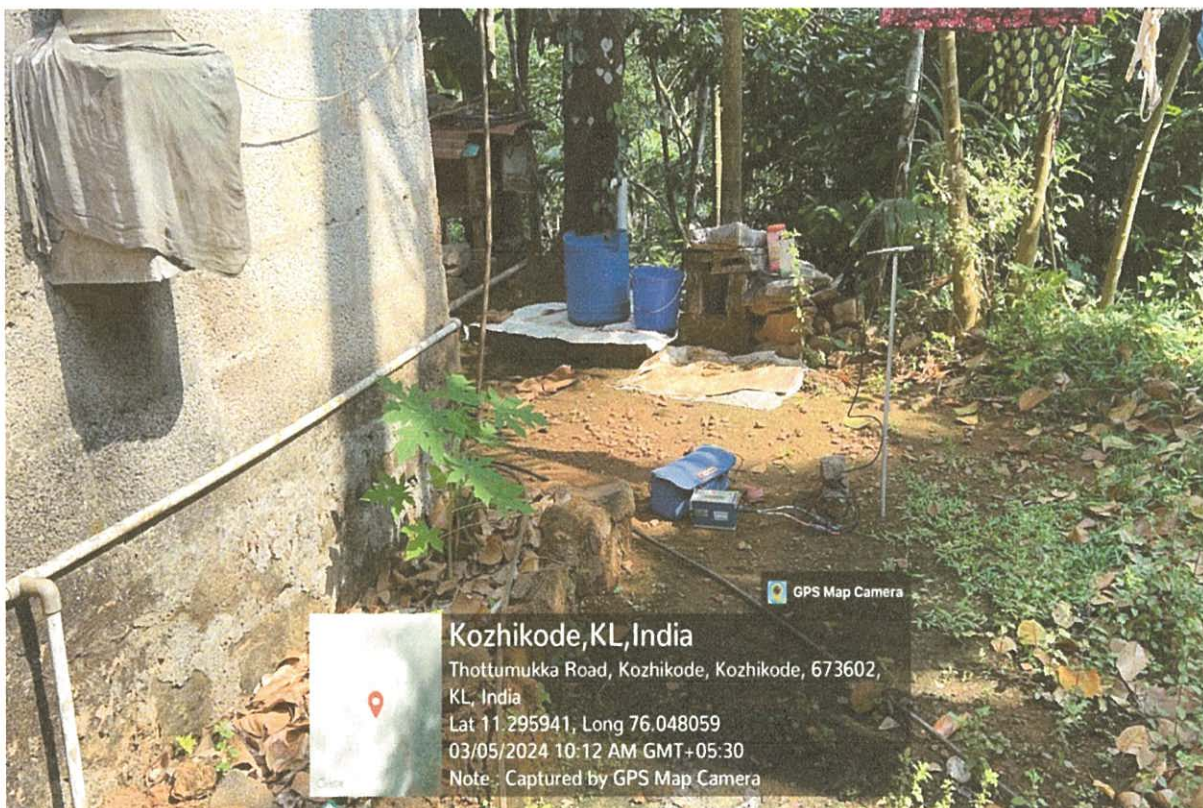
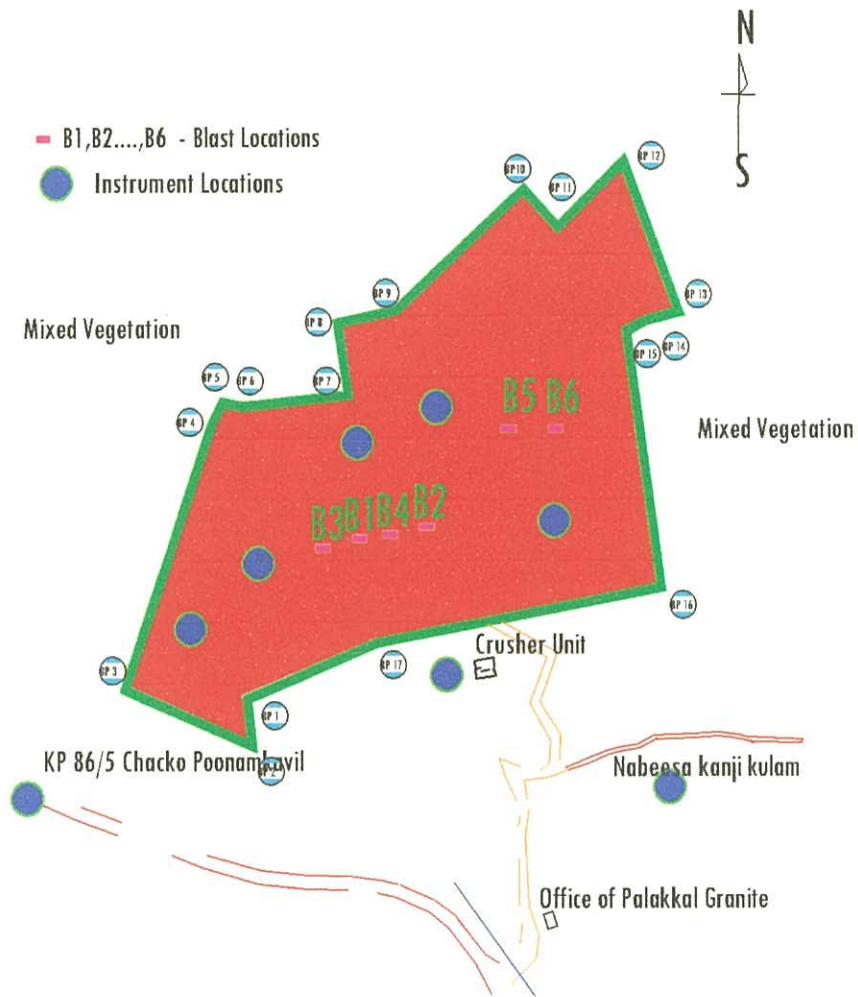


FIG. 3.14 GROUND VIBRATION MONITORING AT THE HOUSE OF MR. CHACKO POONAMKAVIL



FIG. 3.15 GROUND VIBRATION MONITORING AT THE HOUSE OF MS. NABEESA



B1,B2,B6: Blast Locations

M- Monitoring Points

FIG. 3.16 LOCATION OF BLASTS ALONG WITH MONIROING POINTS

TABLE- 3.1 DETAILS OF THE BLASTS STUDIED

Sl. No.	Parameters	Blast No. 1	Blast No. 2
1	Date of Blast	05-03-2024	05-03-2024
2	Time of Blast (Hours)	10.41 AM	10.45 AM
3	Location of Blast	Lat- 11.297656° Long- 76.050726°	Lat- 11.297666° Long- 76.050736°
4	Diameter of Blasthole (mm)	32	32
5	Burden (m)	1.22	1.22
6	Spacing (m)	1.22	1.22
7	Depth of Blasthole (m)	1.50	1.53
8	No. of Blastholes	10	12
9	Explosive Charge / Hole (kg)	0.375	0.375
10	Maximum Charge / Delay (kg)	0.375	0.375
11	Total Charge / Blast (kg)	3.75	4.5
12	Initiation System	Nonel-based shocktube detonator	Nonel-based shocktube detonator
13	Initiation Pattern	Row by row	Row by row
14	Location of Instrument 1	Same bench of blast	Same bench of blast
15	Distance 1 (m)	60	65
16	PPV 1 (mm / s)	3.50	2.60
17	PVS 1 (mm/s)	4.03	2.79
18	Noise 1 (dB)	95.3	98.88
19	Frequency 1 (Hz)	58	62
20	Location of Instrument 2	Same bench of blast	Same bench of blast
21	Distance 2 (m)	75	80
22	PPV 2 (mm / s)	3.36	2.28
23	PVS 2 (mm/s)	3.86	2.44
24	Noise 2 (dB)	110.3	118.4
25	Frequency 2 (Hz)	>100	>100
26	Location of Instrument 3	Same bench of blast	Same bench of blast
27	Distance 3 (m)	130	140
28	PPV 3 (mm / s)	0.93	<0.51
29	PVS 3 (mm/s)	0.99	-
30	Noise 3 (dB)	-	-
31	Frequency 3 (Hz)	102	-
32	Location of Instrument 4	At the house of Mr Chacko Poonamkavil	At the house of Mr Chacko Poonamkavil
33	Distance 4 (m)	290	320
34	PPV 4 (mm / s)	<0.51	<0.51
35	PVS 4 (mm/s)	-	-
36	Noise 4 (dB)	-	-
37	Frequency 4 (Hz)	-	-



TABLE- 3.1 DETAILS OF THE BLASTS STUDIED (CONTD...)

Sl. No.	Parameters	Blast No. 3	Blast No. 4
1	Date of Blast	05-03-2024	05-03-2024
2	Time of Blast (Hours)	11.40 AM	11.44 AM
3	Location of Blast	Lat- 11.287872° Long- 76.058591°	Lat- 11.297812° Long- 76.050823°
4	Diameter of Blasthole (mm)	32	32
5	Burden (m)	1.22	1.22
6	Spacing (m)	1.22	1.22
7	Depth of Blasthole (m)	1.53	1.53
8	No. of Blastholes	15	16
9	Explosive Charge / Hole (kg)	0.375	0.375
10	Maximum Charge / Delay (kg)	0.375	0.375
11	Total Charge / Blast (kg)	5.625	6
12	Initiation System	Nonel-based shocktube detonator	Nonel-based shocktube detonator
13	Initiation Pattern	Row by row	Row by row
14	Location of Instrument 1	Same bench of blast	Same bench of blast
15	Distance 1 (m)	60	70
16	PPV 1 (mm / s)	2.46	2.25
17	PVS 1 (mm/s)	2.73	2.33
18	Noise 1 (dB)	114.3	111
19	Frequency 1 (Hz)	>100	>100
20	Location of Instrument 2	Same bench of blast	Same bench of blast
21	Distance 2 (m)	75	90
22	PPV 2 (mm / s)	2.21	2.11
23	PVS 2 (mm/s)	2.63	2.39
24	Noise 2 (dB)	95.86	91.77
25	Frequency 2 (Hz)	52	62
26	Location of Instrument 3	Same bench of blast	Same bench of blast
27	Distance 3 (m)	145	125
28	PPV 3 (mm / s)	<0.51	0.71
29	PVS 3 (mm/s)	-	0.73
30	Noise 3 (dB)	-	69.69
31	Frequency 3 (Hz)	-	334
32	Location of Instrument 4	At the house of Ms. Nabeesa	At the house of Ms. Nabeesa
33	Distance 4 (m)	310	290
34	PPV 4 (mm / s)	<0.51	<0.51
35	PVS 4 (mm/s)	-	-
36	Noise 4 (dB)	-	-
37	Frequency 4 (Hz)	-	-

....



TABLE-3.1 DETAILS OF THE BLASTS STUDIED (CONTD...)

Sl. No.	Parameters	Blast No. 5	Blast No. 6
1	Date of Blast	05-03-2024	05-03-2024
2	Time of Blast (Hours)	5.39 PM	5.42 PM
3	Location of Blast	Lat- 11.298626° Long- 76.052403°	Lat- 11.29866° Long- 76.052388°
4	Diameter of Blasthole (mm)	32	32
5	Burden (m)	1.22	1.22
6	Spacing (m)	1.22	1.22
7	Depth of Blasthole (m)	1.53	1.53
8	No. of Blastholes	30	32
9	Explosive Charge / Hole (kg)	0.5	0.5
10	Maximum Charge / Delay (kg)	0.5	0.5
11	Total Charge / Blast (kg)	15	16
12	Initiation System	Nonel-based shock tube detonator	Nonel-based shock tube detonator
13	Initiation Pattern	Row by row	Row by row
14	Location of Instrument 1	Same bench of blast	Same bench of blast
15	Distance 1 (m)	55	50
16	PPV 1 (mm / s)	3.44	3.50
17	PVS 1 (mm/s)	3.78	4.36
18	Noise 1 (dB)	116	116.6
19	Frequency 1 (Hz)	>100	>100
20	Location of Instrument 2	Same bench of blast	Same bench of blast
21	Distance 2 (m)	85	85
22	PPV 2 (mm / s)	1.44	1.18
23	PVS 2 (mm/s)	1.52	1.29
24	Noise 2 (dB)	76.82	77.99
25	Frequency 2 (Hz)	128	114
26	Location of Instrument 3	Same bench of blast	Same bench of blast
27	Distance 3 (m)	115	115
28	PPV 3 (mm / s)	1.04	0.88
29	PVS 3 (mm/s)	1.05	0.89
30	Noise 3 (dB)	99.3	98.49
31	Frequency 3 (Hz)	66	174
32	Location of Instrument 4	Crusher unit	Crusher unit
33	Distance 4 (m)	170	180
34	PPV 4 (mm / s)	<0.51	<0.51
35	PVS 4 (mm/s)	-	-
36	Noise 4 (dB)	-	-
37	Frequency 4 (Hz)	-	-



TABLE- 3.2 SUMMARY OF BLASTS STUDIED

Blast No.	Maximum Charge per Delay (kg)	Distance (m)	Peak Particle Velocity (mm/s)	Peak Vector Sum (mm/s)	Noise (dB)	Frequency (Hz)
1	0.375	60	3.50	4.03	95.3	58
		75	3.36	3.86	110.3	>100
		130	0.93	0.99	61.27	102
		290	<0.51	-	-	-
2	0.375	65	2.60	2.79	98.88	62
		80	2.28	2.44	118.4	>100
		140	<0.51	-	-	-
		320	<0.51	-	-	-
3	0.375	60	2.46	2.73	114.3	>100
		75	2.21	2.63	95.86	52
		145	<0.51	-	-	-
		310	<0.51	-	-	-
4	0.375	70	2.25	2.33	111	>100
		90	2.11	2.39	91.77	62
		125	0.71	0.73	69.69	334
		290	<0.51	-	-	-
5	0.5	55	3.44	3.78	116	>100
		85	1.44	1.52	76.82	128
		115	1.04	1.05	99.3	66
		170	<0.51	-	-	-
6	0.5	50	3.50	4.36	116.6	>100
		85	1.18	1.29	77.99	114
		115	0.88	0.89	99.30	174
		180	<0.51	-	-	-



4. RESULTS & ANALYSIS

In total, 6 blasts were conducted and ground vibrations & noise levels were recorded for all the blasts using 4 instruments covering 24 locations. From the above Table-3.2, it can be observed that the highest Peak Particle Velocity (PPV) recorded was 3.50mm/s at a distance of 50m in Blast No. 6 and at a distance of 60m in Blast No. 1 also the same PPV was recorded. The next highest PPV was 3.44mm/s at a distance of 55m in Blast No. 5. The remaining all the values are less than 3mm/s, in fact all the PPV values are less than 1mm/s beyond 100m except in one case (Blast No: 5). No vibration was recorded at the crusher unit as well as at the houses. Intensity of ground vibrations mainly depends upon the maximum charge per delay and the distance between the blast location and monitoring point. Further, the level difference between the blast location and monitoring point, direction of propagation, direction of monitoring location w.r.t blast face etc., also will influence the blast vibration levels.

The highest noise level recorded is 118.4dB at a distance of 80m in Blast No. 2, the second highest was 116.6dB in Blast No. 6 at a distance of 50m from blast location. At many locations the noise level was less than 100dB, which is insignificant. Fly Rock is observed upto a distance of 30 to 40m from blast site within quarry area only and it was within the blast vicinity of 10m with muffling arrangement using sand bags. Fragmentation was also found to be uniform, no excessive breakage of the rock mass and no damage to the rock mass beyond blasting zone.



5. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The scientific study carried out in the Building Stone Quarry of M/s. Palakkal Granite Products Private Limited in Re Survey Block No. 003, Re Survey Nos. 172/1527, 172/1232, 172/1228, 172/1213, 1523, 1862, 172/1212, 172/1134, 172/1137, 172/1201, 172/1221, 172/1120, 172/1238, 172/1136, 172/1135, 172/1119, 172/2275, 172/1526, 172/1200, 172/1239, 1240 of Kodiyathur Village & Re Survey Block No: 001, Un Survey Nos: 153/597, 153/598, 153/604, 153/601, 600 of Kumaranellur Village, Kozhikode -Taluk & Dist, Kerala, led to draw the following conclusions:

- ✓ Initially, a field visit was made and Quarry area, surroundings and other structures were inspected before starting the blasting operations as part of pre-blast survey.
- ✓ In total, 6 blasts were conducted at different locations of the quarry.
- ✓ Blast holes of 32mm diameter were used in the studies.
- ✓ Depth of blast holes was 1.52m (5 feet) with 1.22m (4 feet) burden and spacing.
- ✓ Number of blastholes during the study varied from 10 to 32.
- ✓ Explosive in the form of 25mm diameter cartridges, each weighing 125gm was used for charging the blastholes.
- ✓ Explosive Charge per hole was 375 to 500gm and Maximum charge per delay is also same as each individual hole was provided with delay.
- ✓ Total explosive charge per round varied from 3.75kg to 16.0kg during the scientific study.
- ✓ Ground vibration levels are recorded for all the blasts using one unit of Micromate and one unit of Minimate-Plus- Instantel Canada, one unit of Real Wave Analyser- SV Corporation- South Korea and one unit of SViB1 Vibrometer. Full event sheets are downloaded using the softwares supplied by the respective manufacturers.



- ✓ Monitoring distances varied from 50 to 320m from blast locations.
- ✓ During the studies, it was found that there is a house owned by Mr. Chacko Poonamkavil at a distance of 105m from lease boundary in south west direction and another house owned by Ms. Nabeesa in south east direction at a distance 150 from lease boundary, other structures are at a longer distance than these. There is an office building, crusher unit and workmen quarters belongs to the quarry owner only. The structures are at different elevation and direction compared to blast locations, i.e., there is considerable level difference between the blast locations and structures. As per Director General of Mines Safety (DGMS) guidelines, such structures / houses can be assigned a permissible Peak Particle Velocity (PPV) of 5 mm/s which are not belonging to the owner and 10 mm/s which are belonging to the owner, irrespective of frequency.
- ✓ The highest Peak Particle Velocity (PPV) recorded was 3.50mm/s at a distance of 50m in Blast No. 6 and at a distance of 60m in Blast No. 1 also the same PPV was recorded. The next highest PPV was 3.44mm/s at a distance of 55m in Blast No. 5. The remaining all the values are less than 3mm/s, in fact all the PPV values are less than 1mm/s beyond 100m except in one case (Blast No: 5). No vibration was recorded at the crusher unit as well as at the houses.
- ✓ Intensity of ground vibrations mainly depends upon the maximum charge per delay and the distance between the blast location and monitoring point. Further, the level difference between the blast location and monitoring point, direction of propagation, direction of monitoring point w.r.t blast face etc., also will influence the blast vibration levels. But based on the data generated, it can be stated that in any case the PPV values will not reach the permissible value of 5mm/s beyond 50m.



- ✓ Based on the ground vibration monitoring, it was found that all the PPV values are less than 5mm/s at all the locations, indicating safe condition.
- ✓ The highest noise level recorded is 118.4dB at a distance of 80m in Blast No. 2, the second highest was 116.6dB in Blast No. 6 at a distance of 50m from blast location. At many locations the noise level was less than 100dB, which is insignificant.
- ✓ Fly Rock is observed upto a distance of 30 to 40m from blast site within quarry area only and it was within the blast vicinity of 10m with muffling arrangement using sand bags.
- ✓ Fragmentation was also found to be uniform, no excessive breakage of the rock mass and no damage to the rock mass beyond planned blast location.

It may, therefore, be concluded that the intensity of ground vibrations, noise and fly rock caused due to blasting operations carried out in the Building Stone Quarry of M/s. Palakkal Granite Products Private Limited in Re Survey Block No. 003, Re Survey Nos. 172/1527, 172/1232, 172/1228, 172/1213, 1523, 1862, 172/1212, 172/1134, 172/1137, 172/1201, 172/1221, 172/1120, 172/1238, 172/1136, 172/1135, 172/1119, 172/2275, 172/1526, 172/1200, 172/1239, 1240 of Kodyathur Village & Re Survey Block No: 001, Un Survey Nos: 153/597, 153/598, 153/604, 153/601, 600 of Kumaranellur Village, Kozhikode -Taluk & Dist, Kerala, are within permissible limits and such levels will not cause any damage to any existing structures around the quarry.

Recommendations

Blasting operations may be conducted in the building stone quarry of M/s. Palakkal Granite Products Private Limited in Re Survey Block No. 003, Re Survey Nos. 172/1527, 172/1232, 172/1228, 172/1213, 1523, 1862, 172/1212, 172/1134, 172/1137, 172/1201, 172/1221,



172/1120, 172/1238, 172/1136, 172/1135, 172/1119, 172/2275, 172/1526, 172/1200, 172/1239, 1240 of Kodiyathur Village & Re Survey Block No: 001, Un Survey Nos: 153/597, 153/598, 153/604, 153/601, 600 of Kumaranellur Village, Kozhikode -Taluk & Dist, Kerala, with the following recommendations:

- Blasts may be conducted with a maximum of 30holes in a blast round using 32mm diameter blastholes drilled with hand held Jackhammer drills to a maximum depth of 1.52m (5 feet) with 0.91m to 1.22m (3 to 4feet) burden and spacing based on strata conditions. Accordingly, 250 to 500gm of explosives can be used per hole.
- NONEL based shocktube detonators may be used for initiation. Hole to hole delay can be 17ms or 25ms and accordingly row to row delay shall be 25 or 42ms respectively.
- Muffling with blasting mats and sand bags is advised especially while blasting the top bench.
- Blasting methodology suggested in Table- 5.1 may be followed.
- Blast layouts suggested in Fig. 5.1 & 5.2 may be used with the NONEL based shocktube initiation system with specific delay timing of 200/25ms (or 250/25ms). Blast layouts may be modified based on number of holes.
- Blasts to be conducted following all the rules and regulations stipulated by Director General of Mines Safety (DGMS) and other regulating agencies.
- All other rules and regulations imposed by various agencies like DGMS/ Dept. of Mines & Geology/ any other relevant organization to be followed from time to time.



TABLE-5.1. SUGGESTED BLAST CONFIGURATION

Sl. No.	Parameters	Suggested Value
1	Diameter of Blasthole (mm)	32
2	Burden (m)	0.91 to 1.22
3	Spacing (m)	0.91 to 1.22
4	Depth of Blasthole (m)	Maximum of 1.52
5	No. of Blastholes	Maximum of 30
6	Explosive Charge / Hole (gm)	250 to 500
7	Maximum Charge / Delay (gm)	500
8	Total Charge / Blast (kg)	15.0
9	Initiation System	NONEL based shocktube detonators
10	Initiation Pattern	Row by row or Diagonal
11	Delay timing between any two blastholes	At least 8ms
12	No. of rows	Maximum of 3

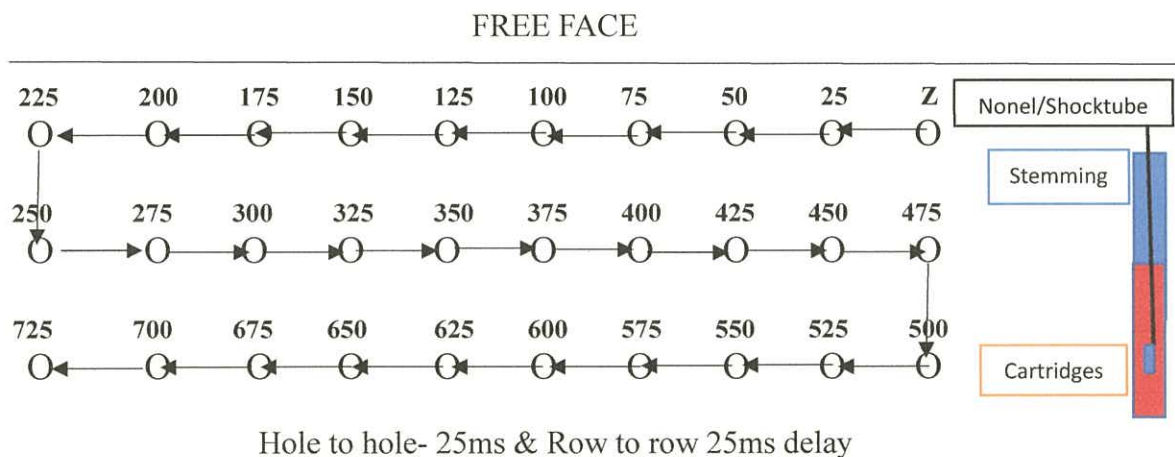
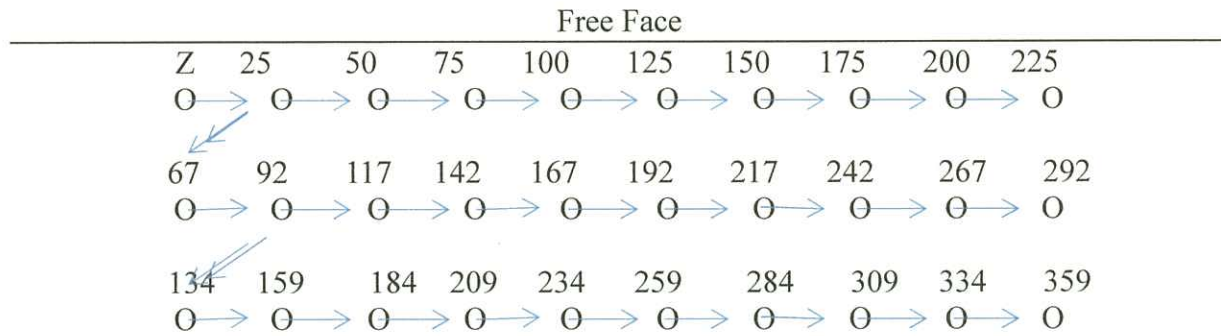


FIG. 5.1 SUGGESTED BLAST LAYOUT -1



Hole to hole- 25ms & Row to row 42ms delay

FIG. 5.2 SUGGESTED BLAST LAYOUT -2

18/3/2024

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Principal Investigator

Consultancy Project Code: NITK/MN/2023-24/0019

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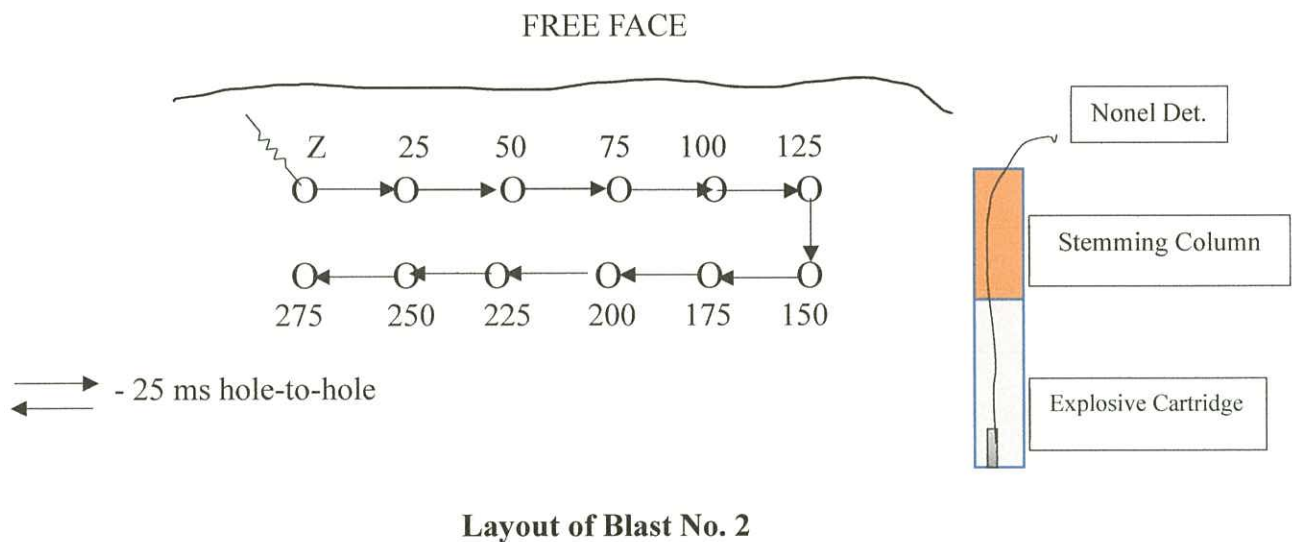
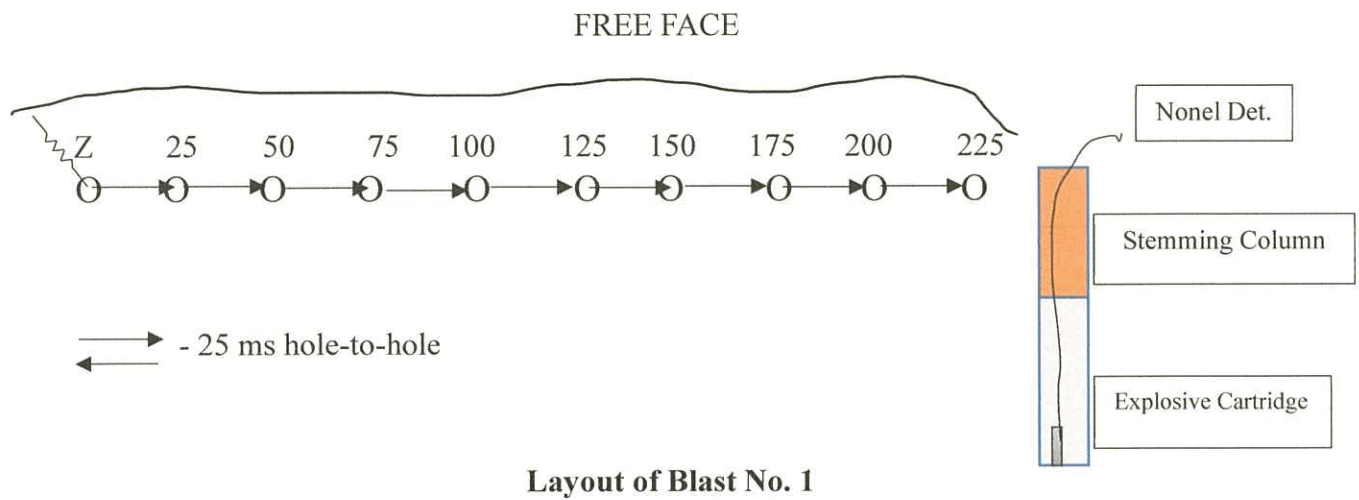
Wiss, J.F. and Linehan, P.W., 1978. Control of Vibration and blast noise from surface coal mining, USBM OPR: 103-79.

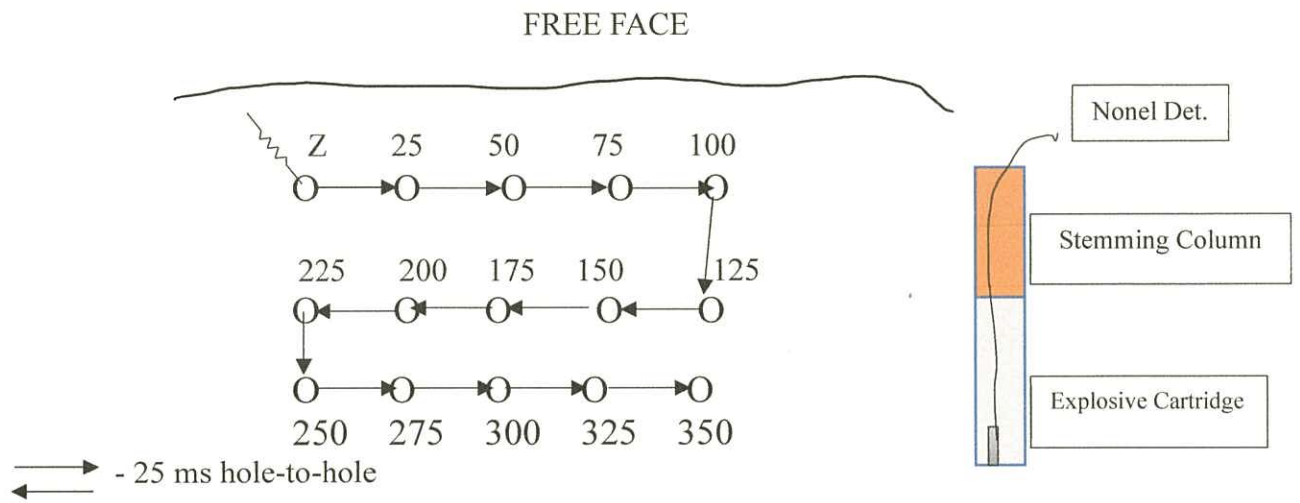
Wiss, J.F. and Nicholls, H.R., 1974. A study of damage to residential structure from blast vibrations, Special Publication, American Society of Civil Engineers, NY,73.



