M/s. WIMROCK GRANITE PVT. LTD.,
Vadasserikkara - Kerala

DOCUMENTS FOR EC

1. Form I
2. Pre-feasibility Report cum EMP
3. Approved Quarry Plan

OF

Building Stone Quarry

(Extent: 3.4080 Ha and Maximum Production: 3 lakhs TPA)

AT

Vadasserikkara Village, Ranni Taluk, Pathanamthitta District, Kerala State.

Environmental Consultant
METAMORPHOSIS[SM] Project Consultants Private Limited
BENGALURU, KARNATAKA
QCI/NABET Accredited EIA Consultants

No. : NABET/EIA/1215/141

July - 2015

FORM – 1

I. Basic Information

Sr. No.	Item	Details
1	Name of the project/s	**Building Stone Quarry**
2	Sr. No. in the schedule	1(a)
3	Proposed Capacity/area/length/tonnage to be handled/command area/lease area/number of wells to be drilled.	Maximum Capacity: 3 lakhsTPA Total Lease Area: 3.4080 hectare
4	New/Expansion/Modernization	New Quarry
5	Existing Capacity/Area etc.	Nil
6	Category of Project i.e. 'A' or 'B'	Category 'A'.
7	Does it attract the general condition? If yes, please specify.	Mining projects of minor minerals with area less than 50 ha of mining lease are categorized as category 'B' as per Notification S.O.2731 (E) dated 9th September 2013. As the quarry falls in ESA and therefore it attracts General Conditions of EIA Notification 2006 Schedule 1 (a) hence the project falls under Category 'A'.
8	Location	The proposed building stone quarry project is situated at Sy. No. 702 / 1 (p), 702 / 1 – 412 and 702 / 1 – 413 (new Sy. Nos. are 391 (p), 394 (p) and 395(p)) of Vadasserikkara Village, Ranni Taluk, Pathanamthitta District, The geographical location of the mine with respect of Latitude : N 09^0 18' 55.01" to N 9^0 18' 57.72" Longitude: E 76^0 50' 23.07" to E 76^0 50' 29.99"
	Plot/Survey/Khasra No.	Sy. No. 702 / 1 (p), 702 / 1 – 412 and 702 / 1 – 413 (new Sy. Nos. are 391 (p), 394 (p) and 395(p))
	Village	Vadasserikkara
	Tehsil	Ranni
	District	Pathanamthitta
	State	Kerala
9	Nearest Railway station / airport along with distance in kms.	**Nearest Railway station:** Thiruvalla - 35.0 kms **Airport:** Thrivananthapuram - 115.0 kms
10	Nearest town, city, District headquarters along with distance in kms.	Ranni Taluk & Pathanamthitta District head quarters, which is at a distance of 10.0 kms.
11	Name of the applicant	Mr. Raju K. Thomas, Managing Director of M/s. WIMROCK GRANITE PVT. LTD.,
Sr. No.	**Item**	**Details**
12	Registered Address	Mr. Raju K Thomas, M/s. Wim Rock Granite Pvt. Ltd., Vadasserikkara Village, Ranni Taluk,

		Pathanamthitta District, Kerala State.
13	Address for correspondence	
	Name	Mr. Raju K. Thomas
	Designation (Owner/Partner/CEO)	Managing Director
	Address	Mr. Raju K Thomas, M/s. Wim Rock Granite Pvt. Ltd., Vadasserikkara Village, Ranni Taluk, Pathanamthitta District, Kerala State.
	Pin Code	689662
	E-mail	rajuwimthomas@gmail.com
	Telephone No.	+91. 4735252979; +91 9447074308
	Fax No.	+91. 4735252979
14	Details of Alternative Sites examined, if any. Location of these sites should be shown on a topo sheet.	Nil
15	Interlined Projects	Nil
16	Whether separate application of interlined project has been submitted	Not applicable
17	If yes, date of submission	Not applicable
18	If no, reason	Building Stone Quarry is a site specific
19	Whether the proposal involves approval/ clearance under: a) The Forest (Conservation) Act, 1980 b) The Wildlife (Protection) Act, 1972 c) (c) The C.R.Z Notification, 1991	Nil
20	Whether there is any Government order /policy relevant /relating to the site	Consent from Kerala State Pollution Control Board (KSPCB) to operate quarry is obtained.
21	Forest land involved (hectares)	No
22	Whether there is any litigation pending against the project and/or land in which the project is propose to be set up a) Name of the Court b) Case No. c) (c) Orders/directions of the Court, if any and its relevance with the proposed project.	No

II. Activity

Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.).

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	No	**Land Use:-** The quarrying activity will have localized impact and create physical change in the existing environment due to the change in the existing land use. Waste will be utilized for roads & plantation.
1.2	Clearance of existing land, vegetation and buildings?	No	The proposed mining area has rubber plantation, climbers, grass, shrubs, herbs etc.
1.3	Creation of new land uses?	No	Quarry pit will be formed.
1.4	Pre-construction investigations e.g. bore houses, soil testing?	No	Nil
1.5	Construction works?	No	Nil
1.6	Demolition works?	No	None
1.7	Temporary sites used for construction works or housing of construction workers?	No	Nil
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations.	Yes	The proposed project activity involves about 90% of the pit area for exploring building stone. At the end of life of mine, by plantation. It is estimated that around 3000 tonnes of top soil will be generated from the proposed pit, which will be properly stacked and will be utilized for plantation over the areas. It is also estimated that around 82,500 tonnes of over burden is generated during entire life of quarry and which will be utilized for construction of garland drains.
1.9	Underground works including mining or tunneling?	No	Nil. There will be no underground quarrying activities. The proposed quarrying will be done by open cast mechanized method of quarry.
1.10	Reclamation works?	No	Nil
1.11	Dredging?	No	None
1.12	Offshore structures?	No	Not applicable

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
1.13	Production and manufacturing processes?	Yes	**Maximum Production:** 3 lakhs TPA **Process:** The quarrying will be done by open cast semi-mechanized method of mining. The bench height and width will be proposed 5 m. Drilling, blasting & breaking operation will be taken up suitably. Excavated material is transported to the crusher unit within the complex for further processing. The ultimate depth of the quarry workings is estimated to be 60 mts
1.14	Facilities for storage of goods or materials?	Yes	The finished material i.e., aggregates will be stored in a stockyard within the quarry area.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	**Solid Waste:** 3,000 tonnes of over burden will be removed during the quarrying operations and the same will be utilized for laying internal haul road and will form base in plantation and construction of garland drains. **Liquid Effluent:** The sewage generated from the canteen, office and colony is about of 12 KLD and the same will be treated in the CPCB approved septic tank and soak pit within the lease area.
1.16	Facilities for long term housing of operational workers?	No	Nil
1.17	New road, rail or sea traffic during construction or operation?	Yes	For the purposes of quarrying activities, existing roads are sufficient. However, haul road will be suitably developed within the proposed area.
1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No	Existing transportation network will cater to the requirements of the Quarrying operation.
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	None
1.20	New or diverted transmission lines or pipelines?	No	None
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	Yes	The run-off from the lease area will be suitably collected through channels and will be stored in storm water pond for further utilization in Quarry/Crusher unit. However, all measures will be taken not to disturb the natural drainage system of

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
			the surrounding area.
1.22	Stream crossings?	No	Nil.
1.23	Abstraction or transfers of water from ground or surface waters?	No	Nil.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	No	There will be no changes in the water bodies. The proposed changes in the land shall not affect the drainage pattern or runoff. In other way it will help to restore the mined out area.
1.25	Transport of personnel or materials for construction, operation or decommissioning?	Yes	The materials produced from the quarry are loaded on trucks by using 1.5 & 1.1 m^3 bucket capacity from quarry.
1.26	Long-term dismantling or decommissioning or restoration works?	Yes	At the end of life of quarry, excavated pit will be backfilled and reclaimed and rehabilitated by Rubber plantation as to restore the natural eco-system.
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	No	At the end of life of quarry, Suitable plantation with shrubs, herbs & trees will be done as a part of eco-restoration work.
1.28	Influx of people to an area in either temporarily or permanently?	Yes	Due to the quarrying activity and the attached ancillary unit, there will be workers attracted to the project area. It is proposed to employ 25 persons in the project.
1.29	Introduction of alien species?	No	None
1.30	Loss of native species or genetic diversity?	Yes	Due to the proposed quarrying activities, there is loss of some native species and vegetation. However, some of these species will be planted at the end use for eco-restoration.
1.31	Any other actions?	No	Nil

2. Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	No	Quarrying will be carried out in non agricultural land
2.2	Water (expected source & competing users) unit: KLD	Yes	The daily water demand will be only 12 KLD. (Water source: Imported from

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
			outside in road tankers and Wells water to meet the drinking water and other domestic water requirement of the workers and the staff. A storm water collection pond for meeting the water requirements of crusher, plantation and dust separation systems).
2.3	Minerals (MT)	Yes	It is a quarry project for excavation of building stone. Production will be 3 lakhs TPA is the maximum.
2.4	Construction material – stone, aggregates, sand / soil (expected source – MT)	No	Nil as there is no construction activities involved
2.5	Forests and timber (source – MT)	No	Nil
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)	No	HSD Power Source is used for crusher unit, workshops, office building, canteen & labors hostel will be supplied by Kerala State Electricity Board, a 11 KVA will be required to run the crushing operation, DG sets of 630 KVA 1 nos & 500 KVA 1 nos capacity will be used as a stand by for the crushing operation.
2.7	Any other natural resources (use appropriate standard units)	No	Nil

3. *Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.*

Sr. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)	Yes	Which is an explosive substance and is hazardous. Also the detonators used for blasting is a hazardous chemical. However, a limited quantity in compliance with Explosives Act will be stored in the magazine for safety of the workers. Explosives will be stored, transported, handled and used in accordance with Indian Explosive Act 1884, MSIHC Rules 1989, Mines Act, 1952 and regulations there under.
3.2	Changes in occurrence of disease or affect disease vectors (e.g.	No	Not envisaged

	insect or water borne diseases)		
3.3	Affect the welfare of people e.g. by changing living conditions?	Yes	The present project will directly/ indirectly develop the area by providing employment opportunities. With the proposed development in and around the area there will be many supporting facilities/ infrastructure eventually leading to the development of the area under socio-economic activities.
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.,	Yes	The nearest human settlement is adjacent to the lease boundary towards east side. All the necessary measures will be taken to operate the quarry in compliance with air, water, noise and vibration standards from time to time.
3.5	Any other causes	No	Not envisaged from the proposed project.

4. Production of solid wastes during construction or operation or decommissioning (MT/month).

Sr. No	**Information/Checklist confirmation**	**Yes/ No**	**Details thereof (with approximate quantities /rates, wherever possible) with source of information data**
4.1	Spoil, overburden or mine wastes	Yes	About 82,500 tonnes of over burden will be generated and will be utilized for laying internal haul road and will form base in plantation and construction of garland drains.
4.2	Municipal waste (domestic and or commercial wastes)	No	Nil
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	Yes	Hazardous wastes of small quantities like used oil, lead acid batteries and waste oil drums are being generated. These are being taken care as per Hazardous Waste (Management & Handling) Rules, 1989 and 2003 and sent to stores for disposal.
4.4	Other industrial process wastes	No	Nil
4.5	Surplus product	No	None
4.6	Sewage sludge or other sludge from effluent treatment	Yes	The sludge generated from the septic tank on a periodical basis will be dried and will be used as manure in plantation.
4.7	Construction or demolition wastes	Yes	Demolition at the end of the quarry will be carried out as per mine closure plan
4.8	Redundant machinery or equipment	Yes	The redundant machineries or equipments are being transferred to other mines where required. If outlived their working life, they will be surveyed off and disposed as

			per Company's Rule.
4.9	Contaminated soils or other materials	No	None
4.10	Agricultural wastes	No	None
4.11	Other solid wastes	No	None

5. Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr)

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources	No	Nil. As no combustion activities involved in the project.
5.2	Emissions from production processes.	Yes	Considerable amount of dust will be generated at various stages of quarrying operations such as drilling, blasting and excavation and vehicle movement. The different measures taken to control the dust emissions.
5.3	Emissions from materials handling including storage or transport	Yes	There will be fugitive emissions generated during material handling, transportation, loading and unloading etc. Regular water sprinkling on haul road will suppress the dust particles and prevent them from getting air-borne.
5.4	Emissions from construction activities including plant and equipment	No	Nil
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	Yes	Dust gets generated during transportation, loading, unloading etc. They are being taken care of by water Sprinkling on the transport routes, asphalting/compacting the internal roads, transporting the raw material and finished goods in the closed vehicles.
5.6	Emissions from incineration of waste	No	None
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	None
5.8	Emissions from any other sources	No	None

6. Generation of Noise and Vibration, and Emissions of Light and Heat:

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	Yes	The main sources of noise in the existing quarry are; ▪ Vehicular movement Noise generated at the surface of Quarry are in the range 64 – 69 dB (A) and near the crusher unit it ranges from 63 – 69 dB (A).
6.2	From industrial or similar processes	No	Nil
6.3	From construction or demolition	No	Nil as there will not be any construction or demolition activities.
6.4	From blasting or piling	Yes	Controlled Blasting (Milli second delay detonotar) technique will be adopted to restrict the PPV levels well below the DGMS standards of <15 mm/sec at all times. The blasting will be done at designated hours i.e. 3 to 4 PM.
6.5	From construction or operational traffic	Yes	Due to vehicular traffic and material transportation within the lease area, noise will be generated. However, the expected noise levels will be well maintained within the DGMS and CPCB norms.
6.6	From lighting or cooling systems	No	None
6.7	From any other sources	No	None

7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	No	Hazardous materials like spent oil, old batteries are being disposed off as per the existing Rules & Guidelines of Hazardous Waste (Management & Handling) Rules, 1989 and 2003 and are being sent to stores for disposal through authorized agents.
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	No	Nil.
7.3	By deposition of pollutants emitted to air into the land or into water	No	Nil.

