

The Director- IA. II (M),
Ministry of Environment, Forests & Climate Change,
Indira Paryavaran Bhawan, Jor Bagh Road,
New Delhi-110 003.

Dt. 31-05-2018

Ref. :- 1. Proposal No. IA/KL/MIN/73668/2018
2. File No. . IA-J-11015/42/2018-IA-II(M)
3. 31st EAC Meeting held on 14th - 15th May, 2018

Sub.:- Environmental Clearance – Proposed “Building Stone Mine” situated at Sy. No. 274, Thirumittacode II Village, Pattambi Taluk, Palakkad District, Kerala for an area of 8.2140 ha. - B2 Category – Clarifications - Reg.

Respected Sir,

With reference to the above mentioned subject, mentioned below is the point wise reply to the queries raised in the minutes of the 31st meeting of Expert Appraisal Committee (EAC) held on 14th – 15th May, 2018.

Q. i. The Member Secretary informed the Committee that the Ministry has issued the directions under Section 5 of the Environment (Protection) Act, 1986, vide letter No. 1-4/2012 - RE (Pt), dated 13.11.2013 regarding prohibition of mining activity in the ESA identified by the HLWG and provided a list (State-wise, District-wise and Taluk-wise village). The Committee noted that the instant LOI/MLA is not a part of the list. However, the Ministry may seek the comments from concerned Division of the Ministry w.r.t. ESA identified by the HLWG and its further development, if any;

Ans. The proposed quarry is located in Thirumittacode II Village, Pattambi Taluk, Palakkad District, Kerala, which is not in the ESA village identified by HLWG on Western Ghats.

Q.ii. Details of type of rock and geology, method of mining, machinery details, blasting details etc. needs to be provided.

Ans. The details of type of rock and geology, method of mining, machinery details, blasting details are provided at **Annexure No. 1.**

Q.iii. Details of haulage roads, slope at different sections needs to be provided.

Ans. The details of haulage roads within the mining lease area, slope at different sections are provided at **Annexure No. 2.**

Q.iv. Details of Occupational health along with budgetary provisions needs to be elaborated.

Ans. The details of occupational health along with budgetary provisions proposed are attached at **Annexure No. 3.**

Q. v. All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery / toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).

Ans. All corner coordinates of the mine lease area superimposed on a High Resolution Imagery of the satellite image of the area is provided at **Annexure No. 4.**

Q.vi. Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by State Government. A Certificate from the Competent Authority in the State Forest Department should also be provided, confirming the involvement of forest land, if any, in the project area.

Ans. There is no National Park, Sanctuary, Biosphere Reserve, Wildlife Corridor, Ramsar site Tiger / Elephant Reserve (existing as well as proposed), within 10 km. of the mine lease.
There is no forest land involved in the mine lease area. A Certificate in this regard vide Letter No. T-3790/2018 dt. 11-05-2018 is issued by the Divisional Forest Officer (DFO), Palakkad District, Kerala is attached at **Annexure No. 5.**

Q.vii. PP needs to submit the detailed Green Belt Development plan on periphery of the lease along with type of plantation etc. Plant species needs to be revised.

Ans. The details regarding the green belt development plan proposed in the periphery of the mine lease area along with type of plantation are provided at **Annexure No. 6.**

Q.viii. Test Reports of Free Silica Concentration need to be submitted.

Ans. The test Report of Free Silica Concentration is attached at **Annexure No. 7.**

Q.ix. Details of connectivity from mine to crusher and its transportation plan needs to be elaborated.

Ans. The mined material will be transported to the proposed crusher unit which will be constructed within the complex and the finished product from the crusher will be sold in the open market.

Q.x. The Committee noted that the Ministry has recently issued a circular vide no. 22-65/2017-IA.III, dated 1st May 2018 on Corporate Environment Responsibility (CER). Accordingly, PP needs to submit the details of budget and its activities as per the said Circular.

Ans. The project cost of the proposed quarry is about Rs. 3.25 Crores. Accordingly, the details of Corporate Environment Responsibility (CER) is provided at **Annexure No. 8.**

In view of the above submission of document, we humbly request you to accord Environmental Clearance to our project at the earliest.

Thanking you,

Yours respectfully,

For TRIPTY GRANITES



**Benny Pathrose
(Managing Partner)**

Encl. :- As above

DETAILS OF TYPE OF ROCK AND GEOLOGY, METHOD OF MINING MACHINERY DETAILS, BLASTING DETAILS

GEOLOGY AND EXPLORATION

TOPOGRAPHY

This is a mine for mining and there is vegetation in that area. Land is covered with native trees, shrubs, herbs, grass, climbers, bushes etc. The highest elevation of the mine area is 120 m. MSL and lowest is 60 m MSL. As the proposed area is hilly, the drainage of the mine area is towards SE to NW. No habitants are located in the mine area. The contour Map showing the topography of the mine lease area is provided at **Plate No. 2**.