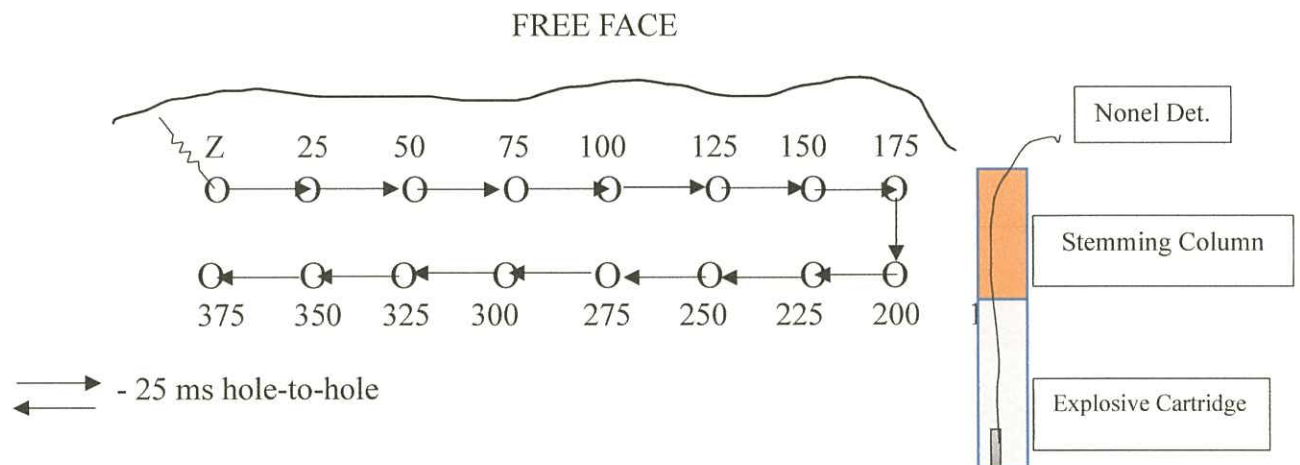
APPENDIX- I





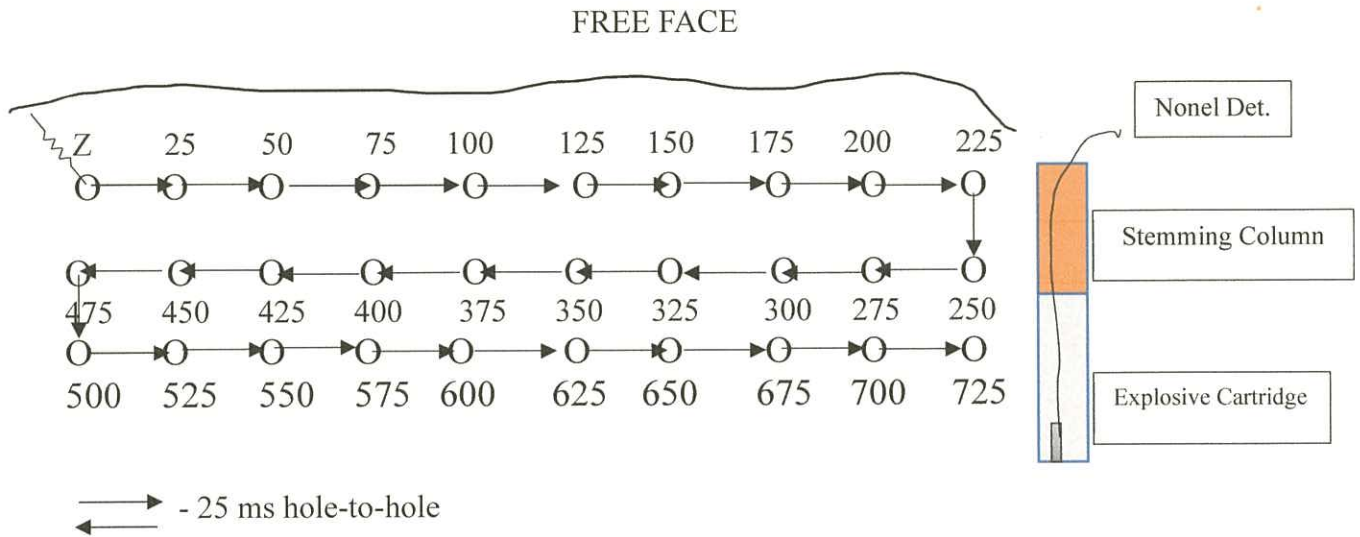


Layout of Blast No. 3

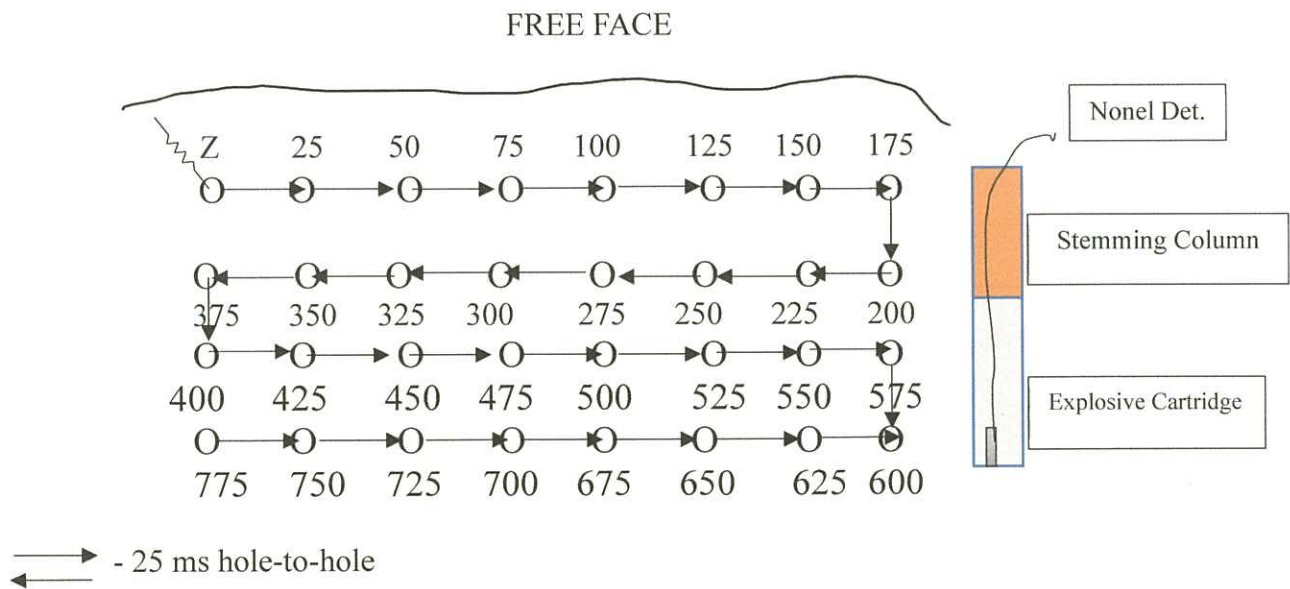


Layout of Blast No. 4





Layout of Blast No. 5



Layout of Blast No. 6



APPENDIX- II

(Blast Event Sheets)



Event Report

Company Name, Company Address

Start Time: 2024-03-05 AM 10:41:13

SV-1 Serial Number: SR4EW4D19192

End Time: 2024-03-05 AM 10:41:15

Duration Time : 2sec

Project : Name Client Name :

Location : Location Measuring Point:

Meas Site GPS: 0.000000 ; 0.000000

Blast Site GPS: 0.000000 ; 0.000000

Distance (m) : 0.00

Post Event Notes:

	X-axis (L)	Y-axis (T)	Z-axis (V)
Trigger Time (sec)	0.11	0.11	0.12

Peak Particle Velocity (mm/s)	2.14	3.50	1.65
-------------------------------	------	------	------

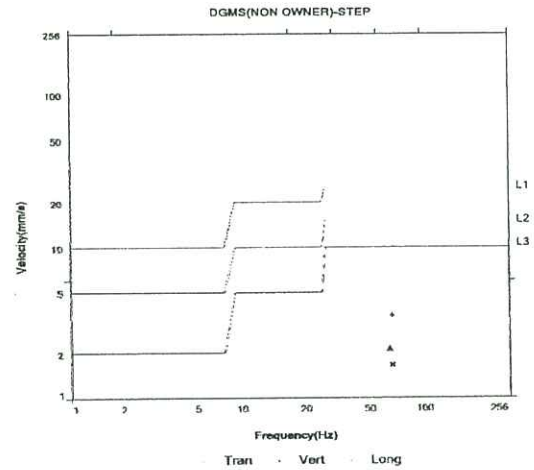
ZC Frequency (Hz)	56	58	58
-------------------	----	----	----

Peak Acceleration (g)	0.0767	0.1301	0.0612
-----------------------	--------	--------	--------

Peak Displacement (mm)	0.006071	0.009607	0.004516
------------------------	----------	----------	----------

Peak Vector Sum: 4.03 mm/s at 0.112 sec

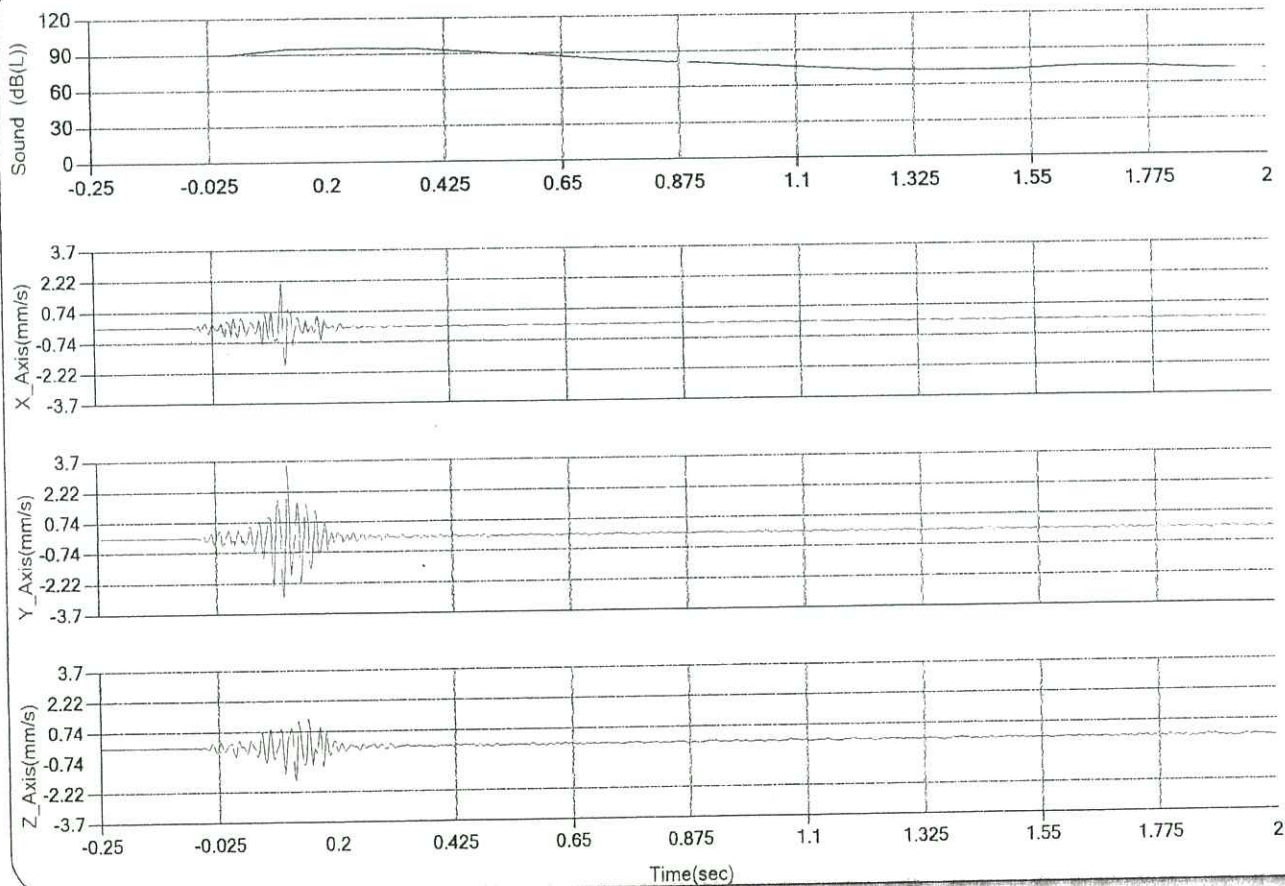
Max Sound: 95.30 dB (L)



L1-Industrial Buildings

L2-Domestic Houses/Structures

L3-Historical Objects/Sensitive Structures



Time Scale: 0.225 sec/divide

Amplitude Scale: Geo (1.48mm/s/divide) Mic (30.0 dB (L)/divide)

Printed: 2024-03-18 PM 03:01:40(Firmware Ver 3.0 401; Software Ver 3.0.4.1.c), Copyrighted Svib Software Technologies Pvt Ltd

Date/Time MicL at 10:41:13 March 5, 2024
Trigger Source Geo: 0.510 mm/s, Mic: 100.00 dB(L)
Range Geo: 254.0 mm/s
Record Time 2.0 sec at 1024 sps
Operator/Setup: Operator/factory.MMB

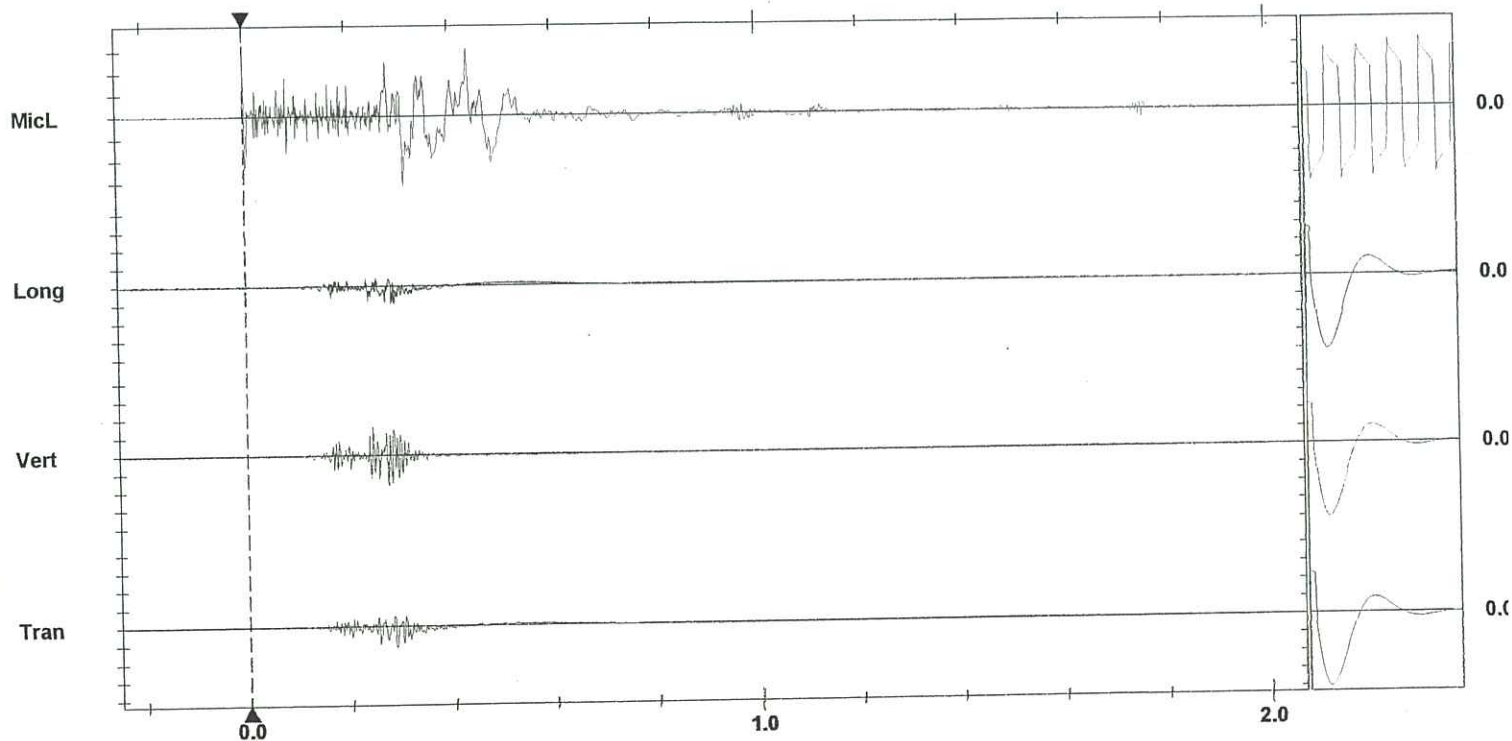
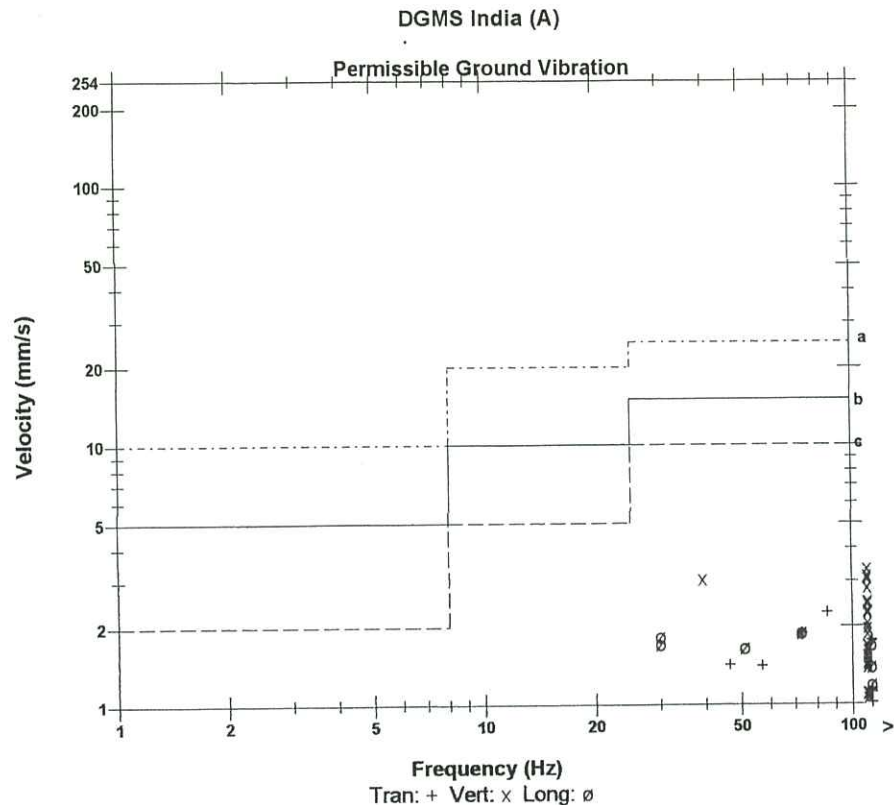
Serial Number UM21162 V 10-90GC Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration November 10, 2023 by UES New Delhi
File Name UM21162_20240305104113.IDFW

Notes
 Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
PSPL 110.3 dB(L) at 0.001 sec
ZC Freq 22 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1172 mv)

	Tran	Vert	Long	
PPV	2.294	3.366	1.907	mm/s
ZC Freq	85	>100	73	Hz
Time (Rel. to Trig)	0.287	0.274	0.284	sec
Peak Acceleration	0.207	0.515	0.222	g
Peak Displacement	0.025	0.006	0.038	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.3	7.5	Hz
Overswing Ratio	4.8	4.3	4.3	

Peak Vector Sum 3.867 mm/s at 0.286 sec



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 2.000 pa.(L)/div
Trigger = 

Sensor Check

Event Report

Company Name, Company Address

Start Time: 2024-03-05 AM 10:41:11

SV-1 Serial Number: SR4EW4D23049

End Time: 2024-03-05 AM 10:41:13

Duration Time : 2sec

Project : Name Client Name :

Location : Location Measuring Point:

Meas Site GPS: 0.000000 ; 0.000000

Blast Site GPS: 0.000000 ; 0.000000

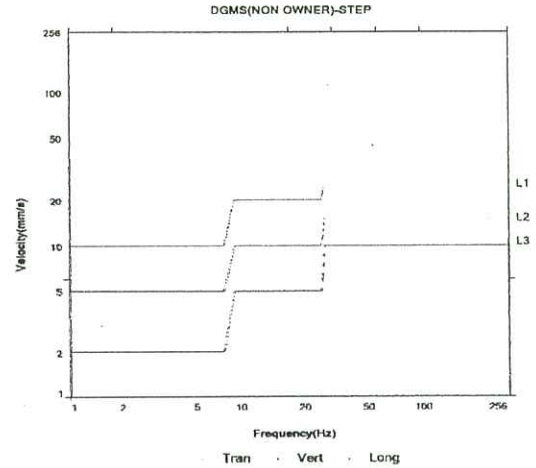
Distance (m) : 0

Post Event Notes:

	X-axis (L)	Y-axis (T)	Z-axis (V)
Trigger Time (sec)	0.14	0.19	0.20
Peak Particle Velocity (mm/s)	0.93	0.36	0.68
ZC Frequency (Hz)	102	106	56
Peak Acceleration (g)	0.0608	0.0241	0.0245
Peak Displacement (mm)	0.001450	0.000533	0.001937

Peak Vector Sum: 0.99 mm/s at 0.138 sec

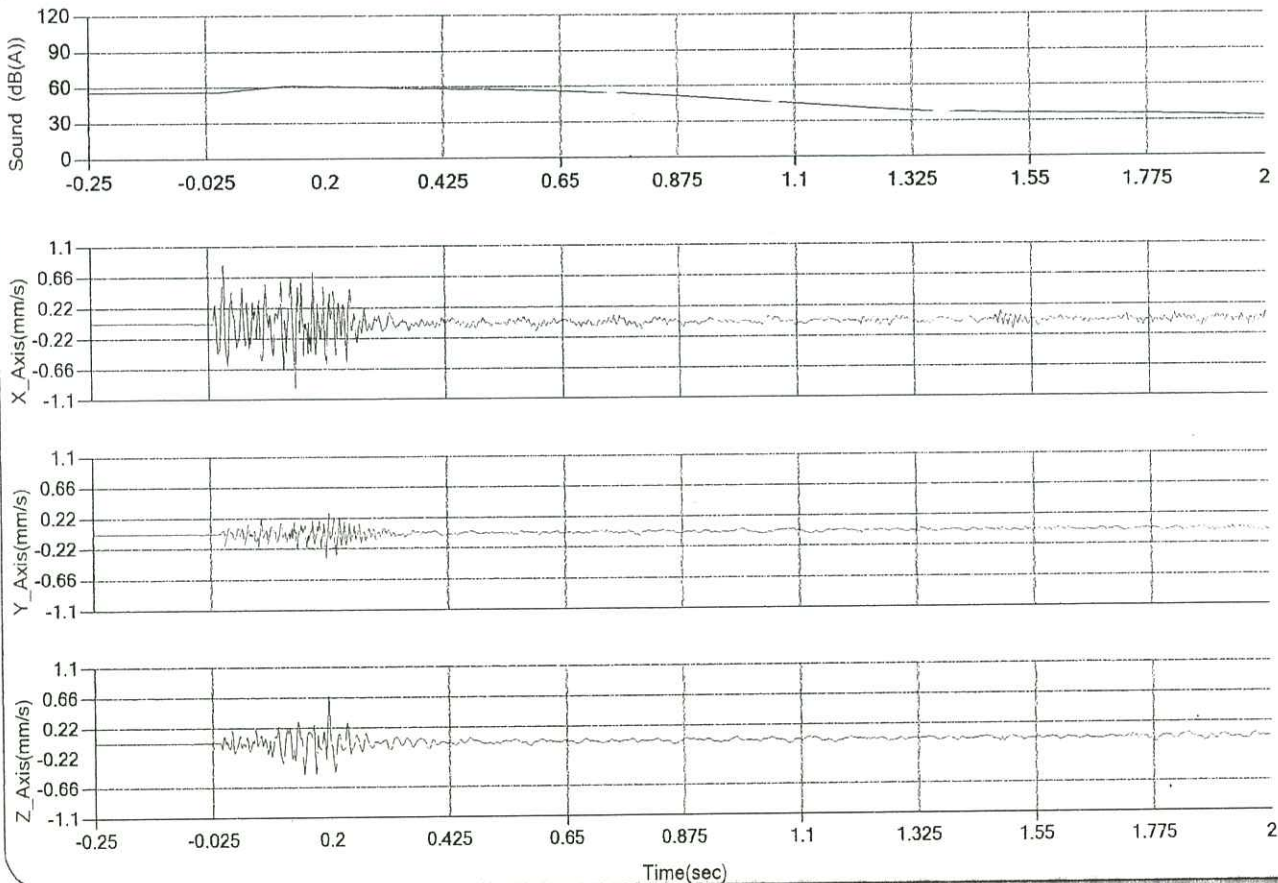
Max Sound: 61.27 dB (A)



L1-Industrial Buildings

L2-Domestic Houses/Structures

L3-Historical Objects/Sensitive Structures



Time Scale: 0.225 sec/divide

Amplitude Scale: Geo (0.44mm/s/divide) Mic (30.0 dB (A)/divide)

Printed: 2024-03-07 PM 03:34:49(Firmware Ver 3.1 401; Software Ver 3.0.5.5a), Copyrighted Svib Software Technologies Pvt Ltd

Event Report

Company Name, Company Address

Start Time: 2024-03-05 AM 10:45:11

SV-1 Serial Number: SR4EW4D19192

End Time: 2024-03-05 AM 10:45:13

Duration Time : 2sec

Project : Name Client Name :

Location : Location Measuring Point:

Meas Site GPS: 0.000000 ; 0.000000

Blast Site GPS: 0.000000 ; 0.000000

Distance (m) : 0.00

Post Event Notes:

	X-axis (L)	Y-axis (T)	Z-axis (V)
Trigger Time (sec)	0.04	0.03	0.18

Peak Particle Velocity (mm/s)	1.34	2.60	1.45
-------------------------------	------	------	------

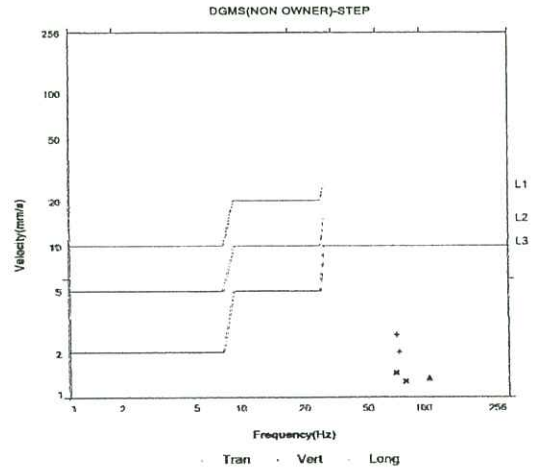
ZC Frequency (Hz)	94	62	62
-------------------	----	----	----

Peak Acceleration (g)	0.0810	0.1035	0.0577
-----------------------	--------	--------	--------

Peak Displacement (mm)	0.002277	0.006685	0.003725
------------------------	----------	----------	----------

Peak Vector Sum: 2.79 mm/s at 0.032 sec

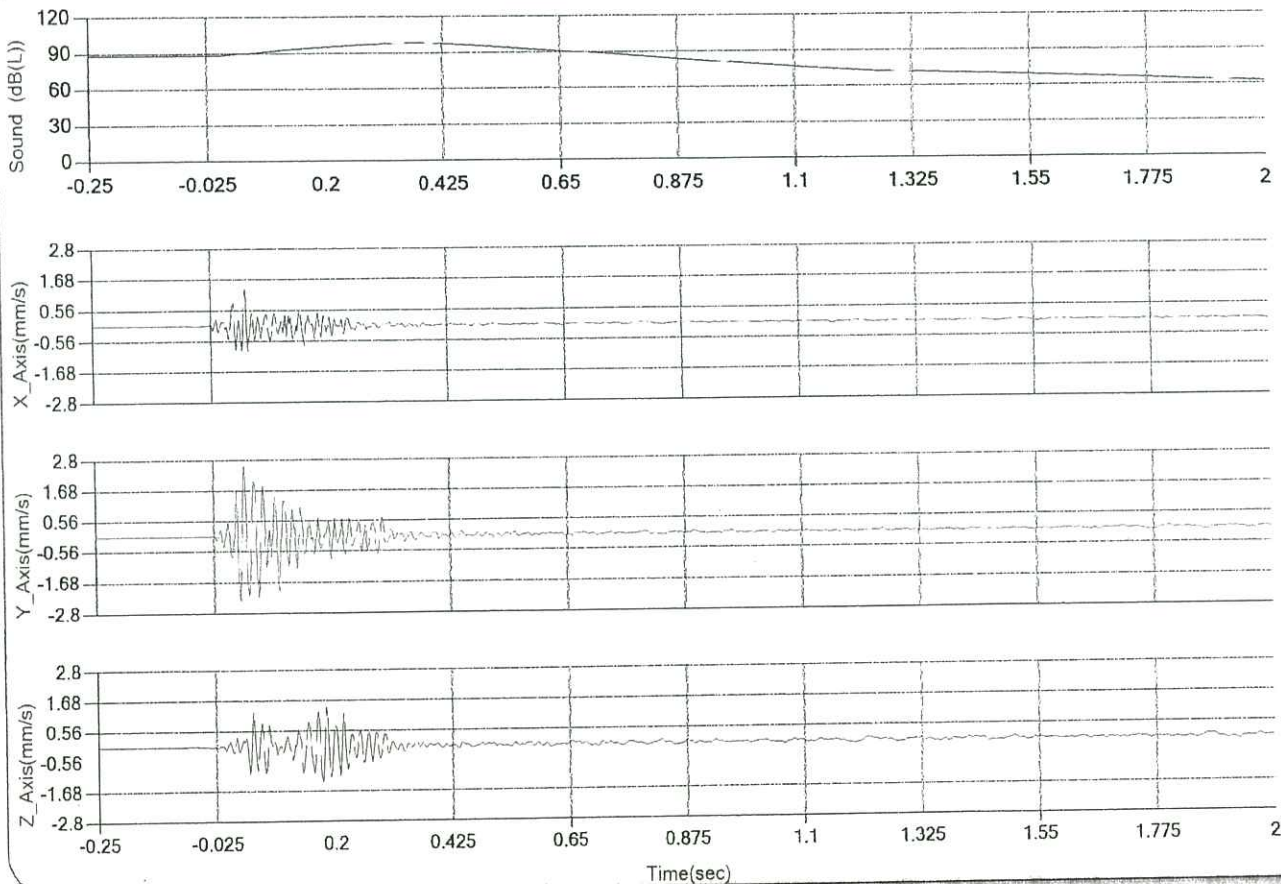
Max Sound: 98.88 dB (L)



L1-Industrial Buildings

L2-Domestic Houses/Structures

L3-Historical Objects/Sensitive Structures



Time Scale: 0.225 sec/divide

Amplitude Scale: Geo (1.12mm/s/divide) Mic (30.0 dB (L)/divide)

Printed: 2024-03-18 PM 03:01:43(Firmware Ver 3.0 401; Software Ver 3.0.4.1.c), Copyrighted Svib Software Technologies Pvt Ltd

Date/Time MicL at 10:45:11 March 5, 2024
 Trigger Source Geo: 0.510 mm/s, Mic: 100.00 dB(L)
 Range Geo: 254.0 mm/s
 Record Time 2.0 sec at 1024 sps
 Operator/Setup: Operator/factory.MMB

Serial Number UM21162 V 10-90GC Micromate ISEE
 Battery Level 3.8 Volts
 Unit Calibration November 10, 2023 by UES New Delhi
 File Name UM21162_20240305104511.IDFW

Notes

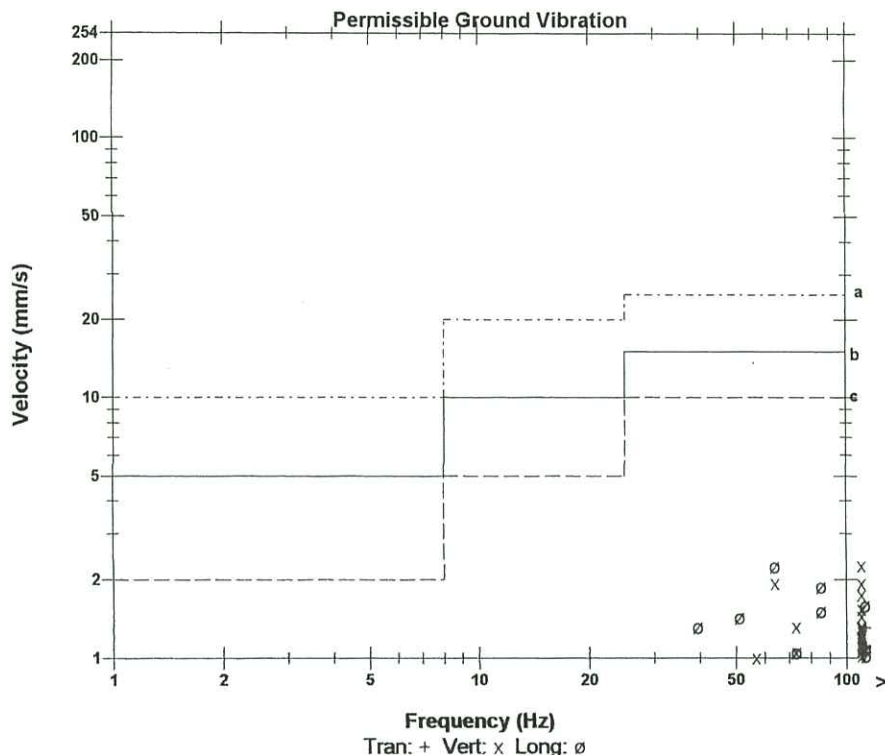
Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
 PSPL 118.4 dB(L) at 0.001 sec
 ZC Freq >100 Hz
 Channel Test Passed (Freq = 20.5 Hz Amp = 1172 mv)

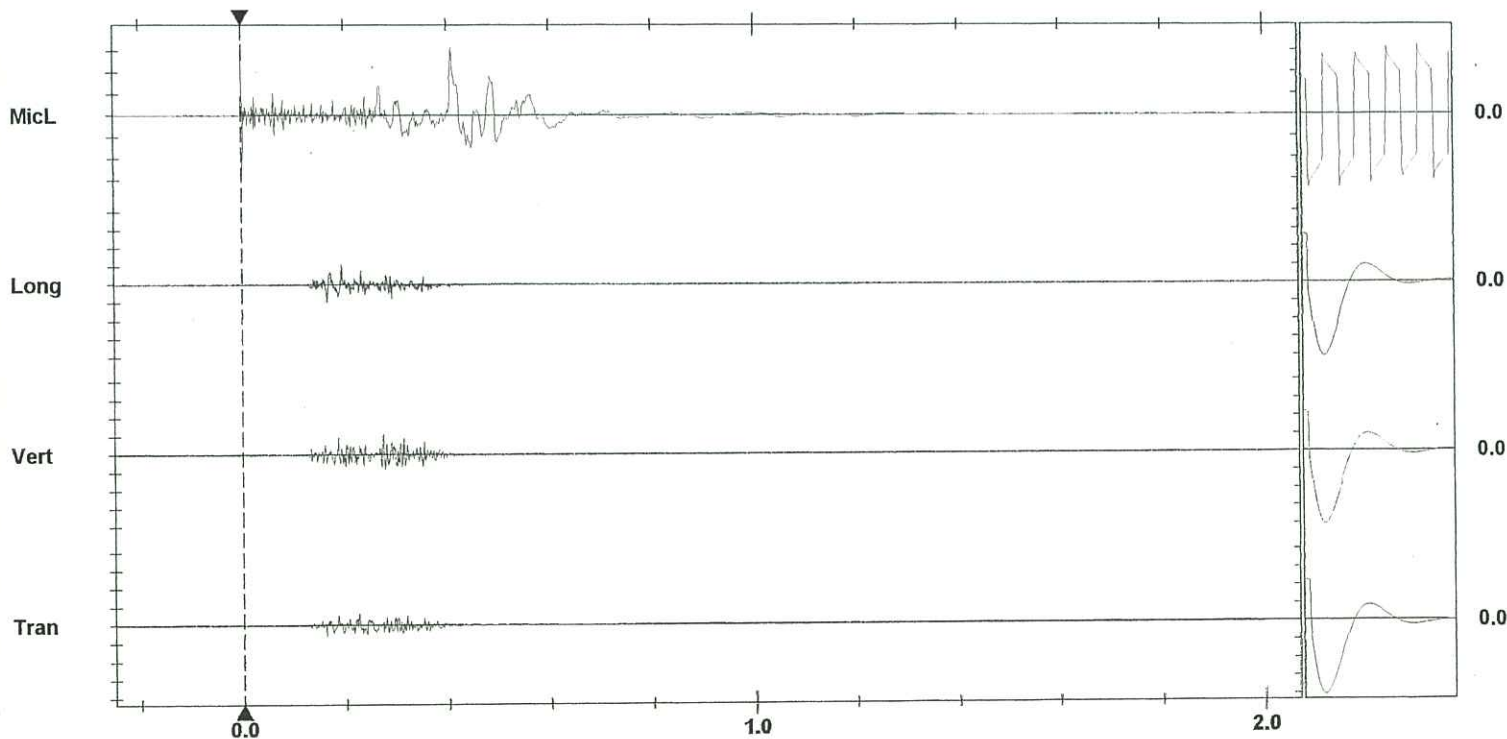
	Tran	Vert	Long	
PPV	1.316	2.286	2.262	mm/s
ZC Freq	>100	>100	64	Hz
Time (Rel. to Trig)	0.225	0.273	0.194	sec
Peak Acceleration	0.150	0.246	0.177	g
Peak Displacement	0.003	0.003	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.3	7.5	Hz
Overswing Ratio	4.8	4.3	4.3	

Peak Vector Sum 2.444 mm/s at 0.194 sec

DGMS India (A)



a) Industrial Buildings
 b) Domestic houses/structures
 c) Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div
 Trigger =

Sensor Check

Date/Time MicL at 11:40:27 March 5, 2024
Trigger Source Geo: 0.510 mm/s, Mic: 100.00 dB(L)
Range Geo: 254.0 mm/s
Record Time 2.0 sec at 1024 sps
Operator/Setup: Operator/factory.MMB

Serial Number UM21162 V 10-90GC Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration November 10, 2023 by UES New Delhi
File Name UM21162_20240305114027.IDFW

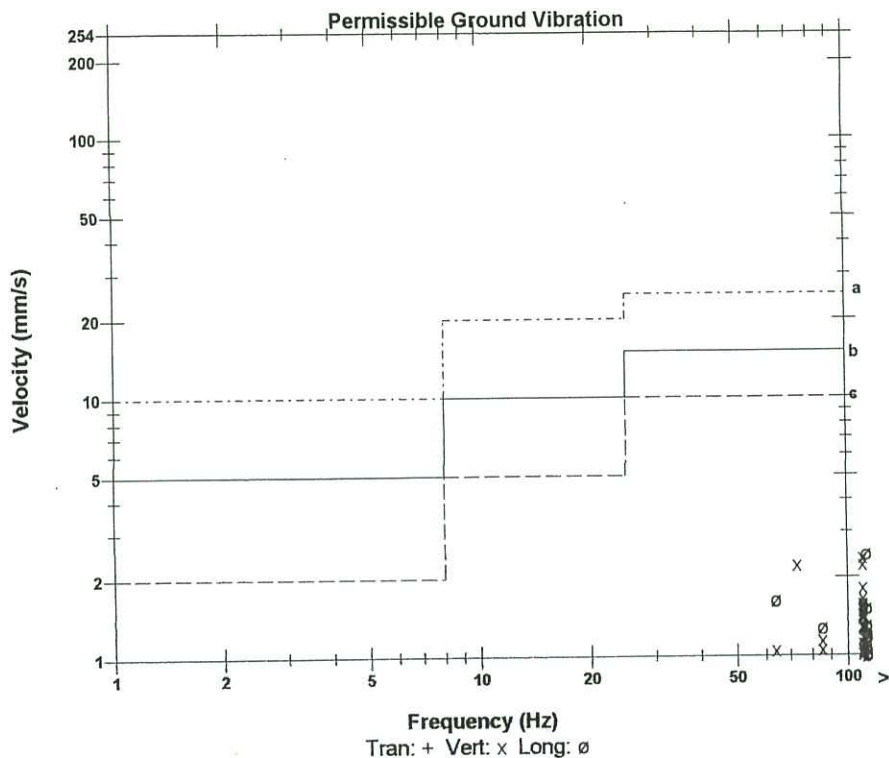
Notes
 Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
SPL 114.3 dB(L) at 0.411 sec
2C Freq 17 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 1087 mv)