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
7.4	From any other sources	No	Nil
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No	Not envisaged

8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	Yes	The explosives will be stored in the magazines in an isolated place and the licensed person will supervise/control the blasting operations.
8.2	From any other causes	Yes	The risks of accidents are envisaged due to the operation of equipments, failure of mine pit etc. Pit slope will be kept at 45°. Face slope will be kept at 70°. No loose stone or debris will be allowed to remain near the edges of excavation and along the sites of haul road. However, good safety practices will be adopted at the site. All precautionary measures will be adopted and use of protective equipments will be mandatory. However, to meet the minor incidences and accidents first aid measures.
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?	No	Nil.

9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
9.1	Lead to development of supporting fa**ci**lities, ancillary development or	Yes	The proposed project will direct /

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
	development stimulated by the project which could have impact on the environment e.g.: o Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.) o Housing development o Extractive industries o Supply industries o Other		indirectly develop the area by providing employment opportunities. With the proposed development in and around the area there will be many supporting facilities/ infrastructure eventually leading to the development of the area.
9.2	Lead to after-use of the site, which could have an impact on the environment	No	The land used will be plantation. Plantation and afforestation will add to the improvement in environment and aesthetic beauty of the area.
9.3	Set a precedent for later developments	No	No such precedents are anticipated
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	Yes	Employment opportunity will improve as a cumulative effect. Few of similar type of mines are in operation within the study area of 10 km radius.

II. Environmental Sensitivity

Sl. No	Areas	Name/ Identity	Aerial distance (within 15 km.) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	Nil	There are no protected areas under international conventions, national or local legislation.
2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	No	Nil
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	Nil	No protected species of flora and fauna for breeding, nesting, foraging, resting present in the study area.
4	Inland, coastal, marine or underground waters	No	Nil
5	State, National boundaries	Nil	There are no inter-State, National boundaries within study region.
6	Routes or facilities used by the public	Nil	None

Sl. No	Areas	Name/ Identity	Aerial distance (within 15 km.) Proposed project location boundary
	for access to recreation or other tourist, pilgrim areas		
7	Defense installations	Nil	Nil
8	Densely populated or built-up area	Nil	There are no any public building, places of worship and monuments within the lease area. & Hospitals, schools, college's places of worships and community facilities are present within the study region which is approximately 4 Kms from the project site.
9	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities).	Yes	Hospitals, schools, college's places of worships and community facilities are present within the study region.
10	Areas containing important, high quality or scarce resources (ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals).	No	There are no areas containing important, high quality or scarce resource in the region.
11	Areas already subjected to pollution or environmental damage. (Those where existing legal environmental standards are exceeded).	Nil	None
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions)	Nil	No areas are susceptible to natural hazard exists.

(IV) Proposed Terms of Reference for EIA Studies – NOT APPLICABLE

"I hereby given undertaking that the data and information given in the application and enclosures and true to the best of my knowledge and belief and I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance give, if any to the project will be revoked at our risk and cost.

For Wimrock Granite (P) Ltd.

Date: 09-02-2015

Place: VADASSERIKARA

RAJU K. THOMAS [MD]
WIMROCK GRANITE (PVT) LTD
KALLOTH RIVER VIEW,
VADASSERIKARA, PATHANAMTHITTA
KERALA

Signature of the applicant
With Name and Full Address,
(Project Proponent/Authorized Signatory)

"I hereby given undertaking that the data and information given in the application and enclosures and true to the best of my knowledge and belief and I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance give, if any to the project will be revoked at our risk and cost.

For Wimrock Granite (P) Ltd

Mg. Director

Date: 09-02-2015

Place: VADASSERIKARA

RAJU K. THOMAS [MD]
WIMROCK GRANITE (PVT) LTD
KALLOTH RIVER VIEW,
VADASSERIKARA, PATHAMTHITTA
KERALA

WIMROCK GRANITE (P) Ltd. VADASSERIKARA

Signature of the applicant
With Name and Full Address,
(Project Proponent/Authorized Signatory)

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Copy of the RQP Certificate	**8**
Copy of the Explosives License	**9**
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CHAPTER – 1

EXECUTIVE SUMMARY

Building Stone Quarry

CHAPTER 1

EXECUTIVE SUMMARY

1.1 About the Project Proponent

M/s. WIMROCK GRANITE PVT. LTD., was incorporated as Private Limited in 1998 under Company's Act 1956. A copy of the incorporation certificate is enclosed as **Annexure No. 5. Mr. Raju K. Thomas** is the Managing Director and authorized signatory residing in Kalloth River view house, Vadasserikkara village, Ranni Taluk, Pathanamthitta district. A copy of the board of resolution is enclosed as **Annexure No. 6. Mr. Raju K. Thomas** having vast experience in Building Stone Quarry mining and trading, he had applied for the grant of quarry lease at Vadasserikkara village, Ranni Taluk of Pathanamthitta district under Kerala Minor Mineral Concession Rule 1967 for exploitation of building stone for construction and infrastructure purposes. In view of the application, Kerala Government has granted the building stone quarry leases in Vadasserikkara Village, Ranni Taluk, Pathanamthitta District, Kerala State.

Sr. No.	Name of the Village	Survey Nos.	QL No. GO No Date.	Date of Expiry	Area in Ha.
2	Vasasserikkara	702 / 1 (p), 702 / 1 – 412 and 702 / 1 – 413 (new Sy. Nos. are 391 (p), 394 (p) and 395(p))	G. O. No. 779 / 98 - 99 / 2009 / M 4 / 99 Dated 10.03.99	06/04/2009	3.4080

A copy of the Government order and lease deed in form H of the above said lease is enclosed as **Annexure No. 2.** And the lease sketch as enclosed in Approved quarry plan **Plate No. 4.**

The said lease has expired on 06.04.2009. Since the part of the land belongs to Government, it is mandate to obtain the No Objection Certificate (NOC) from District collector. Accordingly, lessee had applied an application letter to District Collector seeking NOC, in this connection (several letter communication took place since from 2008 prior to renewal) District Collector made an reply to lessee to submit the obtain the Environment Clearance from the Ministry of Environment & Forest. A copy of all the communications of the letters made with District collector and received from District Collector are enclosed as **Annexure No. 4.**

When once the Environment Clearance is submitted to NOC will be issued by District Collector, thereafter submitting the same to Department of Mining and Geology lease will be renewed further.

M/s. Wimrock Granite Pvt. Ltd., quarrying plan has been approved with the letter of intent issued by the Department of Mining and Geology (DMG) for extent of 0.8980 ha (private patta) as per KMMCR, 1967. (All the related documents are enclosed in the respective quarry plan). A plan showing the Lease area to extent is enclosed as **Plate No. 1.**

Mining projects of minor minerals with area less than 50 ha of mining lease are categorized as category 'B' as per Notification S.O.2731 (E) dated 9th September 2013. As the quarry falls in ESA and therefore it attracts General Conditions of EIA Notification 2006 Schedule 1 (a) hence the project falls under Category 'A'.

Further, lessee has obtained Consent to Operate for the Building Stone Quarry under The Water (Prevention & Control of Pollution) Act 1974 and The Air (Prevention & Control of Pollution) Act 1981 from the Kerala State Pollution Control Board which is valid till 30.06.2015. A copy of the same is enclosed as **Annexure No. 10.**

1.2 About the Quarry

This quarry is lies between N 09^0 18' 55.01" to N 9^0 18' 57.72" and E 76^0 50' 23.07" to E 76^0 50' 29.99" latitude and longitude respectively. The total extent **3.4080 ha** located at Vadasserikkara Village, Ranni Taluk, Pathanamthitta District, Kerala State. The said lease lies towards south of Vadasserikkara village at a distance of 3.00 kms (aerial distance) approximately and also lies towards N of Malayalapuzha village at a distance of 3.00 kms approximately (aerial distance) and nearest road connectivity between Attachakkal – Chengara – Kumbalomoika State highway passes towards west of the quarry area at a distance of 1.00 km. This lease area is approachable by all weather roads up to the lease.

The lease area falls under the Survey of India's Toposheet **No 58 / C / 15** and the topo maps of Kerala are restricted the same are not available. The area is shown on the location plan **Plate No. 3** Thiruvananthapuram is city and state capital which is at a distance of 115.0 kms from the quarry site. The nearest airport is at Thiruvananthapuram which is at a distance of 115.0 kms approximately and the nearest railhead on Broad-gauge is Thiruvalla at a distance of 35.0 kms.

The topography of the said lease occupies the middle part of hillock trending NW-SE, extending from southeast of Edathra of Northwest of Talchira. The highest elevation is about 250 m MSL towards middle of the lease area and the lowest elevation is 215 m MSL towards south of the lease.

A key plan showing the location of the quarry and the details of its 5.0 kms buffer zone is enclosed as **Plate No. 2,** Kerala Map showing the quarry location, Taluka & District head

quarters, railways, approachable roads, river, ports, harbor and etc is enclosed as **Plate No. 3.** A certified lease map / sketch issued by the Directorate of Mining and Geology is enclosed as **Plate No. 4** and the lease area marked on the google image is enclosed as **Plate No. 5.**

1.3 Method of Quarrying

The working will be carried out by opencast semi-mechanized method as per the Mines Act 1952, benches has been designed 5 m height and 5 m width, drilling, blasting, breaking, loading the material by excavator and hauling the material through trippers to the end point. The proposed rate of production will be 3 lakhs TPA and the life of the quarry has been estimated about 8 years. The ultimate depth of the mine working is estimated to reach up to 60 mts.

Employment

The quarry has already generated about 25 members and preference has been given to the local community.

1.4 Environmental Management Measures

The quarry will be operated scientific and systematic method with 5 m bench height and 5 m bench width by adopting all the safety norms as per Mines Act 1952. The quarry operations will be supervised by the qualified Mines Manager. Management shall identify the suitable personnel for implementation of Environmental Management Plan (EMP).

Periodic monitoring of Environmental parameters will be carried out by engaging an approved laboratory.

As part of Corporate Social Responsibility, Proponent Proposes to spend 1 % of profit towards community developmental activities around the quarry area.

Project Cost: The estimated project cost is about **Rs. 1,200 lakhs.**

CHAPTER – 2

INTRODUCTION OF THE PROJECT

Building Stone Quarry

CHAPTER 2

INTRODUCTION OF THE PROJECT

2.1 About Project Proponent

M/s. WIMROCK GRANITE PVT. LTD., was incorporated as Private Limited in 1998 under Company's Act 1956. A copy of the incorporation certificate is enclosed as **Annexure No. 5. Mr. Raju K. Thomas** is the Managing Director and authorized signatory residing in Kalloth River view house, Vadasserikkara village, Ranni Taluk, Pathanamthitta district. A copy of the board of resolution is enclosed as **Annexure No. 6. Mr. Raju K. Thomas** having vast experience in Building Stone Quarry mining and trading, he had applied for the grant of quarry lease at Vadasserikkara village, Ranni Taluk of Pathanamthitta district under Kerala Minor Mineral Concession Rule 1967 for exploitation of building stone for construction and infrastructure purposes. In view of the application, Kerala Government has granted the building stone quarry leases in Vadasserikkara Village, Ranni Taluk, Pathanamthitta District, Kerala State.