REGIONAL GEOLOGY

The district can be broad divided into five geological terranes viz. i) lowland of charnockite country in the west; (ii) Migmatite Complex in the east, extending into adjacent Coimbatore district of Chennai; (iii) Khondalite Group, occurring as linear bodies in the northeastern hill region; (iv) Wynad Group, occurring as high hills in the north in Attappady area and (v) Peninsular Gneissic Complex (PGC) confined to the north of Bharathapuzha river.

The area forms a part of the Precambrian metamorphic shield having a complex geological set up. Wynad Group is represented by rocks of upper amphibolites to lower granulite facies metamorphism. This complex can be divided into an ultramafic dominant upper group and amphibolites dominant lower group. The ultramafic group comprises talc-chlorite schist, talc-pyroxene-garnet schist. The amphibolite group consists of hornblende-biotite schist and gneiss with amphibolites bands garnet. These rocks are exposed in the Attappadi area. Hornblende –biotite gneiss and pink granite gneiss of Peninsular Gneissic Complex are exposed in the north, especially north of Bharathapuzha river. The Khondalite group, which outcrops northeast of Malalbuzha reservoir, comprises garnet-sillimanite gneiss and calc-granulite. Narrow bands of calc granulite are exposed along the Walayar river bed. Numerous thin bands of calc granulite associated with crystalline limestone and calciphyre have been observed in the area. Charnockite group is predominant in the west. This group comprises massive charnockite/gneissic charnockite, pyroxene granulite, pyroxenite and norite and magnetite quartzite amongst which massive charnockite/gneissic charnockite is the most widely distributed. Pyroxene granulite and magnetite quartzite occur as narrow bands. Thin impersistent segregations of pyroxenite and norite occur in the 'Palghat Gap'. The Charnockite Group is succeeded by the Migmatite Complex represented by hornblende-

biotite gneiss and quartz-feldspar gneiss. These rocks occupy the eastern part and the 'Palghat Gap'. They are melanocratic and foliated. These rocks are intruded by pegmatites, quartz veins and gabbro and dolerite dykes. Basic intrusives, especially dolerite, have two distinct trends in the district; one being NW-SE, which is common throughout the State and the other NE-SW, seen in the northeastnorth of Attapady. In the westernmost part, south of Bharathapuzha, a few isolated occurrences of Warkalli sediments are noticed capping small mounds. The valleys are occupied by fluvial alluvium of Quaternary age. Lateritisation is widespread in the west.

Source: 1. District Survey Report of Palakkad District, Published by Mining and Geology Department, Govt. of Kerala.

2. Geological Survey of India www.gsi.gov.in

LOCAL GEOLOGY

The local geology belongs to the regional geology. Main rock type in the study area is granite building stone. At places where they are exposed, the granite building stone is medium to coarse grained with dark grey quartz. The soil & over burden thickness is varies from avg. 0.95 m. and 0.42 m. Topographically, the area is undulating.

GEOLOGICAL RESERVES:-

Summarized Reserves (in MT)	
Geological reserve (A)	5540721
Mineral reserve blocked in 7.5 m Buffer zone (B)	572385
Mineral reserve blocked in Benches (C)	1783908
Mined out quantity (D)	0
Extra mineral blocked (E)	185730
Mineral reserve = A- B + C+ D+E	2998698

The details are provided at the Surface cum Geological plan and sections at **Plate No. 3**

Mining:
a. Whether manual or semi-mechanized or mechanized
semi-mechanized
b. If semi-mechanized or mechanized, number, type and capacity of machines to be used.
Machinery will be deployed as per requirement to meet production target. Brief details of machinery are as follows :-

SINGLE SHIFT WORKING- 8 hrs.

Requirement of machineries :-

The calculation for requirement of different machineries to handle required production of 2,50,000 TPA of granitic building stone or 834 TPD are given below:-

Drilling

The drilling of holes is proposed in one shift.

Drilling rate=5 m/ hr

Utilization of time = 7 hrs/day in single shift

Depth of holes = 1.5 m

Burden = 1.5 m

Spacing = 2.5 m

Specific gravity = 2.5

Rocks broken per hole = sp. Gravity x spacing x burden x depth
= $1.5 \times 2.5 \times 2.5 \times 1.5$
= 14.0625 MT

Therefore, for 834 MT/Day

So, $834/14$ = 59.57 holes required / day

Total meter age of
drilling required per day = depth of hole x no. of holes
= $1.5 \times 59.57 = 89.355$ m / day say 90 m per day

Capacity of One drill
machine = $5 \times 7 = 35$ m per day

For 90 m drilling no of
machines required = $90 / 35$
= 2.57 say **3 jackhammers.**

Excavators

The loading capacity of an excavator can be calculated with the following equation

$$(L) = B \times R \times N \times T \times E/K$$

Here

L = Loading capacity/shift

B = Bucket capacity = 0.9 cu.m i.e. 0.72 cu.m. @ 80%

R = Co-efficient of filling (assumed 0.80)

N = Average no. of loading cycle/hrs
(assumed 120 cycle/ hr of 30 second each)

T = No. of effective working hrs / shift = 7 hrs

E = Efficiency of utilization (assumed 0.80)

K = Swelling factor (taken 1.6)

$$L = 0.72 \text{ cu.m.} \times 0.80 \times 120 \times 7 \times 0.80 / 1.6$$
$$= 241.92 \text{ cu.m. / shift/excavator}$$

Daily ROM granitic building stone = 834 TPD / 2.50 x 1.60 = 512cu.m.