	Tran	Vert	Long	
RPV	0.993	2.396	2.467	mm/s
2C Freq	>100	>100	>100	Hz
Time (Rel. to Trig)	0.251	0.328	0.335	sec
Peak Acceleration	0.180	0.253	0.282	g
Peak Displacement	0.006	0.003	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.3	7.5	Hz
Overswing Ratio	4.7	4.2	4.2	

Peak Vector Sum 2.731 mm/s at 0.335 sec

DGMS India (A)

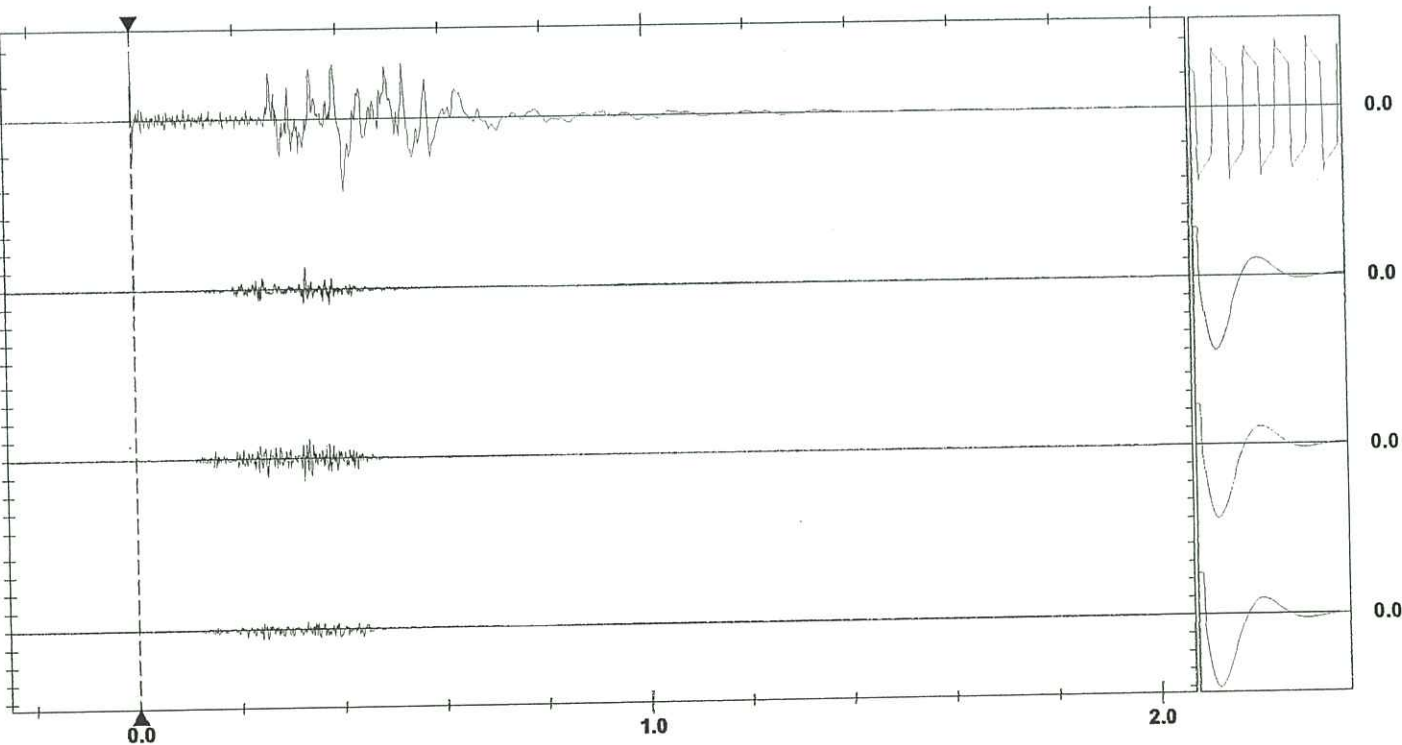


MicL

Long

Vert

Tran



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

Event Report

Company Name, Company Address

Start Time: 2024-03-05 AM 11:40:26

SV-1 Serial Number: SR4EW4D19192

End Time: 2024-03-05 AM 11:40:28

Duration Time : 2sec

Project : Name Client Name :

Location : Location Measuring Point:

Meas Site GPS: 0.000000 ; 0.000000

Blast Site GPS: 0.000000 ; 0.000000

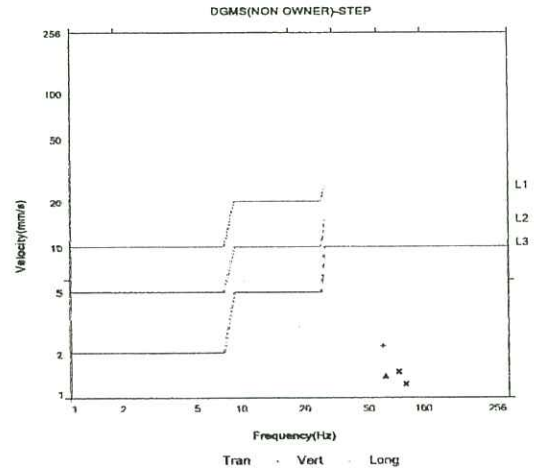
Distance (m) : 0.00

Post Event Notes:

	X-axis (L)	Y-axis (T)	Z-axis (V)
Trigger Time (sec)	0.09	0.13	0.15
Peak Particle Velocity (mm/s)	1.40	2.21	1.48
ZC Frequency (Hz)	54	52	64
Peak Acceleration (g)	0.0483	0.0738	0.0607
Peak Displacement (mm)	0.004118	0.006779	0.003681

Peak Vector Sum: 2.63 mm/s at 0.092 sec

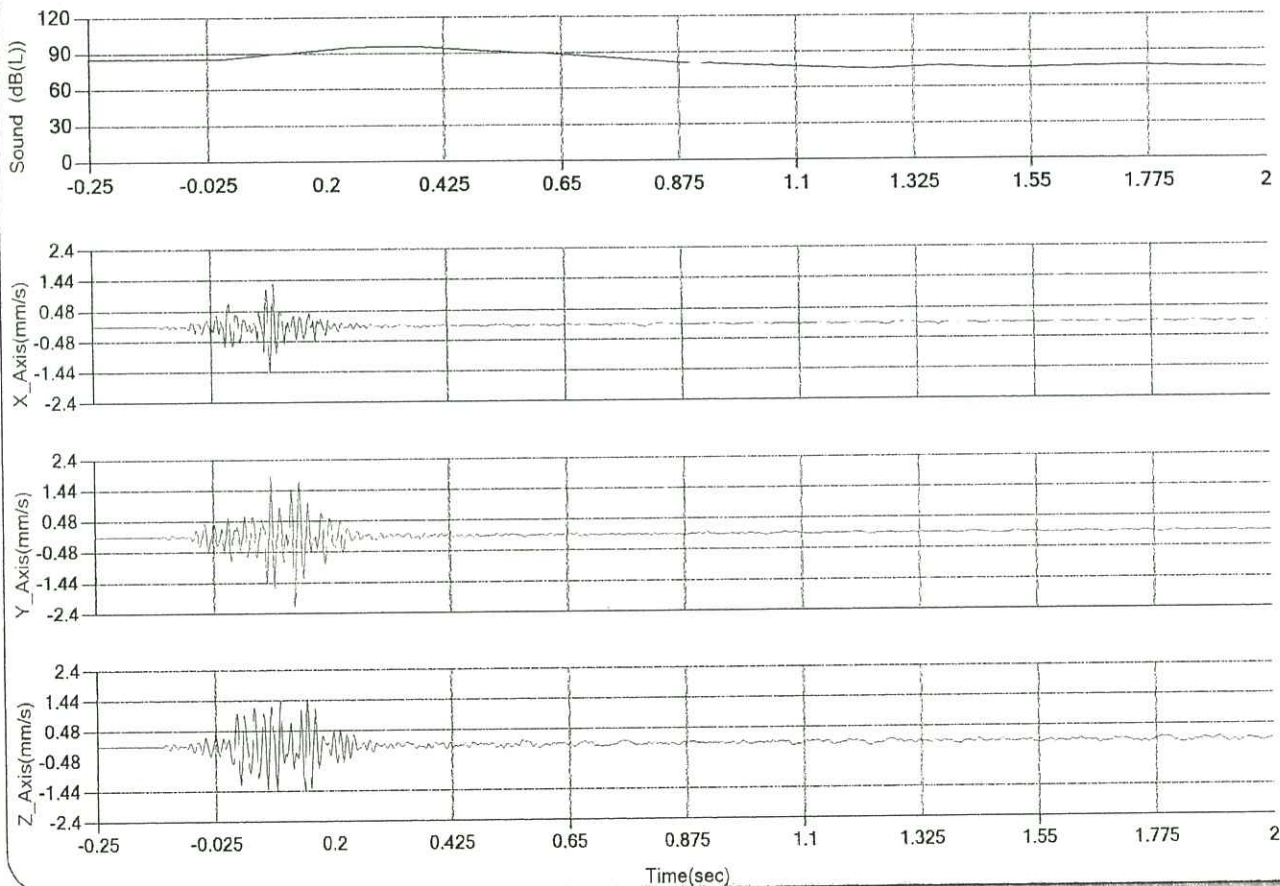
Max Sound: 95.86 dB (L)



L1-Industrial Buildings

L2-Domestic Houses/Structures

L3-Historical Objects/Sensitive Structures



Time Scale: 0.225 sec/divide

Amplitude Scale: Geo (0.96mm/s/divide) Mic (30.0 dB (L)/divide)

Printed: 2024-03-18 PM 03:01:46(Firmware Ver 3.0 401; Software Ver 3.0.4.1.c), Copyrighted Svib Software Technologies Pvt Ltd

Date/Time MicL at 11:43:41 March 5, 2024
 Trigger Source Geo: 0.510 mm/s, Mic: 100.00 dB(L)
 Range Geo: 254.0 mm/s
 Record Time 2.0 sec at 1024 sps
 Operator/Setup: Operator/factory.MMB

Serial Number UM21162 V 10-90GC Micromate ISEE
 Battery Level 3.8 Volts
 Unit Calibration November 10, 2023 by UES New Delhi
 File Name UM21162_20240305114341.IDFW

Notes

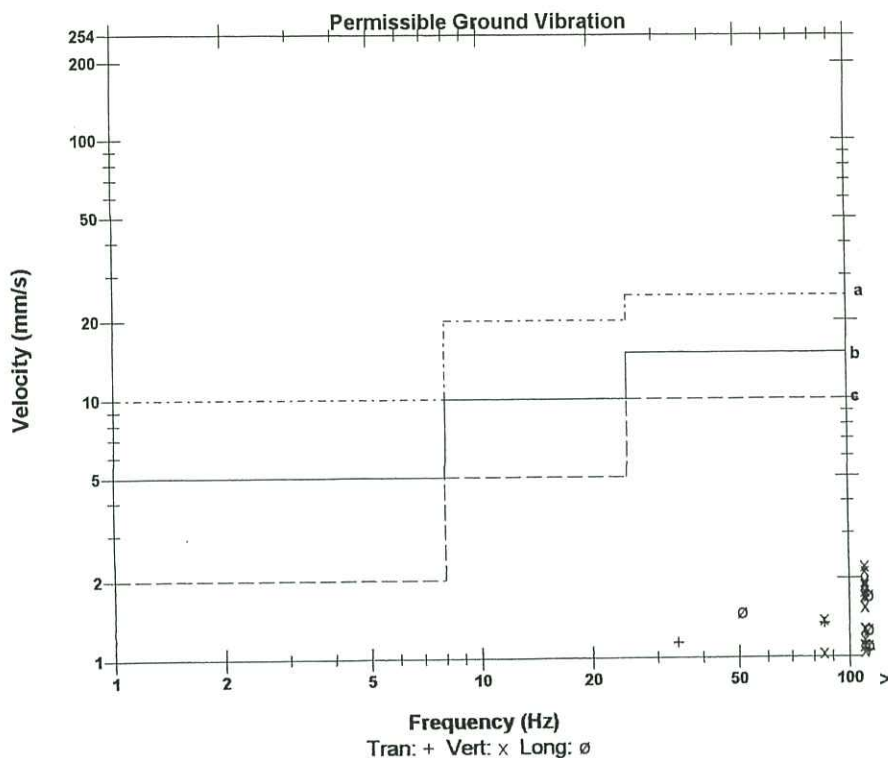
Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
 PSPL 111.0 dB(L) at 0.545 sec
 ZC Freq 16 Hz
 Channel Test Passed (Freq = 19.7 Hz Amp = 1087 mv)

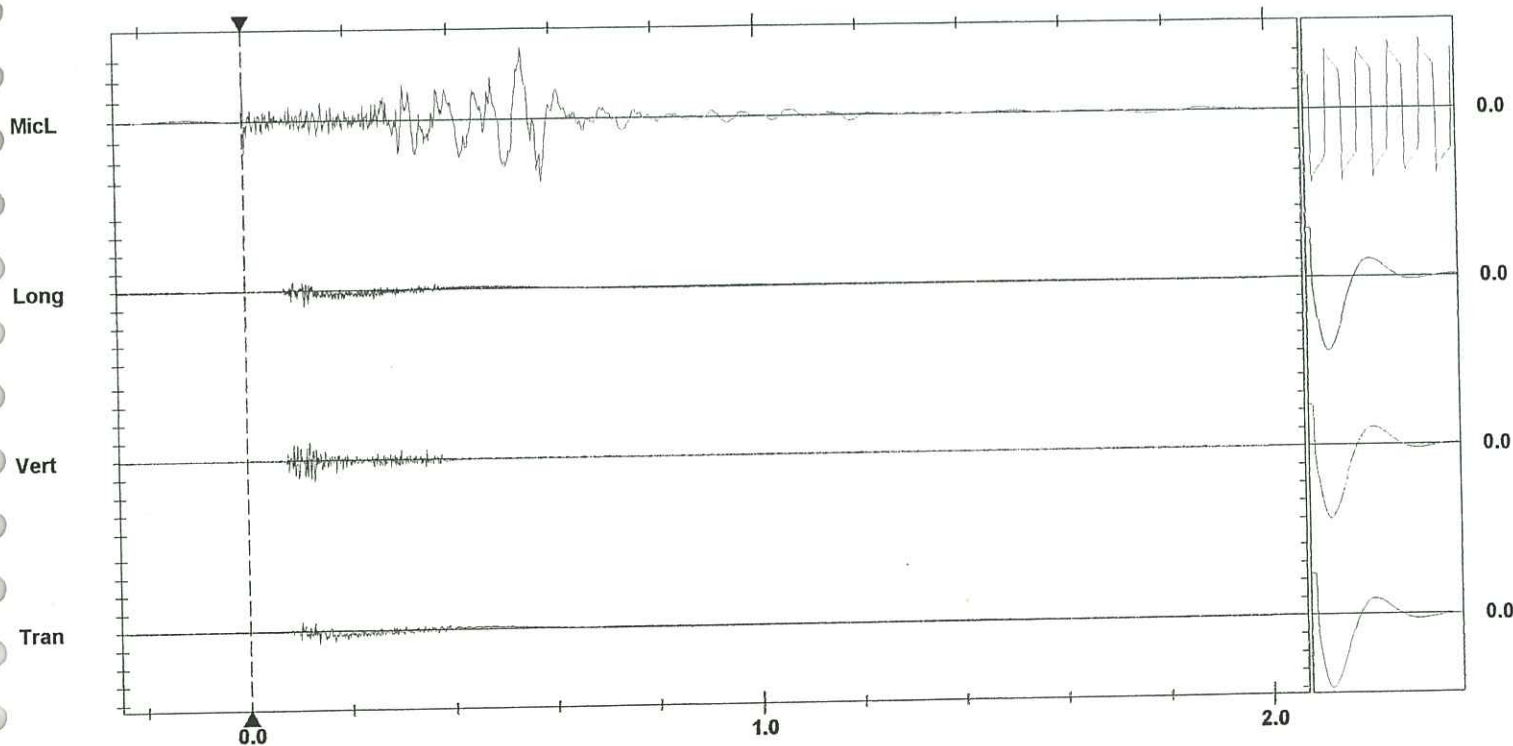
	Tran	Vert	Long	
PPV	1.356	2.254	1.718	mm/s
ZC Freq	85	>100	>100	Hz
Time (Rel. to Trig)	0.135	0.132	0.116	sec
Peak Acceleration	0.129	0.267	0.178	g
Peak Displacement	0.028	0.003	0.028	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.3	7.5	Hz
Overswing Ratio	4.7	4.2	4.2	

Peak Vector Sum 2.339 mm/s at 0.132 sec

DGMS India (A)



a) Industrial Buildings
 b) Domestic houses/structures
 c) Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div Mic: 2.000 pa.(L)/div
 Trigger =

Sensor Check

Event Report

Company Name, Company Address

Start Time: 2024-03-05 AM 11:43:40

SV-1 Serial Number: SR4EW4D19192

End Time: 2024-03-05 AM 11:43:42

Duration Time : 2sec

Project : Name Client Name :

Location : Location Measuring Point:

Meas Site GPS: 0.000000 ; 0.000000

Blast Site GPS: 0.000000 ; 0.000000

Distance (m) : 0.00

Post Event Notes:

	X-axis (L)	Y-axis (T)	Z-axis (V)
Trigger Time (sec)	0.04	0.03	0.05

Peak Particle Velocity (mm/s)	1.32	1.98	2.11
-------------------------------	------	------	------

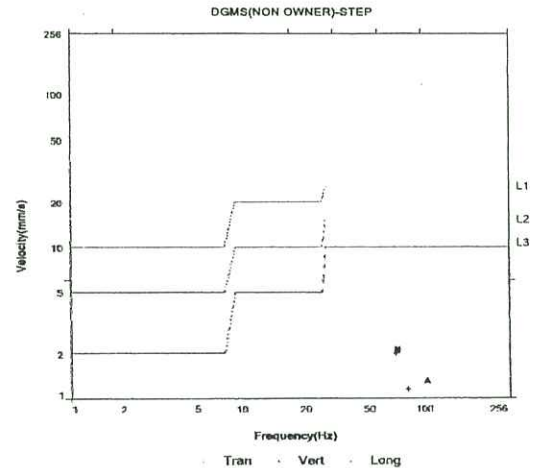
ZC Frequency (Hz)	90	60	62
-------------------	----	----	----

Peak Acceleration (g)	0.0762	0.0761	0.0836
-----------------------	--------	--------	--------

Peak Displacement (mm)	0.002337	0.005252	0.005404
------------------------	----------	----------	----------

Peak Vector Sum: 2.39 mm/s at 0.041 sec

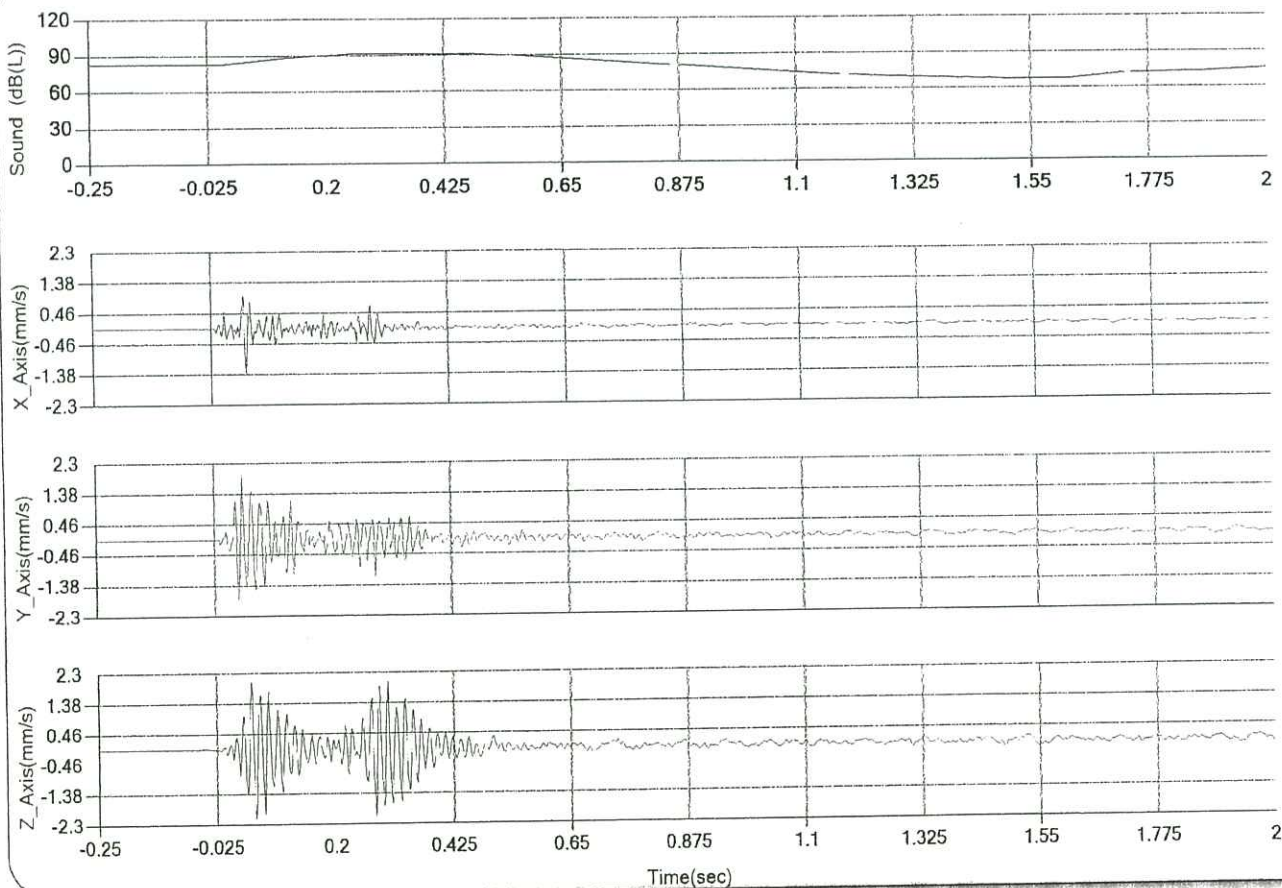
Max Sound: 91.77 dB (L)



L1-Industrial Buildings

L2-Domestic Houses/Structures

L3-Historical Objects/Sensitive Structures



Time Scale: 0.225 sec/divide

Amplitude Scale: Geo (0.92mm/s/divide) Mic (30.0 dB (L)/divide)

Printed: 2024-03-18 PM 03:01:48(Firmware Ver 3.0 401; Software Ver 3.0.4.1.c), Copyrighted Svib Software Technologies Pvt Ltd

Event Report

Company Name, Company Address

Start Time: 2024-03-05 AM 11:43:38

SV-1 Serial Number: SR4EW4D23049

End Time: 2024-03-05 AM 11:43:40

Duration Time : 2sec

Project : Name Client Name :

Location : Location Measuring Point:

Meas Site GPS: 0.000000 ; 0.000000

Blast Site GPS: 0.000000 ; 0.000000

Distance (m) : 0

Post Event Notes:

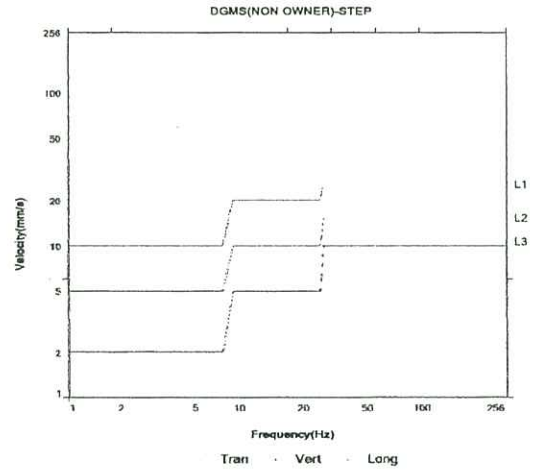
	X-axis (L)	Y-axis (T)	Z-axis (V)
Trigger Time (sec)	0.17	0.05	0.05
Peak Particle Velocity (mm/s)	0.71	0.40	0.52
ZC Frequency (Hz)	334	80	46

Peak Acceleration (g)	0.1518	0.0204	0.0153
-----------------------	--------	--------	--------

Peak Displacement (mm)	0.000338	0.000791	0.001792
------------------------	----------	----------	----------

Peak Vector Sum: 0.73 mm/s at 0.046 sec

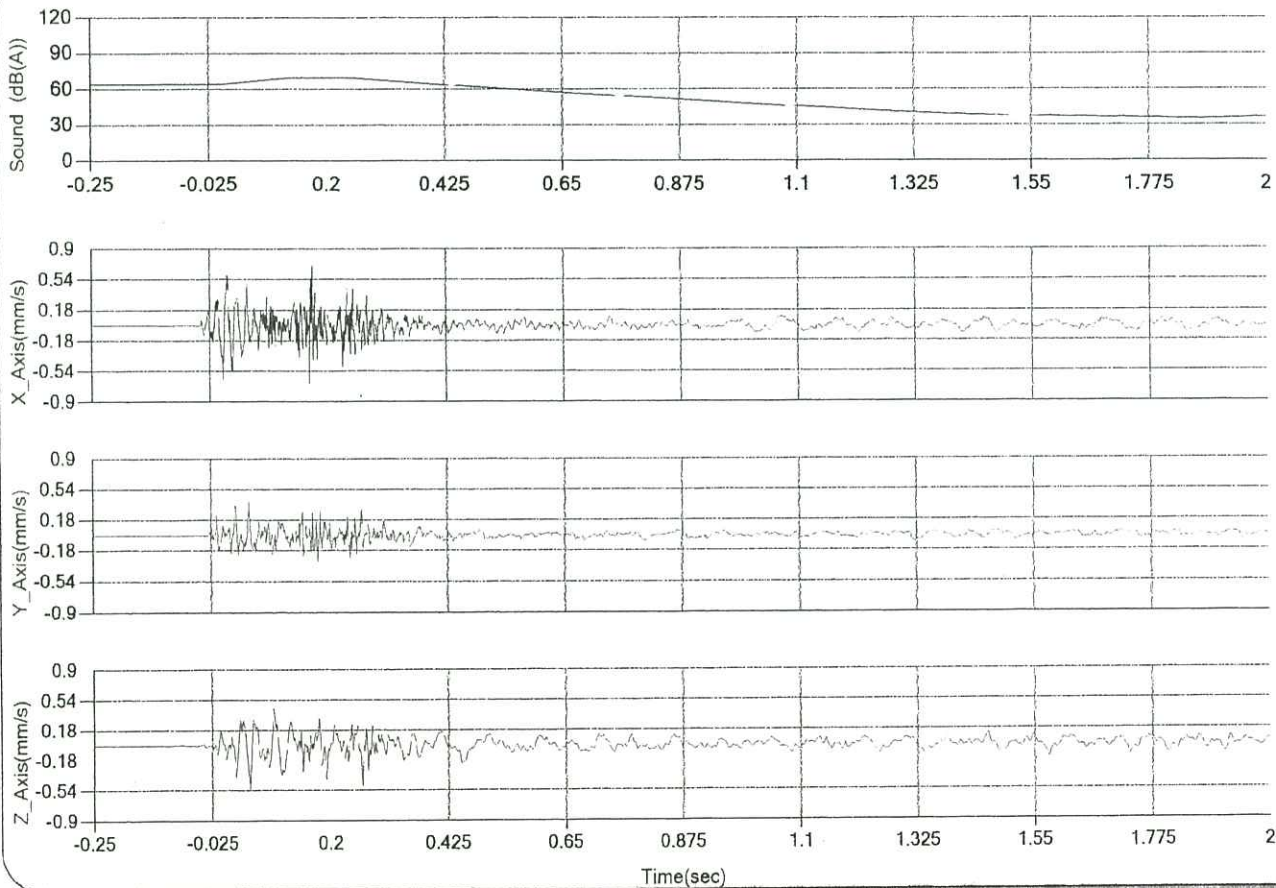
Max Sound: 69.69 dB (A)



L1-Industrial Buildings

L2-Domestic Houses/Structures

L3-Historical Objects/Sensitive Structures



Time Scale: 0.225 sec/divide

Amplitude Scale: Geo (0.36mm/s/divide) Mic (30.0 dB (A)/divide)

Printed: 2024-03-07 PM 03:34:54(Firmware Ver 3.1 401; Software Ver 3.0.5.5a), Copyrighted Svib Software Technologies Pvt Ltd

Date/Time Long at 12:35:29 March 5, 2024
 Trigger Source Geo: 0.510 mm/s, Mic: 100.00 dB(L)
 Range Geo: 254.0 mm/s
 Record Time 2.0 sec at 1024 sps
 Operator/Setup: Operator/factory.MMB

Serial Number UM21162 V 10-90GC Micromate ISEE
 Battery Level 3.8 Volts
 Unit Calibration November 10, 2023 by UES New Delhi
 File Name UM21162_20240305123529.IDFW

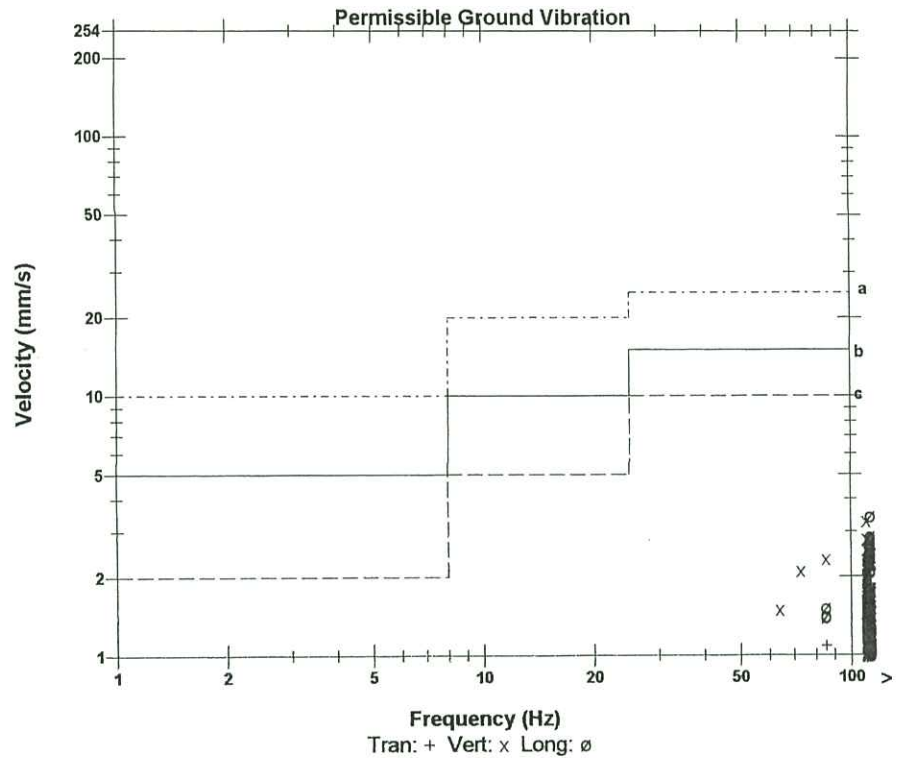
Notes DGMS India (A)

Location:
 Client:
 User Name:
 General:

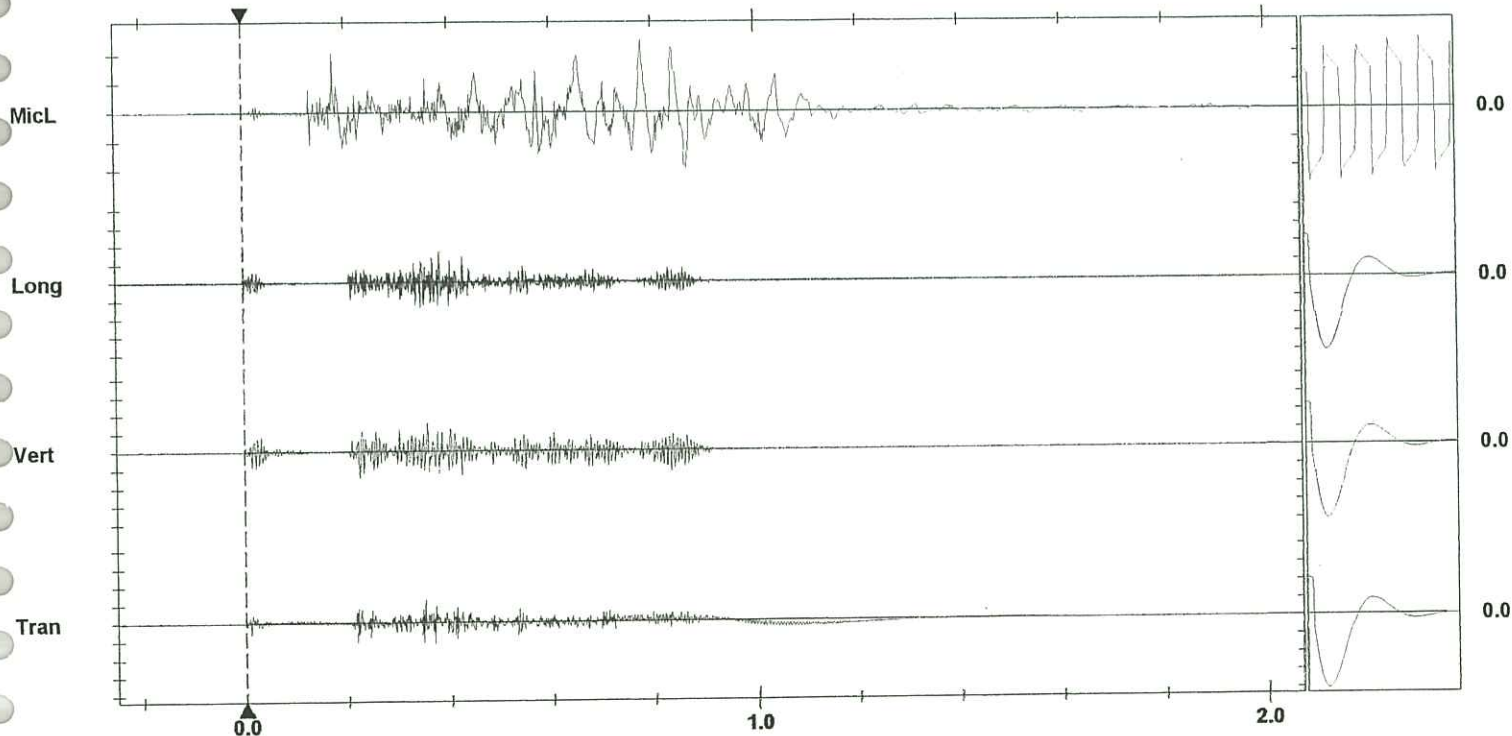
Microphone Linear Weighting
 PSPL 116.0 dB(L) at 0.780 sec
 ZC Freq 21 Hz
 Channel Test Passed (Freq = 20.5 Hz Amp = 1106 mv)

	Tran	Vert	Long	
PPV	2.562	3.310	3.444	mm/s
ZC Freq	>100	>100	>100	Hz
Time (Rel. to Trig)	0.349	0.356	0.383	sec
Peak Acceleration	0.401	0.316	0.348	g
Peak Displacement	0.050	0.004	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.1	7.3	7.3	Hz
Overswing Ratio	4.7	4.2	4.3	

Peak Vector Sum 3.788 mm/s at 0.400 sec



a) Industrial Buildings
 b) Domestic houses/structures
 c) Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div
 Trigger =

Sensor Check

Event Report

Company Name, Company Address

Start Time: 2024-03-05 PM 12:35:25

SV-1 Serial Number: SR4EW4D23049

End Time: 2024-03-05 PM 12:35:27

Duration Time : 2sec

Project : Name Client Name :

Location : Location Measuring Point:

Meas Site GPS: 0.000000 ; 0.000000

Blast Site GPS: 0.000000 ; 0.000000

Distance (m) : 0

Post Event Notes:

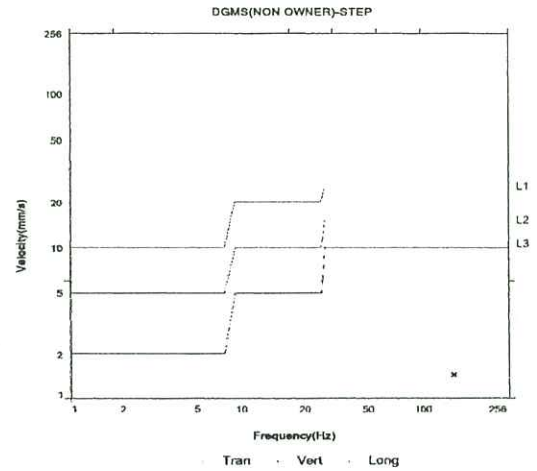
	X-axis (L)	Y-axis (T)	Z-axis (V)
Trigger Time (sec)	0.35	0.36	0.40
Peak Particle Velocity (mm/s)	0.82	0.91	1.44
ZC Frequency (Hz)	132	132	128