2.2 Identification of Project

The quarry site is located in Vadasserikkara Village, Ranni Taluk, Pathanamthitta District, Kerala State over an area of 3.4080 ha and does not involve any forest land. The salient features of the project are given in **Table 2.1.**

Table 2.1: Salient Features of the Project

Longitude	N 09^0 18' 55.01" to N 9^0 18' 57.72"
Latitude	E 76^0 50' 20.41" to E 76^0 50' 33.96"
Nearest Railway Station	Thiruvalla railway station is at distance which is 35.0
Nearest Airport	Thiruvananthapuram - 115.0 kms
Nearest Road Connectivity	Road connecting between Attachakkal – Chengara – Kumbalomoika State highway passes towards west of the quarry area at a distance of 1.00 km
Nearest Head Quarter	Ranni Taluk & Pathanamthitta District Head Quarters - 10.0 kms
Nearest Forest	Social forest at Thekkumala towards west of the lease at a distance of 700 m (Aerial distance). Chittar Reserve forest towards East at a distance of 4.5 kms (Aerial distance).

2.2.1 Location of the Project

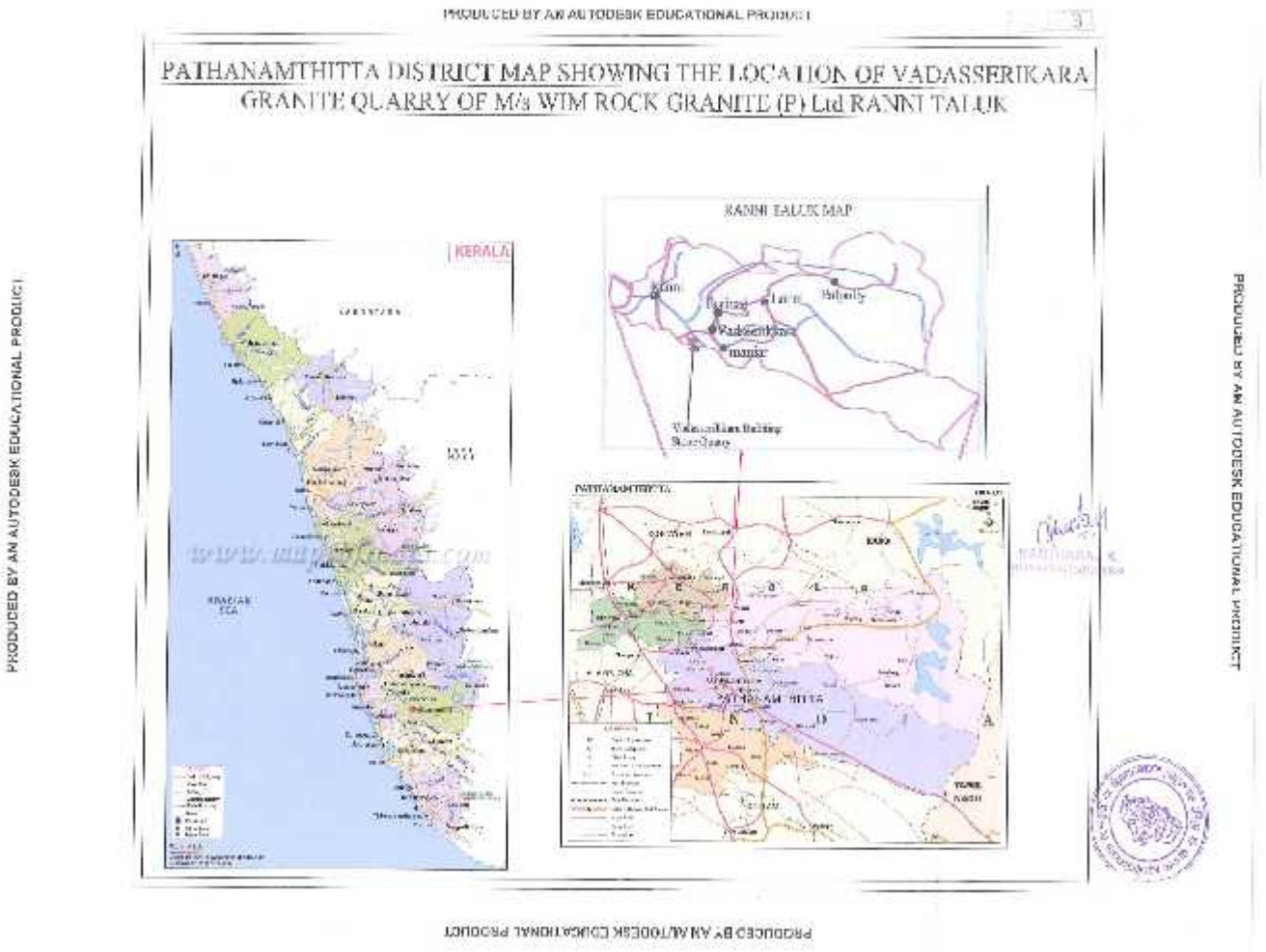

Fig. 2.1: Location of the Project

2.3 Nature and Size of the Project

Size of Operation: The quarry lease area is 3.4080 ha, to operate the Quarry operations permission is already obtained from Kerala Pollution Control Board (KSPCB). It is proposed to carryout building stone/Granite quarry operation with a maximum production of 3 lakhs tonnes/year.

2.3 Nature of the Project

Building stones are naturally occurring rocks of igneous, sedimentary or metamorphic origin which are sufficiently consolidated to enable them to be cut or shaped into blocks or slabs for ruse as walling, paving or roofing materials in the construction of buildings and other structures. Stones suitable for building occur throughout the geological column and have a worldwide distribution. Their exploitation is limited where overburden or structural complexities make their production uneconomic or where national or internationally designated conservation or heritage sites preclude active quarrying.

The principal rock types used as building stone are (including Marbles), sandstone, slates and granites.

Building stone is also commonly referred to as 'Dimension Stone' in many Countries.

2.3.1 Texture, Mineralogy and Colour

Building stones show a very wide textural and mineralogical range dependent on whether they are of igneous. Metamorphic or sedimentary origin. In the building stone trade colour is an extremely important aspect of the resource but is commonly provided in the form of subjective descriptions and does not follow an agreed, standardized colour scheme.

2.3.2 Igneous Building Stone

Igneous rocks are hard and crystalline. They are formed directly by the cooling of hot molten magma of varying composition and under variable conditions of temperature and pressure that consequently produce a very wide spectrum of rock types. They are widely used as building stone but are commonly termed 'granites' by the trade. Scientifically, however, igneous rocks show a range from pale coloured, coarsely crystalline, quartzofeldspathic varieties, that including the true granitic rocks, to dark coloured, finely crystalline basic or basaltic rock types. Building Stone is the major rock type of the area and exposed to the surface. These are highly weathered at the top and hard & compact, fresh below the weathered zone. The rock is gray in color.

The scope of the study involves identification of all the environmental aspects that have a potential impact on the environment, delineating proper environmental measures to minimize the impacts and to check

Building Stone is a stone formed from fire and consists of quartz, feldspar and mica. This stone was once a molten flowing mass much like lava, and as it cooled down it became very dense and hard. Building Stone is the number one choice in natural stone for kitchen, bath, and commercial countertops. Polished granite, with its high gloss, reflects light beautifully, adding elegance to any room or space. The high gloss finish will never wear off.

Building Stones are quarried throughout the world in the form of huge blocks and then reduced into small blocks / slabs / fine pebbles (Jellies) to the required size of the client. These slabs are then carefully dressed by a specialist as per the requirement of client. Building Stone have different patterns or veining. Many stones rarely change in their tight quartz-like appearance, while others have veins that swirl and change irregularly. Small samples cannot give a good overall picture of a high-movement stone, it is wise to see the slab prior to the selection or fabrication. For many, the unique pattern is intriguing and adds to the beauty of the stone.

The top five building stone producing and exporting countries are China, Italy, India, Iran and Spain, together accounting for 74% of world production.

Our country has been progressing very fast requiring inter alia. Natural Stone plays a very important role in improving the economic condition of any country as it plays a crucial role in the construction activities and various building projects. Thus, the project will improve the economic condition of the country to a great extent.

Kerala State is endowed with a number of occurrences/deposits of minerals such as Heavy Mineral Sands (Ilmenite, Rutile, Zircon, Monazite, Sillimanite), Gold, Iron ore, Bauxite, Graphite, China Clay, Fire Clay, Tile and Brick Clay, Silica Sand, Lignite, Limestone, Lime shell, Dimension Stone (Granite), Gemstones, Magnesite, Steatite etc. However, mining activities on large scale are confined mainly to a few minerals - Heavy Mineral Sands, China Clay and to a lesser extent Limestone/Limeshell, Silica Sand and Granite. In fact, Heavy mineral sand and China Clay contribute more than 90% of the total value of mineral production in the State.

An important aspect of recent trend in architecture and construction is the increasing use of a host of crystalline rocks as dimension stones after being cut and polished for enhancing aesthetics and decor of buildings and monuments. In this regard a number of rock types broadly grouped as "Granite" that exist in various parts of Kerala are utilized for this purpose.

The major granite belt of Kerala can be classified by its geologic setting into three categories:

- Charnockite-Khondalite belt of Pattanamthitta, Thiruvananthapuram, Kollam and Kottayam districts (colour ranges from pale green with mottled red, bluish green with cordierite, deep dark green, greyish white).
- True intrusive or anatectic building stone/granites and associated migmatites of Proterozoic age from Idukki, Palakkad, Kannur, Kasargod and Wayanad districts (colour: Pink, light pink, Gray, yellowish white and bluish pink with wavy. patterns).
- Dolerite-Gabbro dykes, Proterozoic intrusive hypabasal dyke swarms from Kottayam, Palakkad, Malappuram and Kozhikode districts (colour: dark greenish blue, black and dark gray with black spots).

2.4 Employment Generation

It is proposed to deploy 25 members from nearby villages on a day-today, taking 25 working days in a month with a total of 250 working days in a year including statutory personnel are employed. The said quarry provides direct employment to about 25 people of (5 nos Highly skilled & 7 nos Skilled) and generates indirect employment Semi skilled 5 nos & Un skilled 8 nos. Most of the directly employed personnel falls in different category the same are mentioned below along with the quantum.

2.5 Cost Estimate

The total Project cost including machineries such as heavy earth moving machineries excavators, dumpers/tippers, drilling machineries, crusher Unit's, Buildings, M sand Plant and compressors, approximate cost towards the same would be about Rs. 1,200 lakhs.

CHAPTER – 3

PROJECT DESCRIPTION

Building Stone Quarry

CHAPTER 3

PROJECT DESCRIPTION

3.1 Location

- Project Proponent : M/s. WIMROCK GRANITE PVT. LTD.,
- Mailing Address : Mr. Raju K. Thomas – Managing Director, Thekkummala, Vadasserikkara (PO), Pathanamthitta District – Kerala State.

- **Proposed Project location:** Sy. No. 702 / 1 (p), 702 / 1 – 412 and 702 / 1 – 413 (new Sy. Nos. are 391 (p), 394 (p) and 395(p)) of Vadasserikkara Village, Ranni Taluk, Pathanamthitta District, Kerala State.
- **Total Extent :** 3.4080 ha
- **Type of land :** Private Patta / Govt. land

3.2 Alternative Sites

No alternative sites are considered as the chosen site founds suitable in all the aspects.

3.3 Process Description

The Quarrying operation is carried out in different stages. A flow chart depicting the operations is shown in **Figure 3.1.**

3.4 Local Geology

Entire area is covered by Granite, where 1 - 2 mts from top it is weathered. At places granite is covered by soil and towards hanging wall side it is occupied by shale & Phyllite. The geological parameters/ features of the ore body as obtained from the field mapping and exploration studies reveal the following.

General strike	:	N -S with local variation of 10^0 - 15^0 on either **s**ide.
Dip	:	70° - 80° dipping westerly.
Length of the ore body	:	300.00 mts.
Width of the ore body	:	100 - 150 mts.
Depth of the ore body	**:**	50.00 mts.