Requirement of No. of excavators = 534 cu.m. / 241.92 cu.m.

= 2.20 or say to 3 nos and one
machine shall be standby, so total
machines will be 3 + 1 = **4 Excavators**

Dumpers

Cycle time of dumper:

Spotting time = 1 min.

Loading time = 3.5 min

Travel time
(loading to unloading) = 10.5 min

Unloading time = 1 min

Total time = 16 min

Utilization time = 7 hrs

No of trips/day/dumpers = $7 \times 60/16 = 26.25$ trips

Tonnage per day / dumper = $26 \times 15T = 390$ ton

ROM handling /day= 834 ton

No. of dumpers = $834/390 = 2.13$ or say to 3 dumpers

Note- 1 dumpers of 10 MT capacity will be used for transportation of soil as well as for miscellaneous operations.

Total No. of dumpers = $3+1 = 4$ dumpers

(i)Drilling & Machines

Sr. No.	Machine Type	Required No. of Machines	Size / Capacity	Make	Source of Power
1.	Jack hammer	3	32 mm (drill hole size)	Atlas Copco	Operated through Compressor
2.	Excavator (Back Hoe)	4	0.9 m ³	Tata - Hitachi	Diesel Engine
3.	Dumper / Tipper	4	15 T	Man / Tata	Diesel Engine
4.	Rock Breaker	2	--	Furukawa	Diesel Engine
5.	Compressor	2 (1 standby)	100 CFM	LG / Atlas	Diesel Engine
6.	DG Set	1	180 kVA	Kirloskar	Diesel Engine

Miscellaneous Machinery:

S. No.	Particulars	Make/ Capacity	Number
1	Water Sprinkler	5 KL	1
2	Diesel Tanker	-	1
3	Ambulance	-	1
4	Jeep/ Van	Mahindra	2
5	Bull Dozer	Komatsu – 165 HP	1
6	Light Truck	Tata- 407 – 5 Tonnes	1
7	Mobile workshop van	Assembled	1
8	Water tanker for plantation	5 KL	1

(ii) Loading Equipment

Mechanical loading equipment such as shovel and excavators will be used for removal and loading of the mineral at face and stock yard.

(iii) Haulage and Transport Equipment

a) Haulage within mining mine hold: Loading of Stone will be done with the help of Shovel and Excavators at face and stock yard. Stone gitti are loaded in truck by manually.

b) Transport from Mine head to destination: The truck will be used for transportation of Stone and Stone Ballast from mine site to destination.

c. Whether drilling and blasting will be made use of, if yes, state monthly quantity of explosives to be consumed.

Drilling : The excavation of mineral is proposed by excavators. The mineral is fractured and easily exploitable by rock breakers and excavators. The hard strata are proposed to excavate after drilling and blasting. The cross-sectional view of drilling operations is shown below:-

Blasting: The controlled blasting is proposed by adopting all the safety measures as per “MMR 1961” and with the permission of DGMS. In this area for fragmentation of granite the blasting will be conducted. Multiple blast holes of 1.5 m depth will be drilled with the help of 32 mm drill rod, Jack Hammer and Air Compressor of 100 cfm capacity. It is estimated about 250g of explosives per hole is required. About 60 holes per blast are proposed. Therefore, the requirement of explosives will be about 15 kg / blast / day.

d. Benching pattern (height & width).

The height of bench will not be kept more than 5.0m at a time and the width of the benches will be always kept safe according to provisions.

e. Face lay out (attached development plan).

Production & Development Plan with Cross Sections enclosed **Plate No.-4.**

f. Quarry floor level (RL) at the end of the year or period of the concession

The proposed mining activity for next five year will reached up to 65 m RL and in the conceptual stage will be reached up to 50 m RL. It is expected that mining will not intersect the water table in the area. Therefore, water quality will remain unchanged.

No ground water management is required.

g. Quantity of mineral to be won (Annual level of Production)

Excavation :

The proposed method of mining will be Semi mechanized open cast mining. The basic mining techniques adopted will be uses of machines. For the systematic working of open cast mines, the main development work will be the forming of systematic benching. The height of bench will not be kept more than 5.0m at a time and the width of the benches will be always kept safe according to provisions. The Mining will be done with the help of tools such as drills, jack-hammer, compressors, hand shovel, picks, excavators etc. The targeted annual production of Stone is about 2, 50,000 MTA.