Peak Acceleration (g)	0.0697	0.0767	0.1183
-----------------------	--------	--------	--------

Peak Displacement (mm)	0.000994	0.001093	0.001793
------------------------	----------	----------	----------

Peak Vector Sum: 1.52 mm/s at 0.354 sec

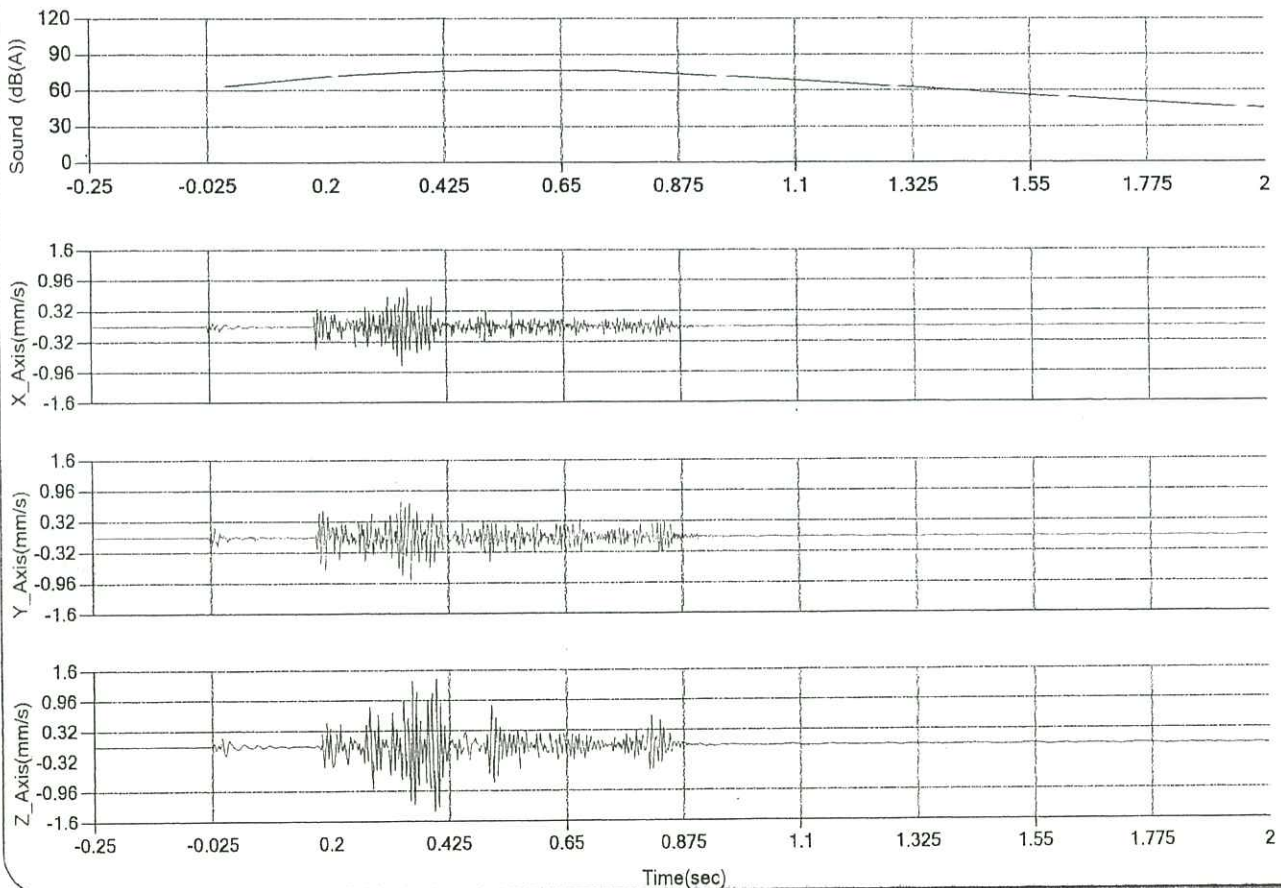
Max Sound: 76.82 dB (A)



L1-Industrial Buildings

L2-Domestic Houses/Structures

L3-Historical Objects/Sensitive Structures



Time Scale: 0.225 sec/divide

Amplitude Scale: Geo (0.64mm/s/divide) Mic (30.0 dB (A)/divide)

Printed: 2024-03-07 PM 03:34:56(Firmware Ver 3.1 401; Software Ver 3.0.5.5a), Copyrighted Svib Software Technologies Pvt Ltd

Event Report

Company Name, Company Address

Start Time: 2024-03-05 PM 12:35:28

SV-1 Serial Number: SR4EW4D19192

End Time: 2024-03-05 PM 12:35:30

Duration Time : 2sec

Project : Name Client Name :

Location : Location Measuring Point:

Meas Site GPS: 0.000000 ; 0.000000

Blast Site GPS: 0.000000 ; 0.000000

Distance (m) : 0.00

Post Event Notes:

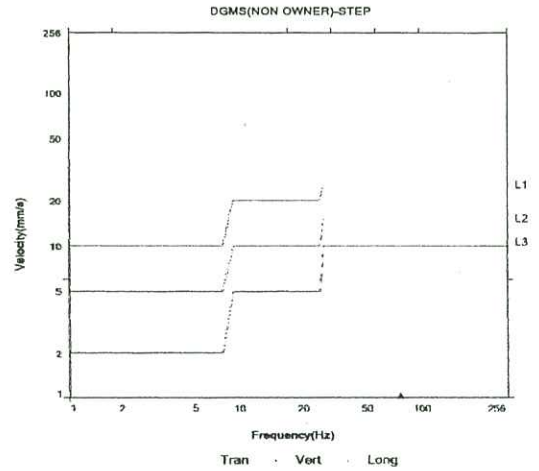
	X-axis (L)	Y-axis (T)	Z-axis (V)
Trigger Time (sec)	0.27	0.30	0.45
Peak Particle Velocity (mm/s)	1.04	0.72	0.78
ZC Frequency (Hz)	66	64	48

Peak Acceleration (g) 0.0439 0.0295 0.0241

Peak Displacement (mm) 0.002501 0.001790 0.002600

Peak Vector Sum: 1.05 mm/s at 0.332 sec

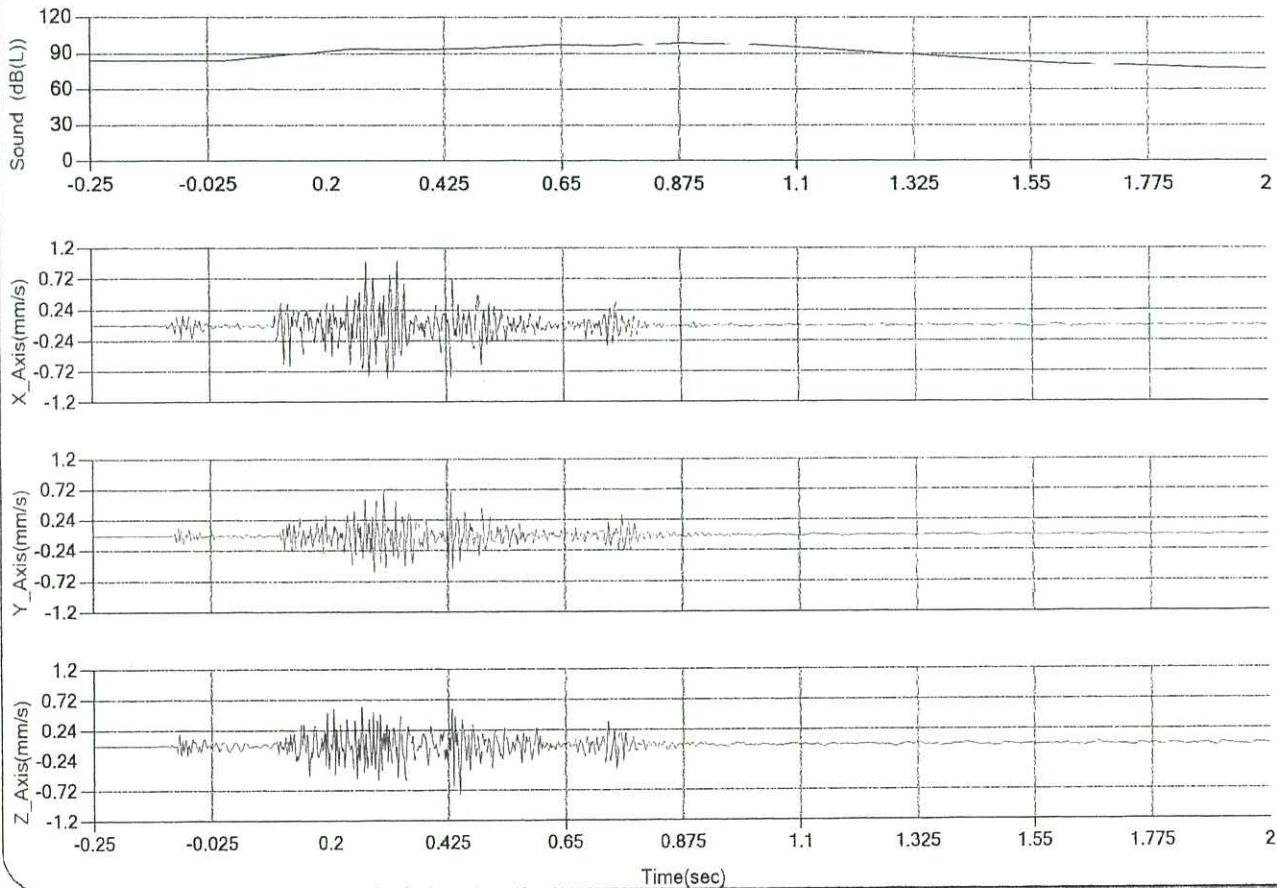
Max Sound: 99.30 dB (L)



L1-Industrial Buildings

L2-Domestic Houses/Structures

L3-Historical Objects/Sensitive Structures



Time Scale: 0.225 sec/divide

Amplitude Scale: Geo (0.48mm/s/divide) Mic (30.0 dB (L)/divide)

Printed: 2024-03-18 PM 03:01:50(Firmware Ver 3.0 401; Software Ver 3.0.4.1.c), Copyrighted Svib Software Technologies Pvt Ltd

Date/Time MicL at 12:38:52 March 5, 2024
 Trigger Source Geo: 0.510 mm/s, Mic: 100.00 dB(L)
 Range Geo: 254.0 mm/s
 Record Time 2.0 sec at 1024 sps
 Operator/Setup Operator/factory.MMB

Serial Number UM21162 V 10-90GC Micromate ISEE
 Battery Level 3.8 Volts
 Unit Calibration November 10, 2023 by UES New Delhi
 File Name UM21162_20240305123852.IDFW

Notes

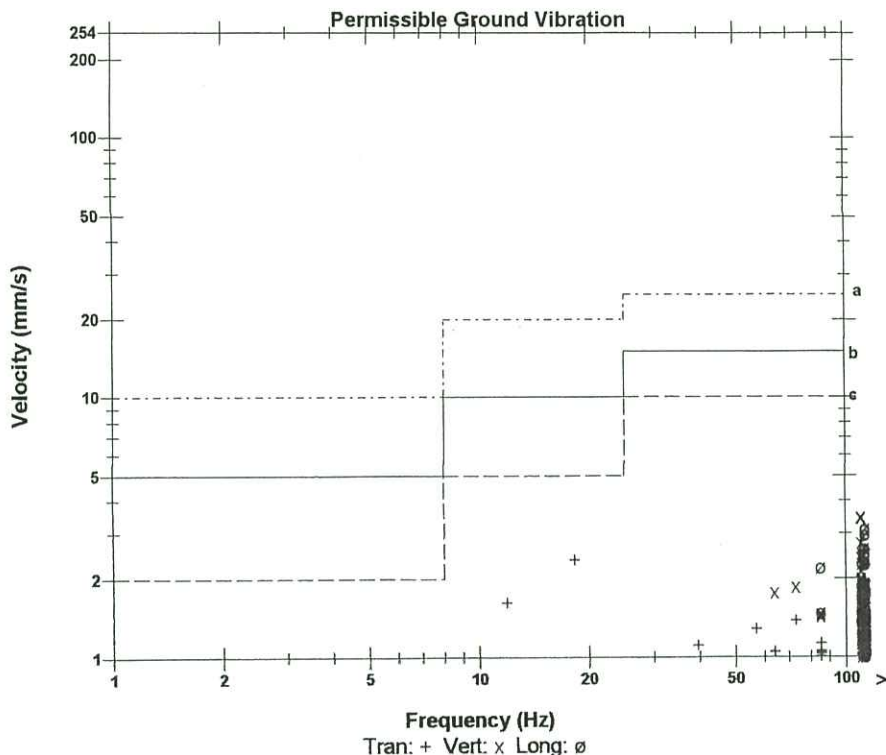
Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
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 ZC Freq 30 Hz
 Channel Test Passed (Freq = 20.5 Hz Amp = 1106 mv)

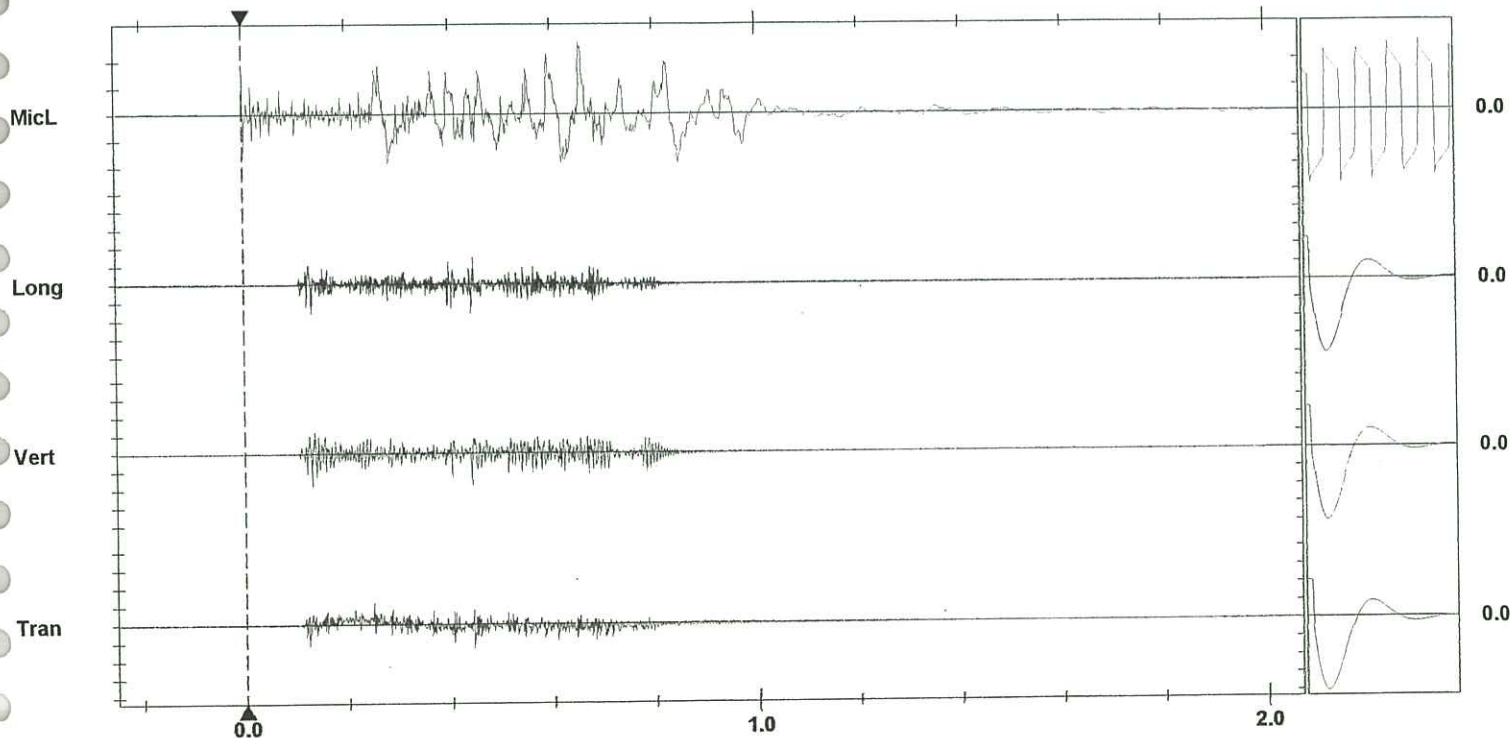
	Tran	Vert	Long	
PPV	2.593	3.507	3.137	mm/s
ZC Freq	>100	>100	>100	Hz
Time (Rel. to Trig)	0.443	0.130	0.442	sec
Peak Acceleration	0.369	0.323	0.386	g
Peak Displacement	0.014	0.005	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.1	7.3	7.3	Hz
Overswing Ratio	4.7	4.2	4.3	

Peak Vector Sum 4.362 mm/s at 0.441 sec

DGMS India (A)



a) Industrial Buildings
 b) Domestic houses/structures
 c) Historic objects, sensitive structures



Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div
 Trigger =

Sensor Check

Event Report

Company Name, Company Address

Start Time: 2024-03-05 PM 12:38:48

SV-1 Serial Number: SR4EW4D23049

End Time: 2024-03-05 PM 12:38:50

Duration Time : 2sec

Project : Name Client Name :

Location : Location Measuring Point:

Meas Site GPS: 0.000000 ; 0.000000

Blast Site GPS: 0.000000 ; 0.000000

Distance (m) : 0

Post Event Notes:

	X-axis (L)	Y-axis (T)	Z-axis (V)
--	------------	------------	------------

Trigger Time (sec)	0.27	0.51	0.52
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Peak Particle Velocity (mm/s)	0.77	0.68	1.18
-------------------------------	------	------	------

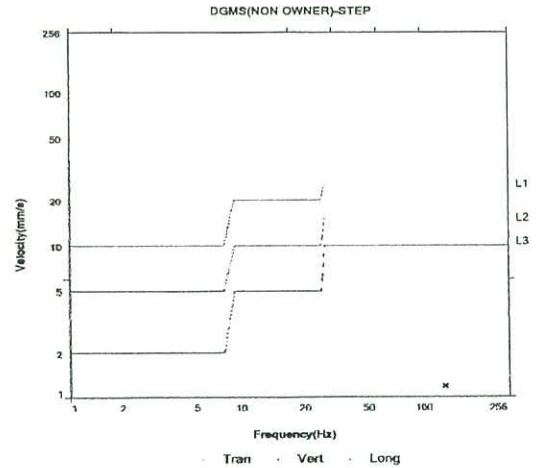
ZC Frequency (Hz)	144	114	114
-------------------	-----	-----	-----

Peak Acceleration (g)	0.0711	0.0500	0.0863
-----------------------	--------	--------	--------

Peak Displacement (mm)	0.000851	0.000955	0.001649
------------------------	----------	----------	----------

Peak Vector Sum: 1.29 mm/s at 0.524 sec

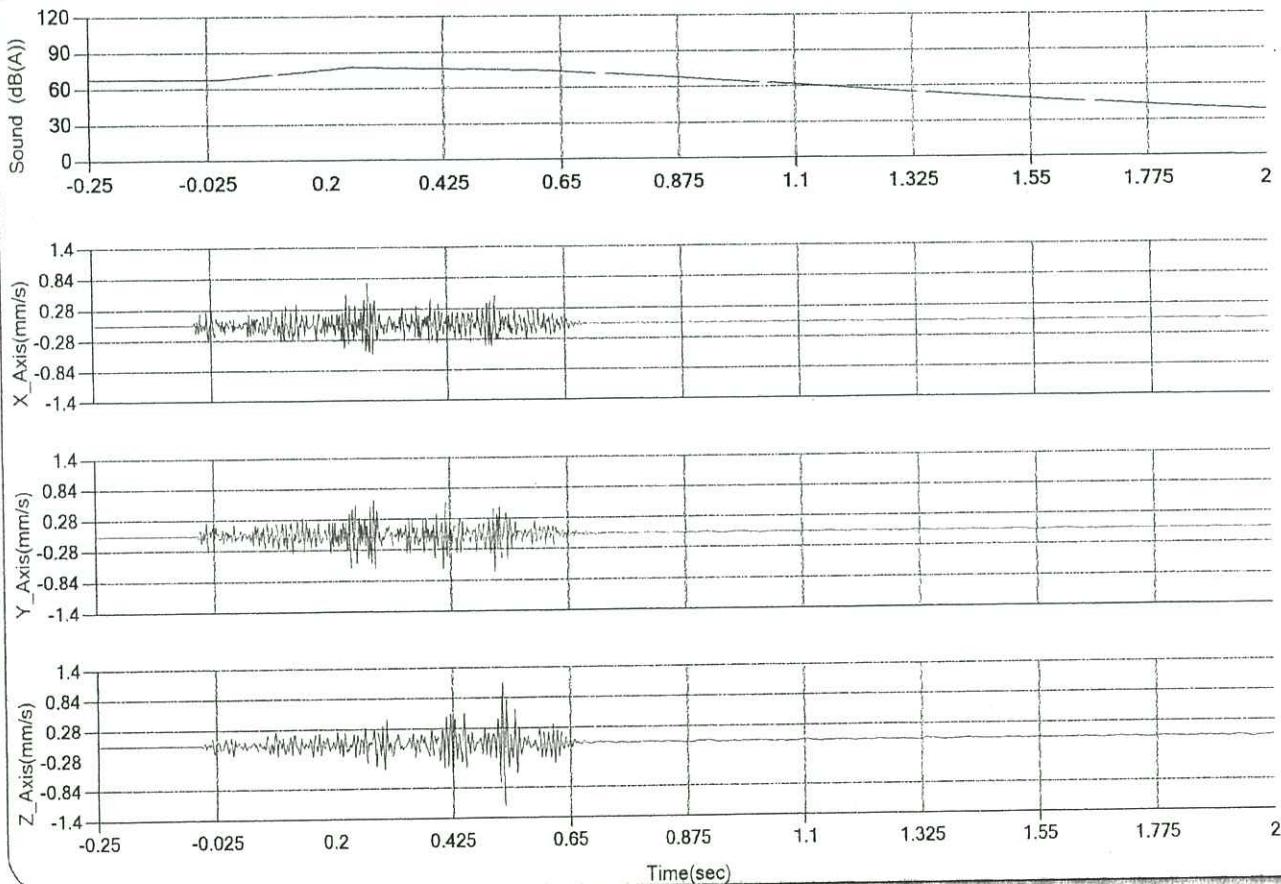
Max Sound: 77.99 dB (A)



L1-Industrial Buildings

L2-Domestic Houses/Structures

L3-Historical Objects/Sensitive Structures



Time Scale: 0.225 sec/divide

Amplitude Scale: Geo (0.56mm/s/divide) Mic (30.0 dB (A)/divide)

Printed: 2024-03-07 PM 03:34:58(Firmware Ver 3.1 401; Software Ver 3.0.5.5a), Copyrighted Svib Software Technologies Pvt Ltd

Event Report

Company Name, Company Address

Start Time: 2024-03-05 PM 12:38:51

SV-1 Serial Number: SR4EW4D19192

End Time: 2024-03-05 PM 12:38:53

Duration Time : 2sec

Project : Name Client Name :

Location : Location Measuring Point:

Meas Site GPS: 0.000000 ; 0.000000

Blast Site GPS: 0.000000 ; 0.000000

Distance (m) : 0.00

Post Event Notes:

	X-axis (L)	Y-axis (T)	Z-axis (V)
Trigger Time (sec)	0.43	0.21	0.19

Peak Particle Velocity (mm/s)	0.70	0.44	0.88
-------------------------------	------	------	------

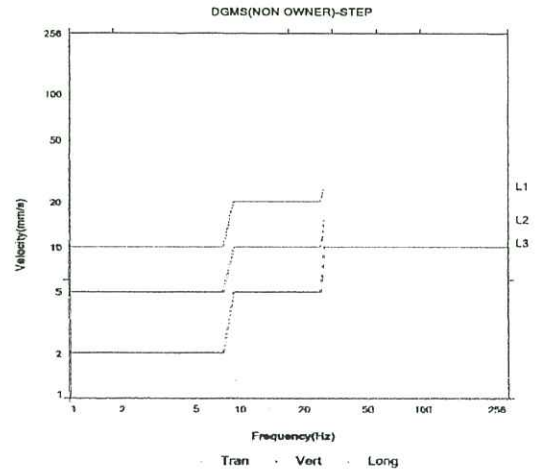
ZC Frequency (Hz)	90	86	174
-------------------	----	----	-----

Peak Acceleration (g)	0.0401	0.0244	0.0982
-----------------------	--------	--------	--------

Peak Displacement (mm)	0.001230	0.000819	0.000805
------------------------	----------	----------	----------

Peak Vector Sum: 0.89 mm/s at 0.187 sec

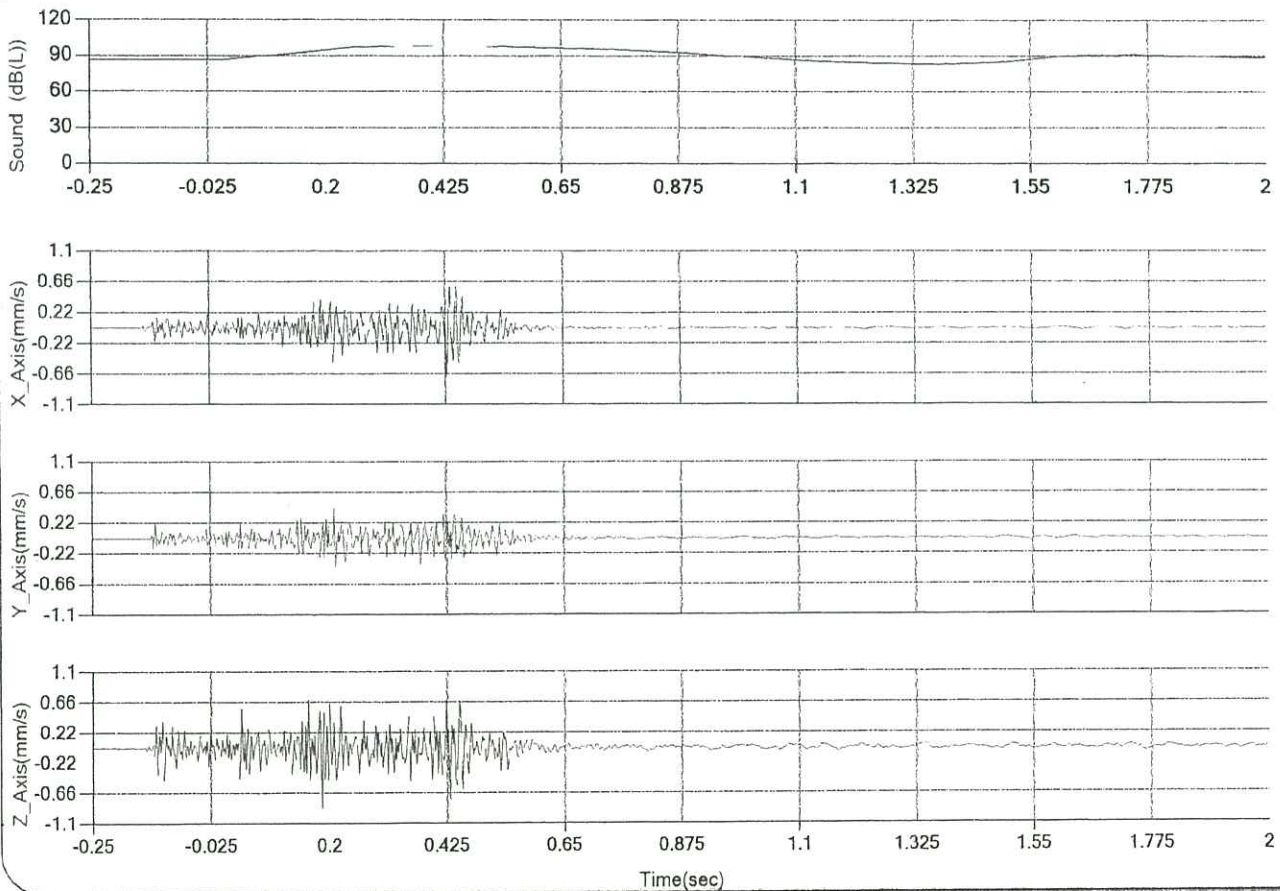
Max Sound: 98.49 dB (L)



L1-Industrial Buildings

L2-Domestic Houses/Structures

L3-Historical Objects/Sensitive Structures



Time Scale: 0.225 sec/divide

Amplitude Scale: Geo (0.44mm/s/divide) Mic (30.0 dB (L)/divide)

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Our main consultancy services are offered in the areas of
“Rock Blasting” and “Slope / Dump Stability”
SOME OF OUR RECENT CLIENTS ARE:

Govt./Public Sector Companies

- The Singareni Collieries Company Limited-Kothagudem. Govt. of Telangana (Mines in Telangana & Odisha)
- IREL (India) Limited – Govt. of India (Mines in Tamil Nadu)
- Dept. of Mines & Geology- Govt. of Karnataka.
- Southern Railways, Mangalore
- Hindustan Petroleum Corporation Limited, Mangalore

Iron Ore Companies

- MSPL Limited, Hospet, Karnataka
- Vedanta Limited, Karnataka
- VESCO Limited, Sandur, Karnataka.
- PBS & Sons Limited, Hospet, Karnataka
- M/s. BKG Mining Private Limited, Sandur, Karnataka
- M/s. Zeenath Transport Company, Sandur, Karnataka
- SMIORE Limited- Sandur
 - Ultratech Cements Private Limited,

Expertise in Blasting:

- Controlled blasting to protect important structures near mines/quarries and other Civil/infra projects
- Ground vibration and noise monitoring
- Blast optimization
- Fragmentation analysis
- Blast performance analysis with High-speed camera

Cement Industry/ Limestone Sector

- Andhra Pradesh
- Bharathi Cements Limited, Andhra Pradesh
- Chettinad Cements Limited, Karnataka
- Lafarge Umiam Mining Private Limited, Meghalaya
- Orient Cements Limited- Karnataka
- Shree Cements Limited- Karnataka

Others

- TJN Construction Pvt Ltd- Bangalore
- Aastraa Resources- Goa
- M/s. Utkal Coal Mining India Private Limited- Odisha
- BGR Mining & Infra Pvt Ltd- Jharkhand
- Various granite quarries in the state of Karnataka, Kerala, Andhra Pradesh, Tamil Nadu

Expertise in Slope Stability:

- Design of Slopes and Dumps
- Slope stability analysis
- Dump stability analysis

Total No. of Project carried out: 210

Principal Investigator

Dr. Ram Chandar Karra

Professor & Former Head of the Department

Dept. of Mining Engineering

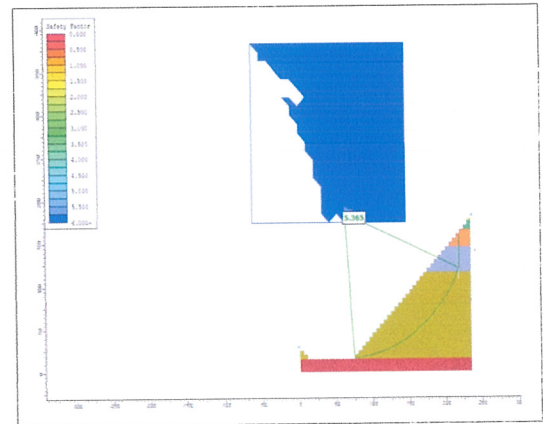
NITK, Surathkal (Govt. of India), Mangalore-575025

Email: krc_karra@yahoo.com, krc@nitk.edu.in

Mob: 94486 27564

ANNEXURE 6
COPY OF SLOPE STABILITY STUDY

A SCIENTIFIC STUDY REPORT
ON
SLOPE STABILITY ANALYSIS OF GRANITE BUILDING STONE
QUARRY OF M/s. PALAKKAL GRANITE PRODUCT PRIVATE
LIMITED IN KODIYATHUR & KUMARANELLUR VILLAGES,
KOZHILODE- TALUK & DISTRICT OF KERALA
(CONSULTANCY PROJECT CODE: TC/MN/JB-137)



SUBMITTED TO:
MR. P.M. ABOOBACKER
MANAGING DIRECTOR
M/S. PALAKKAL GRANITE PRODUCT PRIVATE LIMITED
KP8/308, NEAR SAKEENA INDUSTRIES
CHETHUKADAVU-PO, KUNNAMANGALAM
KOZHIKODE-DIST, KERALA



BY
DR. RAM CHANDAR KARRA
ASSOCIATE PROFESSOR & FORMER HEAD
DEPARTMENT OF MINING ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA,
SURATHKAL (GOVERNMENT OF INDIA)
MANGALORE – 575 025
(MAY, 2023)

10/05/2023
Dr. K. RAM CHANDAR
Associate Professor
Dept. of Mining Engineering
National Institute of Technology Karnataka
Surathkal, P.O. Srinivasnagar
MANGALORE - 575 025. INDIA

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Department of Mining Engineering

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FIE, MMEAI, MISRMTT, MISTE, MISRM, MMGM

Associate Professor & Former Head

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Mob: 9448627564

Email: krc_karra@yahoo.com, krc@nitk.edu.in

<https://mining.nitk.ac.in/faculty/karra-ram-chandar>

ACKNOWLEDGEMENTS

The Principal Investigator is thankful to Mr. Aboobacker – Managing Director of M/s. Palakkal Granite Private Limited for awarding the scientific study.

The Principal Investigator is grateful to the Director, National Institute of Technology Karnataka, Surathkal (Govt. of India) for permitting to take up the project.

Thanks to Mr. Avadaiyappan -Quarry manager, field team for the help rendered during field studies.

Dr. K. Ram Chandar

Principal Investigator

Consultancy Project Code: TC/MN/JB/137

May. 08, 2023

Dr. K. RAM CHANDAR

Associate Professor

Dept. of Mining Engineering

National Institute of Technology Karnataka

Surathkal, P.O. Srinivasnagar

MANGALORE - 575 025. INDIA

Recipient of : IE (India) Young Engineer Award,
MGMI Engineering Gold Medal
MEAI-SRG IT Award,

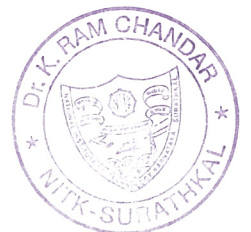
ISTE –SGSITS Young Teacher Award,
IE-NDRF-National Design Award
MEAI- Smt. Kiran Devi Singhal Memorial Award

ABSTRACT

Mr. P.M. Aboobacker – Managing Director of M/s. Palakkal Granite Product Private Limited has approached the Principal Investigator from National Institute of Technology Karnataka (NITK-Surathkal, Govt. of India), to conduct a scientific study to assess the stability of slopes in his granite quarry proposed for expansion combining with the existing benches for safe workings.

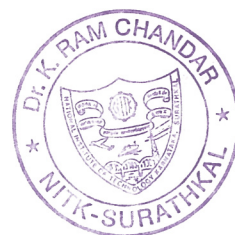
A preliminary visit was made to the project site and a reconnaissance survey was carried out. Rock formation, method of working, bench configuration etc., were studied. The quarry is a slightly hilly deposit. Samples were collected from different parts exposed rock and also from the exposed benches of the working quarry, and brought to the laboratory of NITK, Surathkal. Various physico-mechanical properties were determined in the laboratory and required shear parameters were estimated. Equilibrium based software 'Slide' is used to assess the stability of slopes and benches.

Stability analysis of benches is carried out along 3 sections (AA', BB'' and CC'') as given in approved mine plan. In each case, the bench height is 5m, bench width is 5m and slope angle is 90°. Each model is analysed under circular and non circular/ plane failure conditions. Further, under each condition, Bishop and Janbu's methods of analysis are used. 10m x 10m grid is used while analysis. Among the sections analysed, CC' section has resulted the lowest FOS, then this section is further analyzed under external load, joint pattern and wet condition, which resulted a FOS of 4.84, which is more than 3 times of the required FOS of 1.5 as per DGMS guidelines. So, it can be stated that the benches would be very stable while working.



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1. INTRODUCTION

Presently, due to ever-increasing demand of minerals / raw materials for the country, it is very much required to have the opencast mines at a greater depth. Increasing depth also increased the severity of slope stability problems of the opencast mines. Unlike the previous quarrying practices at shallow depths, now-a-days, study the stability of slopes of working benches and waste-dumps in mines/quarries and analyzing their stability has become a challenge for the mining community.

For the purpose, besides design of slopes by modeling or analytical methods, it is pertinent to utilize various techniques for monitoring the slopes to understand the status of its stability and early detection of instability of slopes in surface mines.