A geological map showing the different litho units is mapped and enclosed as **Plate No. 7,** and the cross section showing the disposition of the different litho units are marked and enclosed as **Plate No. 8.**


Photographs showing Exposure of Charnockite at quarry

Considering the all technical and practical constraints such as lease boundary as safety barrier all along the lease periphery and estimation of reserves has been calculated as on December 2014 and the same will be given in **Table 3.1.**

Table 3.1: Charnockite/Granite reserves of leases combined as on December 2014

Insitu reserves		**Unit : 000' tonnes**
Category	**R O M**	**Waste Rock**
Geological reserves	59,63,000	3,27,000
Mineable reserves	38,74,000	2,12,000
Blocked reserves	20,89,000	1,15,000
Total	**1,19,26,000**	**6,54,000**

Note: Geological Reserves = Mineable Reserves + Blocked Reserves

3.5 Method of Quarrying

Presently the said quarry is put into operation, it is proposed to work with conventional open cast method with bench system and mode of operation will be mechanized. Based on the mode and method so adopted and taking into the consideration of geological parameters of the ore body the quarry pit is designed such that the height of the bench is kept about 5.00 mts max., and the width is also kept 5.00 mts, maintaining 45˚ pit slope.

3.5.1 Extent of Mechanism

The proposed maximum handling is 1,270 tonnes during the plan period. The adequate total handling capacity of loading units will be deployed. For hauling proposed quantities of ore and waste, the requirement is met with a fleet of 10 nos. of tippers of 17 tons capacity each.

List of Quarrying machinery deployed in the quarry along with their capacities, efficiencies and other details are given in **Table 3.2.**

Table 3.2: The details of Equipment / Machinery's

Sr. No	Equipment / Machinery	No. of units	Engine H P	Bucket Capacity
1	Excavator	1	266	1.5 M^3
2	Excavator	2	165	0.9 M^3
3	Excavator / Rock breaker	2	165	0.9 /F 22
4	Tippers	10	220 / 280	17 tonnes
5	Compressor	4	169	600 CFM
6	Jackhammers drills	10	--	--
7.	Crushing unit	2	--	--

3.5.2 Drilling & Blasting

Since the quarry is proposed to work by mechanized and the benches are kept 5.00 mts height (with two sub benches of height 2.5 mts each) and the Charnokite is the material which is hard to medium hard in nature which requires drilling and blasting to exploit the same. On an average 1,270 tonnes of material to be drilled and blast daily.

The broad blasting parameters are determined for the blasting pattern and blast design, which are as follows:

Blast hole will be, preferably by jack hammer where the diameter is normally 33 mm and the depth of the hole is 2.0 – 2.5 mts. Blasting pattern is generally square or rectangle or staggered with burden ranging from 0.75 to 1.00 meters and spacing of 1.00 to 1.20 meters. Usually single / double row of holes is blasted along free face to achieve optimum powder factor, best fragmentation and minimized adverse impacts on account of blasting. Maximum numbers of holes will be blasted at a time in a round are generally limited to 20 to 30 with milli second delay detonators (MSDD) to mitigate adverse impacts such as air blast, throw and the ground vibration and less noise.

Nitrate mixture of slurry explosives are used for blasting with 20 to 25 percent, proportion of primer/ booster cartridges and rest as stemming. About 1 to 1.5 kgs of explosives are loaded

in 33 mm diameter holes. And powder factor approximate 5.0 tons per kgs of explosives is achieved.

A copy of the Explosive license is enclosed as **Annexure No. 9**

3.5.3 Loading

Loading will be done with the help of excavators end loaders in to the tippers/trucks.

3.5.4 Transportation

Subsequent to the drilling and blasting, the materials so dislodged / loosen from the rock mass, the big boulders are subjected to secondary blasting with a help of jack hammer. There after the material is loaded into trucks / tippers of 17.0 tonnes capacity with the help of the excavator. The loaded material is transported to the crushing and screening unit for further process. Further the finished products are transported to client / customer by their vehicles.

Quarry → Drilling → Blasting → Loading → Transportation

Figure 3.1: Flow Chart Showing the Quarry operation

3.6 Top Soil

More or less entire area is exposed by Charnockite, only at places topsoil is visualized which is sparsely distributed. The amount of topsoil occurs with the thickness of just 50 cms to 70 cms. However during the course of quarrying of such area, the topsoil so occurs will be removed separately and stacked. This topsoil will be used exclusively for plantation purpose. The total amount of topsoil is existing within the leasehold is calculated below:

Length	100.00 m
Width	20.00 m
Depth	1.0 m
Bulk density	1.50

100 X 20 X 1.0 X 1.50 = 3,000 tonnes.

The topsoil generated during quarrying activity, it will be removed separately and stacked within the quarry area earmarked for the same and the same be utilized for plantation.

3.7 Site Security and Safety

Since Kerala falls under coastal region, Western Ghats and Malnad belt, this state receive a copious amount of rain fall to an extent of 3,000 – 4,000 mm annually. So safety and precaution of the quarry pit is very much essential.

Before onset of monsoon, drains are cut along toe of the quarry faces to divert the surface run off. Garland drain is provided at the quarry top to regulate monsoon water and direct the same to the settling ponds / quarry pit to contain the quarry wash off and to avoid the same joining to the adjoining surface water bodies / water courses. It also helps to avert eventual collapses and damages to the quarry faces.

The pit will be fenced, such that no habitats can enter the pit. And watch and ward is provided round the clock.

The copies of all safety and management documents will be made available to on site personnel and mandatory training for operations at the Quarry will take place. The Area Coordinator will ensure that operations are consistent with other management plans, terms and conditions of the issued permits, and safety procedures for the Project.

Security signage will be posted at the entrance to the quarry. The remoteness of the quarry and the onsite presence of operations personnel will make perimeter fencing unnecessary. Audible warning systems will be employed for all blasting operations at posted intervals prior to any detonations.

Blasting and processing operations will be suspended if incursions into the quarry occur, or if observations of wildlife in the immediate quarry area are made. On site monitors for animals will provide warnings if approach by any animals is noted.

3.8 Production Details

The production program is to produce of building stones of 25,60,000 tonnes for first five years. Year-wise production details are given in **Table 3.3.**

Table 3.3: Year-wise Production Plan for first five years.

Qty: in tonnes

Year	ROM	Waste
1st Year	3,00,000	16,000
2nd Year	3,00,000	17,000
3rd Year	3,00,000	16,500
4th Year	3,00,000	17,000
5th Year	3,00,000	16,000
Total	**15,00,000**	**82,500**

CHAPTER – 4

SITE ANALYSIS

Building Stone Quarry

CHAPTER 4

SITE ANALYSIS

4.1 Connectivity

The said quarry area is situated in Sy No. 702 / 1 (p), 702 / 1 – 412 and 702 / 1 – 413 (new Sy. Nos. are 391 (p), 394 (p) and 395(p)) of Vadasserikkara Village, Ranni Taluk, Pathanamthitta District, Kerala State. Extends over an area of 3.4080 Ha. The said lease lies towards south of Vadasserikkara village at a distance of 3.00 kms (aerial distance) approximately and also lies towards N of Malayalapuzha village at a distance of 3.00 kms approximately. (Distances are aerial distance). This lease area is approachable by all weather road/s up to the lease. And also it falls under the Survey of India's Toposheet **No 58 / C / 15**. Since the topo maps of Kereala are restricted the same are not available. However said quarry lease falls between the geographical co – ordinates i.e

Latitude	:	N 09^0 18' 55.01"	to	N 9^0 18' 57.72"	and
Longitude	:	E 76^0 50' 23.07"	to	E 76^0 50' 29.99"	

This lease area is approachable by all weather road/s. Public road connecting between Attachakkal – Chengara - Kumbalompoika State highway passes towards west of the quarry area which is at a distance of 1.00 km. Ranni Taluk & Pathanamthitta District Head Quarters at a distance of 10.0 kms approximately where all the infrastructural facilities are available. Thiruvananthapuram is city and state capital which is at a distance of 115.0 kms from the quarry site via Pattanapura, Chengamanad and Venjaramood. The nearest airport is at Thiruvananthapuram which is at a distance of 115.0 kms approximately and the nearest railhead on Broad-gauge is Thiruvalla is at distance of 35.0 kms.

4.2 Land Form, Land Use and Land ownership

The Lease Area does not involve any forest, agriculture or grazing land. The land is Private patta / Govt. land, the land is not viable for agricultural purpose.

4.3 Topography

The said lease occupies the middle part of a hillock trending NW – SE, extending from southeast of Edathra to Northwest of Talchira. The highest elevation is about 250.0 Mts towards middle of the lease area and the lowest elevation is 215.0 mts towards south of the lease. The lease area is generally sloppy from east to west. The slope is moderate to steep. The lease area is more or less broken up and there is no any vegetation within the lease area. The area surrounding the lease is moderate to thick in vegetation. There are no any perennial

water course / water bodies / streams / nallahs within the leasehold area. The storm water passes through the minor water courses and gets confluence with the adjacent nallah.

Geology: **Regional Geology:**

Kerala State, bounded by north latitudes 8º 17' 30" and 12º 47' 40" and east longitudes 74º 51' 57" and 77º 24' 47" covers an area of 38,864 sq km and is located in the southwestern part of the Indian Peninsular shield. This linear strip of land is bounded by the Western Ghats on the east and the Arabian Sea on the west.

4.4 Infrastructure

Since the scale of operation is very small and total employment is only 25 employs hence infrastructure are not required minimums infrastructure like rest shatter, toilet are provided at site.

4.5 Environmental Baseline Data Description

4.5.1 Climate Conditions

With around 120 - 140 rainy days per year. Kerala has a wet and maritime tropical climate influenced by the seasonal heavy rains of the **southwest summer monsoon and northeast winter monsoon.** Around 65% of the rainfall occurs from June to August corresponding to the southwest monsoon, and the rest from September to December corresponding to northeast monsoon.

Southwest Monsoon: the moisture-laden winds, on reaching the southernmost point of the Indian Peninsula, because of its topography, become divided into two parts: the "Arabian Sea Branch" and the "Bay of Bengal Branch". The "Arabian Sea Branch" of the Southwest Monsoon first hits the Western Ghats in Kerala, thus making the area the first state in India to receive rain from the Southwest Monsoon.

Northeast Monsoon: The distribution of pressure patterns is reversed during this season and the cold winds from North India pick up moisture from the Bay of Bengal and precipitate it in the east coast of peninsular India. In Kerala, the influence of the northeast monsoon is seen in southern districts only. Kerala's rainfall averages 2,923 mm (115 in) annually. Some of Kerala's drier lowland regions average only 1,250 mm (49 in); the mountains of eastern Idukki district receive more than 5,000 mm (197 in) of or graphic precipitation: the highest in the state. In eastern Kerala, a drier tropical wet and dry climate prevails. During summer, the state is prone to gale force winds, storm surges, cyclone-related torrential downpours, occasional droughts, and rises in sea level. The mean daily temperatures range from 19.8 °C to 36.7 °C. Mean annual temperatures range from 25.0–27.5 °C in the coastal

lowlands to 20.0–22.5 °C in the eastern highlands. The detail of Climate Data in Kerala is given in **Table 4.1.**

Table 4.1: Climate Data in Kerala

Month	Average high °C (°F)	Average low °C (°F)	Rainfall mm (inches)
January	28.0 (82.4)	22 (72)	8.7 (0.343)
February	30 (86)	23 (73)	14.7 (0.579)
March	31 (88)	24 (75)	30.4 (1.197)
April	32 (90)	25 (77)	109.5 (4.311)
May	34 (93)	25 (77)	239.8 (9.441)
June	34 (93)	24 (75)	649.8 (25.583)
July	30 (86)	23 (73)	726.1 (28.587)
August	29 (84)	23 (73)	419.5 (16.516)
September	29 (84)	23 (73)	244.2 (9.614)
October	30 (86)	23 (73)	292.3 (11.508)
November	30 (86)	23 (73)	150.9 (5.941)
December	31 (88)	22 (72)	37.5 (1.476)
Year	**34 (93)**	**22 (72)**	**2,923.4 (115.096)**

4.5.2 Air Environment

Proposed project is located in an area where farm based activities constitute the major portion of the economic activities of region. Thus, the identified location is significantly far away from the industrialized belt and thus perils of industrialization. Comparative distance of the selected location from other areas that were identified as severely/ critically polluted are given graphically in Fig below.

Existing Ambient Air Quality scenario in the study region has been assessed through a network of 2 Ambient Air Quality locations in the Buffer Zone and 2 monitoring locations in Core Zone within the Quarry Area. Design of monitoring network of the air quality surveillance program was based on the following considerations.