Table : Year wise production of building stone for life of mine

Year	Bench	Production (MT)
I	115-90	2,50,000
II	90-80	2,50,000
III	80-75	2,50,000
IV	75-70	2,50,000
V	70-65	2,50,000
VI	65	2,50,000
VII	65-60	2,50,000
VIII	60	2,50,000
IX	60-55	2,50,000
X	55	2,50,000
XI	55-50	2,50,000
XII	50	2,48,698
TOTAL		29,98,698

The year wise tentative excavation plan is provided at **Plate No. 5**

Loading and Transportation: Loading of mineral will be done by excavator and will be sent to the crushing unit/destination. Trucks / Tippers of 15T will be used for transportation of mineral from mine site. It is expected that 55-56 trips will be required to transport on daily basis. For this, movement of truck per hour will be 3 – 4 only. Thus, the impact due to movement of trucks from the mine will be marginal and well within the capacity of the roads.

h. Quantity of overburden to be removed (Show location of such disposal in development plan)

Nature and Quality of Top-Soil and overburden to be generated

Top Soil

A total quantity of 78033 cu.m. of topsoil is proposed to be removed during the mining operations.

Overburden

About 34499 cu. m. of overburden will be generated throughout the mine life.

Year	Top Soil (cu. m.)	Overburden (cu. m.)
I	14335	4977
II	11674	4672
III	10253	4513
IV	9899	4159
V	8670	3833
VI	7231	3574
VII	6148	3157
VIII	5354	2941
IX	4469	2673
X	-	-
XI	-	-
XII	-	-
Total	78033	34499

i. Whether heavy blasting to be adopted. If yes, location of nearest habitation (to be shown in the surface plan)

No heavy blasting will be adopted. Whereas small scale blasting will be adopted.

Following are the parameters which is used

Depth of Hole – 1.5 m

Diameter of hole – 32 mm

Spacing - 2.5 m

Burden - 1.5 m

Sp. Gravity - 2.5

Blasting Pattern:

The blasting pattern entirely depends on the situation of the joints present in the rocks.

The drilling is done as per the requirement of the rock fragmentation with desired production of mineral.

Type of Explosive to be used

Only class 2 and class 6 explosive is proposed for use as given below:-

Description	Class & division	Qty.
Nitrate mixture – Slurry and Emulsion Explosives	2, 0	400 kg
Safety fuse	6, 1	1000 mtrs.
Detonators (Ordinary)	6, 3	5000 nos.
Detonators (Electric)	6, 3	5000 nos.

j. Safety precautions to be adopted.**PRECAUTIONS:**

- Blasting in the open cast pit will be done only during day time at designated hours.
- Only competent blasters will be appointed to handle explosives.
- Explosives will be stored in approved and licensed magazine as per Explosive Act/ Rules.
- Explosives will be brought from magazine to blasting site in licensed Explosive Van under the care of blaster.
- Sufficient warning signals will be given before blasting the holes.
- Guards will be posted on all roads and paths at least 250 m distance to stop entrance to the danger zone during blasting hour.
- Controlled blasting will be practiced to control vibrations and flying fragments.
- Optimum charge will be used, while blasting near office complex/ infrastructure site.
- Maximum charge per delay will always be less than 15 kg to limit the PPV levels within the DGMS standards of 15 mm/sec.

k. Brief description on method of procurement and storage of explosives.

- a. Proper and safe storage of explosives in approved and Licensed Magazine.
- b. Proper, safe and careful handling and use of explosives by competent Blasters having Blaster's Certificate of Competency issued by DGMS.
- c. Proper security system to prevent theft/ pilferage, unauthorized entry into Magazine area and checking authorized persons to prevent carrying of match box, lights, mobile phones, cigarette or Beedi, etc.
- d. The explosives of class 2 will be used in their original cartridge packing and such cartridge shall not be cut to remove explosive for making cartridge of different size.
- e. Detonators will be conveyed in special containers. These will not be carried with

other explosives.

- f. The holes which have been charged with explosives will not be left unattended till blasting is completed.
- g. Before starting charging, clear audible warning signals by Sirens will be given so that people nearby can take shelter.
- h. Blasting operations will be carried out in day times only. However, in this project the mining operations are proposed to be carried out in day times.

Storage of Explosive

Considering low consumption, a 400 kg magazine is for storing the explosive. The magazines are to be constructing within the complex. The controlled blasting is proposed by adopting all the safety measures as per “MMR 1961” and with the permission of DGMS.

Blasting will be performed as per requirement on the face. The explosive by authorized blasting party himself and the blasting will be carried out by registered blasting contractor as per present practices.

Waste Disposal

a. Location (show it in the development plan)

Disposal of waste have been Shown in environment plan & surface runoff plan in **Plate No.-7 & 9.**

b. Area covered

	Years	Top soil (cu.m.)	Overburden (cu.m.)	Area (ha.)
	I – IX	78033 (concurrently used)	34499 (concurrently used)	0.3400 (outside, own land)

c. Environmental safeguards for such disposal

Top Soil

The topsoil excavated from the quarry will be dumped separately at pre-determined place and subsequently will be utilized in spreading over reclaimed areas for plantation. Precautions will be taken to limit the height of the topsoil dump to 5 to 6 meters in order to preserve its fertility and shelf life. It will be suitably protected from soil erosion and infertility by planting fodder grass and leguminous plants during temporary storage.