Now days quarries and surface mines are reaching greater depth leading to the requirement of design and analysis of slopes for safe workings. An understanding of failure mechanisms requires a knowledge of the physico-mechanical properties of the intact material and discontinuities which make up the rock mass, as well as the geological aspects.

Scope of the Study

Mr. P.M. Aboobacker – Managing Director of M/s. Palakkal Granite Product Private Limited has approached the Principal Investigator from National Institute of Technology Karnataka (NITK-Surathkal, Govt. of India), to conduct a scientific study to assess the stability of slopes in his granite quarry proposed for expansion combining with the existing benches for safe workings. In view of this, a scientific study is taken up.



Location of Study Area

Mr. P.M. Aboobacker – Managing Director of M/s. Palakkal Granite Product Private Limited has obtained Letter of Intent from Department of Mining & Geology to quarry Granite Building stone over an extent of 10.1903 Ha. in Re-Survey Block No: 003 & 001 & Re-Survey No. 172/1527, 172/1232, 172/1228, 172/1213, 1523, 1862, 172/1212, 172/1134, 172/1137, 172/1201, 172/1221, 172/1120, 172/1238, 172/1136, 172/1135, 172/1119, 172/2275, 172/1526, 172/1200, 172/1239, 1240 in Kodyathur Village & Re-Survey Block No.001, under Survey nos. 153/597, 153/598, 153/604, 153/601, 600 in Kumaranellur Village, Kozhilode- Taluk & District of Kerala, vide Letter no.DOZ/M-2230/2021 dated 17.11.2021 (Letter of Intent No.5794/M3/2020). The proposed area falls between Latitude $11^{\circ}17'46.03''\text{N}$ to $11^{\circ}18'1.58''\text{N}$ and Longitude $76^{\circ}2'56.36''\text{E}$ to $76^{\circ}3'10.00''\text{E}$, under Toposheet No.58A/3.

A field visit was made to the proposed quarry site and first reconnaissance survey was made.

The following objectives were set to conduct the scientific study on slope stability.

Objectives

- a. To assess the stability of slopes as per the Mining/Quarry Plan.
- b. To suggest modifications in the bench configuration if required, based on the modeling studies.



Methodology

In order to achieve the above objectives, the following methodology is followed.

- A field visit was made, and mine/quarry planning/bench configuration details are collected.
- The quarry area is inspected and some samples were collected from the exposed rock mass/.benches.
- Collected samples were brought to the laboratory of NITK- Surathkal and the relevant rock properties are determined.
- Modeling studies were carried out using limit equilibrium-based modeling software (Slide) and determined Factor of Safety (FOS) in each case.
- Based on the study, conclusions are drawn and suitable recommendations are made.

Field Investigations

A field visit was made and a reconnaissance survey was done as detailed below:

- a. In the proposed quarry area, a thin cover of top soil is present. Rock is exposed in most of the area.
- b. Rock formation, method of working, bench configuration etc., were studied. The quarry area is a hilly deposit and quarrying is planned for expansion in north and west directions. As the proposed expansion area is in continuation to the present quarry workings, so the stability analysis to be carried out for the entire bench profile combining the present and the proposed workings.
- c. The complete lease area was inspected and area proposed for expansion is shown in

Fig. 1.1. A broad view of the existing quarry is shown in Fig. 1.2. From these



exposed rock mass, it is observed that it is very hard compact deposit and massive with multiple joint planes (Fig. 1.3.).

- d. There are no indications of any failures. Eastern side of the quarry is having thicker soil/ morum layer (Fig. 1.4).
- e. No spalling of benches, local slides, depressions, crater formation, heaving formation of bulges on the floor of benches, etc., was observed.
- f. Stability analysis of benches require various physico-mechanical properties like density, cohesive strength, angle of internal friction etc. Some of these properties can be determined directly, some are difficult to determine then such properties to be predicted indirectly. In order to determine these properties, some samples were collected.

Sample Collection

In order to determine the rock properties, suitable soil and Rock samples were collected from different locations of the applied lease area representing the surface of the lease area (Fig. 1.5). Some more samples were collected from the exposed benches of the existing quarry (Fig. 1.6). All the collected samples were transported to the laboratory of NITK, Surathkal.





FIG. 1.1 (A)



FIG. 1.1(B)
FIG. 1 A VIEW OF PROPOSED QUARRY AREA FOR EXPANSION



FIG. 1.2 (A)



FIG. 1.2 (B)

FIG. 1.2 A VIEW OF THE EXISTING QUARRY



FIG. 1.3 (A)



FIG. 1.3 (B)

FIG. 1.3 A VIEW OF COMPACT MASSIVE AND JOINTED ROCKMASS



FIG. 1.4 (A)



FIG. 1.4 (B)

FIG. 1.4 EASTERN SIDE OF THE QUARRY WITH MORUM LAYER



FIG. 1.5 COLLECTION OF SURFACE SOIL SAMPLES IN APPLIED AREA



FIG. 1.6 (A)



FIG. 1.6 (B)

FIG. 1.6 COLLECTION OF ROCK SAMPLES

2. LABORATORY INVESTIGATIONS

Different samples were collected from the exposed area of the proposed quarry site & from the working quarry site representing different depths. All the samples were brought to the laboratory of Mining Engineering Department of NITK, Surathkal (Fig. 2.1). Samples were prepared as per International Society for Rock Mechanics (ISRM) suggested methods to determine density, cohesive strength angle internal friction. In each case, number of tests were carried out and the mean values only reported here. First, Schmidt rebound hardness test was carried out as it is a non- destructive test (Fig. 2.2). Prepared samples to determine density are shown in Fig. 2.3. Laboratory experiment to determine density is shown in Fig. 2.4. The same samples are kept as it is in water for 24 hours to determine water content. As it will be difficult to determine cohesive strength and angle of internal friction directly, some indirect tests were carried out to estimate the shear parameters of rock samples. Fig. 2.5 shows the prepared samples for Protodyakanov's strength index test and the test is shown in Fig. 2.6. Fig. 2.7 shows Point load strength index test. Water content was found to be nil in the granite samples. These tests results are correlated with the available data in literature, and also using RocData software, optimum shear parameters were estimated.





FIG. 2.1 VIEW OF ROCK SAMPLES BROUGHT TO THE LABORATORY





FIG. 2.2 SCHMIDT REBOUND HARDNESS TEST



FIG. 2.3 PREPARED SAMPLES TO DETERMINE DENSITY



FIG. 2.4 DETERMINATION OF DENSITY



FIG. 2.5 PREPARED SAMPLE FOR PROTODYAKANOV'S STRENGTH INDEX TEST



FIG. 2.6 (A)

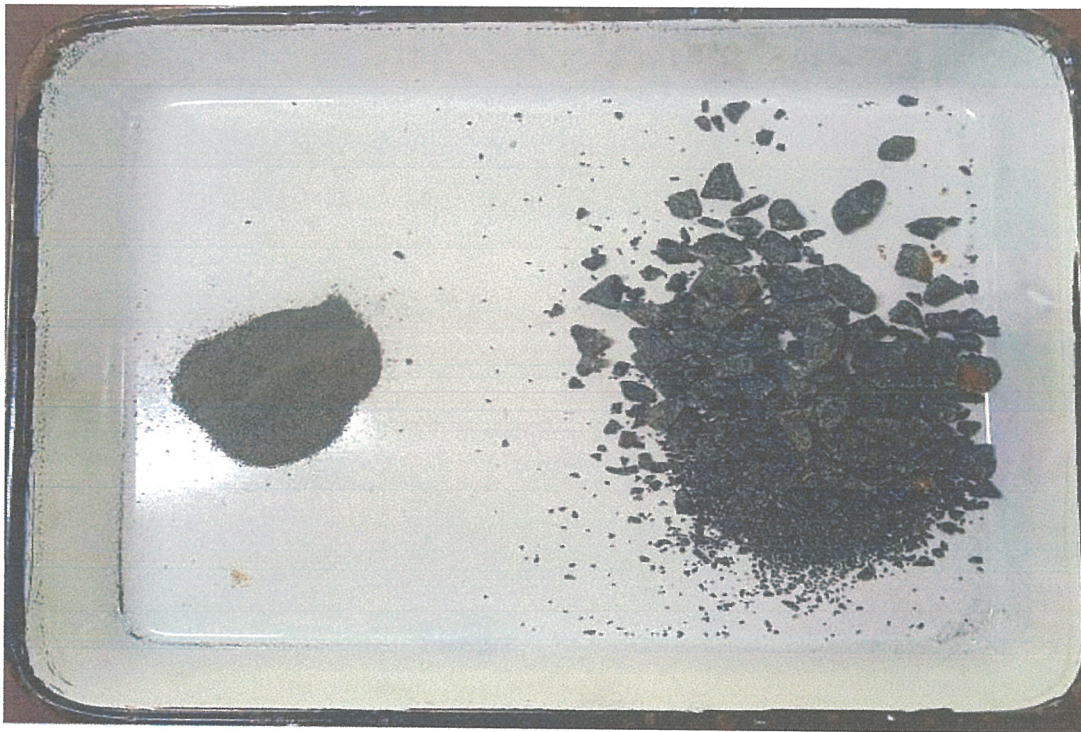


FIG. 2.6 (B)

FIG. 2.6 CARRYING OUT PROTODYAKONOV'S STRENGTH INDEX TEST



FIG. 2.7 DETERMINATION OF POINT LOAD STRENGTH INDEX

3. MODELLING STUDIES

Cohesive strength (c), angle of internal friction (ϕ) (these two together called as shear parameters) and density are essential properties to assess the stability of slopes using any equilibrium modelling software. It's difficult to determine shear parameters directly. So, it is essential to predict the required rock properties from other rock properties. In fact, some researchers have tried to predict ' c ' and ' ϕ ' values based on other physico-mechanical properties of rocks. So, based on laboratory determined rock properties and by close examination of large data sets from literature review and also by using RocData software, the following properties are considered for modelling studies (Table- 3.1). At many places the rock is exposed and at some places there is top soil, so the first bench is considered as top soil for a maximum of 2m. The first bench properties are considered based on the water content test results and for the remaining benches rock properties are considered are dry, so that both dry and wet conditions are considered.

TABLE- 3.1 ROCK PROPERTIES USED FOR MODELING STUDIES

Depth(m)	Unit Weight (kN/m ³)	Cohesion (kPa)	Friction Angle (°)
Soil(0-2)	19	40	34
2-10	23.54	1100	33
10-30	24.52	1650	32
30-60	25.50	2400	30
>60	26.48	2640	29



Stability analysis of benches is carried out along 3 sections as given in approved mine plan (Fig. 3.1). In each case, the bench height is 5m, bench width is 5m and slope angle is 90° . Each model is analysed under circular and non circular/ plane failure conditions. Further, under each condition, Bishop and Janbu's methods of analysis are used. 10m x 10m grid is used while analysis.

Case 1: Stability analysis of multiple benches along the Section – AA'

Case 2: Stability analysis of multiple benches along the Section – BB'

Case 3: Stability analysis of multiple benches along the Section – CC'

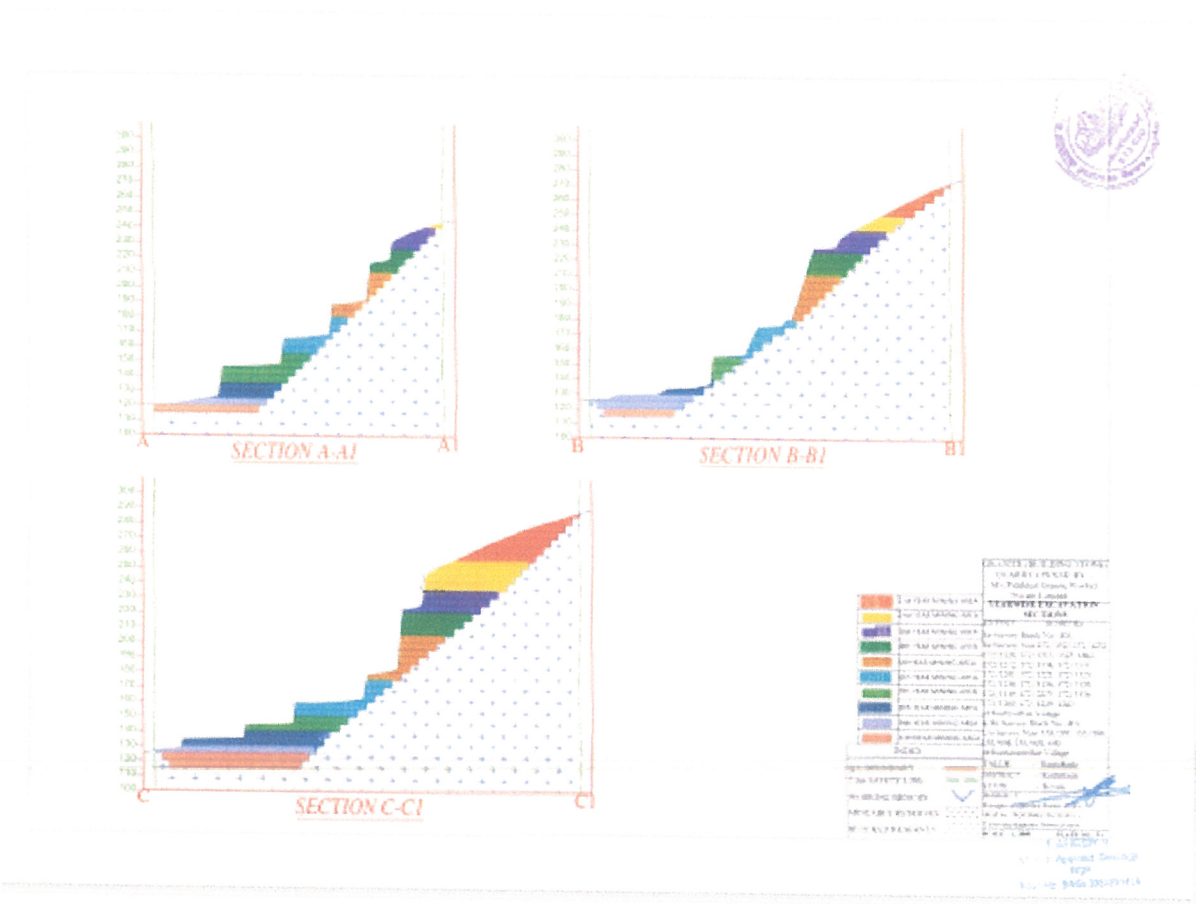


FIG. 3.1 SECTIONS AS PER APPROVED MINE PLAN

Case 1: Stability Analysis of Multiple Benches Along the Section- AA'

This case gives the stability analysis of multiple benches upto 130m height. The bench configuration is presented in Table- 3.2.

TABLE- 3.2 BENCH CONFIGURATION ALONG THE SECTION – A – A'

Bench No. From Surface	Height (m)	Exposed Width (m)	Slope Angle (degree)
1	5	5	90
2	5	5	90
3	5	5	90
4	5	5	90
5	5	5	90
6	5	5	90
7	5	5	90
8	5	5	90
9	5	5	90
10	5	5	90
11	5	5	90
12	5	5	90
13	5	5	90
14	5	5	90
15	5	5	90
16	5	5	90
17	5	5	90
18	5	5	90
19	5	5	90
20	5	5	90
21	5	5	90
22	5	5	90
23	5	5	90
24	5	5	90
25	5	5	90
26	5	5	90

Under dry condition, circular failure analysis has resulted in 8.761 FoS with Bishop's method and 9.459 FoS with Janbu's method (Figs. 3.2 & 3.3) and with plane failure condition, the



FoS of the benches resulted in 6.816 FoS with Bishop's method and 8.30 FoS with Janbu's method (Figs. 3.4 & 3.5).

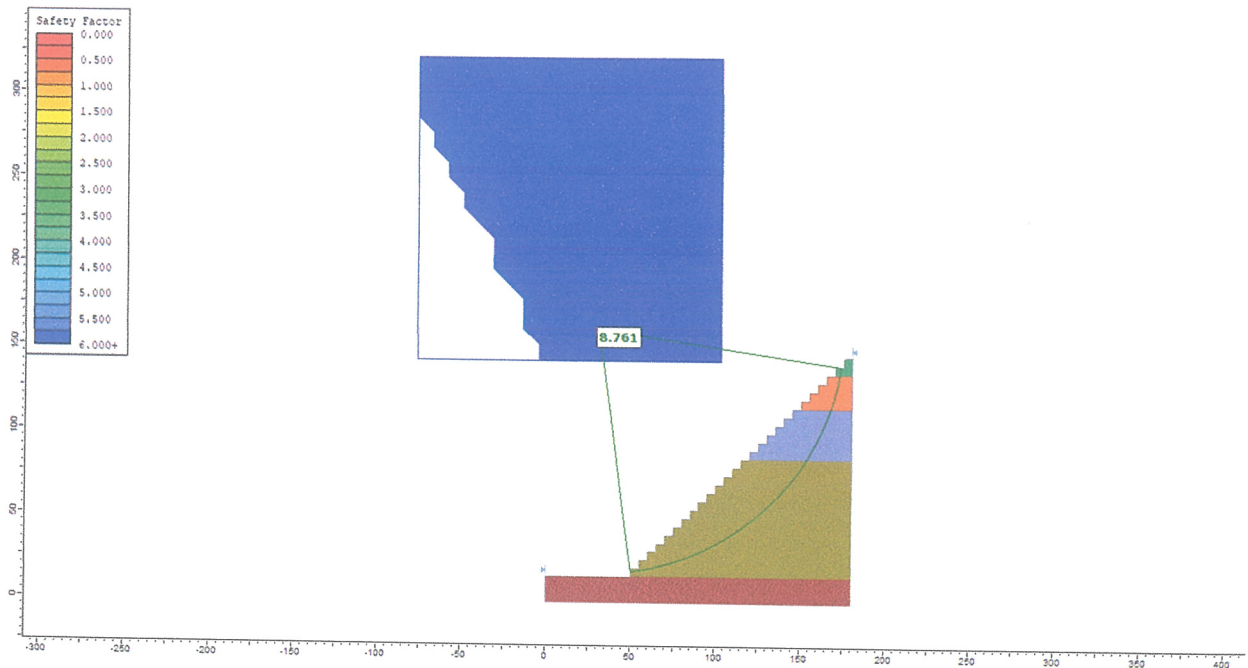


FIG 3.2. FOS OF MULTIPLE BENCHES UNDER CIRCULAR FAILURE USING BISHOP'S METHOD

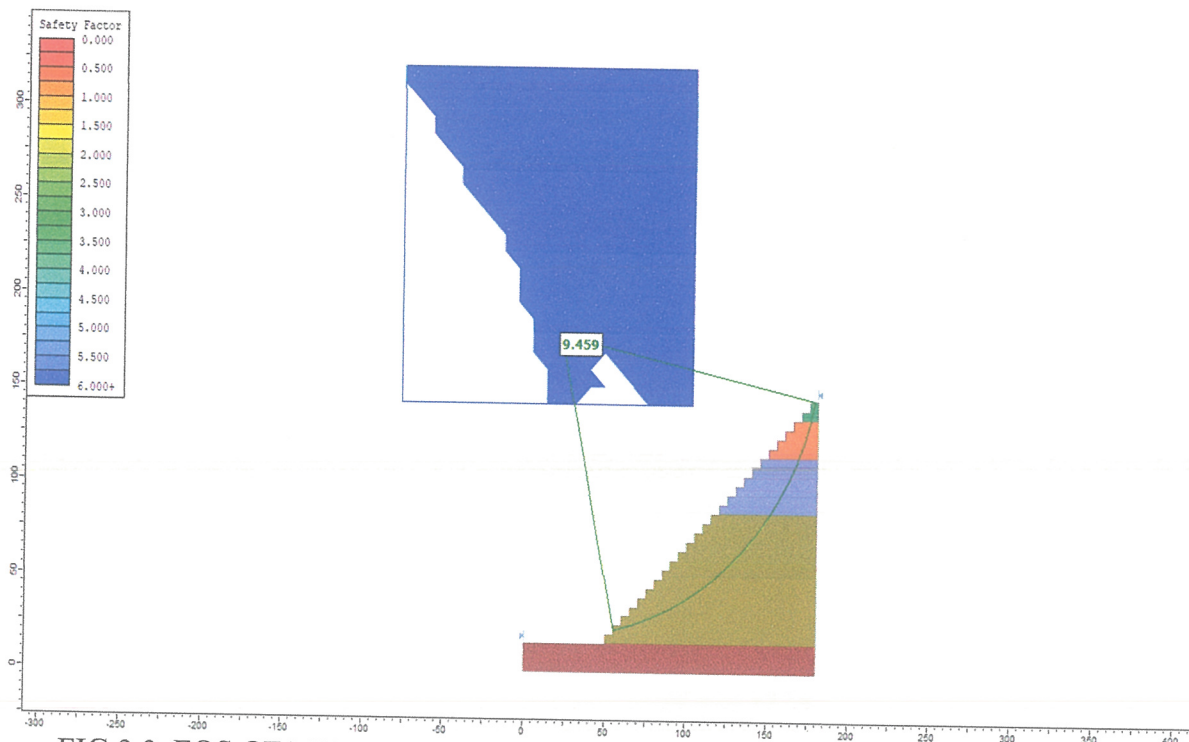


FIG 3.3. FOS OF MULTIPLE BENCHES UNDER CIRCULAR FAILURE USING JANBU'S METHOD

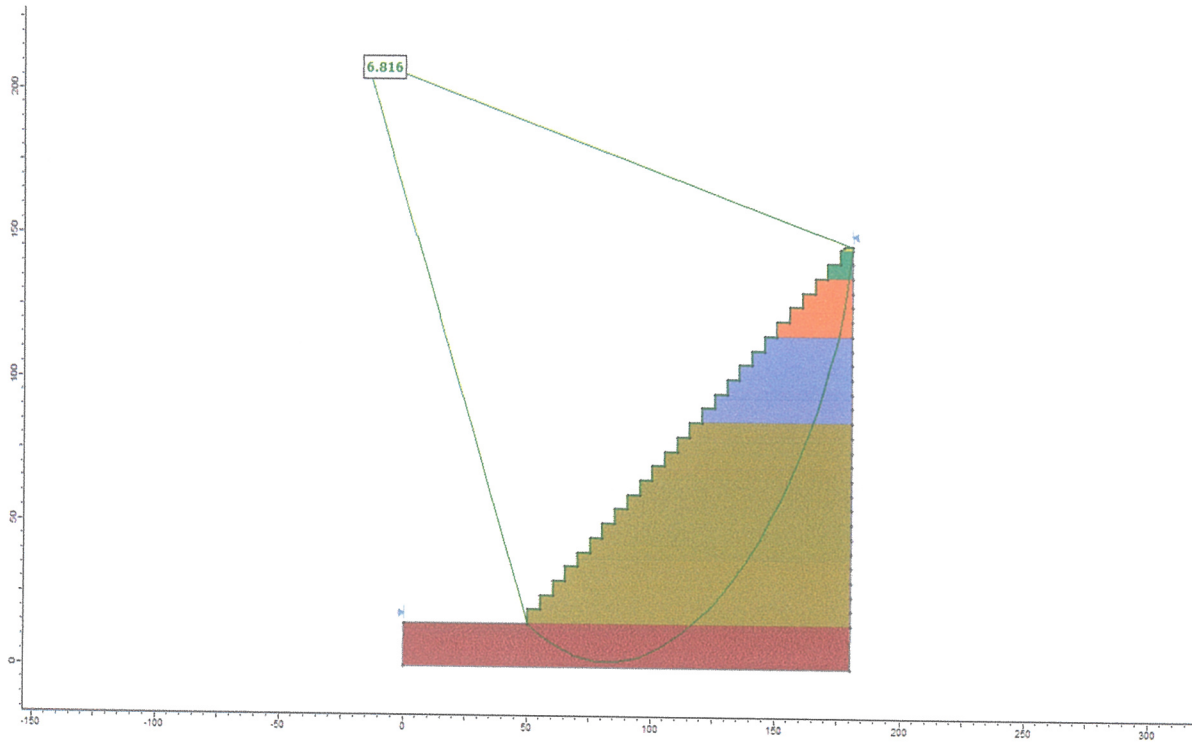


FIG 3.4. FOS OF MULTIPLE BENCHES UNDER PLANAR FAILURE USING BISHOP'S METHOD

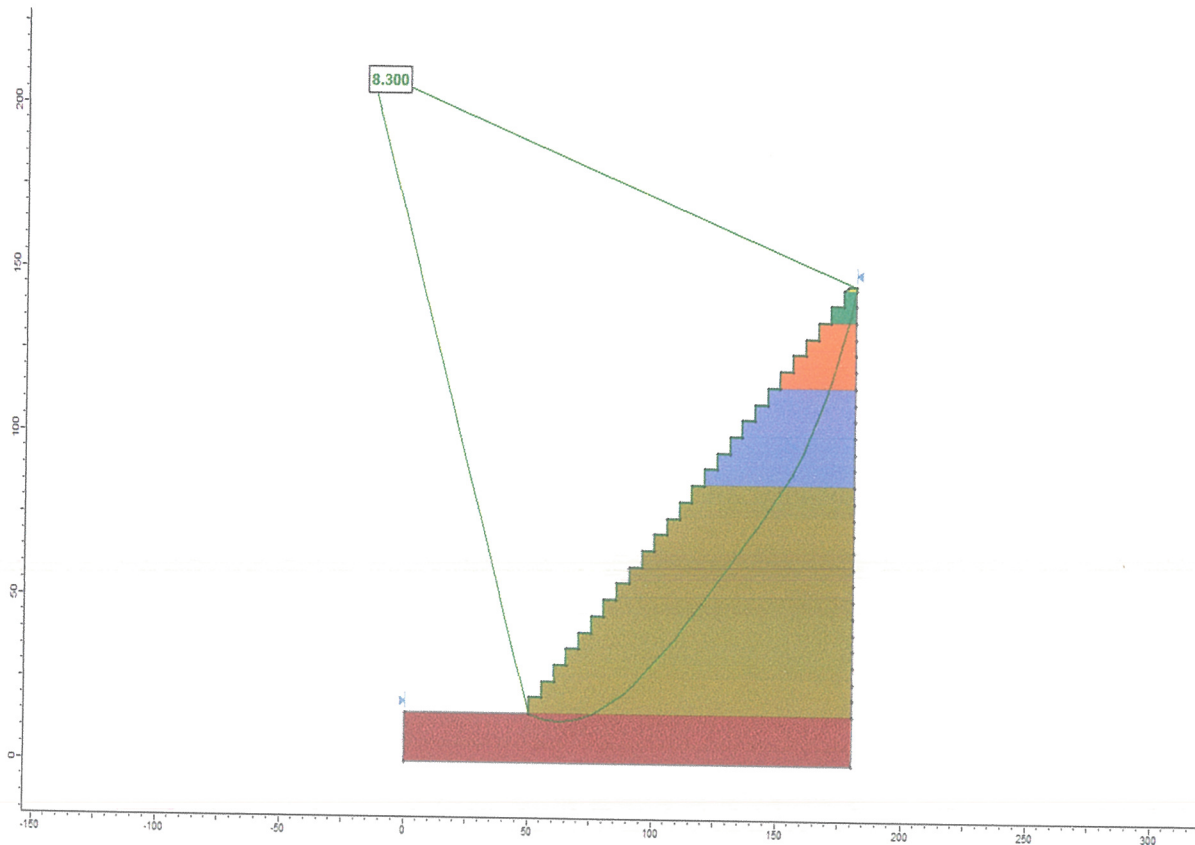


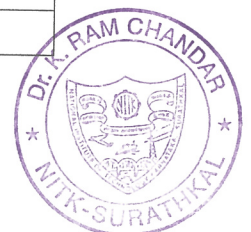
FIG 3.5. FOS OF MULTIPLE BENCHES UNDER PLANAR FAILURE USING JANBU'S METHOD

Case 2: Stability Analysis of Multiple Benches Along the Section – BB'

This case gives the stability analysis of multiple benches upto 155m height. The bench configuration is presented in Table- 3.3.

TABLE- 3.3 BENCH CONFIGURATION ALONG THE SECTION – B – B'

Bench No. From Surface	Height (m)	Exposed Width (m)	Slope Angle (Degrees)
1	5	5	90
2	5	5	90
3	5	5	90
4	5	5	90
5	5	5	90
6	5	5	90
7	5	5	90
8	5	5	90
9	5	5	90
10	5	5	90
11	5	5	90
12	5	5	90
13	5	5	90
14	5	5	90
15	5	5	90
16	5	5	90
17	5	5	90
18	5	5	90
19	5	5	90
20	5	5	90
21	5	5	90
22	5	8	90
23	5	8	90
24	5	5	90
25	5	5	90
26	5	5	90
27	5	5	90
28	5	5	90
29	5	5	90
30	5	5	90
31	5	5	90



Under dry condition, circular failure analysis has resulted in 7.734 FoS with Bishop's method and 8.433 FoS with Janbu's method (Figs. 3.6 & 3.7) and with plane failure condition, the FoS of the benches resulted in 6.048 FoS with Bishop's method and 6.970 FoS with Janbu's method (Figs. 3.8 & 3.9).

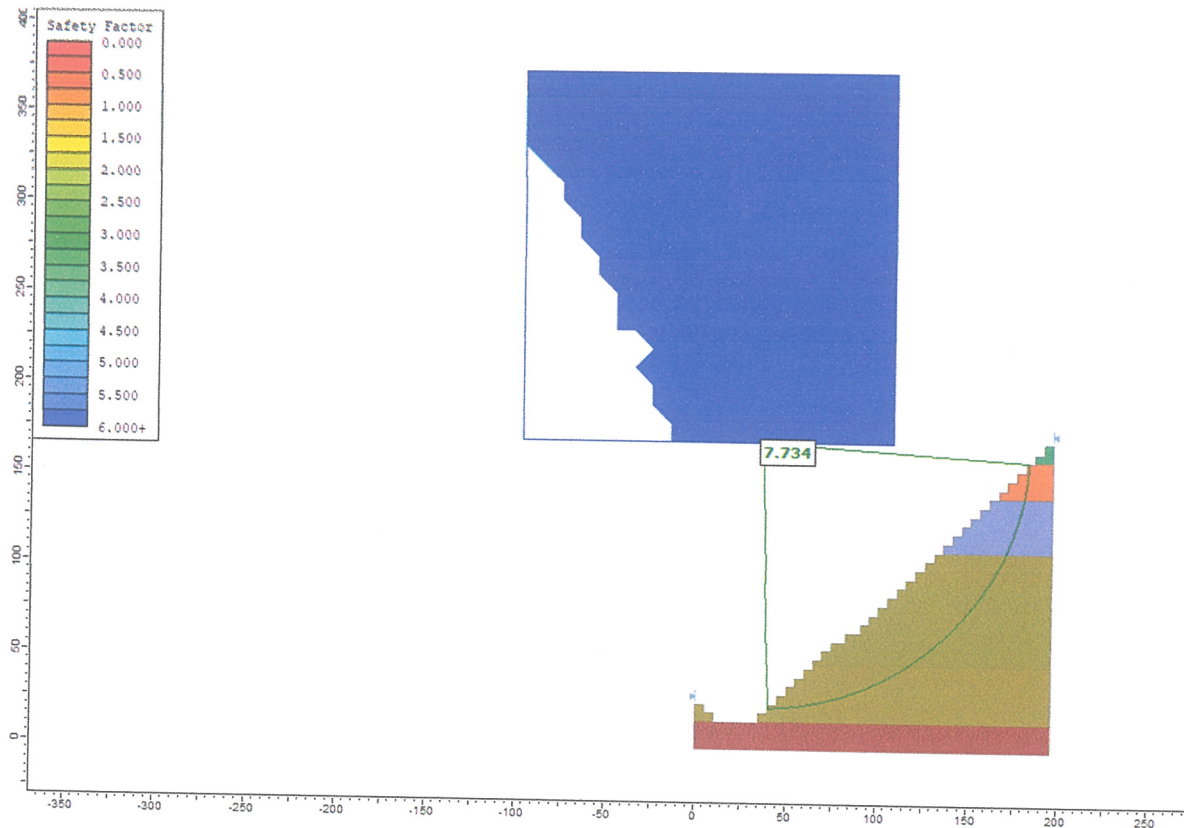


FIG 3.6. FOS OF MULTIPLE BENCHES UNDER CIRCULAR FAILURE USING BISHOP'S METHOD

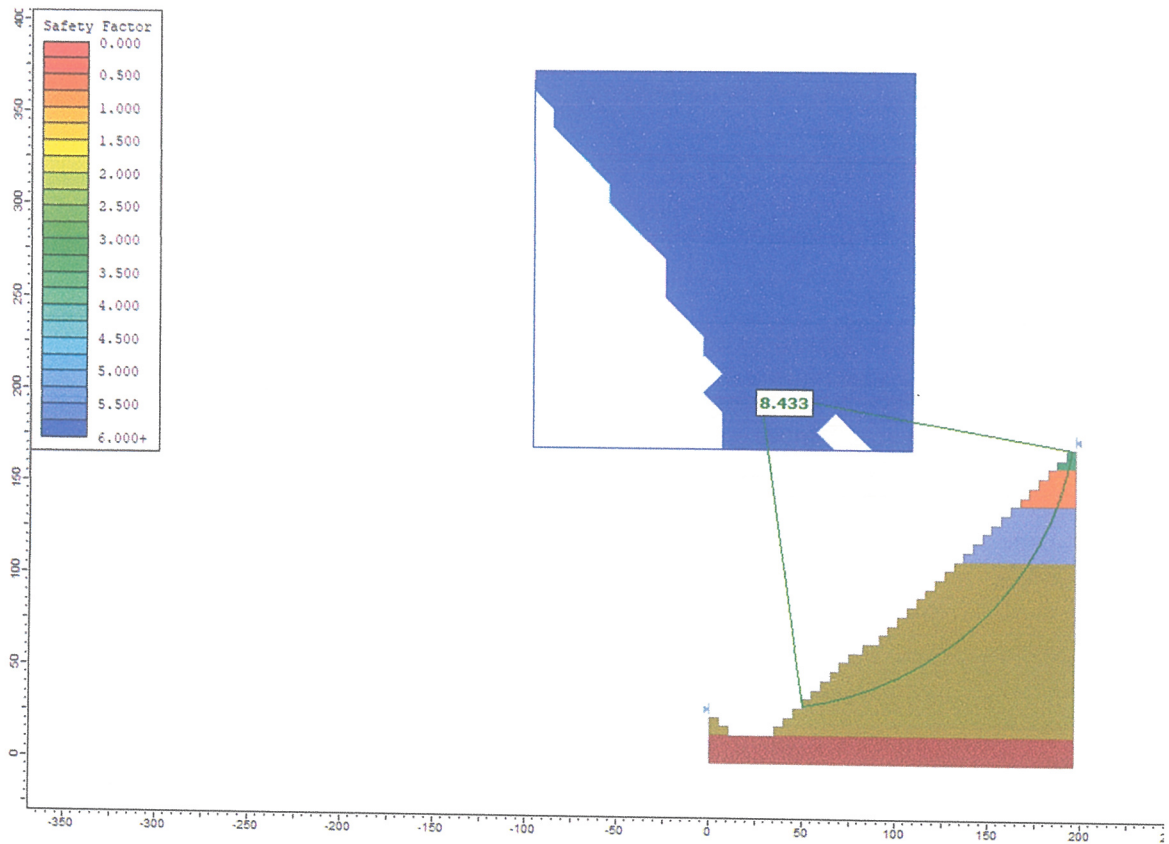


FIG 3.7. FOS OF MULTIPLE BENCHES UNDER CIRCULAR FAILURE USING JANBU'S METHOD

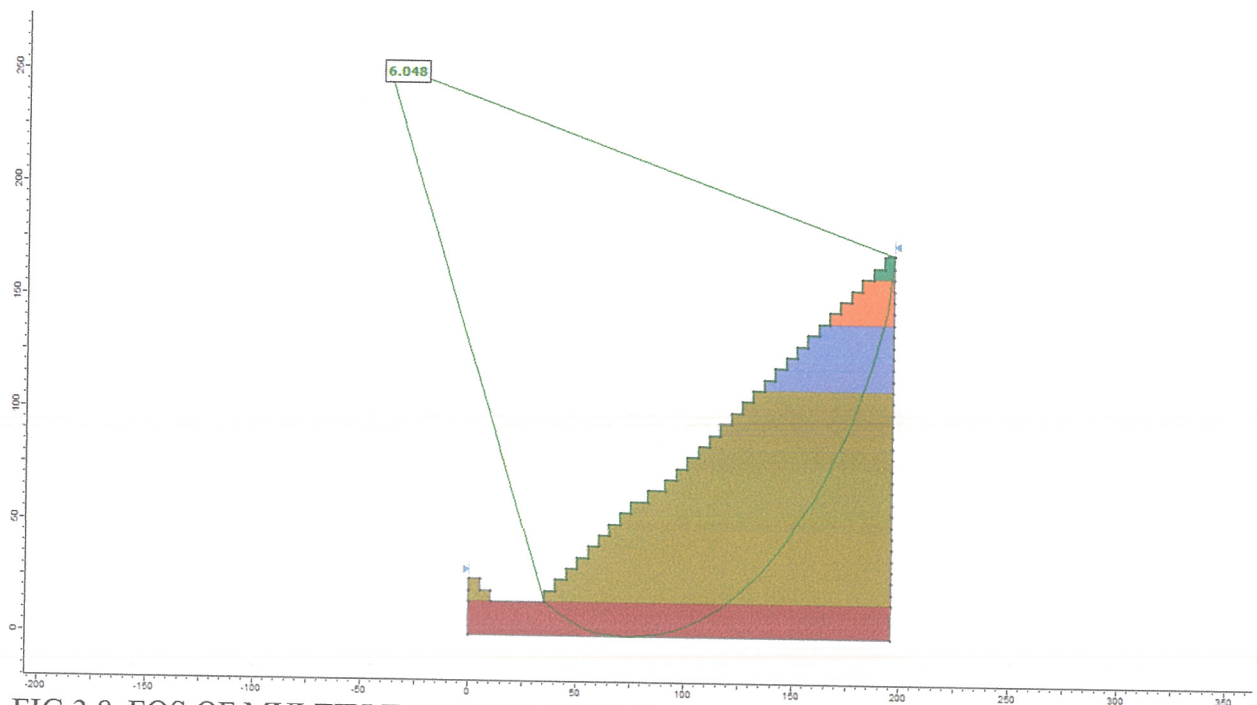


FIG 3.8. FOS OF MULTIPLE BENCHES UNDER PLANAR FAILURE USING BISHOP'S METHOD

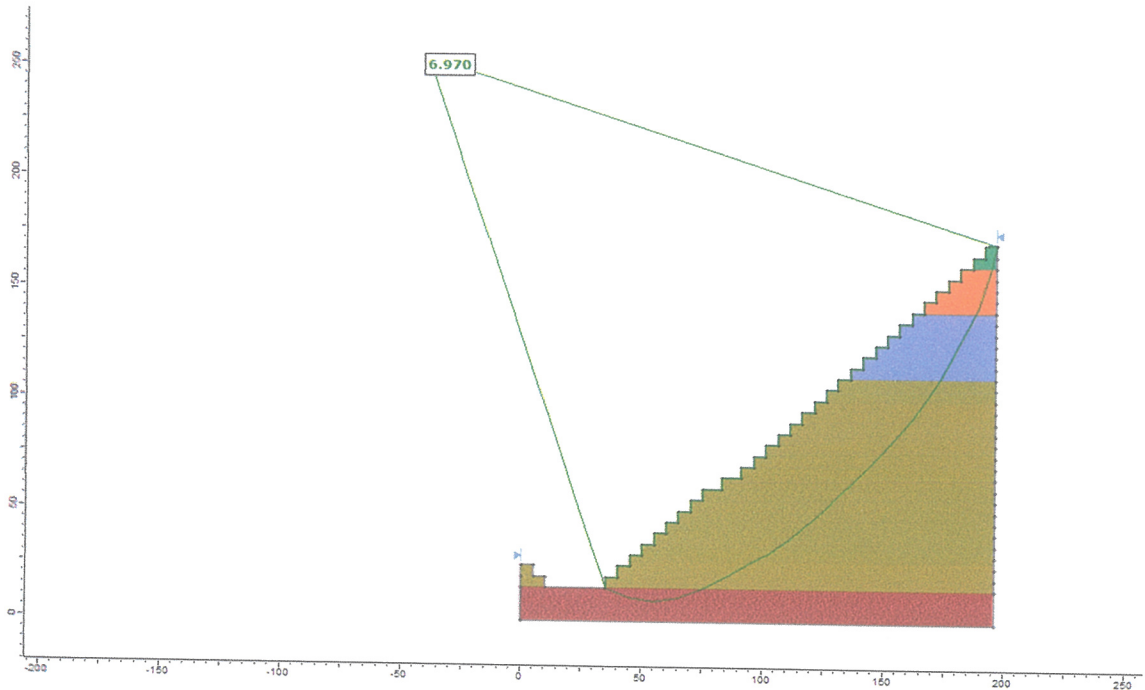


FIG 3.9. FOS OF MULTIPLE BENCHES UNDER PLANAR FAILURE USING JANBU'S METHOD

Case 3: Stability Analysis of Multiple Benches Along the Section – CC'

This case gives the stability analysis of multiple benches upto 160m height. The bench configuration is presented in Table- 3.4.