- Topography / Terrain of the study area
- Human Settlements
- Wind Pattern
- Health Status
- Representation of Regional Background Levels

- ➔ Accessibility of Monitoring Site
- ➔ Resource Availability

Pre-calibrated Respirable Dust Samplers (RSD) has been used for monitoring the existing AAQ status. Maximum, Minimum, Average and Percentile values have been computed from the raw data collected at all individual sampling stations to represent the Ambient Air Quality Status. Significant parameters *viz*., Particulate Matter (size less than 10µm and less than 2.5µm - $PM_{2.5}$), Sulphur Dioxide (SO_2) and Nitrogen Dioxide (NO_2) were monitored in the Core and Buffer Zones. The data thus obtained is considered for preparing this report. Ambient Air Quality locations are given in **Table 4.2 and Fig 4.1.**

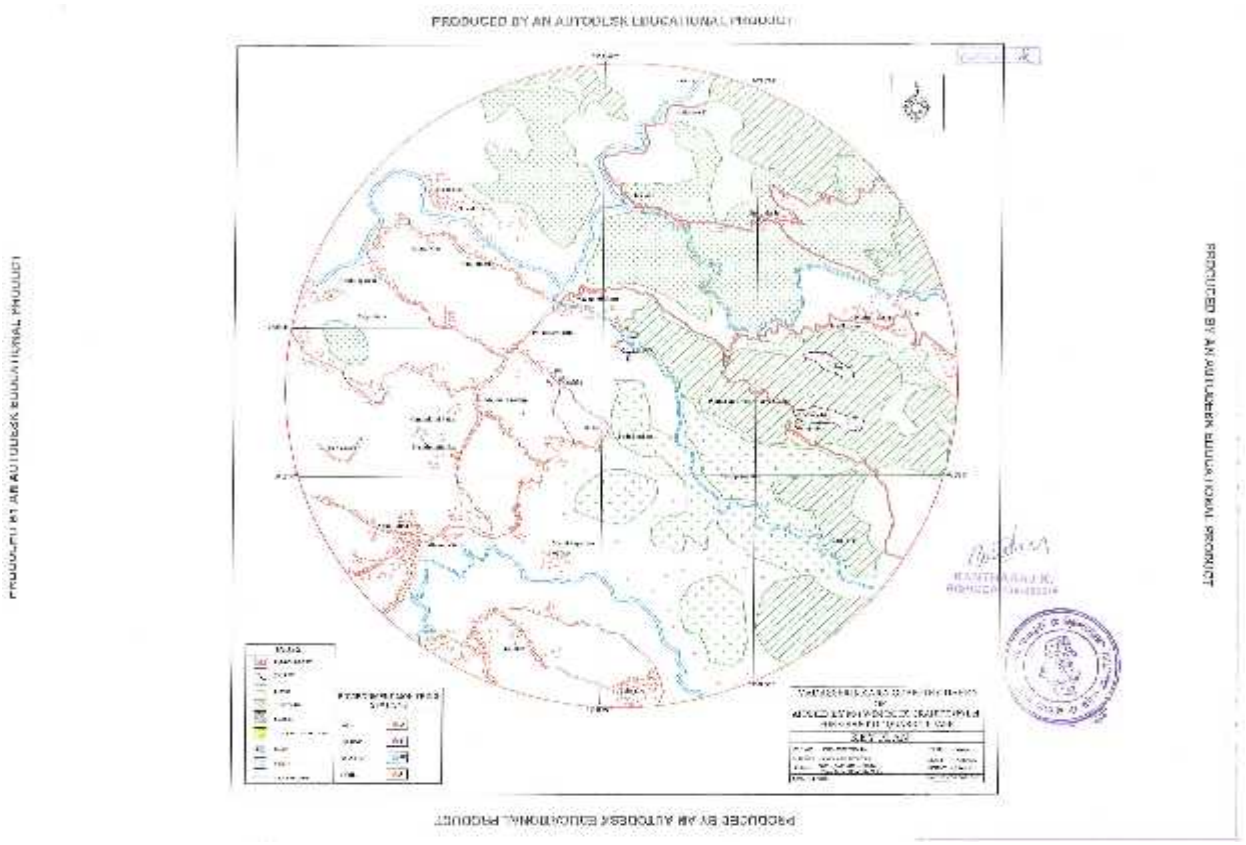

Fig 4.1: Locations Showing Air Monitoring Station

Table 4.2: Ambient Air Quality Locations with Distance

Code	Name of Sampling Location	Distance in Km.	Direction
Core Zone			
A-1	Quarry / Working area	-	-
A-2	Crushing & Screening area	-	-
Buffer Zone			
A-3	Talchira village	3	SE
A-4	Vasasserikkara village	3	NW

The sampling stations were located both in core zone and buffer zone. The RSD sampler was placed at a height of 1.5 m above the ground level.

4.5.2.1 Analysis of Baseline Concentrations

The Ambient Air Quality levels in the study area are summarized below in **Table 4.3**.

Table 4.3: Summary of Ambient Air Quality Data (Units: µg / m^3)

Code	Name of Sampling Location		PM_{10}	$PM_{2.5}$	SO_2	NO_X
Core Zone						
A-1	Quarry / Working area	01/09/2014	42	16.8	16.9	20.6
		02/09/2014	41	16.6	15.7	20.5
		03/09/2014	45	14.0	16.3	19.5
		04/09/2014	48	19.4	18.4	22.0
A-2	Crushing / Screening area	01/09/2014	44	17.6	14.5	19.1
		02/09/2014	46	18.4	17.2	22.8
		03/09/2014	44	17.6	17.6	21.8
		04/09/2014	46	18.4	17.9	21.7
Buffer Zone						
A-3	Talchira village	01/09/2014	47	18.9	13.6	19.1
		02/09/2014	41	16.3	14.0	21.5
		03/09/2014	40	16.0	14.7	18.3
		04/09/2014	42	16.7	15.7	20.1
A-4	Vasasserikkara village	01/09/2014	45	18.1	14.7	17.8
		02/09/2014	43	17.3	16.2	19.7
		03/09/2014	44	17.5	12.7	23.0
		04/09/2014	46	18.4	13.9	20.7

The ambient air quality observed during the study period is well within the prescribed National Ambient Air Quality Standards (CPCB) prescribed by CPCB. Ambient Air Quality Analysis reports are given[1].

In the ***Quarry / Working Area,*** the PM_{10} concentration is well below the prescribed limit with the values 40-48 µg/m^3 during the monitoring period and $PM_{2.5}$ Concentration is 14.0-19.4 µg/m^3. The SO_2 concentration is 15.7-18.4 µg/m^3 and NOx concentration is 19.5-22.0 µg/m^3.

In the ***Crushing / Screening Area,*** the PM_{10} concentration is well below the prescribed limit with the values 44-46 µg/m^3 during the monitoring period and $PM_{2.5}$ Concentration is 17.6-18.4 µg/m^3. The SO_2 concentration is 14.5-17.9 µg/m^3 and NOx concentration is 19.1-22.8 µg/m^3.

In the ***Talchira village***, the PM_{10} concentration is well below the prescribed limit with the values 40-47 µg/m^3 during the monitoring period and $PM_{2.5}$ Concentration is 16.0-18.9 µg/m^3. The SO_2 concentration is 13.6-15.7 µg/m^3 and NOx concentration is 18.3-21.5 µg/m^3.

In the ***Vasasserikkara village,*** the PM_{10} concentration is well below the prescribed limit with the values 43-46 µg/m^3 during the monitoring period and $PM_{2.5}$ Concentration is 17.3-18.4 µg/m^3. The SO_2 concentration is 12.7-16.2 µg/m^3 and NOx concentration is 17.8-23.0 µg/m^3.

4.5.3 Noise Environment

The exposure to aggregate by mechanical stripping of soil and rock, extraction by digging, transportation of materials around the site and processing are likely sources of noise.

This Noise generated from quarry activity and vibrations can seriously affect people in noise sensitive locations and interfere with their ability to relax, sleep, or communicate, causing stress and annoyance, however when the survey was carried out at the project site and surrounding areas, the nearest human settlements found was in Vadasserikkara Village which is about of 3 Kms distance.

The base line ambient noise quality at the project site and the surrounding areas where monitored which was recorded In daytime, the noise level was measured at 4 locations, including Quarry area and crusher unit area at the project site for a 5 min duration which is detailed in **Approved Quarry plan as Annexures** of the Report and all the Parameters are found to be in the respective standards with regard to CPCB Standards.

Specific methodology of drilling & blasting details including technical details is enclosed in **Approved Quarry Plan.**

The data thus obtained is considered for preparing this report. Ambient Noise Quality locations are given in **Table 4.4 and Fig 4.2.**

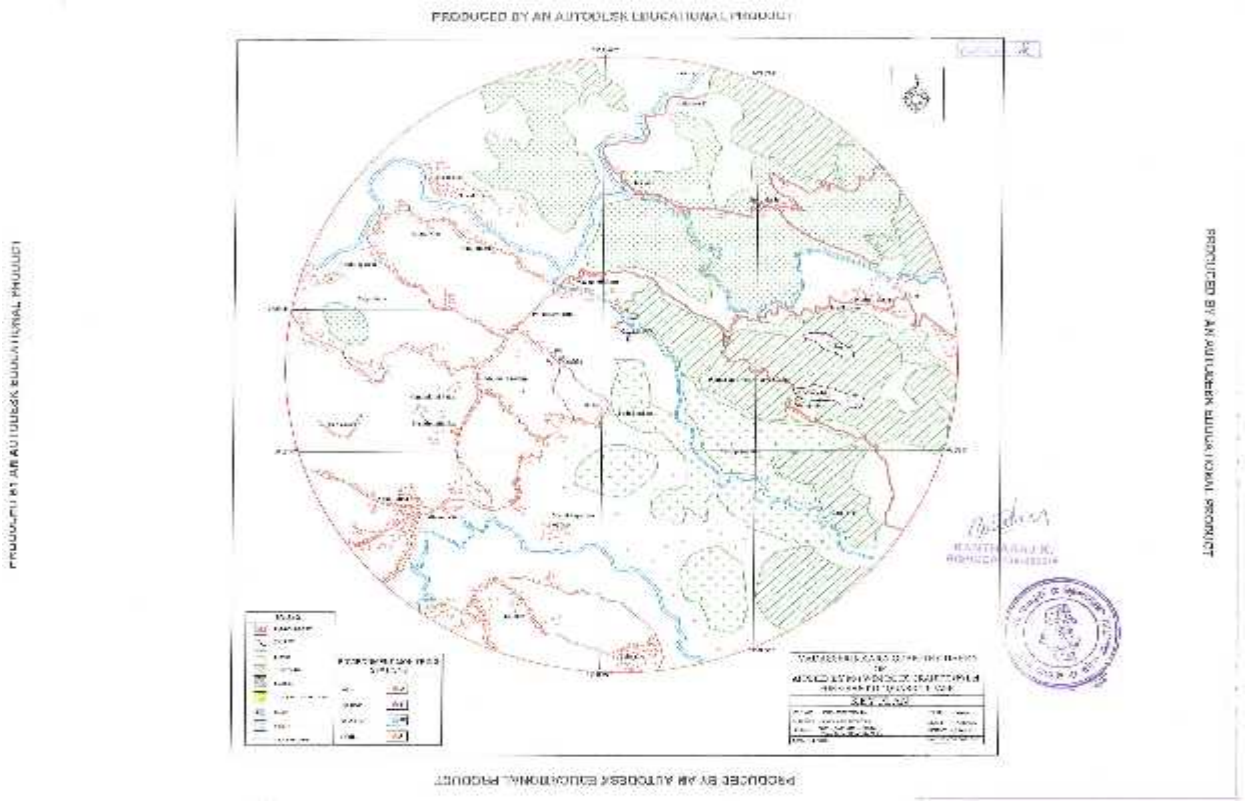

Fig 4.2: Locations Showing Noise Monitoring Stations

Table 4.4: Noise monitoring Locations with Distance

Code	Name of Sampling Location	Distance in Km.	Direction
Core Zone			
N-1	Project site Quarry area	-	-
N-2	Project site Crusher area	-	-
Buffer Zone			
N-3	Talchira village	3	SE
N-4	Vasasserikkara village	3	NW

High background noise levels were reported to have negative influence on the human beings. To estimate background noise level, the Standards are given in **Table 4.5.**

Table 4.5: Exposure Limit for Different Noise Levels

Sr. No.	Location	Noise Level [Leq in dB (A)]	
		Day	Night
1.	Industrial Area	75	70
2.	Commercial Area	65	55
3.	Residential Area	55	45
4.	Silence Zone	50	40

In addition to this, there are another set of exposure limits laid down by Occupational Safety and Health Administration in USA and IS: 3483. These are given in below in **Table 4.6.**

Table 4.6: Ambient Noise Standards

Maximum Duration (hrs/day)	Sound Level dB(A)	
	OSHA	IS : 3483
8	90	85
6	92	-
4	95	88
2	100	91

(OSHA – Occupational Safety and Health Administration, USA)

The noise levels measured at 5 locations and the results obtained are given below in **Table 4.7**.