Overburden

This waste will be utilized within the pit for lying of haul roads. At the end use, OB can be reutilized as soil base for plantation.

Safeguard measures for dump

- Proper slope will be maintained to avoid rundown of edges and sides of the dump.
- Retaining wall shall be constructed on downward side to prevent rolling of boulders outside the dumping area and also to prevent inadvertent entry by persons or animals.
- Proper heights and width of terraces will be created.
- Due care will be taken to plan the overall slope of 27° for each dump.
- Regular water sprinkling shall be carried out.
- Proper drainage plan given for prevent sliding & de-siltation runoff water

Mine drainage

(Give details of total make of water during dry and rainy season and its method of handling)

Topography:

This is a mine for mining and there is vegetation in that area. Land is covered with native trees, shrubs, herbs, grass, climbers, bushes etc. The highest elevation of the mine area is 120 m. MSL and lowest is 60 m MSL. As the proposed area is hilly, the drainage of the mine area is towards SE to NW. No habitants are located in the mine area.

Rain Fall:

The normal rainfall of the district is 2348 mm. Out of this, major rainfall contribution is from SW monsoon followed by the NE.

Method of handling

Normally, the mine will be closed during rains, in case of necessity accumulated rainy water (free from suspended solid material) from pit bottom may be pumped out & may spilled over adjoining areas, which may be used by native plants (rubber / coconut) and the same will be use for watering saplings/trees in the plantation side.

Storm water management

The following measures will be taken with respect to the prevailing site conditions:-

- Storm water drains with silt traps will be suitably constructed all along the periphery of the pit area to collect the run-off from the mine area and divert into the storm water pond.
- All measures will be taken not to disturb the existing drainage pattern adjacent to the other property.
- The storm water collected from the mine area will be utilized for Crusher/M Sand unit as well as for dust suppression on haul roads, plantation within the premises, etc. The details showing the storm water drains, retaining walls are shown in

Surface Runoff Map and same is provided at **Plate No. 9.**

DETAILS HAULAGE ROADS, SLOPE AT DIFFERENT SECTIONS

Haulage road :-

The gradient of the main haulage ramps must be selected to give a safe haulage profile and optimization between increased dumper cost for steeper gradient and increased construction cost for flatter gradient. Haulage ramp gradient generally used in surface mines varies from 8% to 12%.

It is generally found that there should be considerable savings in transportation cost with 8% gradient. The development of haul roads is done with a gradient of 8% to facilitate the movement of dumpers. The same gradient can be maintained in the ramps even if the excavation is carried out by benching method. As per the safety guidelines specified by the DGMS, the gradient of haul roads should not exceed 1 in 16 (6.25%) for long haul. However, it may be steepened to 1 in 10 (10%) for bench to bench ramp and short haul distance.

The plate showing the haulage roads within the mine lease area is provided at **Plate No.10**.

Slope study :-

We have prepared the contour map. The area is fully granitic rock, prepared the surface cum geological map.

The section shows the slope of the area varies 9° to 22° , which is shown in the **Plate No.- 3**.

- The haul roads will be at gradient not exceeding 1:16. The benches will be joined by 5 m. wide ramps at gradient not exceeding 1:10.
- Bench height and width will be kept 5 m, which make the total slope the pit is 45° to prevent land slide.
- The high walls will slope at 72° - 75° .
- Flatter slopes angles are adopted where occurrences of loose earth are encountered.
- No disaster like land slide, flood, the opening of the pits shall be at a level 6 m above the Highest Flood Level of River.
- Unmanageable heights are not created.
- Loose rocks are properly dressed.
- Nature and structure of the rocks are properly studied for their slips.
- The hanging wall, footwall, and mineralized zone are competent to stand safely for long time.

Conclusion:- The proposed mine site is fulfilling the open cast mining conditions. As per the KMMCR, 2015 of Mining & Geology Department, Government of Kerala and SEIAA, Kerala, if the slope angle is not more than 45° , no land slide problem is expected to be occurred.

:- GENERAL RULES :-

SLOPE STABILITY IN CASE OF OPEN CAST MINE:

1. As per the Metalliferous Mines Regulations 1961, for open cast working, the following precautions shall be taken namely:-
 - a) In alluvial soil, morum gravel, clay debris or other similar ground-
 - i. The sides shall be sloped at angle of safety not exceeding 45 degrees from the horizontal.
 - ii. The sides shall be kept benched and the height of the bench shall not exceed 1.5 m and breadth thereof shall not less than the height.
2. Where the ore body consists of comparatively hard and compact rock, the regional inspector may, by an order in writing subject to such conditions as he may specify therein, permit the height of the bench to be increased up to 7.5 m while its width not less than 6 m.
3. In an excavation in any hard and compact ground or in prospecting trenches or pits, the side shall be adequately benched, sloped or secured so as to prevent danger from fall of sides.