Under dry condition, circular failure analysis has resulted in 6.928 FoS with Bishop's method and 8.215 FoS with Janbu's method (Figs. 3.10 & 3.11) and with plane failure condition, the FoS of the benches resulted in 5.750 FoS with Bishop's method and 6.572 FoS with Janbu's method (Figs. 3.12 & 3.13).

TABLE- 3.4 BENCH CONFIGURATION ALONG THE SECTION – C – C'

Bench No. From Surface	Height (m)	Exposed Width (m)	Slope Angle (Degrees)
1	5	5	90
2	5	5	90
3	5	5	90
4	5	5	90
5	5	5	90
6	5	5	90
7	5	5	90
8	5	5	90
9	5	5	90
10	5	5	90
11	5	5	90
12	5	5	90
13	5	5	90
14	5	5	90
15	5	5	90
16	5	5	90
17	5	5	90
18	5	5	90
19	5	5	90
20	5	5	90
21	5	5	90
22	5	5	90
23	5	5	90
24	5	5	90
25	5	5	90
26	5	5	90
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28	5	5	90
29	5	5	90
30	5	5	90
31	5	5	90
32	5	5	90



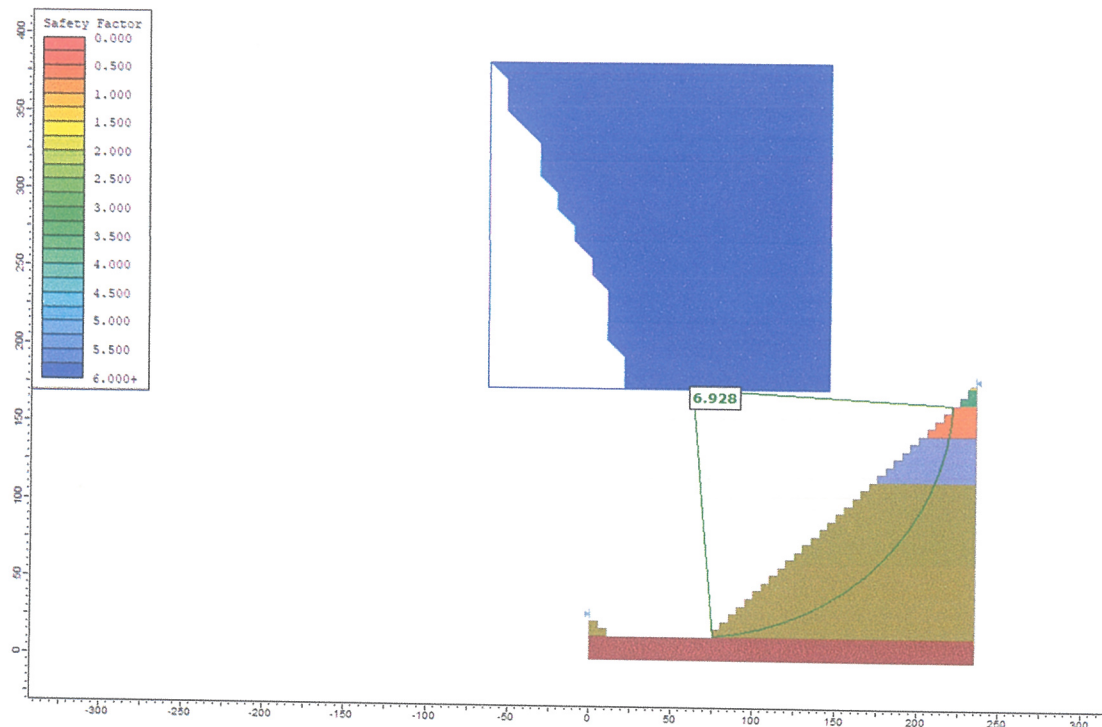


FIG 3.10. FOS OF MULTIPLE BENCHES UNDER CIRCULAR FAILURE USING BISHOP'S METHOD

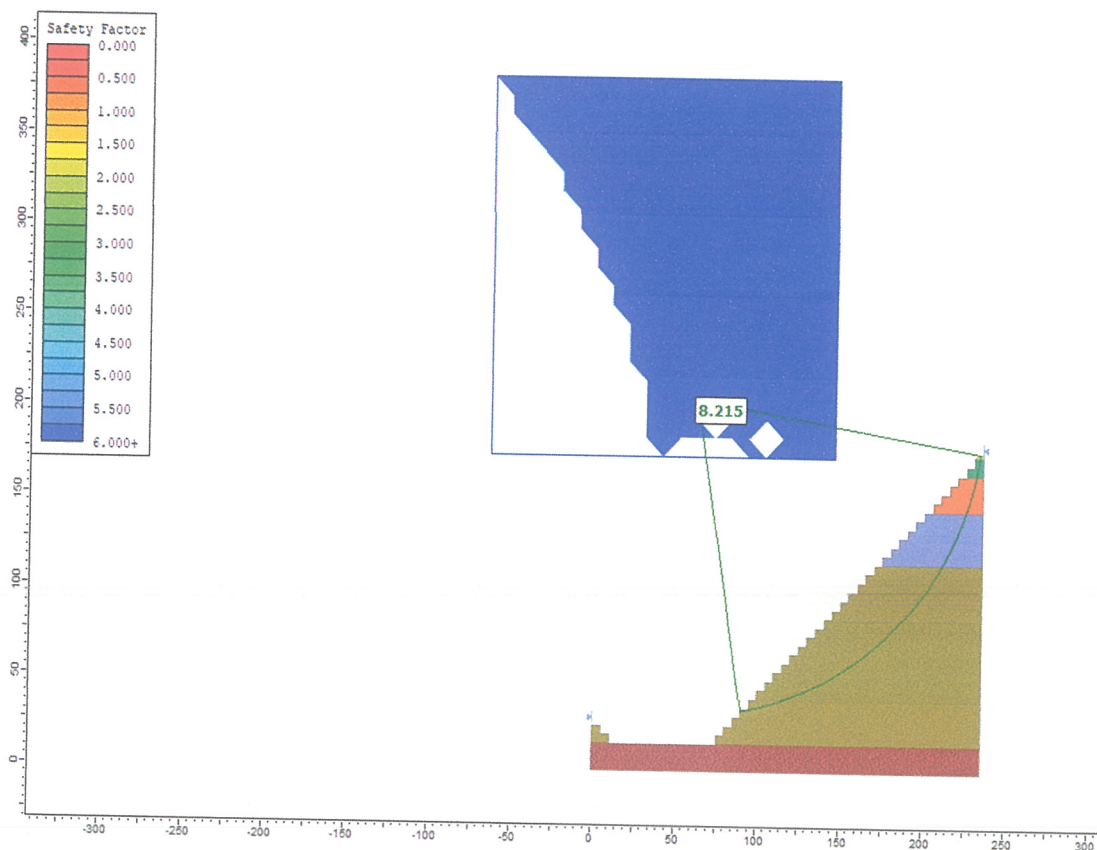


FIG 3.11. FOS OF MULTIPLE BENCHES UNDER CIRCULAR FAILURE USING JANBU'S METHOD

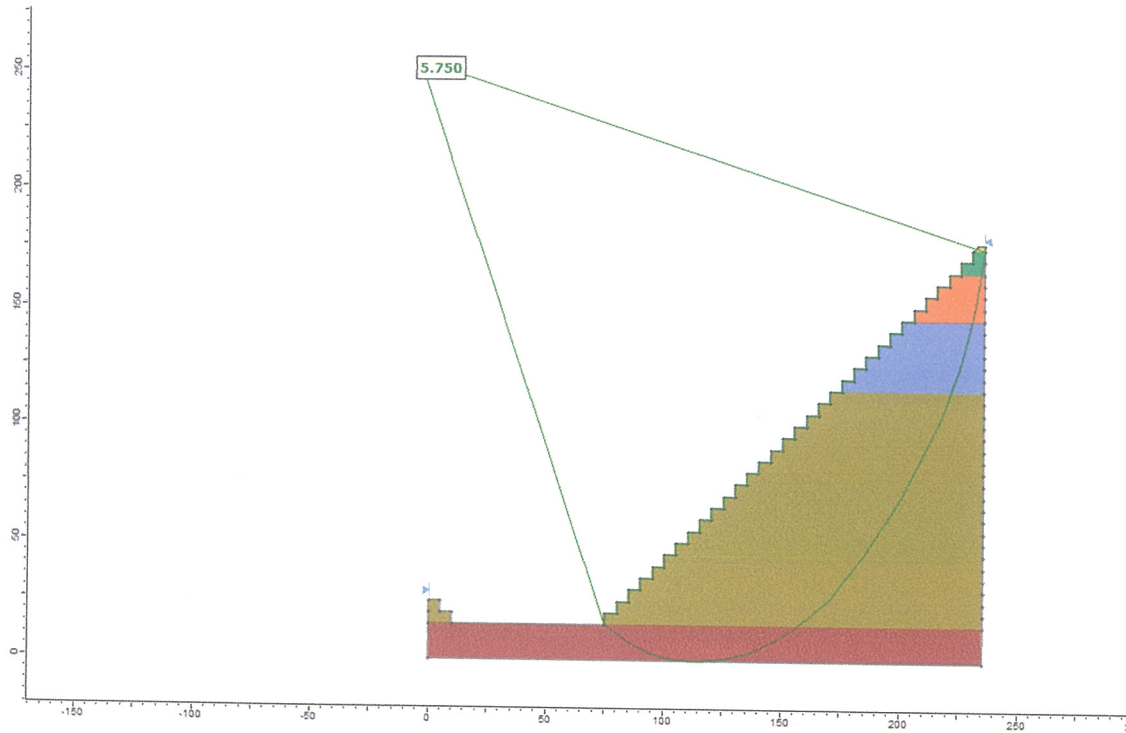


FIG 3.12. FOS OF MULTIPLE BENCHES UNDER PLANAR FAILURE USING BISHOP'S METHOD

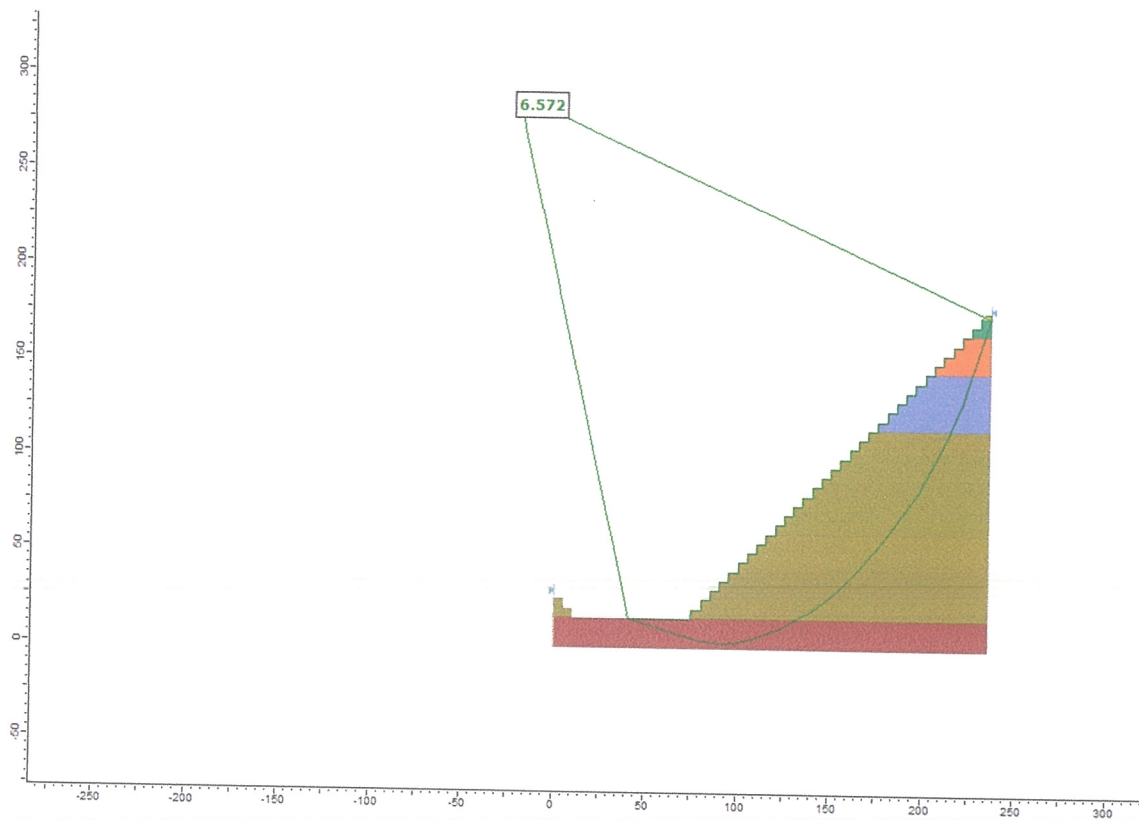


FIG 3.13. FOS OF MULTIPLE BENCHES UNDER PLANAR FAILURE USING JANBU'S METHOD

Among the above sections analyzed, as the section- C-C' has resulted the lowest FOS values, so this section is further analyzed under external load and wet conditions.

Case 3 (A): Stability Analysis of Multiple Benches Along the Section – CC' with External Load

Keeping in view the different machinery being used while working on the benches, external load is applied on the multiple benches to assess the influence of the movement of machinery on the benches. Joint pattern and wet condition also incorporated into the model. Though granite is hard, massive and non porous, the water may flow through joints and may weaken the joint planes. Further the soil/morum thickness is more in this section and it is porous in nature. Keeping these points in view, the Section-CC' is re-analyzed which resulted a FOS of 4.84 (Fig. 3.14).

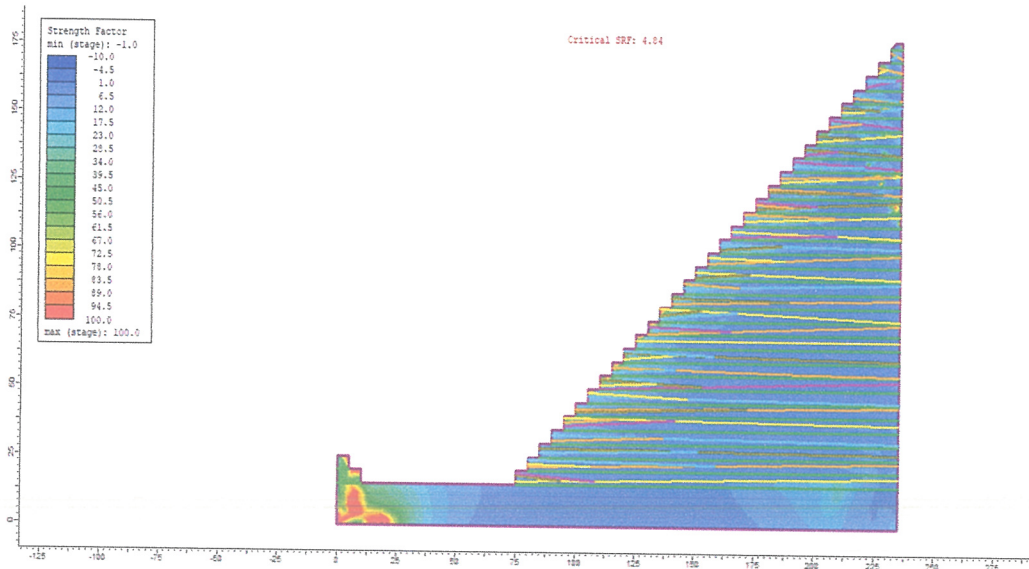
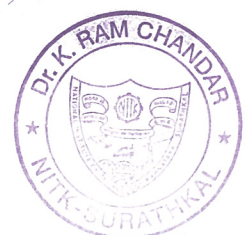


FIG 3.14. FOS OF MULTIPLE BENCHES UNDER WITH EXTERNAL LOAD, JOINTS AND WET CONDITION

FOS values of all the cases are shown in Table 3.5

TABLE 3.5 FOS VALUES OF ALL THE CASES

Section	Type of failure	Method	FOS	Remarks
A – A'	Circular	Bishop	8.761	Satisfactory
		Janbu	9.459	Satisfactory
	Planar	Bishop	6.816	Satisfactory
		Janbu	8.300	Satisfactory
B – B'	Circular	Bishop	7.734	Satisfactory
		Janbu	8.433	Satisfactory
	Planar	Bishop	6.048	Satisfactory
		Janbu	6.970	Satisfactory
C – C'	Circular	Bishop	6.928	Satisfactory
		Janbu	8.215	Satisfactory
	Planar	Bishop	5.750	Satisfactory
		Janbu	6.572	Satisfactory
C – C' with external load, joints and wet condition			4.8	Satisfactory



4. CONCLUSIONS & RECOMMENDATIONS

Based on field investigations, laboratory investigations and modelling studies under different conditions, the following conclusions & recommendations are made for safe working of benches in the Quarry of M/s. Palakkal Granite Product (Pvt) Ltd. (existing and proposed in applied area).

Conclusions

- a. Initially a field visit was made and a reconnaissance survey was carried out comprehensively. Existing quarry worked out area and proposed/applied quarry area for expansion were inspected.
- b. Different bench configuration /sections details were collected from the Project Management as per approved mine / quarry plan.
- c. Samples were collected from proposed quarry area and also from exposed benches representing different depths, and were brought to the laboratory of NITK-Surathkal. Different physico-mechanical properties were determined from which the shear parameters were estimated for granite/rock.
- d. Influence of blasting is also considered in the form of 'disturbance factor' while estimating the shear parameters / rock properties.
- e. Limit equilibrium based Slide software is used to assess the stability of slopes.
- f. Models were developed as per the approved mine plan along 3 different sections. In general, bench height is 5m, width is 5m and bench slope angle is 90 degrees for hard granite formation. Keeping in view the top soil/morrum, 1 to 2m soil bench is considered at the top.
- g. Each section bench configuration is analysed under different conditions like circular,



non- circular /plane failure conditions using Bishop's and Janbu's methods. 10m x 10m grid is considered while analysis.

- h. Among all the sections analyzed, the C-C' section has yielded the lowest FOS, so this section is further analyzed to assess the influence of external load representing the movement of machinery /HEMM and also under wet condition.
- i. Among all the cases, the lowest FOS was found to be 4.46, which is almost 3 times of the required value of 1.5 as per DGMS (Director General of Mines Safety) guidelines vide DGMS(Tech) Circular no.03 of 2020 dated 16.01.2020.
- j. Based on the scientific study, it can be stated that it is safe to carry out the quarrying activity as per the approved mine plan. There is no possibility of failres.

RECOMMENDATIONS

- a. Initially, top soil / morum to be removed and kept stored at the earmarked places as given in the approved Mining Plan.
- b. If alluvia soil/ morum gravel bench is formed, then the sides shall be sloped at an angle not exceeding 45 degree from the horizontal. Height should not be more than 2m in height, and width should be atleast 3times of height.
- c. In the hard granite rock, proposed bench height of 5m as per approved mine /quarry plan may be adopted. Bench width should be not less than 5m while working the benches.
- d. As per the scientific study, the slope angle of individual bench may be kept at 85 ° to 90° from horizontal in general, but however the overall pit slope angle should not be more than 45 ° while working of benches for the safety reasons.
- e. As far as possible the working bench should be maintained wider to the possible extent according to the size of the Heavy Earth moving machineries/Dumpers /



tippers deployed.

- f. Though the proposed quarry bench configuration is very safe, keeping large number of benches in view, it is advised to keep one bench of atleast 10m width after every 10benches from the surface.
- g. During the quarrying, the quarry manager (or) any statutory person should inspect the benches periodically to see if any minor or local discontinues/ disturbances/ cracks occurred, which may weaken the stability of the rock mass resulting in the slope failures.
- h. The quarry management should maintain an effective drainage system, in order to avoid inrush of water during rainy season on to the benches. An effective drainage and dewatering management system should be in place, even in peak rainy day, the water should move away from the benches/workings.
- i. The rain run off water should be coursed into drains constructed at the toe of the benches and that are filled with boulders. The water further flows to the pit bottom through a maze of depressurized channels and drains.
- j. Effective drainage channels should be maintained to channelize the rain water which may ingress into the quarry premises/on the slope of the benches.
- k. It is advisable to monitor the slopes periodically. Slope monitoring to be carried out once in 3 months initially with total station and prisms, the periodicity may be modified after generating some baseline data. Monitoring points should not be more than 30m apart horizontally and 5m vertically (every bench)

The Quarry management should implement the recommendations in true spirit.


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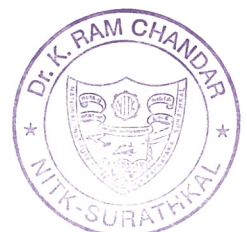


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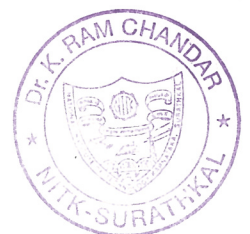


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Our main consultancy services are offered in the areas of

“Rock Blasting” and “Slope / Dump Stability”

SOME OF OUR RECENT CLIENTS ARE:

- The Singareni Collieries Company Limited- Kothagudem. Govt. of Telangana (Mines in Telangana & Odisha)
- IREL (India) Limited – Govt. of India (Mines in Tamil Nadu)
- Dept. of Mines & Geology- Govt. of Karnataka.
- Southern Railways, Mangalore
- Hindustan Petroleum Corporation Limited, Mangalore
- MSPL Limited, Hospet, Karnataka
- Vedanta Limited, Karnataka
- Bharathi Cements, Andhra Pradesh
- Ultratech Cements Private Limited, Andhra Pradesh
- Chettinad Cements Limited, Karnataka
- VESCO Limited, Sandur, Karnataka.
- TJN Construction Pvt Ltd- Bangalore
- Aastraa Resources- Goa
- M/s. Utkal Coal Mining India Private Limited- Odisha
- Lafarge Umiam Mining Private Limited, Meghalaya
- Various granite quarries in the state of Karnataka
- Various granite quarries in the state of Kerala
- Various granite quarries in the state of Tamil Nadu
- Various granite quarries in the state of Andhra Pradesh

Principal Investigator

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NITK, Surathkal (Govt. of India), Mangalore-575025

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ANNEXURE 7
COPY OF REPORT OF IMPACT
ASSESSMENT

**REPORT ON IMPACT ASSESSMENT OF THE
PROPOSED BUILDING STONE QUARRY PROJECT IN
KODIYATHUR AND KUMARANELLUR VILLAGES,
KOZHIKODE DISTRICT**

Client

**Mr. P. M. ABOOBACKER
Managing Director
Palakkal Granite Products (Pvt) Ltd
Kunnamangalam P. O.
Kozhikode - 673 571**



**DEPARTMENT OF CIVIL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY CALICUT (NITC)
KOZHIKODE - 673 601
KERALA, INDIA
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APRIL 2024

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APRIL 2024

INTRODUCTION

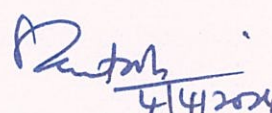
Mr. P. M. Aboobacker, Managing Director, Palakkal Granite Products (Pvt.) Ltd., Chethukadavu, Kunnamangalam P. O., Kozhikode District, hereinafter referred to as the Client, submitted a letter on 18th January 2024 requesting the Department of Civil Engineering, NIT Calicut, to conduct some studies in connection with impact assessment of the proposed building stone quarry project at Re Survey Block No. 003, Re Survey Nos. 172/1527, 172/1232, 172/1228, 172/1213, 172/1523, 172/1862, 172/1212, 1712/1134, 172/1137, 172/1201, 172/1221, 172/1120, 172/1238, 172/1136, 172/1135, 172/1119, 172/2275, 172/1526, 172/1200, 172/1239, 172/1240 in Kodiyathur Village, Kozhikode Taluk, Kozhikode District, Kerala and Re Survey Block No. 001, Un Survey Nos. 153/597, 153/598, 153/604, 153/601, and 153/600 in Kumaranellur Village, Kozhikode Taluk, Kozhikode District, Kerala. The Client had submitted an application seeking environmental clearance for the above mentioned project to the State Level Environment Impact Assessment Authority (SEIAA). The SEIAA, at its 154th meeting on 2nd December 2023, recommended that some additional studies, pertaining to four different aspects be conducted. The Client requested the Department of Civil Engineering, NITC to conduct studies on two of the four aspects. These are as follows:

- (i) Vulnerability assessment of the immediate neighbourhood of the proposed site covering 1 km distance from the project boundary all around, considering site-specific rainfall data, landform and slope characteristic, thickness and character of the soil, natural drainage characteristics etc
- (ii) Hydrological and hydrogeological characteristics of the site and surrounding areas and specific impact on the u/s and d/s portion of the watershed in which the proposed site falls

Department of Civil Engineering, NIT Calicut, agreed to take up the work. A team from the Department, comprising of Dr. S. Chandrakaran, Professor (HAG), Dr. Santosh. G. Thampi, Professor (HAG), and Dr. K. Madhavan, Assistant Professor visited the site on


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Dr. S. Chandrakaran


4/1/2024
Dr. Santosh G. Thampi

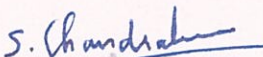
30th January 2024 to understand and assess/ evaluate the site conditions. Representatives of the Client present at the site during the visit presented an overview of the existing quarry project and the expansion proposed. The team went around the quarry site to get an overall idea about the topography, slope, soil, natural drainages etc. After the visit, the Client was asked to submit some details including : (i) copy of the original proposal submitted to the SEIAA, (ii) site plan showing the existing quarry and the expansion proposed, (iii) samples of the cover soil from five different locations identified by the team, (iv) rainfall data at any nearby location etc. The Client submitted the same within about a week from the date of the site visit.

STUDY AREA

As mentioned above, the areal extent of the proposed building stone quarry project (Figure 1) is spread in Kodyathur and Kumaranellur Villages in Kozhikode District. The total area of the project is 10.1903 hectares (ha) - 7.7827 ha in Kodyathur Village and 2.4076 ha in Kumaranellur Village. Of the 10.1903 ha area for which environmental clearance is being sought by the Client, 4.7660 ha was already under extraction and the duration of the permit has since expired. The additional area proposed for extraction is 5.4233 ha. It is located on the northern and western sides of the existing building stone quarry. In the decision of the SEIAA, it is mentioned that there are two quarries in operation within 500m radius of the proposed building stone quarry owned by the Client. On enquiry, it is understood that there is only one such building stone quarry (lease area - 2.2800 ha) in operation, located towards the east of the proposed building stone quarry. The other one is part of the proposal for which environmental clearance was being sought by the Client.

In our analysis, we have considered a stretch about 100m wide all round the existing building stone quarry to take care of the proposed expansion and a buffer zone of diameter about 2 km. The topography of the region is reasonably steep, with the ground


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slope ranging from about 25 % to 50 % (Figure 2). According to the publication entitled "Natural Hazard Zonation Map of Kerala" by the Centre for Earth Science Studies published in 2014, Kodyathur and Kumaranellur Villages are in the low hazard zone w.r.t. landslides. However, the site is found to be located in Medium Landslide Hazard Zone based on the information presented in the "The District Disaster Management Plan Kozhikode 2015" published by the Kozhikode District Disaster Management Authority and the Multi Hazard Map of Kozhikode District published by the Kerala State Disaster Management Authority (KSDMA). The landslide susceptibility map of the site and a 2 km buffer around is presented (Figure 3). The soil piping affected area map published by the KSDMA shows that the area is not affected by soil piping.



Figure 1 Proposed building stone quarry

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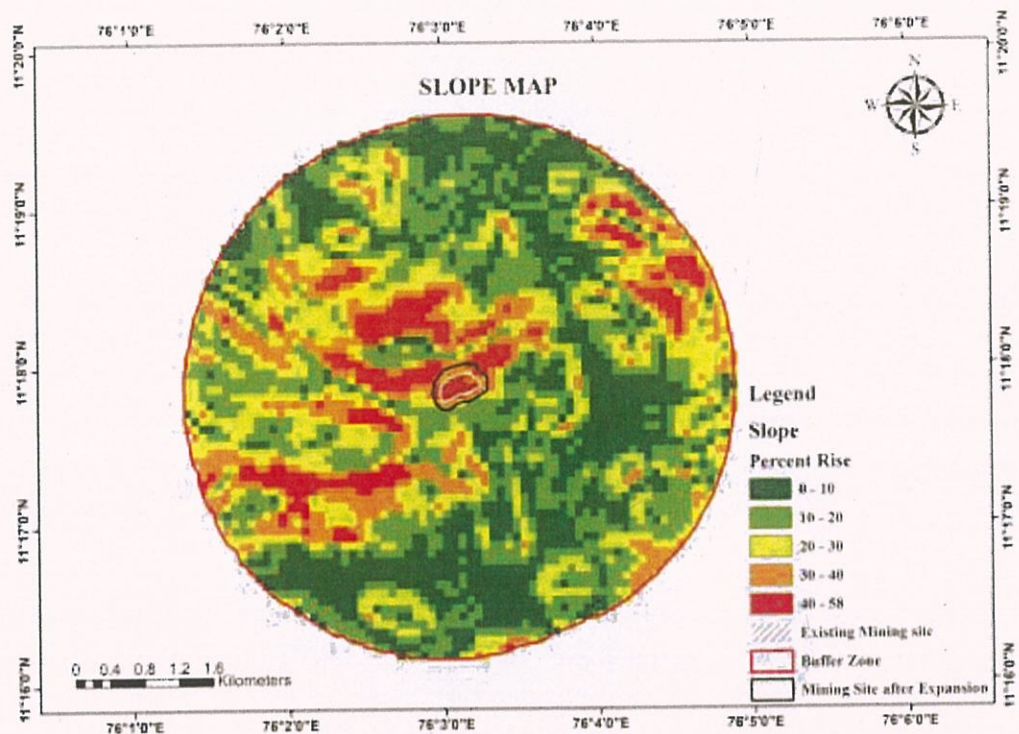


Figure 2 Slope map of the area

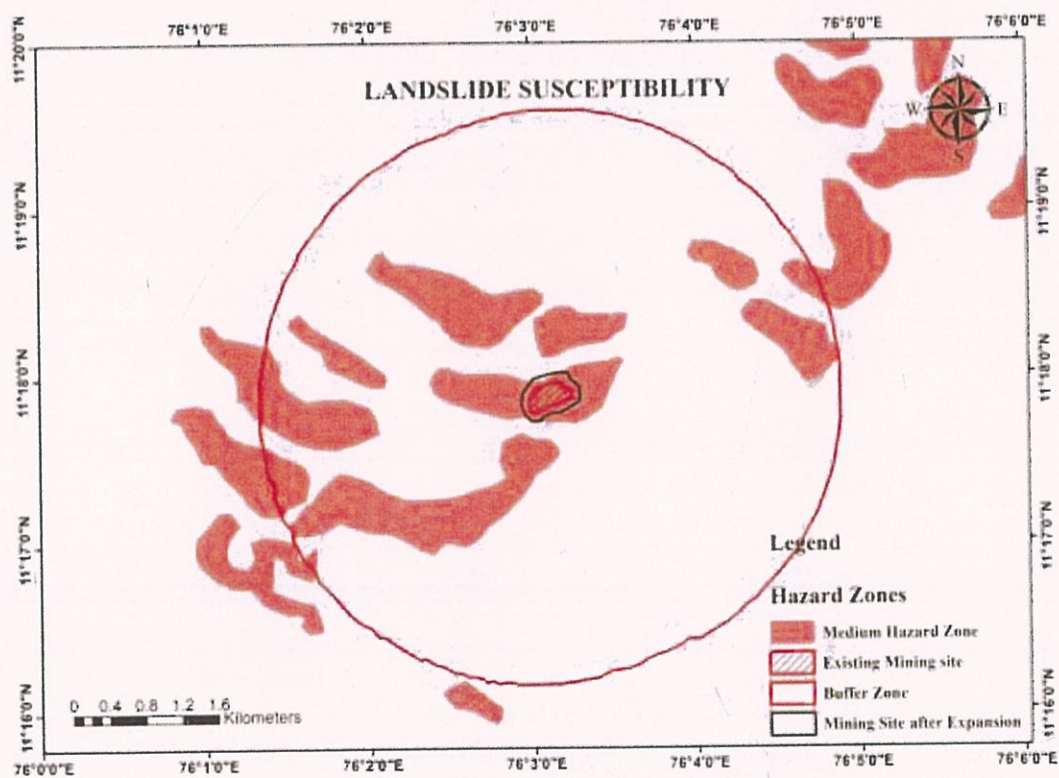


Figure 3 Landslide susceptibility of the site

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SOIL

Overall, the entire study area has very thin overburden. On an average, the thickness of soil was found to be less than or at the most 2 m. During the field visit, five locations were identified in the site for collection of soil samples. The samples collected were subsequently tested in the laboratory. The tests performed were: grain size distribution, direct shear test, and natural moisture content. Results of the tests performed are presented in Table 1.