Table 4.7: Measured Noise Values

Code	Name of Sampling Location	Date	Min.	Max.
Core Zone				
N-1	Project site Quarry area	03/09/2014	64.3	69.1
N-2	Project site Crusher area	03/09/2014	63.7	69.8
Buffer Zone				
N-3	Talchira village	03/09/2014	47.3	52.3
N-4	Vasasserikkara village	03/09/2014	46.1	53.4

It is observed that the values obtained were within the prescribed Ambient Air Quality Standards with respect to Noise. Measured noise levels are given in **Approved Quarry Plan as Annexures**.

4.5.4 Water & Hydrology Environment

There are no perennial water courses / bodies within the leasehold area. Apart from this the water source in this area is mainly storm and ground water. Entire storm water flows through the minor watercourses and joins the adjoining seasonal nallah. The drainage pattern in this area is dendritic in nature.

The main source of water to the Vadasserikkara village is from groundwater (open wells) and rain water sources. The area receives abundant rainfall for about 2,000 mm - 3,000 mm annually. The general ground water table in this area is 15 mts below the general ground level during summer 12 – 15 mts and 8 – 10 mts during monsoon. The lease area is situated on the

hillock where the the maximum level of working is about 250 mts and the lowest is 190 mts so totally the depth of working is 60 mts.

There are no nallahs / water bodies at the quarry site, however there are few Nallahs exists near the project site, where the entire storm water flows and joins adjoining seasonal Nallahs. There are very few bore wells located near the project site and most of the ground water source is the Open wells, which are mainly used for drinking and agriculture purposes, however the water samples from Open well at the project site and nearby villages was collected and analyzed and also Nallah water from the nearby villages were also analyzed for physical, chemical and biological parameters.

The data thus obtained is considered for preparing this report. Water Quality locations are given in **Table 4.8 and Fig 4.3.**

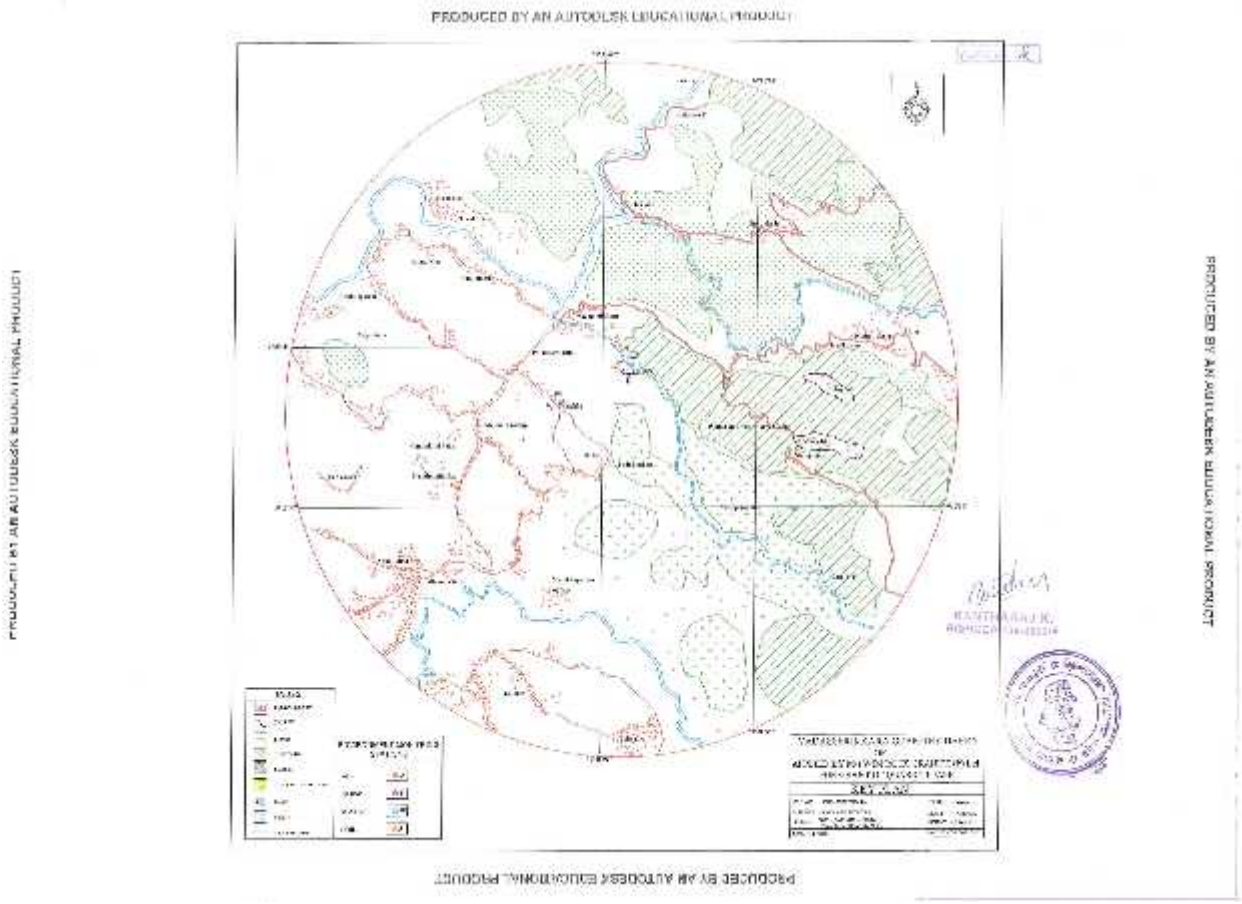

Fig 4.8: Locations Showing Water Monitoring Stations

4.5.4.1 Ground Water

One Bore well has been selected to test the characteristics at Project site, Three Surface (well & River) water at Vasasserikkara, Edattara & Pampa river

Table 4.8: Ground Water Sampling Locations with Distance

Code	Name of Sampling Location	Distance in Km.	Direction
Core Zone			
GW - 1	Project site	-	-
Buffer Zone			
SW - 2	Vasasserikkara village	3	NW
SW - 2	Edattara village	3	SW
SW - 3	Pampa river	4	NW

4.5.4.2 Analysis of Ground Water Sample

Three well has been selected to test the characteristics. One at Project site, and three in buffer zone for the analysis of physical, chemical and biological parameters. The sample was collected and was analyzed using standard techniques and procedure, a detailed Analysis report is provided in **Approved Quarry Plan as Annexures**.

The analysis results of ground water are well within the guidelines CPCB Standards. The analysis of parameters like pH, iron, chloride, Sulphate, nitrate Nitrogen, and other parameters, the Nallah water near the project site is found to be magnesium content more and the rest location sites were found below prescribed limits. The water is free from coli-form organisms & E. Coli Bacteria.

Table 4.9: Summary of Ground Water Data

Name of the Locations	TDS	Iron	$CaCO_3$	Cl	NO_3	F
Borewell at Project site	210	0.31	82	138	18.2	0.2
Surface (Well water)Vasasserikkara village	340	0.21	98	137.2	19.6	0.25
Surface (Well water) Edattara village	210	0.1	107	162.4	19.6	0.2
Surface water Pampa river	370	0.37	137	221	21.5	0.08

4.5.5 Biodiversity Study

Biodiversity represents the variety and abundance of life expressed at the genetic, population, species and ecosystem levels, both cultivated and natural, terrestrial and marine. Biodiversity provides the goods and services essential for the survival of human beings and other species on the earth. Thus biodiversity may be roughly defined as the total number of species in a particular area. Conservation of biodiversity is therefore important to ensure sustainable

human development. A bacterium, the domestic cow, rice, the resplendent tiger are all part of biodiversity. Biodiversity knows no limits, and *no distinction between wild and domesticated, microbial and terrestrial. In short biodiversity is the diversity among all living forms in this universe*

Biological resources, including the diversity of living organisms provide critical ecosystem services of creation, maintenance and destruction. These three are comparable to that of shrishti, stithi and laya. Out of about two million species that are known, nearly half are insects and other invertebrates, and these are, as E.O. Wilson has said, "the little things that run the world" by breaking down plant and animal matter and making it available as nutrients. Interactions between the living and the non-living parts of the environment are critical to soil formation, water recycling and climate control.

The conservation of biodiversity is based on a variety of perspectives: scientific, philosophical, economic, ethical, and aesthetic. Scientists contend that much remains to be learned about species and ecosystems around the world, and that a loss of this diversity would foreclose that opportunity. Whether a species is economically important or not every species has its own intrinsic value and hence every attempt should be made to conserve biological diversity and integrity of ecosystems.

Western Ghats - one of the Biodiversity hotspot of World

About 18 'Hot Spots' (of tropical forests) are identified around the world. Among them two are in India - one in the Western Ghats and the other in the eastern Himalayan region. These two 'Hot Spots' together have about 5330 endemic species including flowering plants, mammals, reptiles, amphibians and butterflies. The biodiversity of Western Ghats has been well known for millennia. It is considered to be the centre of origin of important commercial spices like pepper, cardamom and ginger (Nair, 1997). India's forests and their biodiversity were the significant source of income for the colonialists since 1750. Forests resources had been severely exploited. Teak and Rosewood were extracted in large scale for shipbuilding. Biodiversity of the colonies and western technology made the western countries the leading economic powers of the world. The present-day developed countries do not possess such diverse life forms.

Geography

Pathanamthitta is a landlocked district, located at 9°16′N 76°47′E, spanning over an area of 2,637 square kilometres (1,018.15 sq mi). The district is bordered by the districts Kottayam and Idukki in the north, Alappuzha in the west, Kollam in the south. To the east it has border with the Tamil Nadu state. The district can be divided into three natural geographical regions:

the highland, the midland and the lowland. The highland stretches through the Western Ghats, where the hills are tall and covered with thick forests. Western Ghats maintains an average altitude of around 800 m. It descends to the smaller hills of midland in the centre and finally to the lowland. The lowland with its abundance of coconut trees, lies along the western borders of Alappuzha district.

Forest

	Pathanamthitta Area in (sq km)
Forest area	1533.7937
Ecologically fragile land	Nil
Forest covers – very dense	144
Forest covers – moderate dense	1147
Open forest	467

This is approximately 50% of the total district area. The forest area can broadly be classified as evergreen, semi-evergreen and moist deciduous. The forest is the main source of raw materials for wood based industrial units. Timber is the most important produce.

Three important rivers flow through the district. These rivers originate from various mountains of the Western Ghats mountain range. The Pamba (176 km/109 mi) which is the third longest river in kerala, has its origin in Pulachimala. The Achankovil river (128 km/80 mi) originates from Pasukida Mettu, and Manimala river (90 km/56 mi) originates from the Thattamalai hills. A small portion of Kallada river also falls in the southern border of the district. Pamba and Achankovil rivers together drain more than 70% of the total area of Pathanamthitta.

Flora : More or less entire Part of the lease area is occupied by pit but for a small patch with open scrub forest, which is sparse vegetation. Therefore, flora in and around the area are as good as non-existent, but for scattered growth of jungle trees and wild bushes.

Fauna: Fauna found in this area are common varieties of rabbits, porcupine and snakes. There are no endangered or rare species in the area.

Water Bodies - Streams, Water tank, Lentic water body
Flora - Types of Vegetation (Big Trees, Shrubs, Ground cover)
Fauna - Birds, Mammals, Insects, Amphibians, Dragonflies, Leeches, Reptiles

The Detailed Bio-diversity study of Study Area has been enclosed as Annexure No. 1

4.5.6 Socio-Economic

The major occupation of the Kerala state is the cultivation, Household activity, Livestock, Forestry, Fishing, Mining, Quarrying activities. The quarrying activity will benefit local villages in both directly and in-directly .Direct beneficiary will be those who get employed in Quarry as skilled and unskilled workers. The indirect beneficiaries are those who are open for small business, comparatively in long run backward inhabitants will send their children to school.