In morum gravel, clay debris or other similar ground the slope angle of 45 degrees is safe. Further, the mine working has been proposed by open cast semi-mechanized method by forming systematic benches of 5 m height and 5 m width. The ultimate slope angle thus by formation of benches will be 45 degrees. In comparison to the morum gravel, clay debris or other similar ground granite rock is very hard and compact and can withstand a slope angle more than 45 degrees. It is also considered safe by Directorate General of Mines Safety (DGMS). As mentioned above in case of hard and compact rock the bench height can be increased up to 7.5 m while the breadth will be 6 m, overall slope angle by formation benches of the said dimension will be 51 degrees. Therefore the slope angle in granite mine can be increased up to 51 degrees.

Granite rock is very hard and compact and on Mohs scale of hardness it ranges between 6 to 7 hardness values which are on the higher side. Considering the hardness and compactness of granite the individual bench slope will be maintained at 75°-80°, and overall slope angle will be 45°. So landslide/slope failure is not anticipated at the given slope angle.

However, other parameters may affect the rock strength like rainfall which results in physical and chemical weathering of the rock. To prevent such a situation the garland drain will be constructed to channelize the water flow.

Preventive measures already given in mining plan for slope stabilization:-

❖ **Drainage:** - In 7.5 m Barrier zone storm water drainage is given.

It will help in channelization of storm water.

To prevent water flow over the slopes which may results in opening of cracks and cause slope failure.

To collect seasonal rainfall in the area.

❖ **Benches:** - Development of mine will be in the form of benches of 5 m height and 5 m breadth, overall slope angle will be 45° and individual bench slope will be 72°-80 °.
As per DGMS 45° slope angle is considered as safe.
The hill slope will be 45°, hence there will be no landslide occurrence in the area.

❖ **Plantation:-** Plantation proposed in the lease area will prevent soil erosion.
It also helps in controlling of water flow.
It will helps in percolation of groundwater.
Prevent rolling of stones if any.

❖ **Fencing:-** Fencing will be done in the lease area to prevent and control of rolling stones over slope.

At the sites of possible rock fall rock netting will be done to prevent rock fall and if needed shortcrete will also be done.
Jute geo matting will be done over the top soil/OB dump.

DETAILS OF OCCUPATIONAL HEALTH ALONG WITH BUDGETARY PROVISIONS

INTRODUCTION

The following risks to human health from building stone mining activity are due to inhalation of airborne pollutants (dust and fumes) from mining activity, transportation and air borne wind erosion. The pollutants may trigger asthma, silicosis or other respiratory problems depending on the exposure time and exposed concentration. Free silica or crystalline silica is suspected to be a carcinogen and exposure limits prescribed by DGMS are 3 mg/m³ for respirable dust and 5% of respirable dust for Free Silica.

The mining operations especially drilling, blasting, loading and unloading and transportation result in high noise levels causing deafness and tinnitus. The usage of drilling equipment and other hand held equipment operations may lead to excessive vibration resulting in hand arm vibration syndrome and circulatory problems. The work area ergonomics like awkward body postures or repetitive movements result in upper-limb disorders, repetitive-strain injury and other musculoskeletal conditions.

OCCUPATIONAL HEALTH

Quarrying operations should have some form of occupational health programme in place. Occupational health is about protecting the physical and mental health of workers and ensuring their continual welfare in their working environment. In addition to preventing ill health, other important aspects of occupational health include:

- ensuring fitness and physical capability to perform a job safely
- health education and promotion
- providing medical services including health surveillance
- rehabilitation after illness or injury.

Recruitment of employees shall be based on the skill set requirement of specific trade in the mining activity ranging from supervision to manual work. All employees undergo health monitoring during recruitment and periodically during employment depending on the age of employee. All employees are provided

with personal protective equipment depending on the trade, ranging from helmets, safety shoes, dust masks, safety goggles, gloves, ear plugs and ear muffs. The employees are made aware of the hazards related all mining activities and transportation of aggregate and the occupational safety practices to be adopted to ensure safe work environment. The frequency of health monitoring and type of evaluation is presented in the following table;