Clay plus silt content was found to be very low in the samples (varies from 0 to 0.1 %). Sand content varied from 73% to 84 % whereas the gravel varied from 12% to 26%. Based on the grain size distribution, the soil can be classified as well graded sand. Overall, the area where the site is located is well drained. Results of the tests performed on the soil samples reveal that the infiltration capacity of the soil ranges from low to moderate whereas its hydraulic conductivity and consequently the rate of transmission of water ranges from moderate to relatively high. Hence, chances of water stagnation and build up of pore pressure resulting in slides are very low. The shear strength of the soil is enough to hold the soil and prevent slides on the slopes. The shallow depth of soil is also a favourable factor in this regard.

Table 1 Results of the tests performed on the soil at the site

Sample No.	Grain size distribution			Natural moisture content (%)	Shear strength parameters	
	Percentage				c (kPa)	Φ (degrees)
	Clay+ Silt	Sand	Gravel			
1	0.06	84.32	15.62	21.17	1.60	29.00
2	0.09	76.17	23.74	27.05	3.20	31.93
3	0.04	75.74	24.22	15.60	1.10	31.94
4	0.08	87.37	12.55	23.47	17.20	27.60
5	0.10	73.91	25.99	17.53	13.00	25.42


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GEOMORPHOLOGY, GEOLOGY AND LANDFORM

The overall geomorphology and landform of the site and a 2 km buffer around it is presented in Figure 4. A map of the geology of the area (Figure 5) is also presented.

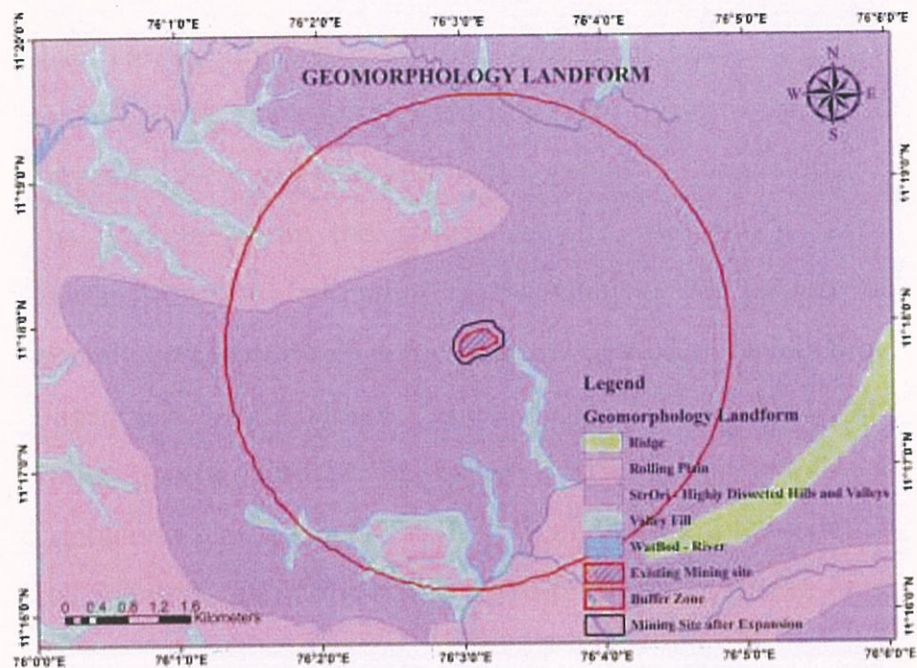


Figure 4 Geomorphology and landform

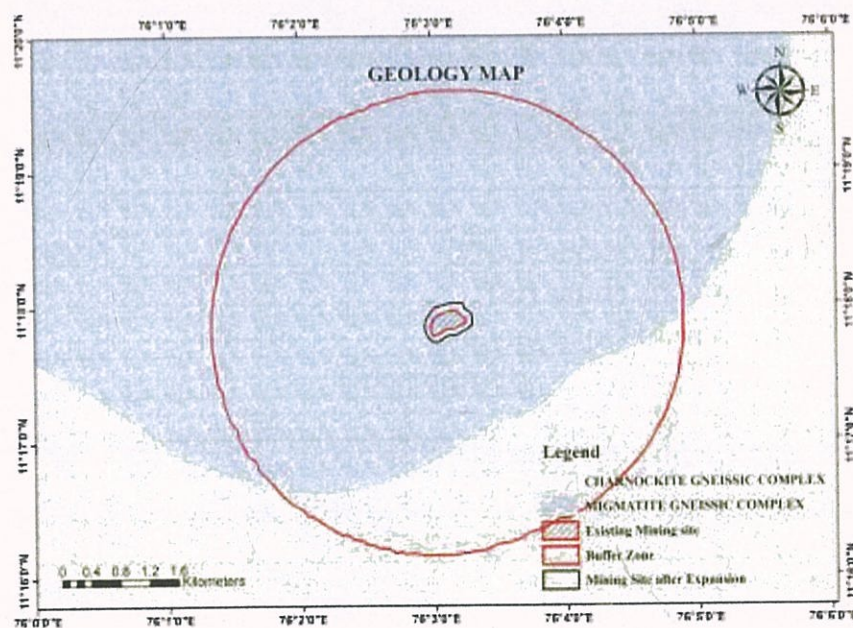


Figure 5 Geology Map

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The site is situated about 120 m above the mean sea level and hence can be physiographically classified as hilly terrain. The landform unit identified in the site includes highly dissected hill and valleys, and valley fill surrounded by rolling plains.

Kozhikode District can be divided into three geological belts viz., (i) a linear NW-SE trending gneissic belt, along the middle extending from north to south, (ii) a Charnockite belt occupying areas in the north-east and south, extending to the adjacent districts and also occurring as pockets within the gneissic terrain, and (iii) a narrow coastal belt. Charnockite Gneissic complex belonging to the Charnockite Group has a very wide distribution, especially in the north-east and south with variations like biotite-hypersthene gneiss, biotite-hornblende-hypersthene gneiss and hornblende-hypersthene gneiss. Magnetite quartzite, another unit of this group, occurs as narrow linear bodies within charnockite. Hornblende-biotite gneiss of the Migmatite complex extends from north to south and is well foliated. Garnetiferous quartzo-feldspathic gneiss, another member of Migmatite complex, occurs as lenses within Charnockite, in the east. The overall stratigraphy of the Kozhikode region is presented in Table 2.

Table 2 Overall stratigraphy of the Kozhikode region (Source: GSI)

Age	Thickness (in m)	Litho-units
QUATERNARY	1-15	Soil and Alluvium
	1-10	Beach sand and sands bars
	1-2	Block sticky clay and mud with sheel
	4-5	Teri sands and laterite pebble bed
	8-10	Polymitic pebble bed with grit and clay
Unconformity		
TERTIARY WARKALI	1-2	Sandstone with clay beds
	2-3	Lignite associated with beds of pluish Green clay kalnadu caly
Unconformity		
PRECAMBRIAN	Crystalline Rock Intrusives	Pegmatite and quartz veins Dolerite -gabbro
	Dharwars	Charnockite Gneiss and Khondalite

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The main rock type in the site consists of Migmatite Gneissic complex surrounded by Charnockite Gneiss rocks. Migmatite Gneissic complex is composed of minerals like Hornblende, Biotite, Quartz and Garnet. These are formed as a result of retrograde metamorphism of Charnockites under Upper Amphibolite to Granulite Facies conditions. In this site, the Migmatite Gneissic complex is overlain by a relatively thin layer of lateritic soil. Lateritic soils are formed by residual weathering of the Migmatite Gneissic rock. Typical values of the geotechnical properties of quarry stones in the Kozhikode region are presented in Table 3.

Table 3 Geotechnical properties of quarry stone in the Kozhikode region
(Source: D. V. Reddy et. al., 2015)

Rock type	Average specific gravity	Average bulk density (g/cc)	Average natural moisture content (%)	Average tensile strength (M Pa)	Average uniaxial compressive strength (M Pa)
Migmatite Gneiss	2.76	2.80	1.5	8.80	105.48
Charnockite Gneiss	2.88	2.91	0.8	7.65	100.09

HYDROLOGY

Observed rainfall data was not readily available in the vicinity of the site. The nearest raingauge station was at Kottamparamba in the campus of the Centre for Water Resources Development and Management, Kunnamangalam. Hence, it was decided to use the very high spatial resolution (0.25 x 0.25 degree) daily gridded rainfall data (in mm) which could be downloaded from the website of the India Meteorological Department (IMD). Data is available for 122 years - 1901 to 202 and is arranged in 135 x 129 grid points. Precipitation data for the required location (11.295246°N, 76.052065°E) was interpolated by Shepard's inverse weighted distance interpolation method using the Python script IMDLIB. The time series for monthly rainfall from 1981 to 2022 was generated (Figure 6) and the data is presented in Table 4. Analysis was performed to detect trends, if any, in

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the data. Flow direction was also determined using the Digital Elevation Model (DEM) of the area.

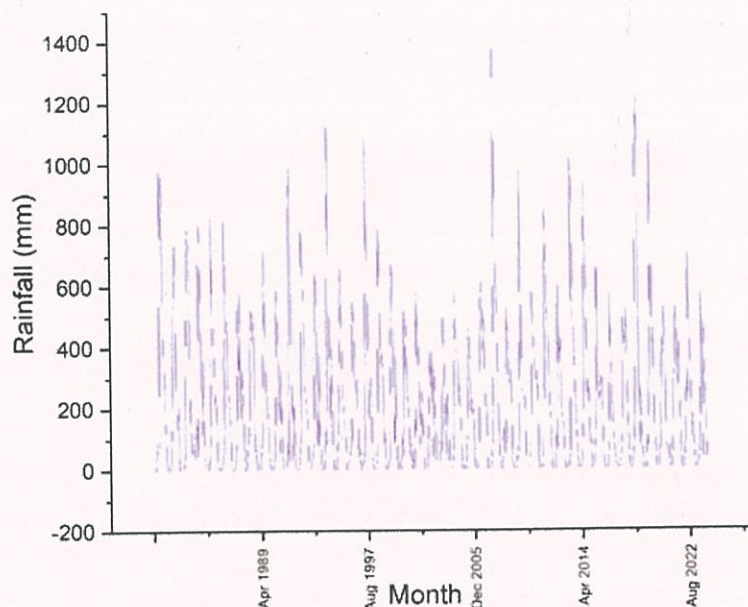


Figure 6 Monthly rainfall from 1981 to 2022

FLOW DIRECTION AND FLOW ACCUMULATION

The direction of flow and flow accumulation can be obtained by using the Digital Elevation Model (DEM). In this study, SRTM DEM of 30m resolution in GeoTIFF format was downloaded from the USGS Earth Explorer website. (The dataset can be downloaded from the link www.earthexplorer.usgs.gov.in).

The flow direction and flow accumulation rasters were created by using the Hydrology tools in the ArcGIS toolbox. For this, the DEM of the area (larger than the actual area being studied) was downloaded and sinks were filled. Thereafter, the portion of the DEM corresponding to the area under study was clipped using the digitized shape file of the area. The flow directions were then determined using the D8 Algorithm. The D8 algorithm is a simple grid based algorithm that approximates the primary flow direction by choosing the direction to the neighbour with the maximal 2D gradient. The direction code for the D8 algorithm is presented in Figure 7.

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Table 4. Rainfall (gridded precipitation) data at the location

Year	Monthly Rainfall (mm)												Rainfall (mm)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SW Monsoon	Annual
1981	0	0	72	56	101	974	730	995	459	239	145	20	3158	5773
1982	0	0	3	27	147	524	539	735	170	139	206	0	1968	4472
1983	0	0	0	0	61	365	717	787	697	167	54	85	2566	4917
1984	52	38	97	156	48	800	793	411	120	357	44	24	2124	4924
1985	20	0	2	32	165	857	412	396	219	239	6	5	1885	4339
1986	3	1	1	27	54	811	450	492	290	217	177	6	2044	4515
1987	1	0	6	26	94	524	297	585	149	332	237	73	1554	4310
1988	1	6	54	143	108	451	527	426	491	65	33	18	1895	4310
1989	0	0	3	68	110	433	717	266	218	187	42	16	1634	4049
1990	4	0	6	14	173	574	586	320	58	327	129	0	1538	4181
1991	0	0	1	89	31	839	987	328	36	229	55	7	2190	4593
1992	0	0	0	66	119	777	694	531	282	207	162	0	2283	4829
1993	0	11	28	46	96	518	661	337	36	383	127	12	1551	4246
1994	5	0	14	132	77	735	1172	411	141	394	166	3	2459	5242
1995	1	8	0	99	240	457	654	349	240	151	128	0	1701	4323
1996	0	0	40	88	96	547	517	272	260	295	37	75	1595	4222
1997	5	0	24	25	74	499	1101	621	167	274	298	47	2388	5132
1998	0	0	1	51	89	702	807	338	378	333	88	103	2224	4887
1999	0	4	15	38	377	537	689	313	45	370	38	0	1583	4424
2000	24	7	0	109	41	547	312	469	264	192	45	84	1592	4094
2001	0	37	0	169	122	618	484	257	78	254	216	2	1437	4239
2002	0	0	5	42	201	379	271	395	42	324	145	0	1087	3807
2003	0	4	18	90	57	491	501	244	48	257	178	0	1283	3891
2004	0	0	0	70	395	566	403	381	205	283	154	1	1554	4462
2005	13	0	0	63	115	410	469	190	187	224	150	12	1256	3837
2006	0	0	25	29	484	573	610	390	510	207	214	0	2083	5048
2007	0	0	2	63	224	667	1375	580	556	173	23	6	3178	5676
2008	0	20	146	52	85	525	402	293	278	326	27	0	1498	4161
2009	0	0	44	31	95	334	979	268	230	234	233	4	1811	4461
2010	2	0	3	83	89	588	449	305	294	319	269	14	1635	4425
2011	0	11	4	93	99	860	649	506	474	213	132	3	2488	5054
2012	0	3	2	116	62	632	351	422	204	143	123	1	1608	4070
2013	1	3	22	3	67	1024	941	394	359	174	91	29	2718	5122
2014	0	0	0	33	208	625	937	531	245	287	102	91	2338	5074
2015	0	0	8	81	189	719	290	220	240	306	205	17	1470	4292
2016	0	5	1	4	94	568	363	218	103	59	15	11	1252	3457

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Year	Monthly Rainfall (mm)												Rainfall (mm)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SW Monsoon	Annual Rainfall
2017	2	0	33	35	113	490	404	417	524	225	90	8	1835	4357
2018	0	16	29	75	228	1052	1058	1215	43	261	155	19	3368	6170
2019	0	0	1	90	72	328	588	1133	393	462	97	64	2442	5247
2020	1	3	12	69	81	424	369	531	486	80	58	29	1810	4162
2021	74	5	3	64	319	306	539	399	274	434	182	12	1519	4632
2022	0	2	34	86	289	236	724	516	248	102	175	61	1724	4496
2023	5	1	10	19	65	187	620	35	480	322	195	13	1322	3975

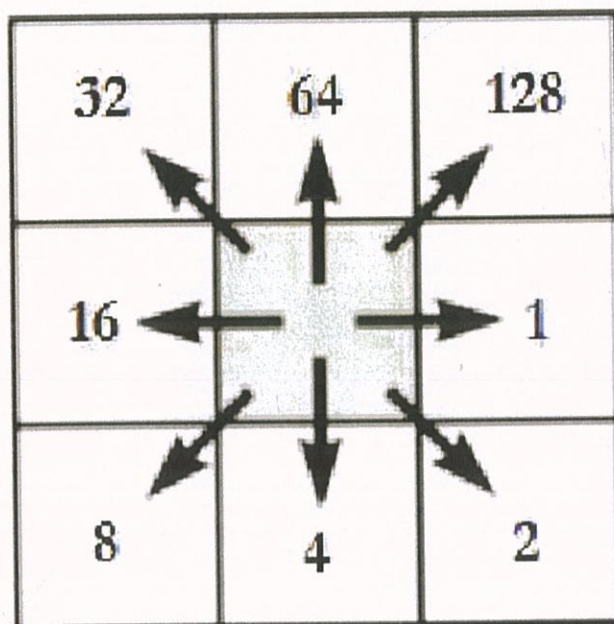


Figure 7 Direction code for the D8 algorithm

The DEM was input to the "Flow Direction" tool in the Hydrology Toolbox of ArcGIS. A raster indicating the flow direction in each cell in the area was obtained as per the direction code given above. The flow direction raster with the direction of flow marked by arrows is presented in Figure 8. The flow direction is from a higher elevation to a lower elevation area.

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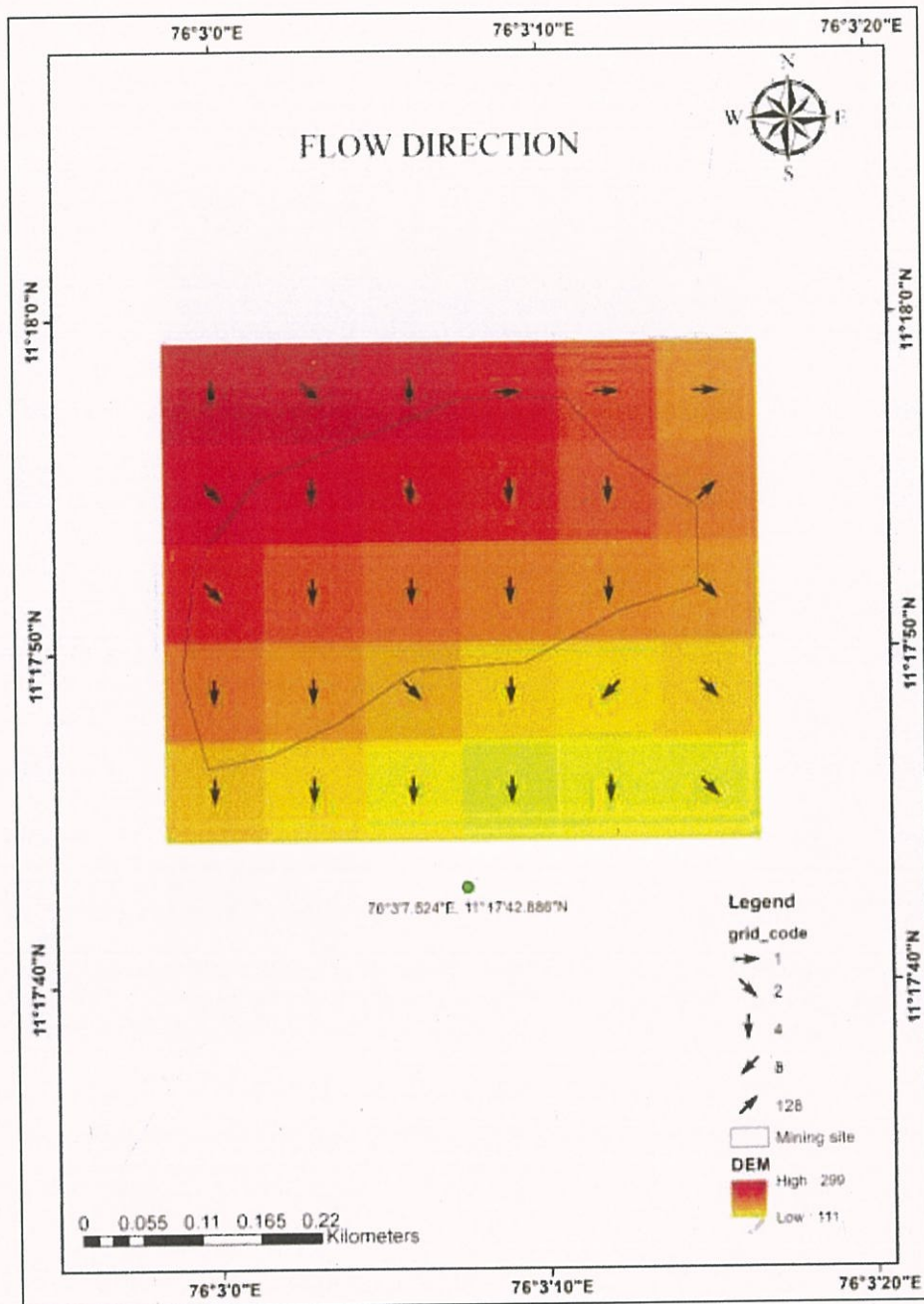


Figure 8 Flow direction

From Figure 8, it can be observed that the flow in the site is towards the South. This is in agreement with the general topography of the area. Flow accumulation (Figure 9) was calculated using the flow direction raster as input to the "Flow Accumulation" tool in the Hydrology tool box of Arc GIS.

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Figure 9 Flow accumulation

The darker the shade in the flow accumulation map, the more the number of cells draining to that cell. In our case, the cells located towards the extreme south have the maximum number of cells draining to it. This indicates that flow would be towards these cells. In our study area, almost all the cells drain towards the southern side. Appropriate arrangements should be made in the southern part of the site to collect the stormwater runoff and dispose it off safely.

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Stream networks can be delineated using the output from the "Flow Accumulation" tool, which calculates the number of upslope cells that flow into each cell. Stream networks can be delineated by applying a threshold value to the results of the "Flow Accumulation" tool. Then each link in a stream network is assigned a numeric order using the method of stream ordering. This is done to identify and classify different types of streams based on their numbers of tributaries. The Strahler method is the most commonly used for assigning a numeric order to links in a stream network. In this method, all links without any tributaries are assigned an order of 1 and are referred to as first order. The intersection of two first-order links will create a second-order link, while the intersection of two second-order links will create a third-order link. However, the intersection of two links of different orders will not result in an increase in order. By using the "Stream Order" tool, it is possible to identify the order of streams and infer some of their characteristics. The major natural drainage near the site is Churulithodu. The overall slope of the site is towards the natural drainage. The order of the streams adjacent to our area of interest is presented in Figure 10. In the Figure, the areal extent of the existing mining site and its approximate area after expansion are also shown. A third order stream can be seen on the southern side of the site at a distance of about 110 m from it. All the streams in the vicinity of the site are seasonal and have flow only during the monsoon period.

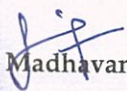
TREND ANALYSIS

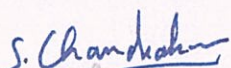
The Modified Mann-Kendall test along with the Sen's slope can be used to detect the existence of trend in the rainfall time series. Mann-Kendall's Test is a commonly used non-parametric test for detecting trends in time series data. The Mann-Kendall test is independent of the probability distribution, i.e., the data need not be normally distributed to perform this test. Hence knowledge of the population is not necessary.

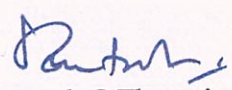
The test statistic, S , can be obtained as follows:

$$S = \sum_{i=1}^{n-1} \sum_{j=i+1}^n \text{sgn}(x_i - x_j) \quad (1)$$

where, x_i and x_j are measurements at time i and j , and n is the number of observed events.


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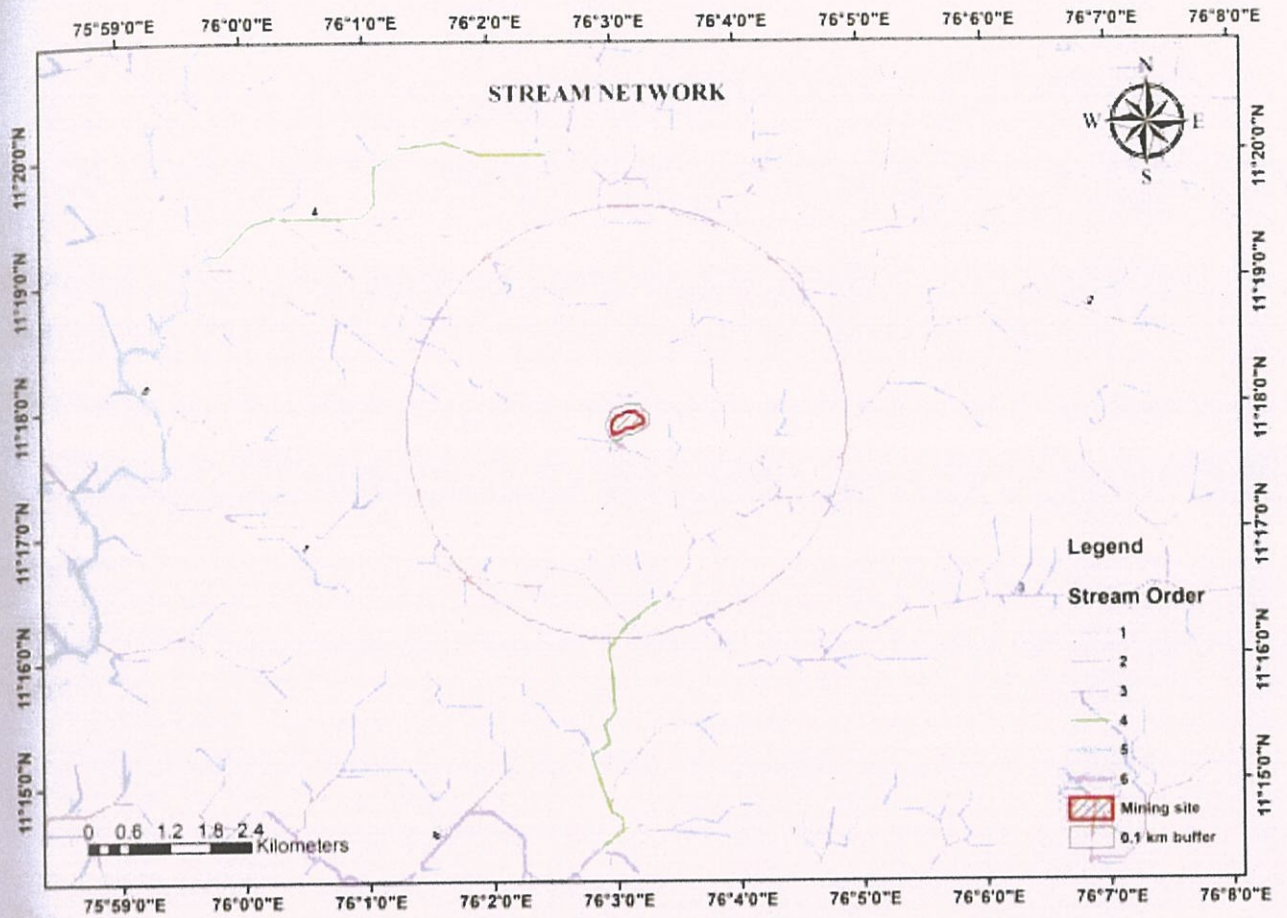


Figure 10 Stream ordering

The function $sgn()$ is described using the following equation.

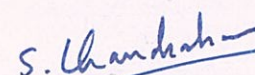
$$sgn(x_i - x_j) = \begin{cases} +1 & \text{if } (x_i - x_j) > 0 \\ 0 & \text{if } (x_i - x_j) = 0 \\ -1 & \text{if } (x_i - x_j) < 0 \end{cases} \quad (2)$$

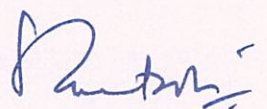
The variance of the test statistic S can be calculated as

$$Var(S) = \frac{[n(n-1)(2n+5) - \sum_{i=1}^m t_i(t_i-1)(2t_i+5)]}{18} \quad (3)$$

where, n is the number of observations, m is the total number of tied groups, and t_i denotes the number of ties of extent i . The standardized test statistic (Z) is computed using the following relationship.


Dr. K. Madhavan


Dr. S. Chandrakaran


Dr. Santosh G Thampi

$$Z = \begin{cases} \frac{S - 1}{\sqrt{\text{Var}(S)}} & \text{if } S > 0 \\ 0 & \text{if } S = 0 \\ \frac{S + 1}{\sqrt{\text{Var}(S)}} & \text{if } S < 0 \end{cases} \quad (4)$$

A positive Z value indicates an upward trend, negative Z value indicates downward trend and a zero Z value indicate no trend. The trend can be quantified using the Sen's slope. The slope of the lines (Q_i) connecting N distinct pairs can be computed using the equation,

$$Q_i = \frac{y_j - y_i}{j - i} \quad i = 1, 2, \dots, N \quad (5)$$

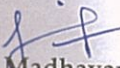
where, y_j and y_i are data values corresponding to j and i ($j > i$), respectively. After arranging the values of in the ascending order of magnitude, the median of the slopes (Sen's slope estimator) (Q_{med}) is computed as follows,

$$Q_{med} = \begin{cases} Q_{\frac{(N+1)}{2}} & \text{if } N \text{ is odd} \\ \frac{Q_{\frac{N}{2}} + Q_{\frac{(N+2)}{2}}}{2} & \text{if } N \text{ is even} \end{cases} \quad (6)$$

The Sen's slope procedure also does not require normality in the data set.

Time series data is often influenced by serial correlation. When the data are not random and is influenced by autocorrelation, Modified Mann-Kendall test may be used for trend detection. The variance correction approach proposed by Yue and Wang (2004) to address the issue of serial correlation in trend analysis is used in this method. Data are initially detrended and the effective sample size is calculated using significant serial correlation coefficients. The following values are used to analyze the trend in Modified Mann-Kendall's Test.

- Corrected Z_c - Z statistic after variance correction
- New P value - P -value after variance correction
- Sen's Slope


Dr. K. Madhavan

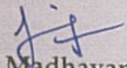

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Dr. Santosh G Thampi

Modified Mann-Kendall's test was performed on these datasets and the Sen's slope was calculated. The corrected variances and new P values were calculated for each month, the South West Monsoon season and for every year of record. Corrected P values < 0.05 represent a trend, and the trend direction was determined by using Sen's Slope values for the corresponding months. The statistics and the trend by Modified Mann-Kendall's Test are presented in Table 5.

Table 5 Statistics and trend by the Modified Mann-Kendall's Test

Month/ Season	Corrected Z _c	New P value	Sen's slope	Trend
January	1.570683259	0.11625624	0	Nil
February	4.513999075	6.36165E-06	0	Constant
March	0.92890757	0.35293699	0.016	Nil
April	0.579700286	0.56211675	0.12	Nil
May	1.961251964	0.049849638	0.813636364	Increasing
June	-3.108931618	0.001877652	-5.207692308	Decreasing
July	-2.409941862	0.015955063	-2.43	Decreasing
August	-1.562485687	0.118173615	-2.669230769	Nil
September	2.577665817	0.009947014	2.559259259	Increasing
October	-0.062649429	0.950045668	-0.076190476	Nil
November	2.954342562	0.00313336	0.763636364	Increasing
December	1.976158207	0.048136862	0.083333333	Increasing
SW Monsoon	-2.328678975	0.019876079	-7.05	Decreasing
Annual	-1.219535371	0.222641059	-3.285714286	Nil


Dr. K. Madhavan

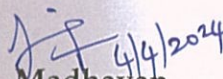

Dr. S. Chandrakaran

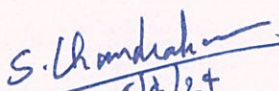

Dr. Santosh G Thampi

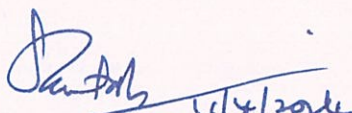
INFERENCES

From a critical review of the data collected and the results of the analysis performed, the following conclusions are drawn.

- With respect to rainfall, it is observed that the area is experiencing a falling trend in the rainfall values during the months of June, and July and a rising trend during the months of May, September, November & December. South West Monsoon rainfall also exhibited a falling trend whereas the annual rainfall did not exhibit any discernable trend. Considering this along with other related factors such as the geology and geomorphology, landform, slope, soil, natural drainage characteristics etc, it is concluded that the project will not render the area vulnerable to natural hazards.
- Considering the overall hydrology and hydrogeology of the site and its surroundings, along with the soil characteristics, natural drainages etc, it is concluded that the project will not adversely impact the u/s and d/s portions of the watershed in which the site of the proposed building stone project is located.
- The overall slope of the terrain is towards the natural drainages on the southern side of the proposed development. The Client shall do the needful to ensure that flow towards the natural drainages and in the natural drainage located close to the proposed site is not obstructed in any manner. Also, major impoundments shall not be constructed/ developed in the site.


Dr. K. Madhavan
Assistant Professor


Dr. S. Chandrakaran
Professor (HAG) (Retired)


Dr. Santosh G Thampi
Professor (HAG)

Countersigned


T.H. Mathur
5/4/24

Professor and Head

Department of Civil Engineering

National Institute of Technology Calicut, Kozhikode - 673 601

National Institute of Technology Calicut

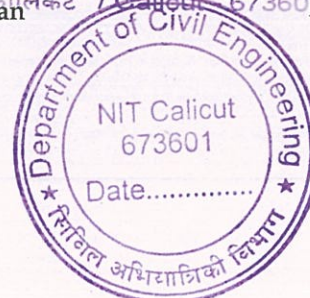
राष्ट्रीय प्रौद्योगिकी संस्थान कलिकट

कलिकट / Calicut - 673601

Dr. K. Madhavan

Dr. S. Chandrakaran

Dr. Santosh G Thampi



ANNEXURE 9
COPY OF MINING LEASE ORDER

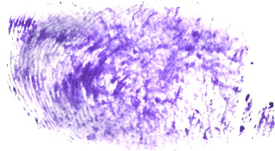
1955/I/2025

FILE NO. DRG/KKD/1884/2025-CL

(CERTIFICATE UNDER SEC. 32(1)(b) OF KERALA STAMP ACT 1959)

Certified that the Deficit/ Proper stamp duty of Rs. 4,30,440
Has been paid for this instrument as per chalan No. KL016659424202526M.
.....Dated. 08.07.2025 at Addl. Sub Treasury, Kozhikode

KOZHICODE DISTRICT REGISTRAR (GENERAL)/COLLECTOR
Date: 08.07.2025 KOZHICODE



FORM H
(See Rule 43)
QUARRYING LEASE

This deed of lease made on this the 5th day
of July 2025 between the Governor of Kerala (hereinafter referred to as the "State
Government" which expression shall, where the context so admits be deemed to include his
successors and assigns) of the one part and M/s Palakkal Granite Product Pvt. Ltd., Kp 8/308,
Near Sakeena Industries, Chethukadavu P.O, Kunnamangalam, Kozhikode - 673571
(Represented by its Managing Director, Shri. P. M. Aboobacker S/o Alavi Palakkal Meethal
house, Kunnamangalam P.O Kozhikode (Adhar No:812230444482 Pan No:ACXPA0238K)
(hereinafter called the "lessee/lessees" which expression shall where the context so admits, include
his/their heirs, executors, administrators, representatives and permitted assigns) of the other part.

5.7.25
Lessor
GEOLOGIST
DISTRICT OFFICE
DEPARTMENT OF MINING AND GEOLOGY
CIVIL STATION
KOZHICODE - 673 020



Lessee

5.7.25



Total 9 Sheets 1st Sheet
District Registrar (GL)
Kozhikode

Presented in Office of the Sub Registrar
Koduvally on the 10th day of July 2005 with photographs and
finger prints of presentant/buyers/sellers
affixed under section 32 A and a fee of
1080.25 repaid by

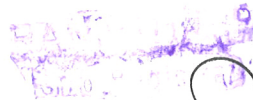
1955/25

S/o Alawi Managing director
Bala

Palakkal Granite product Pvt Ltd.

Residing @ Palakkal Meethal House Kunnampalam

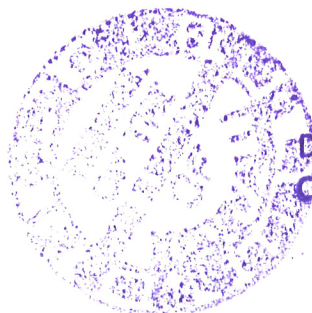
10th day July 2005-



Signature

Ahamed Kabeer Palakkal Meethal

S/o P.M Aboobakar Business Kunnampalam



Document No. 1957 of 2005
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Sub Registrar

Witnesseth that in consideration of the rents and royalties and lessee's/lessees' covenants, hereinafter reserved and contained the State Government hereby give on lease to the lessee/lessees the land measuring 10.1903 Hectares described in the schedule hereunder and delineated on the plan hereto annexed and therein coloured red (hereinafter called the "said lands") to hold the same for a period of 10 (Ten) years commencing from the 05-07-2025 and ending on the 04-07-2035 for the purposes of extracting minor mineral/minerals and subject to the terms and conditions contained in the Kerala Minor Mineral Concession Rules, 2015 (hereinafter referred to as "the Rules") and to the terms and conditions hereinafter appearing.