Human settlement exists around the Quarry area. In all, there are 21 villages situated within the buffer zone of 5.0 kms radius. The nearest human settlement is Talchira village, Edathara village and Kumplampoik village at a distance of 1.00, 1.00 & 2.00 kms respectively from the quarry.

An official Census 2011 detail of Pathanamthittadistrict of Kerala has been released by Directorate of Census Operations in Kerala. Enumeration of key persons was also done by census officials in PathanamthittaDistrict of Kerala.

According to the 2011 census Pathanamthitta district has a population of 1,197,412. The district has a population density of 452 inhabitants per square kilometre. Its population growth rate over the decade 2001-2011 was - 3.12 %. Pathanamthitta has a sex ratio of 1,129 females for every 1000 males, and a literacy rate of 96.93%.

In 2011, Pathanamthittahad population of 1,197,412 of which male and female were 561,716 and 635,696 respectively. There was change of -2.97 percent in the population compared to population as per 2001.

Average literacy rate of Pathanamthitta in 2011 were 96.55 compared to 94.84 of 2001. If things are looked out at gender wise, male and female literacy were 97.36 and 95.83 respectively. For 2001 census, same figures stood at 96.41 and 93.43 in Pathanamthitta District. Total literate in Pathanamthitta District were 1,062,553 of which male and female were 499,181 and 563,372 respectively. In 2001, Pathanamthitta District had 1,049,876 in its district.

Description	**2011**	**2001**
Actual Population	1,197,412	1,234,016
Male	561,716	589,398
Female	635,696	644,618
Population Growth	-2.97%	3.84%
Area Sq. Km	2,652	2,652
Density/km2	452	468
Proportion to Kerala Population	3.58%	3.88%
Sex Ratio (Per 1000)	1132	1094
Child Sex Ratio (0-6 Age)	976	967
Average Literacy	96.55	94.84
Male Literacy	97.36	96.41
Female Literacy	95.83	93.43
Total Child Population (0-6 Age)	96,837	127,024
Male Population (0-6 Age)	49,002	64,568
Female Population (0-6 Age)	47,835	62,456
Literates	1,062,553	1,049,876
Male Literates	499,181	505,976
Female Literates	563,372	543,900
Child Proportion (0-6 Age)	8.09%	10.29%
Boys Proportion (0-6 Age)	8.72%	10.95%
Girls Proportion (0-6 Age)	7.52%	9.69%

Source: http://www.census2011.co.in/census/district/282-pathanamthitta.html

CHAPTER – 5

PLANNING BRIEF

Building Stone Quarry

CHAPTER 5

PLANNING BRIEF

5.1 Land Use Planning

The total lease area of the quarry extends over an area of 3.4080 Ha, due to Quarrying activities there will be change in the ground profile in the form of pits, roads, dumps and etc. The detail of the land use as at present, during the ensuing Plan period /conceptual period is shown below in tabular form: **Table 5.1.**

Table 5.1: Details of Proposed Land Use

Unit in Ha.

Description	As on date	Plan period	Concp. period
Area under Quarrying	1.500	2.498	2.498
Infrastructure / Crushing plant	0.160	0.160	0.160
Roads (part of quarry)	-	-	-
Green belt	--	0.750	0.750
Area for future use / undisturbed	1.748	-	--
Total	**3.408**	**3.408**	**3.408**

As a part of mine closure plan, this quarry will be used for various activities such as water pond, back filling and etc., the details of the land use of post mine closure is given in **Table 5.2.**

Table 5.2: Details of Post mining Land Use

Sl. No.	Type of activities	Extent in Ha.	Post mining land use of degraded land	Extent in Ha.
1.	Area under Quarrying	2.498	1. Part of the quarry pit area will be converted as water pond. 2.Balance of the quarry area retained as pit	0.260 2.238
2.	Infrastructure	0.160	Retained for future use	0.160
3.	Green belt / plantation	0.750	Retained as green belt	0.750
	Total	**3.408**	**Total**	**3.408**

5.2 Assessment of Infrastructure Demand

The facilities required are very minimal, except rest shelter and first aid facilities.

5.3 Amenities / Facilities

The facilities required are very minimal, except rest shelter and first aid facilities.

CHAPTER – 6

INFRASTRUCTURE

Building Stone Quarry

CHAPTER 6

INFRASTRUCTURE

6.1 Industrial Area (Processing Area)

The total lease area is 3.4080 ha and the permit it has been sanctioned by Department of Mines & Geology.

6.2 Green Belt

The 7.5 mtr safety zone will be planted with suitable local spices and part of the pit will act as water pond which acts as a tool for ground water recharge.

6.3 Connectivity

The said lease lies towards south of Vadasserikkara village at a distance of 3.00 kms (aerial distance) approximately and also lies towards N of Malayalapuzha village at a distance of 3.00 kms approximately. (Distances are aerial distance). This lease area is approachable by all weather road/s up to the lease. Public road connecting between Attachakkal – Chengara - Kumbalompoika State highway passes towards west of the quarry area which is at a distance of 1.00 km.

Pattanamthitta is the district head quarter which is at a distance of 10.0 kms approximately where all the infrastructural facilities are available. Thiruvananthapuram is city and state capital which is at a distance of 115.0 kms from the quarry site via Pattanapura, Chengamanad and Venjaramood. The nearest airport is Thiruvananthapuram which is at a distance of 115.0 kms approximately and the nearest railhead on Broad-gauge is Thiruvalla is at distance of 35.0 kms.

6.4 Water Management

Generally, there are two monsoons in Kerala, the onset monsoon is known as Southwest Monsoon which commence form June and ends in September. The second monsoon is known as Northeast Monsoon and also known as Reverse monsoon which commence from October and ends in November. The average rainfall for the last ten years is around 3,000 mm annually. The storm water flows through the minor water courses and get collected to the larger courses. The main source of water to the Vadasserikkara village is from groundwater (open wells) and rain water sources. The area receives abundant rainfall for about 2,000 mm - 3,000 mm annually. The general ground water table in this area is 15 mts below the general ground level during summer and around 10 mts during monsoon. The lease area is situated on the hillock where the the maximum level of working is about 250 mts and the lowest is 150

mts so totally the depth of working is 60 mts, the quarry operation will not touch the ground water. Hence there is no any impact on ground water.

Drinking water facility is being provided at site and also canteen facility is also provided for the benefit of the employees.

There will not be any effect on ground water table since the operation is much above the ground water table. Also there will not be any wastewater generation from the activities.

6.5 Sewerage System

There will not be any wastewater generation from the operation. Domestic waste water will be treated through CPCB approved soak pit and septic tank.

6.6 Solid Waste Management

Waste rock generated incidental to quarrying is being dumped inside the quarry lease and suitable retention wall /rubber wall will be provided so that there will not be any land pollution to the surrounding environment during rainy season.

6.7 Power Requirement & Supply / Source

As the quarrying operations are considered, no power is required because quarrying operation is carried with the help of earth moving machineries which runs by HSD. However for the administrative work, work shop, crusher unit and labors hostel the power is required. To meet this power supply is taken from the local electricity department. Diesel Generator is kept as a standby.

6.8 Environmental Considerations

6.8.1 Air pollution control

The pollution released from the quarrying activity will be from the machineries (Heavy Earth Movers, compressor, etc) and ferrying vehicles. For the purpose of the quarry activity and to maintain a quality environment selection of good condition machineries/vehicles shall be undertaken and servicing shall be undertaken regularly so as to limit vehicular emission within the standard prescribed by CPCB/KSPCB.

The Dust is also another component of air pollution which is released from the stone quarry. The drilling activity generates comparatively more dust than other activity such as breaking and loading. Another common source of dust dispersal is from the haulage road. The movement of vehicles (dumper & tripper) to ferry the rock fragments is one of the source of dust. The improvement of haulage road is the main remedy to suppress dust during

transportation. Also water sprinklers shall be utilized to check the dusty road in the operation area.

The effective plantation will be undertaken around the QL area with an average of 1,200 trees/year. The objective is not only greener, but for creating barrier to dust dispersal from the area. The year-wise Plantation is given in **Table 6.1.**

Table 6.1: Details of year-wise plantation

Year	Area of plantation (ha)	No of plants	Type of species
2014 - 15	0.750	300	Rubber, Bougainvillea, Coconut, Red palm, Mahogany etc however local forest advice will be taken while selecting the species for plantation.
2015 - 16		300	
2016 - 17		300	
2017 - 18		300	
2018- 19		300	
Total	**0.750**	**1,500**	

6.8.2 Water Pollution Control

In this quarrying activity there is no utilization of water for the process. The requirement is for drinking and domestic purposes and that shall be collected from nearby tanker/tube well. Other requirement is for plantation work undertaken and dust suppression.

A toilets shall be constructed which is of temporary structure. The domestic effluent will be treated in the CPCB Approved Soak Pit and Septic Tank.

6.8.3 Noise Pollution Control

The Noise is the environment attribute associated with the drilling activity. To attenuate noise various measures shall be taken up from the source point. The activity such as drilling shall be updated to latest technology which involves wet drilling technology.

The noise from vehicular movement can be reduced by leveling road for a smoother drive. In above plantation and formation of green belt all around the quarry mine also attenuate noise.

6.8.4 Waste Material Management

The waste rock is mainly is the rock generated due to quarry loss during the course of quarry operation which will amounts to 5% of the total production. The waste so generated is non-

toxic in nature. The site chosen for disposal of waste rock lies outside the quarry area and the area belongs to proponent. This area is pre determined for its barrenness.

About 18,000 tones of over burden will be generated as solid waste for first five years of the quarry. This waste is mainly weathered rock, intercalated waste and the waste generated due to incidental to the quarrying activities.

Yearly generation of waste rock for the scheme period is given **Table 6.2.**

Table 6.2: year-wise generation of waste rocks

Qty: tonnes

Year	Waste
1st Year	16,000
2nd Year	17,000
3rd Year	16,500
4th Year	17,000
5th Year	16,000
Total	**82,500**

The Hazardous waste such as used / spent oil will be disposed off to authorized recyclers. The details of hazardous waste are given **Table 6.3.**

Table 6.3: Hazardous Waste Management

Plant	Waste	Quantity	Utililization plan
Generator/ Tippers/ excavators & compressors	Used oil / Lubricants	1,200 liters per year	Shall be sold to the approved/authorized recycler/reprocessors.

6.8.4.1 Mitigative Measures

A wheel loader will be provided to level waste material unloaded by tipper Trucks and spread laterally in area earmarked. Continuous movements of tipper trucks while unloading consolidate the ground. Water is regularly sprinkled in rounds over the dumps to control the blowing dust.

While building up, dumps are properly graded and terraced with provision of contour drainage. It is ensured that the angle of repose of dump will be maintained 25 degree. Dump

slopes are suitably protected from any environmental damages, providing such as rubble walls, trenches, and etc.

All along the toe of the dump garland drains will be formed to arrest the wash off during the monsoon. Adjacent to the garland drain retention wall will also be constructed all along the periphery of the dump to arrest the runoff of the dump effectively. During the post mine closure, entire dump material will be reclaimed and backfilled in the quarry pit. The details of solid waste management are given in **Table 6.4.**

Table 6.4: Details of solid Waste Management

Production	Waste	Quantity	Utilization Plan
Building Stone	Over Burden	82,500 tones / five years	Garland drain and retention wall will be constructed all along the periphery of the dump to arrest the runoff of the dump effectively.
	Domestic Waste	-	The sludge generated from the septic tank on a periodical basis will be dried and will be used as manure for plantation.

6.8.5 Occupational health and Safety

Since the activity of the project involves drilling, rock breaking, loading and transportation, the primary safety for the workers is the main concern of the project. Generally Personal Protective Equipments (PPE) shall be provided to all individuals inside the Quarry Lease Area. The worker which are more concerned with the activity of drilling work, additional protective equipments shall be provided such as Thick Gloves, Goggles, ear plugs, thick boot wears, etc.

The secondary safety of workers health shall also be given the same importance. Secondary health threat arises from disease causing vectors and untidy housekeeping. The workers' health can also be at risk from communicable diseases which may be seasonal or pandemic. Sanitation of the mine area, provision of standard drinking water, clean system of toilet, etc are the first steps to protect spreading of communicable diseases. Other condition such as unhygienic disposal of waste, unscientific disposal of human waste, logging of water specially in quarry pits, etc. are the secondary criteria which spread sporadic and deadly diseases in the mines. Such quarry pits are the source of Dengue fever, Chicken-gunia, Malaria, etc. Avoiding water logging, regular spraying of insecticide, etc are the measure that can be undertaken for effective protection from the life threatening diseases.