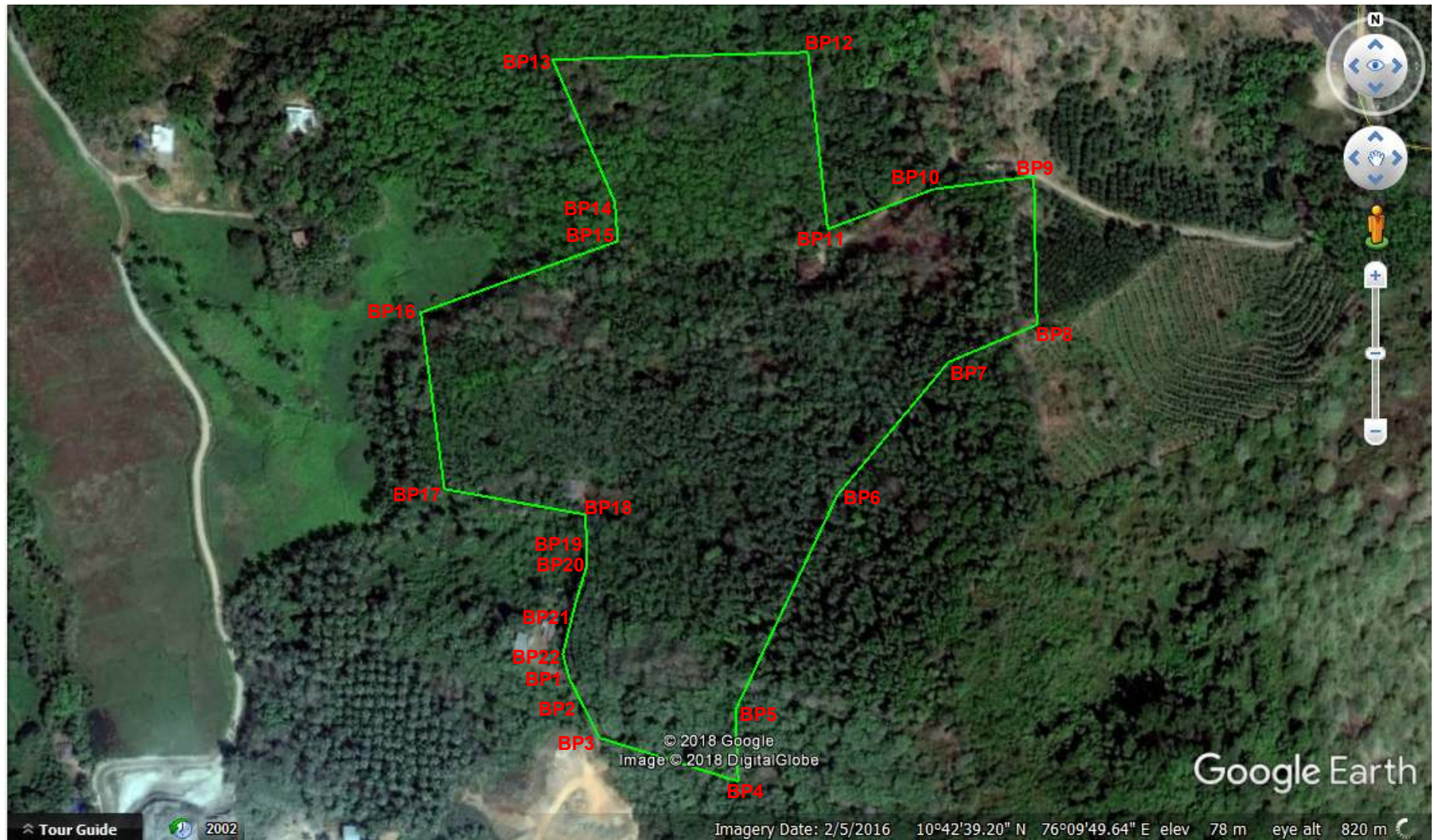
FREQUENCY OF HEALTH MONITORING

Occupation	Type of evaluation	Frequency
All employees in the mine	Chest X-ray, spirometry and vision testing, Far & Near Vision; Colour Vision; and Hearing tests	I . At the time of recruitment, II. Every 5 years to age <30; every 4 years to age 31 – 40; and every 2 years to age 41-50; Once a year above 50 years.
Noise prone areas - drilling, blasting, loading and unloading	Audiometry	Annual

The cost estimate (Budgetary provisions) for health monitoring is presented in the following table;

COST ESTIMATE

S. No.	Particular	Capital Cost (in Rs.)	Recurring Cost (in Rs.)
1	Initial medical check-up for all workers for lung function, audiometric test, tuberculosis and pulmonary disease	50,000	2000/Person
2	Provision for free medicines for all workers	-	7500/year
3	Provision for personal protection equipment like ear plug, dust mask, shoes, goggles and etc.	50,000	15% of capex
4	Provision for First Aid facilities	20,000/-	20% of capex



BP NO	LATTITUDE	LONGITUDE	BP NO	LATTITUDE	LONGITUDE
1	10°42'33.88"N	76° 9'47.11"E	12	10°42'45.95"N	76° 9'51.80"E
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Applicant	:- M/s Tripthy Granites
Village	:- Thirumittacode-II
Taluk	:- Pattambi
District	:- Palakkad
State	:- Kerala
Plot area	:- 8.2140 Ha.

T-3790/2018.

Narendra Nath Veluri, IFS
Divisional Forest Officer,
Palakkad

Office of the Divisional Forest Officer
Kallekulangara PO, Palakkad-678 009
Phone: 0491-2555156
E-mail: dfo-pkd.for@kerala.gov.in
Date :11.05.2018.

CERTIFICATE

This is to certify that the project site of M/S Tripty Granites at Sy. No 274 in Thirumittakode II village, Pattambi Taluk, Palakkad District, Kerala (Geo co-ordinates: Latitude (N)10°42'45.91" to 10°42'32.20", Longitude (E) 76°09'56.26" to 76°09'43.96") for an area of 8.2140 Ha does not come under Forest Land. There is no Wildlife Sanctuary or National Park/Protected Area located within 10 Km radius of the project site.