1. The lessee/lessees shall have the right in and upon the said lands to extract Granite Building Stone (herein after called the said mineral/minerals) and to do all acts necessary for the extraction of the said mineral/minerals including the erection on the said lands, buildings and plant required for the purposes and also to take lead and carry away over the said lands and to dispose of the said minerals extracted as aforesaid.
2. The lessee/lessees shall, during the subsistence of this lease, have the liberty to work the said mineral/minerals and remove the same from the leasehold on permits issued by the State Government/competent authority or any other officer authorised by him in this regard. The permits shall be issued only on the basis of pre-paid royalty at the rates specified in Schedule I to these Rules. The royalty rates shall be subject to revision from time to time as the State Government may order.
3. The lessee/lessees shall pay to the State Government a yearly surface rent equal to the land revenue if any, assessable under the rules for the time being in force, or if the land be the property of Government or in reserve forest then equal to the land revenue plus cess, if any, per hectare of the land the surface whereof shall be occupied or used by the lessee/lessees for any of the purposes of this deed and so in proportion for any area less than one hectare. The said surface rent shall be paid by yearly payments; the first of such payments to be made on or before the last day of the first year of occupation provided always that no such rent shall be paid or demanded in respect of any roads or ways now in existence.

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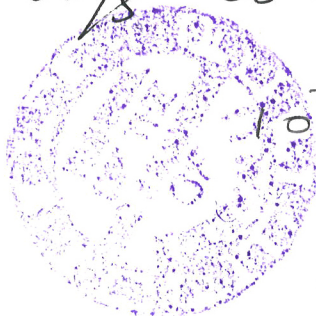


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District Registrar (GL)
Kozhikode

14/04/2025 dhanak k A J s/o Koman
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pensional.

I have satisfied myself as to the
execution of the instrument by Geologist
District Office, department of mining and
Geology, Civil Station, Kozhikode 673020 who
is exempted from personal appearance
u/s 88(1) of the Registration Act 1908.



10th day July 2025

Registered as no. 1955-2025
Book I Volume 1205
pages from 95 to 110
9 sheets 2 sheet

RANJITH E P
Sub Registrar

10th day July 2025

RANJITH E P
Sub Registrar

4. The lessee/lessees shall at all times during the currency of this lease keep correct and intelligible books of account showing accurately the quantity of the said minerals extracted and the weight and value of the said mineral sold or exported, together with the names of the purchasers or consignees. The lessee shall also maintain a register of employees showing therein separately men, women employed daily and shall at reasonable times allow the competent authority appointed under the rules (hereinafter referred to as "competent authority") or the officer authorized by him to examine the said books of account and the register of employees and to take copies and extracts there from. The lessee/lessees shall submit reports in Forms F and G on the specified dates.

5. All sums found due under or by virtue of this deed from the lessee/lessees may be recovered from him jointly and severally from them and his/their properties movable and immovable under the provisions of the Revenue Recovery Act for the time being in force as though such sums are arrears of land revenue or in any other manner as the State Government may deem fit.

6. The lessee/lessees shall at the lessee's/lessees' own expense erect and at all times maintain and keep in repair boundary marks and pillars along the boundaries of the said lands according to the demarcation shown in the plan hereto annexed.

7. The lessee shall not carry on or allow to be carried on any quarrying operations at or to any points within a distance of 100 meters from any railway line except with the previous written permission of the railway administration concerned and any bridge on National Highway or 50 meters from any reservoir, tanks, canals, rivers, bridges, public roads, other public works, residential buildings, the boundary walls of places of worship, burial grounds or burning ghats or any monument protected by Government except with the previous permission of the authorities concerned or the Government or competent authority. Provided that the railway administration or the State Government or any other authority in this behalf may, in granting such permission, impose such other conditions as may be found proper and necessary.

8. The sides of open workings shall be sloped, stepped or secured by the lessee in such a manner as to prevent slope failure. When an open working is worked in steps, the steps shall be of sufficient breadth in relation to their height to secure safety. In open workings, trees liable to fall and all loose ground and material shall be removed by the lessee sufficiently far from the edge or otherwise made source in order to prevent danger to persons employed in the quarry.

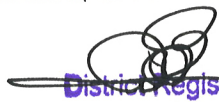
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DEPARTMENT OF MINING AND GEOLOGY
CIVIL STATION
KOZHIKODE - 673 020



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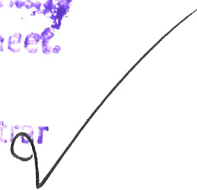
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District Registrar (GL)
Kozhikode

Document No. 1955 of 2005
Consists of 9 sheets 3 sheet.



Subregistrar



9. If a working place is found to be unsafe all persons shall be withdrawn by the lessee/lessees immediately from the dangerous area and all access to such working place except for the purpose of removing the danger of saving life shall be prevented by securely fencing the full width of all entrances to the place.

10. The lessee/lessees shall at all reasonable times allow any officer authorized by the Central Government or by the State Government in that behalf to inspect the said lands and the buildings and plants erected thereon and the lessee/lessees shall assist such persons in conducting the inspection and afford them all information they may reasonably require, and shall conform to and observe all orders which the Central and State Governments as the result of such inspection or otherwise, may from time to time pass.

11. The lessee shall be responsible for implementing the provisions of the various labour laws applicable, from time to time, to the quarry.

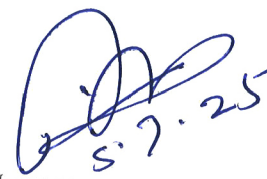
12. The lessee/lessees shall not assign or underlet the said lands or any part thereof or the rights or privileges, therein hereby granted or any of them, without the previous permission in writing of the State Government/competent authority.

13. Where the lease or any right, title or interest therein has been assigned, sublet or transferred as provided in rule 45 read with condition 12, then the person in whose favor such assignment, sublease or transfer has been made shall be responsible for implementing the provisions of the various labour laws applicable, from time to time, to the quarry.

14. The lease may be surrendered by the lessee/lessees at any time after 3 months' notice in writing to the State Government/competent authority, provided the lessee/lessees has/have paid all sums due on account of the lease. Provided further that if the lessee/lessees elects/elect to determine this lease before the expiry of the term of the lease, shall pay in addition to other dues a sum equal to the dead rent payable for the remaining part of the term of the lease deed.


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Total 9 Sheets 43 Sheet

District Registrar (GL)
Kozhikode



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Subregistrar

15. If the lessee/lessees shall be desirous of taking a further lease of the said lands for a further term, he/they shall give three months' previous notice in writing of such desire to the State Government/competent authority and if the lessee/lessees has/have duly observed all the conditions of this lease, the State Government/competent authority may agree to renew the lease for such further term and on such terms and conditions as the State Government/competent authority may determine which shall be in accordance with the provisions of these rules.

16. If the lessee/lessees shall at any time during the said term use the said lands or any part thereof in any manner other than as authorized by this lease or fail to carry on quarrying operations as per the approved mining plan without sufficient cause of which the State Government/competent authority shall be the judge or shall commit a breach of any of the conditions of this lease it shall be lawful for the State Government/competent authority to cancel this lease after giving the lessee an opportunity of being heard or the alternative to receive from the lessee/lessees such penalty not exceeding Rs.500000/- for the breach as the State Government/competent authority may fix.

17. In cases where the area under quarrying lease is Government land, the lessee shall close the mine within three calendar months after the expiry of the lease or its determination and remove any engine, machinery, buildings, structures and other works and conveniences from the area under the lease. If the lessee does not remove the same within the said period, the same shall become the property of the State Government and the State Government shall have the right to dispose the same on such terms and conditions as it deems fit.

18. This lease is subject to all rules and regulations which may from time to time be issued by the State Government regulating the working of the quarries and other matters affecting safety, health and convenience of the lessee's/lessees' employees or of the public, whether under the Indian Mines Act or otherwise.

19. The lessee/lessees shall without delay send to the District Collector and the competent authority or the officer authorized by him in this regard report of any accident-causing loss of life or serious bodily injuries or seriously affecting or endangering life or property which may at any time occur at or in the said lands in the course of operations under this lease.

20. The lessee/lessees shall furnish such reports and returns relating to output, labourers employed and other matters as the State Government may prescribe.

21. The lessee/lessees shall make and pay such reasonable compensation as may be assessed by lawful authority in accordance with the law in force on the subject for all damage, injury or disturbance which may be done by him/them in exercise of the powers granted by this lease and shall indemnify and shall keep indemnified fully and completely the State Government against all claims which may be made by any person or persons in respect of any such damage, injury or disturbance and all costs and expenses in connection therewith.

GEOLOGIST
S-7 DISTRICT OFFICE
DEPARTMENT OF MINING AND GEOLOGY
CIVIL STATION
KOZHIKODE - 673 020

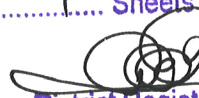


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District Registrar (GL)
Kozhikode



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22. Any condition prescribed in the Kerala Minor Mineral Concession Rules, 2015, but left out in this lease, which may be found applicable to the lessee /lessees, shall be treated as binding on the lessee/lessees.

23. In this case, the anticipated royalty to be remitted for the mineral extracted per year at the present rate of royalty of Rs 48/- per metric ton with maximum annual production of 400000 metric tonne is Rs 1,92,00,000/- (Rupees One crore ninety two lakh only/-).

24. In this case, the annual surface rent to be remitted per year at the present rate of Rs.8/- per Are per year is Rs.8,152/- (Rupees Eight thousand one hundred and fifty two only/-) and the refundable Security Deposit is Rs. 101,903/- (Rupees One lakh one thousand nine hundred and three only).

SCHEDULE OF DESCRIPTION OF LAND

District : Kozhikode

Taluk : Kozhikode

Sub District : Mukkam

Village : Kodyathur, Desom : Pannikkode

Village	Re Survey No.	Lease area in Hectares
Kodyathur	172/1527	0.8588 ✓
Kodyathur	172/1232	0.1617 ✓
Kodyathur	172/1228	0.2428 ✓
Kodyathur	172/1213,1523,1862	0.9064 ✓
Kodyathur	172/1212	0.1107 ✓
Kodyathur	172/1134	0.6650 ✓
Kodyathur	172/1137	0.6471 ✓
Kodyathur	172/1201	0.4046 ✓
Kodyathur	172/1221	0.2023 ✓
Kodyathur	172/1120	0.1016 ✓
Kodyathur	172/1238	0.2389 ✓
Kodyathur	172/1136	0.1466 ✓
Kodyathur	172/1135	0.4046 ✓
Kodyathur	172/1119	0.1224 ✓
Kodyathur	172/2275	0.8127 ✓
Kodyathur	172/1526	0.8906 ✓
Kodyathur	172/1200	0.5748 ✓
Kodyathur	172/1239,1240	0.2911 ✓
Total Area in Hectares		7.7827



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DISTRICT OF MINING AND GEOLOGY
CIVIL STATION
KODIYATHUR
KODIYATHUR - 673 020

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Total 9 Sheets 6th

District Registrar (GL)
Kozhikode



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Subregistrar

Bounderies- By property

East	Palakkal Granite owned property.
North	Palakkal Granite owned property and Palakkal Granite owned property.
West	Palakkal Granite owned property.
South	Palakkal Granite owned property.

District :Kozhikode
 Taluk :Kozhikode
 Sub District : Mukkam
 Village : Kumaranellur
 Desom : Alli

Village	Re Survey No.	Lease area in Hectares
Kumaranellur	153/597	0.5261 ✓
Kumaranellur	153/598	0.8094 ✓
Kumaranellur	153/604	0.4958 ✓
Kumaranellur	153/601, 600	0.5763 ✓
Total Area in Hectares		2.4076
Grant Total		10.1903

Bounderies- By property

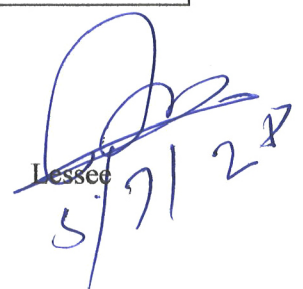
East	Property of Ravi.
North	Palakkal Granite owned property.
West	Property of Xavier Mamparambil
South	Property of Palakkal Granite

Bounded by Survey No.

On the North by	153/604, Unsurvey
On the East by	153/601,153/600, 172/1239, 172/1240, 172
On the South by	172/1527, 172/1232, 172/1120, 172/1238, 172/1137, 172/1136, 172/2275, 172/1526, 172/1200,172/1213,1523,1862
On the West by	172, Unsurvey

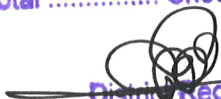

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 DISTRICT OFFICE
 DEPARTMENT OF MINING AND GEOLOGY
 CIVIL STATION
 KOZHIKODE - 673 020




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 5/7/28

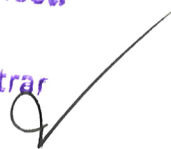


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District Registrar (GL)
Kozhikode

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Subregistrar



In witness whereof the parties hereto have signed on the date and year first above written.

Signed by.....Dr. Manju C.S., District Geologist
Dept. Mining & Geology, Kozhikode.
For and on behalf of the Governor of Kerala.

5-7-25
GEOLOGIST
DISTRICT OFFICE
DEPARTMENT OF MINING AND GEOLOGY
CIVIL STATION
KOZHIKODE - 673 020

In the presence of

(1) Abdul S. Suseel,
Asst. Geologist, Mining and Geology Dept.
Kozhikode Abdul 5-7-25

(2) Abhishek. P.
Sr. Clerk, Mining and Geology
District Office, Kozhikode Abhishek P.
05-07-2025

Signed by.....Abdusacker P.

For and on behalf of the lessee/lessees In the presence
of

(1) NOUSHAD C. K. To Hansa
CHANDRANUNNATH HOUSE
TIRUTTUNIKARAN - KOZHIKODE 5-7-25

(2) Lutemicle de Lennuimuramed
CHOLEKODUPPAROMBA (H)
TIRUTTUNIKARAN, Kozhikode 5-7-25





Total 9 Sheets 8th Sheet
District Registrar (GL)
Kozhikode



Document No. 1955-2025
Contains 9 sheets. 8 sheet.

Subregistrar
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75
A. 8059/2020

SURVEY MAP 228/2020

335/2020

DISTRICT KOZHIKODE
TALUK KOZHICODE
VILLAGES KODIYATHUR & KUMARANELLUR
RE SURVEY No 172 & UNSURVEY
RE SURVEY BLOCK No - 003 & 001

APPLIED AREA 7.7827 HECTARE & 2.4076 HECTARE

TOTAL APPLIED AREA 10.1903 HECTARE

SCALE 1CM 25M

LEGEND	
	MINING AREA
	MOSQUE
	SCHOOL
	CRUSHER
	SURVEY BOUNDARY
	BUFFER ZONE
	ROCK MARK
	SURVEY STONE
	HOUSE
	CHURCH
	ROAD
	CULVERT
	ALREADY EXTRACTED AREA
	BOUNDARY PILLER
	EXISTING Q.L. AREA

AREA DETAILS

KODIYATHUR VILLAGE

SL No	D O C No	R S No	TOTAL AREA	APPLIED AREA	NAME
1	1773/2007	172/1527	1.2104 HECTARE	0.8588 HECTARE	HASEENA
2	571/2007	172/1232	0.2828 HECTARE	0.1617 HECTARE	AJMILA
3	4462/2006	172/1228	0.2428 HECTARE	0.2428 HECTARE	AJMILA
4	1465/2014	172/1213,1523,1862	0.9064 HECTARE	0.9064 HECTARE	AHAMMEDKABEER, AJMILA HASEENA, HAIRUNNEESA & ANEESHA
5	1470/2014	172/1212	0.1107 HECTARE	0.1107 HECTARE	
6	3964/2006	172/1134	0.8093 HECTARE	0.6650 HECTARE	ABOBACKER
7	3965/2006	172/1137	0.6869 HECTARE	0.6471 HECTARE	
8	577/2007	172/1201	0.4046 HECTARE	0.4046 HECTARE	AHAMMEDKABEER
9	1774/2007	172/1221	0.2023 HECTARE	0.2023 HECTARE	AJMILA
10	3969/2006	172/1120	0.7688 HECTARE	0.1016 HECTARE	T P AISHA
11	572/2007	172/1238	0.4046 HECTARE	0.2389 HECTARE	HASEENA
12	3966/2006	172/1136	0.4046 HECTARE	0.1466 HECTARE	ABUBACKER
13	3967/2006	172/1135	0.4046 HECTARE	0.4046 HECTARE	
14	4185/2006	172/1119	0.1224 HECTARE	0.1224 HECTARE	T P AISHA
15	712/2010	172/2275	1.2141 HECTARE	0.8127 HECTARE	ALAVUDHEEN
16	575/2007	172/1526	1.0728 HECTARE	0.8906 HECTARE	HASEENA
17	119/2007	172/1200	0.6006 HECTARE	0.5748 HECTARE	AHAMMEDKABEER
18	1769/2007	172/1239,1240	1.2138 HECTARE	0.2911 HECTARE	HASEENA
TOTAL			11.0625 HECTARE	7.7827 HECTARE	

KUMARANELLUR VILLAGE

19	2797/2007	153/597	0.5261 HECTARE	0.5261 HECTARE	AHAMMEDKABEER
20	3329/2014	153/598	0.8094 HECTARE	0.8094 HECTARE	AHAMMEDKABEER
21	3313/2009	153/604	0.8701 HECTARE	0.4958 HECTARE	ALEEMA
22	1677/2015	153/601,600	0.6880 HECTARE	0.5763 HECTARE	HAIRUNNEESA
TOTAL			2.8936 HECTARE	2.4076 HECTARE	
GRAND TOTAL			13.9561 HECTARE	10.1903 HECTARE	

ALREADY EXTRACTED AREA 47660.0 M²

PARATHODE
1.5KM
ST JOSEPHS CHURCH PARATHODE

KP 89/5 DANY KALLOLIKAL

MANKUZH CULVERT

KP 86/5 CHACKO POONAMKAVIL

OWN PROPERTY OF PALAKKAL GRANITE PRODUCTS PVT LTD - RE SURVEY No 172

OWN PROPERTY OF PALAKKAL GRANITE PRODUCTS PVT LTD - RE SURVEY No 172

OWN PROPERTY OF PALAKKAL GRANITE PRODUCTS PVT LTD - RE SURVEY No 172

Name of Applicant :
മി. എ. രാജേഷ്,
മാനേജിംഗ് ഡയറക്ടർ,
പാലക്കാട് ഗ്രാനൈറ്റ്

പോലീസ് സ്റ്റേഷൻ
ലിമിറ്റഡ്, KP 6/306,
നിയർ സെഷൻ ഉറപ്പാക്കി
ഉപയോക്താവ്
പോസ്റ്റ് ഓഫീസ്
കോഡ് - 673571

RAJESH. M
TALUK SURVEYOR
TALUK OFFICE
KOZHIKODE

5.7
GEOLOGIST
DISTRICT OFFICE
DEPARTMENT OF MINING AND GEOLOG.
CIVIL STATION
KOZHIKODE - 673 020

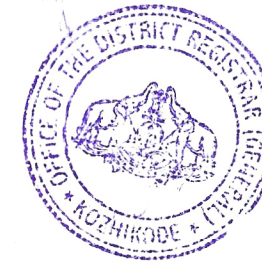
VILLAGE OFFICER
KODIYATHUR

VILLAGE OFFICER
KODIYATHUR

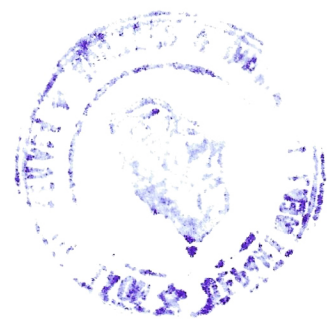
VILLAGE OFFICER
KUMARANELLUR

TAHSILDAR
KOZHIKODE

TALUK
KOZHIKODE - 673 020



Total 9 Sheets 9th Sheet
District Registrar (GL)
Kozhikode



Document No. 1753-2005
Contains 9 sheets 9 sheet



Subregistrar
✓

ANNEXURE 9
COPY OF NEWS PAPER
ADVERTISEMENT

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mmercial complex
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is 26.05.2025,
node.

auk, Chennai -

of Agriculture
(h)

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i) <https://etenders.gov.in/eprocure/app>

ii) <https://www.vocport.gov.in>

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Kochi: 9895875173

Kottayam: 9447695936

Thrissur: 9446992927

Kozhikode: 9847200442

PUBLIC NOTICE

PUBLIC NOTICE

In the state of Kerala, Kozhikode Dt, Kozhikode Taluk, at Kodyathur & Kumaranellur Village, for implementing a granite building stone quarry project over an area of 10.1903 hectares, M/s.Palakkal Granite Products Pvt.Ltd., Managing Director Sr.P.M.Aboobacker, KP 8/308, Near Sakeena Industries, Chethukadavu PO, Kunnamangalam, Kozhikode-673571, has received Environmental Clearance from the State Environmental Impact Assessment Authority (SEIAA), Kerala.

File No. 2439/EC2/2023/SEIAA

Date of Clearance: 14.03.2025

NOTICE

Kozhikode District Kozhikode Taluk Chelannur Village R No. 93/94 Deed No. 2803/2022 Dated 07/11/2022 owned by Sajif and others has lost the land title deed No. 920/ 2019 dated 11/04/2019 (SRO Chelannur). Sajif intends to take a housing loan against the above land from Piramal Finance Ltd, Kozhikode. If anyone has any right, authority or interest in the above land, he/she is requested to inform Piramal Finance Ltd. Legal Advisor Adv. Sainath. K within 15 days of the publication of this notice. In case of default in the same, it is hereby

PERSONAL

CHANGE OF NAME

CHANGE OF NAME

I, K Rajeesh, Son of K Krishnan, Madathil House, Valliyaye, PO Pathayakunnu, Thalassery-670691 have changed my name from K Rajeesh to **RAJEESH K**. Hence officially declare that K.RAJEESH and RAJEESH K refer to the same individual.

CHANGE OF NAME AND DATE OF BIRTH

I, **MARIYAMMA K V** is legally wedded spouse of No. JC 724758 W, Rank. NB/SUB, Name. MATHEW T U presently residing at Thekkanathu House, Kudamaloore P.O, Kottayam District, Kerala, Pin- 686017 have changed my Name from **MARIYAMMA K V** to **MARIAMMA K V** and Date of Birth from **NIL in PPO** to **22.08.1964** vide affidavit dated 16/05/2025 before the Advocate and Notary at Kottayam District

CHANGE OF NAME AND DATE OF BIRTH

I, **MONCY** is legally wedded spouse of No. 2590244F, Rank. Havildar, Name. Thomas John presently residing at Nattannoor, Thamallackal P O, Kumarapuram, Karthikappally Taluk, Alappuzha District, Kerala Pin- 690548 have changed my Name from **MONCY** to **MONCY THOMAS** and Date of Birth from **07.05.1973** to **20.05.1970** vide affidavit dated 13/05/2025 before the Advocate and Notary at Haripad Alappuzha District



ANNEXURE 10
MONITORING LAB REPORT

TEST REPORT

ULR No: TC1293926000000932F

LRI No.: SEAAL26010949A

Date: 08-01-2026

Page 1 of 2

CUSTOMER DETAILS

Customer Name & Address	Mr. P. M. Aboobacker Managing Director M/s Palakkal Granite Products Pvt. Ltd., KP 8/308, Near Sakeena Industries, Chethukadavu P.O, Kunnamangalam, Kozhikode District
Customer Reference	Test Request date: 31-12-2025

SAMPLE DETAILS

Product Category	Atmospheric Pollution	Sample Code	EN26010041
Sample Name	Ambient Air	Sample Received on	01-01-2026
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	02-01-2026
Sampled by	Lab Authorized Sampler	Test Completed on	08-01-2026

DETAILS OF SAMPLING

Sampling Location	Project Site	Date of Sampling	31-12-2025
Sampling Procedure	SEAAL/CHL/SOP/7.3/02	Humidity	68%

INFORMATION PROVIDED BY CUSTOMER -SAMPLING SITE DETAILS

Survey No	172/1527, 172/1232, 172/1228, 172/1213, 1523, 1862, 172/1212, 172/1134, 172/1137, 172/1201, 172/1221, 172/1120, 172/1238, 172/1136, 172/1135, 172/1119, 172/2275, 172/1526, 172/1200, 172/1239, 1240 in Kodyathur Village & 153/597, 153/598, 153/604, 153/601, 600 in Kumaranallur Village		
Taluk	Kozhikode		
District	Kozhikode	State	Kerala

TEST RESULTS-CHEMICAL DISCIPLINE

SL NO	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
1	Particulate matter ,PM ₁₀	IS 5182 (Part 23): 2006	µg/m ³	53.8	100 (Max)



Shency Joy
TM - Chemical
 Checked by




Ramar R.
Technical Head
 Authorized Signatory

The results are related to the samples tested; This test report shall not be reproduced except in full, without the written approval of the laboratory, Unless requested by the customer; the samples will not be retained for more than 7 days from the date of report.

Standards Environmental & Analytical Laboratories

Accreditation & Certification:

NABL accredited Laboratory as per ISO/IEC 17025:2017 vide Certificate No. TC-12939; ISO 45001:2018 OHSAS certified laboratory.

Approval & Recognition: MoEF recognized Environmental Laboratory; "A" Grade Laboratory approved by KSPCB.

'Standards' Bldg. No: 338/A,B,C,D,E (Behind BPCL Petrol Pump), Edayar, Muppathadam P.O., Ernakulam Dist. - 683 110.

Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.standardslab.in, E-mail: seaalab@gmail.com

TEST REPORT**ULR No: TC1293926000000932F**

LRI No.: SEAAL26010949A

Date: 08-01-2026

Page 2 of 2

TEST RESULTS-CHEMICAL DISCIPLINE

SL NO	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
2	Particulate matter ,PM _{2.5}	IS 5182 (Part 24): 2019	µg/m ³	25.4	60.0 (Max)
3	Sulphur dioxide as SO ₂	IS 5182 (Part 2): 2001	µg/m ³	4.41	80.0 (Max)
4	Nitrogen dioxide as NO ₂	IS 5182 (Part 6): 2006	µg/m ³	5.48	80.0 (Max)

Remarks:

End of Report

**Shency Joy**
TM - Chemical
Checked by**Ramar R.**
Technical Head
Authorized Signatory

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Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.standardslab.in, E-mail: seaalab@gmail.com

TEST REPORT

ULR No: TC129392600000934F

LRI No.: SEAAL26010951A

Date: 08-01-2026

Page 1 of 2

CUSTOMER DETAILS

Customer Name & Address	Mr. P. M. Aboobacker Managing Director M/s Palakkal Granite Products Pvt. Ltd., KP 8/308, Near Sakeena Industries, Chethukadavu P.O, Kunnamangalam, Kozhikode District
Customer Reference	Test Request Date: 31-12-2025

SAMPLE DETAILS

Product Category	Water	Sample Code	WT26010034
Sample Name	Ground Water	Sample Received on	01-01-2026
Sample Description by Customer	Open Well Water	Temperature @ Receipt	4°C
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	02-01-2026
Sample Quantity& Packing	2 L & 125 ml in a Plastic Bottle	Test Completed on	08-01-2026
Information Provided by Customer	---	Sampled by	Lab Authorized Sampler

DETAILS OF SAMPLING

Sample Source	Project Site	Date of Sampling	31-12-2025
Sampling Procedure	SEAAL/QAD/SOP/7.3/01	Sample Temperature	26°C

INFORMATION PROVIDED BY CUSTOMER -SAMPLING SITE DETAILS

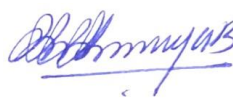
Survey No	172/1527, 172/1232, 172/1228, 172/1213, 1523, 1862, 172/1212, 172/1134, 172/1137, 172/1201, 172/1221, 172/1120, 172/1238, 172/1136, 172/1135, 172/1119, 172/2275, 172/1526, 172/1200, 172/1239, 1240 in Kodiathur Village & 153/597, 153/598, 153/604, 153/601, 600 in Kumaranallur Village		
Taluk	Kozhikode		
District	Kozhikode	State	Kerala

TEST RESULTS- CHEMICAL DISCIPLINE

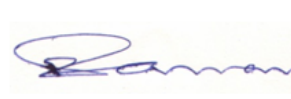
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	Requirement as per Acceptable Limit of IS 10500: 2012
1	Colour	IS 3025 (Part 4): 2021	Hazen	1	5 (Max)



Shency Joy
TM - Chemical
 Checked by

Remya B.
TM-Biological
 Authorized Signatory



Ramar R.
Technical Head
 Authorized Signatory

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Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.standardslab.in, E-mail: seaalab@gmail.com

TEST REPORT

ULR No: TC1293926000000934F

LRI No.: SEAAL26010951A

Date: 08-01-2026

Page 2 of 2

TEST RESULTS- CHEMICAL DISCIPLINE

Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	Requirement as per Acceptable Limit of IS 10500: 2012
2	Odour	IS 3025 (Part 5): 2018	---	Agreeable	Agreeable
3	Turbidity	IS 3025 (Part 10): 2023	NTU	<0.10	1 (Max)
4	pH @ 25°C	IS 3025 (Part 11): 2022	---	7.10	6.50-8.50
5	Conductivity	IS 3025 (Part 14): 2013	µS/cm	126	---
6	Total Dissolved Solids @ 180°C	IS 3025 (Part 16): 2023	mg/L	68.0	500 (Max)
7	Total Hardness as CaCO ₃	IS 3025 (Part 21): 2009	mg/L	30.3	200 (Max)
8	Calcium as Ca	IS 3025 (Part 40): 1991	mg/L	8.20	75 (Max)
9	Magnesium as Mg	IS 3025 (Part 46): 2023	mg/L	2.46	30 (Max)
10	Chloride as Cl	IS 3025 (Part 32): 1988	mg/L	17.6	250 (Max)
11	Total Alkalinity as CaCO ₃	IS 3025 (Part 23): 2023	mg/L	16.8	200 (Max)
12	Iron as Fe	IS 3025 (Part 53): 2003	mg/L	0.20	1 (Max)
13	Sulphate as SO ₄	IS 3025 (Part 24/Sec 1): 2022	mg/L	<1.00	200 (Max)

TEST RESULTS - BIOLOGICAL DISCIPLINE

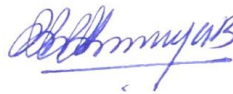
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	Requirement as per Acceptable Limit of IS 10500: 2012
1	Total Coliform Bacteria	IS 15185: 2016	---	Absent/100ml	Absent/100 ml
2	<i>E.coli</i>	IS 15185: 2016	---	Absent/100ml	Absent/100 ml

Remarks:

End of Report



Shency Joy
TM - Chemical
 Checked by

Remya B.
TM-Biological
 Authorized Signatory



Ramar R.
Technical Head
 Authorized Signatory

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Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.standardslab.in, E-mail: seaalab@gmail.com

ANNEXURE 11
MINES MANAGER CERTIFICATE



Cert No. MR/SZ/480

भारत सरकार/Government of India

खान अधिनियम, 1952/Mines Act, 1952

खनन परीक्षा बोर्ड/Board of Mining Examinations

खनन मेट सक्षमता प्रमाण-पत्र

MINING MATE'S CERTIFICATE OF COMPETENCY

(केवल ओपेनकास्ट खानों तक सीमित)

(Restricted to mines having opencast workings only)

(धात्विकीय खान विनियम, 1961 के अन्तर्गत)

(Under the Metalliferous Mines Regulations, 1961)



श्री **सुपुत्र** है, को अपनी
जिनकी जन्म तिथि **आयु, स्वस्थता, सदाचार, साक्षरता और धात्विकीय खानों में काम करने के विहित अनुभव का सन्तोषजनक प्रमाण**
प्रस्तुत करने एवं दिनांक **को** केन्द्र पर आयोजित
विहित परीक्षा में उत्तीर्ण होने पर एतद्वारा केवल ओपेनकास्ट खानों तक सीमित मेट सक्षमता प्रमाण-पत्र
प्रदान किया जाता है।

Shri **R. SARAVANAN** son of **S. RAMALINGAM**
born on **05TH MAY, 1985 (EIGHTY FIVE)** having given satisfactory evidence of his age,
medical fitness, good character, literacy and prescribed experience of working in metalliferous
mines and having passed the prescribed examination held at
centre on **28.04.2014** is hereby granted **MINING MATE'S CERTIFICATE OF COMPETENCY** restricted to mines having opencast workings only.

बाएं हाथ के निशान

Left hand thumb impression

अंचल सचिव

खनन परीक्षा बोर्ड

Zonal Secretary

Board of Mining

Examinations

अंचल सचिव

खनन परीक्षा बोर्ड

दक्षिणी अंचल, बंगलूरु

Zonal Secretary

Board of Mining Examination

Southern Zone, Bengaluru.

अध्यक्ष

खनन परीक्षा बोर्ड

Chairman

Board of Mining

Examinations

Signed and Sealed

Date **17/09/14**

MR

To

SRI SARAVANAN

S/o SRAMALINGAM

Home Address

Village

THALAIYUR

PO

PAVATTAKUDI

Police Station

NANNILAM

District

THIRUVARUR

State

TAMILNADU - 609403

प्रमाणित किया जाता है कि उनकी सक्षम चिकित्सा अधिकारी द्वारा स्वास्थ्य परीक्षा कर
खान में कार्य करने के लिए स्वस्थ घोषित किया जाता है।

Certified that he has been examined by qualified medical
officer and declared fit for employment in mines.

1 16-03-2019

On Director of Mines Safety, Chennai Region

को

2

17-02-2024

On Director of Mines Safety, Chennai Region

को

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Prepared by

Checked by

Registered

भारत सरकार
रोजगार एवं श्रम मंत्रालय
खान सुरक्षा महानिदेशालय

सं० परीक्षा/Foreman/छुट//प्रमाणपत्र/संशोधन/

५३३७

धनबाद, दिनांक:-

११/१२/०८

सेवा में,

Rana Radheshyam Khiru

S/o Khiru Rana

Qr.No.L/B-8,

WCL Umrer Project,

Dist.- Nagpur (MS)

विषय:-Foreman प्रमाण पत्र सं० 2704, दिनांक 26/12/2007 में आवश्यक संशोधन करने हेतु।

महाशय,

उपरोक्त विषय पर आपके पत्र दिनांक 06/02/08 के संदर्भ में आपके Foreman प्रमाण पत्र में आवश्यक संशोधन कर पुनः वापस किया जाता है।

इसकी पावती की अपेक्षा है।

अनुलग्नक:- 1) Orig.Foreman Cert.No.
2704 dt.26.12.07

भवदीय


०५/१२/०८

सचिव

खनन परीक्षा समिति एवं
खान सुरक्षा निदेशक(परीक्षा)
खान सुरक्षा महानिदेशालय, धनबाद।

CERTIFICATE CORRECTED
04/12/08

GOVERNMENT OF INDIA
MINISTRY OF LABOUR & EMPLOYMENT
DIRECTORATE-GENERAL OF MINES SAFETY
Board of Mining Examination
Director of Mines Safety (Exam)
NO. EXAM/EXEMPT/2704/213



DHANBAD, DATED

26/11/07

M E M O R A N D U M

Ref: His application dated 04.7.07 by virtue of Government Notification No. 712(E), dated 13/12/1974.

Shri Rana Radheshyam Khiru S/o Khiru Rana

Of Village : Umrer

Thana: Umrer

District: Nagpur

State: Maharashtra

Born on: 06th June, 1979 (Seventy nine)

possessing a Diploma in Mining & Mine Surveying approved under Regulation 18 of Metalliferous Mines Regulations, 1961 and on completion of prescribed experience has become eligible to work in a capacity requiring possession of Foreman's Certificate Restricted to Mines having opencast workings only under Metalliferous Mines Regulations, 1961 with effect from 17.5.2007 till the above Notification remains in force.

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Secretary
Board of Mining Examination &
Director of Mines Safety(Exam)
Directorate-General of Mines Safety office
Dhanbad



on 28/8/12
निदेशक खान सुरक्षा
DIRECTOR OF MINES SAFETY
भारत सरकार GOVT. OF INDIA
गोवा क्षेत्र GOA REGION
मार्गव 403 601/
गोवा GOA

Exam on
06/04/17

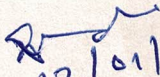
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Valid upto
05/04/2022

खान सुरक्षा निदेशक
DIRECTOR OF MINES SAFETY
गोवा क्षेत्र/GOA REGION गोवा/GOA

Exam on
04/12/2021

Valid upto
31/12/2026


12/01/2022

आन सुरक्षा निदेशक
DIRECTOR OF MINES SAFETY
कोटा डेवडूमा REGION, दमोडो