Also workers exposed in high dust area are at the risk of lungs disease such as Asthma, Bronchitis, and Silicosis. Thus for high dust area worker shall wear mask. In addition first aid box shall be stored in one of the temporary shed inside the QL area. Also regular health check up from professional medical practitioners (once in a month) shall be arranged.

The detailed measures taken as per the requirement for occupational Health and Safety along with the explanation is given below in **Table-6.5**.

Table – 6.5: Requirement for Occupational Health and Safety

Sr. No	Requirement	Explanation	
1.	What principal environmental and occupational risks are likely to be created.	**Instant**	**Long term**
		Accident during plant operation Accident during transportation of material & finished goods.	Hearing loss due to continuous exposure to noise generating equipment, and or location.
2.	Rank the risks to public health in order of severity.	Negligible.	
3.	How will risks be assessed.	Design of hazard risk assessment matrices for ranking occupational health risks in mineral processing industries.	
4.	Measures to communicate these risks to people and steps for prevention & control of the anticipated risk.	All the risks and steps for prevention & control will be communicated during induction training. Periodical refresher training will be conducted to all the workers to educate the workers at the time of accidents and also to overcome risk hazardous. Providing display boards at the approach road and other critical locations in local language and in English.	
5.	How would the health impact assessment undertaken, if needed.	The health status will be obtained by carrying out reconnaissance survey of both the employees and the nearby villagers on regular basis and if necessary free annual health camp will be organized to help the villagers and the	

		workers as social obligation.
6.	Does project provide a hiring a person with established credentials to be able to undertake such activities.	In house facilities with specialized person in occupation health with established credentials will be hired.
7.	Name specialized agency to undertake an environmental health study, if needed.	In house facility will be provided.
8.	Budget for environmental and occupational health activities.	Designated amount has been earmarked for taking up environmental & occupational health activities.
9.	Breakup of the budget for every activity proposed to be undertaken.	Provided in EMP
10.	List of hazardous operations / activities that are likely.	In the Chemical Analysis, Laboratory, DG Operation Etc.
11.	How long are they expected to be employed.	During the Mining operation period.
12.	Would a safety committee be constituted.	Yes
13.	Who will be the members of safety committee.	1. Mines Manager. 2. Safety Officer 3. Worker's representative
14.	What will be the function of safety committee and who will head it.	Function: To implement the proposed OHAS management plan & Environmental Program and to take proper mitigative measure proposed in the EMP. Head: Quarry Manager
15.	Will there be a budget to allow it to hold meetings.	Budget has been allocated under Recurring Annual Cost For Environmental Protection
16.	Is there a provision of induction training for workers health and safety.	Yes (Half Yearly), Under occupational Category.
17.	How workplace exposures will be assessed.	By internal audit (Medical Officer of the Plant) and periodical medical checkup.
18.	How these will be communicated and explained to the workers.	Non conformance will be made as circular and will be displayed at the relevant places.
19.	Who will conduct training and	Health & Safety Officer and Occupational

	education in occupational health and safety.	Health Practitioner.	
20.	Where will health surveillance be undertaken.	All the plant workers will be sent to local hospital once in a year.	
21.	What occupational illness are anticipated in view of the hazardous exposure	Not envisaged.	
22.	Who will pay for the tests and the treatment of non occupational illness.	All expenditure related to health check up and treatment of the workers will be borne the by organization.	
23.	Who will compensate the workers for health impairment due to injury or illness.	All the workers will be covered under Medical Reimbursement. The management will make their contribution towards subscriptions.	
24.	The amount of compensation: List the minimum and maximum amount stipulated	As per Works men Compensation Act.	
25.	How will and how long the records of health checkups be maintained and what will happen to records when the project ends	Individual health record of every worker will be maintained till the end of service. Annual health check report will be submitted to the local health center.	
26.	Who will identify occupational disease early to prevent serious damage	Internal Occupational Health Practitioner.	
27.	What measure are to be undertaken for following		
28.	Preventing heat stress	Not Applicable	
29.	Preventing noise exposure	Individual	Providing ear muff / ear plug to all the employees working in the high noise area and reducing the exposure time.
		Common	Regular maintenance of transportation vehicles.
30.	Preventing injuries	Environmental Safety Policy and Preventive actions shall be displayed at relevant places, awareness program will be conducted periodically to educate the workers on different components of health, safety and the environment.	

31.	Providing ergonomic support	Ergonomic support will be provide by Ergonomic Program Manager (EPM) who is trained under OH&S.
32.	Who will undertake administration of Personal Protective Equipment	Mines Manager and Administration Officer.
33.	What if any action is proposed when the project ends, workers become exposed and have latent disease which may appear in future	At the end of service of the workers, the health certificate will be provided from district medical officer after thorough checkup from the environmental budget of organization.

6.8.6 Social Responsibility

Quarrying sites are generally remote and under developed. Standard of living of people in such areas is normally low, therefore due to industrial activity like Quarrying, people residing in the nearby villages within the buffer zone are to be benefited by direct and indirect employment opportunities created by the Quarrying activities. People are also beneficiaries for the facilities developed due to Quarrying activity.

Lessee shall provide required Medical facility to all the employees at the quarry such as first aid, regular checkup, ambulance etc. In addition lessee also provides the medical checkup camps to the local villagers, supply of drinking water, and contribution of funds for social and cultural programme.

Quarrying activity contributes towards economic up-liftment by way of job opportunities in the region. Hence there will be an increase in quality of life in the area. Quarrying activity will also boost the ancillary industries, business and market establishments.
The state government also will earn revenue in terms of royalty.

6.8.6.1 Corporate Social Responsibility Undertaken

As a part of Corporate Social Responsibilities, The Project proponent initiatives the socio-economic activities in the surrounding villages. The proposed details of C S R is given in **Table 6.6**:

Table 6.6: Details of Socio-economic

Sr. No	Description	Amount in INR	Remarks
1.	Distribution of school bag, umbrella, text and note books for primary school children at surrounding villages.	50,000/-	yearly
2.	Medical Facilities of surrounding villages	1,60,000	yearly
2.	Construction of toilet / washroom for government school in Vasasserikkara village.	1,50,000	2017 - 18
3.	Contribution for marriages to poor / needy people at least 4 people @ Rs. 25,000/- each	1,00,000	yearly
4.	Old age and Widow pension 1500 each	1,95,000	yearly
5.	Contribution for local cultural and festivals	1,00,000	yearly
6.	Distribution of ration through panchayat to the needy people during Onam / Ramzan / Christmas festival at least 50 families @ Rs. 500/- per family each festival	45,000	yearly
7.	Construction of Bus shelter or repair of road in and around quarry	2,00,000	2018-19
	Total	**10,00,000/-**	**-**

6.8.6.2 Corporate Social responsibility Proposed

- Quarrying activity will employ people from nearby villages, due to this people are benefited by direct and indirect employment and also standard of living of the people will also improve.
- The project proponent will provide Medical facility to all the employees within quarry. Medical facility shall be extended to the nearby needy population around the project site.
- Quarrying activity contributes towards economic prosperity in getting jobs in the region. Quarrying activity will also improve the ancillary industries, business and market establishments.
- The state government also will receive revenue in terms of royalty.
- Rs. 1.5 lakhs will be earmarked to Construction of toilet / washroom for government school in Vasasserikkara village in the year 2017-18
- Rs. 2.0 Lakhs will be earmarked to construct /renovation of bus shelter and road in and around the quarry area in the year 2018-19.
- Rs. 10.0 Lakhs/annum is earmarked as corpus fund for environmental mitigative measures.

Additionally, 1 percent of the annual profit shall be given to the concerned Panchayat for Biodiversity Management Committee towards eco-restoration.

CHAPTER – 7

REHABILITATION & RESETTLEMENT (R&R) PLAN

Building Stone Quarry

CHAPTER 7

REHABILITATION AND RESETTLEMENT (R & R) PLAN

The quarry site is rocky terrain. Where it is not viable for agricultural proposes other than rubber plantation. Moreover, there are no any structures, settlements within the quarry area and the settlement/village is away from quarry site which are not affected from this quarrying operation. Hence no rehabilitation and resettlements are required.

CHAPTER – 8

PROJECT SCHEDULE & COST ANALYSIS

Building Stone Quarry

CHAPTER 8

PROJECT SCHEDULE & COST ESTIMATES

8.1 Project Schedule

Quarrying Plan has been approved by the Department of Mining and Geology (DMG) for total extent of 3.4080 ha as per KMMCR, 1967

8.2 Cost Estimate

Since requires heavy earth moving machineries such as excavators, dumpers/tippers, drilling machineries, crusher Unit's, Buildings, M sand Plant and compressors, approximate cost towards the same would be about Rs. 1200 lakhs.

8.3 Economic viability of the project

There is good demand in inland and outside countries for building stone for construction of Houses, Temples, Statues, Roads & Bridges etc. hence project will be viable.

CHAPTER – 9

ANALYSIS OF PROPOSAL

Building Stone Quarry

CHAPTER 9

ANALYSIS OF PROPOSAL

9.1 Recommendations

The occupation of the local villages of the area is rubber plantation & rubber tapping. The quarrying activities in this belt will benefit to the local people both directly and indirectly. The direct beneficiaries will be those who get employed in the mines as skilled and un-skilled workers. The indirect beneficiaries will be those who are open small business to sell goods required by the residents whose "Per Capita" income will be enhances by the quarrying activities and thereby their purchasing power. In the long run a lot of social goods are expected in the comparatively backwards area when the inhabitant will be sent their children to school.

Quarrying activity improves the economics status of the people working in this project. Overall improvement will be expected in local area. Few labors will get employment and the State Government and Village Panchayat will get royalty due to quarrying activities.

As the project proponents commit to protect Environment from pollution in various activity of the quarrying operation can be abated effectively.

Analysis of Proposal can be concluded as follows:

- There will be no environmental impact from the project since the scale of operation is very minimum.
- There will be no major environmental impact due to proposed ornamental stone quarrying. This operation doesn't need relocation of any habitats.
- The project provides employment opportunities to the people of surrounding area, in turn helps in improving the economic status of the present population.
- Also there are many similar quarry operations working in the vicinity.
- Further, the firm has obtained Consent to operate from Kerala State Pollution Control Board (KSPCB).

Considering the above overwhelming aspects the project can be treated as **"B2 Category"** and requested to accord Environmental Clearance for this project.

CHAPTER- 10

DETAILS OF CONSULTANTS

Building Stone Quarry

DETAILS OF CONSULTANTS

Name of Consultant: **METAMORPHOSIS[SM] Project Consultants Pvt. Ltd. BENGALURU.** ***"Accredited EIA Consultant Organization" from Quality Council of India (QCI)/National Accreditation Board for Education & Training (NABET).***

The details of the EIA Co-coordinators and Functional Area Experts involved in the project are given in **Table** No. 10.1

Table No. 10.1 Details of EIA Co-ordinator Functional Area Experts

Sr. No.	Name of the EIA Co-ordinator	
1.	Dr. Shanth A. Thimmaiah	
	In-House Functional Area Experts	
1.	Dr. Shanth A. Thimmaiah	Air Pollution Control, Air Quality Modelling, Water Pollution Control & Socio-Economics
2.	Mr. Kantharaj. K.	Hydrology, Ground Water & Water conservation Geology
3.	Mrs. Sreelekha K.S	Land Use
4.	Mrs. Jeevana Kalakuntla	Water Pollution Monitoring, Prevention and Control Solid and Hazardous Waste management (Municipal Solid Waste.)
5.	Mr. Kusha K.M	Ecology Bio-diversity
	Empanelled Functional Area Experts	
1.	Dr. Harsha Vardhan	Noise & Vibration, Risk Hazardous & Solid Waste Management.
2.	Dr. Naguraj B.C	Soil Conservation, Ecology & Bio-diversity
3.	Dr.venkat Reddy	Hydrology, Ground water & Conservation and Geology
	Additional EIA Team Members	
1.	Rekha M.J	Meteorology, Air Quality Modeling & Prediction, Solid & Hazardous Waste Management, Risk & Hazards Management
2.	Mr. Tamil selvan B	Ecology & Bio-diversity, & Meteorology, Air Quality Modeling and Prediction

For **M/s. WIMROCK GRANITE PVT LTD.**

Managing Director

Authorized Signatory

For **M/s. METAMORPHOSIS[SM] Project Consultants Pvt. Ltd.,**

Authorized Signatory