This certificate is issued for submission to Ministry of Environment, Forest and Climate Change for the purpose of obtaining Environmental Clearance for the minor mineral (building stone) mining project of M/S Tripty Granites.




Divisional Forest Officer,
Palakkad

GREEN BELT DEVELOPMENT PLAN

- The year wise program of eco-restoration for the life of mine, about 9,000 trees will be planted in an area of 4.3766 ha. (@ 2,000 trees / ha.)
- Biological reclamation / ecological restoration for the mined area by plantation of the species as per the time schedule suggested below: -
 - First Six months -- Herbs & grass
 - Next Six months -- Shrubs
 - Next Six months onwards -- Trees
- The following recommendations were made for the sustainable development of the project so as to protect the biodiversity of the area. The following species of native plants can be planted in the area earmarked for green zone and also during mine closure.

SI No.	Trees	Shrubs
1	<i>Briedelia retusa</i>	<i>Dendrocalamus strictus</i>
2	<i>Schleichera oleosa</i>	<i>Bambusa bambos</i>
3	<i>Artocarpus hirsutus</i>	<i>Helicteres isora</i>
4	<i>Wrightia tinctoria</i>	<i>Sida rhombifolia</i>
5	<i>Terminalia paniculata</i>	<i>Cycas circinalis</i>
6	<i>Tabernaemontana alternifolia</i>	<i>Justicia adhatoda</i>
7	<i>Tectona grandis</i>	<i>Mussaenda frondosa</i>
8	<i>Vitex altissima</i>	<i>Ochlandra sp.</i>
9	<i>Olea dioica</i>	<i>Bambusa vulgaris</i>
10	<i>Lagerstroemia microcarpa</i>	<i>Ixora coccinea</i>
11	<i>Dalbergia latifolia</i>	<i>Pseuderthria viscida</i>
12	<i>Lannea coromandelica</i>	<i>Clerodendrum infortunatum</i>
13	<i>Grewia tiliifolia</i>	<i>Capparis rheedii</i>
14	<i>Xylia xylocarpa</i>	<i>Glycosmis pentaphylla</i>

The green belt development plan for the mine lease area is provided at **Plate No. 6 & 8**

TEST REPORT AMBIENT AIR QUALITY DATA

Issued to:

M/s Triphy Granites
Sy. No. 274, Thirumittacode II Village,
Pattambi Taluk, Palakkad District, Kerala.

Average Flow rate (m³/min) (PM₁₀): 1.08

DATA OF ANALYSIS

S.No	Parameter	Result	Unit
1	Particulate Matter <10 (PM ₁₀), µg	38.0	µg/ m ³
2	Free Silica	0.94	µg/ m ³

Equipment Used: Respirable Enviro Dust samplers, Model: RDS 9000.

*** End of the report***


Verified by
M. Sandhya
Environmental Chemist


Authorized by
A.Ravi Pavan
Technical Manager

SPECIFIC PROPOSAL ON CER ACTIVITIES

INTRODUCTION

The capital investment of the project is Rs. 3.25 Crores. In compliance to O.M. No. F.No. 22-65/2017-IA.III dated 01-05-2018, an amount equivalent to Rs. 5.85 Lakhs (non recurring expenses) and Rs. 6.75 Lakhs (recurring expenses) (the project is a green field project and the requirement is 2% of the project cost) is earmarked for delivery the Corporate Environment Responsibility (CER).

CORPORATE ENVIRONMENT RESPONSIBILITY ACTIVITIES

To identify the needs of the nearby community to the project site, a community need assessment study was carried out in Thirumittacode Gram Panchayat. The main purpose of the study was to assist the project proponent in delivering their Corporate Environment Responsibility (CER) activities. The study was mainly focused on the following areas.

1. **Promotion of quality education**
2. **Health care**
3. **Community development and**
4. **Environmental sustainability**

1. Education

A. 82 children are studying in A L P School, Pallipadam. The project can support the school to improve its facilities.

Particulars	Amount (in Rs.)	Total (in Rs.)	Type of Expense
Desks	Rs.2,000 x 10 Desks	20,000	Non Recurring
Roofing for urinal block	Lump sum	50,000	Non Recurring
Computers with speakers	Lump sum	30,000	Non Recurring
Total		1,00,000	

B. 1,700 children are studying from 5th to 10th standard in Govt. High school, Chathanoor. To develop the infrastructure facilities and extracurricular activities of children, the project can support the school.

Particulars	Amount (in Rs.)	Total (in Rs.)	Type of Expense
For construction of a kitchen	Lump sum	2,50,000	Non Recurring
Total		2,50,000	

C. The project will start a sponsorship and scholarship program for children from economically back ward families.

Particulars	Amount (in Rs.)	Total (in Rs.)	Type of Expense
Scholarship for professional course	Rs.25,000 x 4students	1,00,000	Recurring
School kit for 50 children (Bag, books, umbrella, etc.)	Rs.1,000 x 50 students	50,000	Recurring
Total		1,50,000	

D. The project can provide recreational & learning materials and shelf to 5 anganwadies near to the project site.

Particulars	Amount (in Rs.)	Total (in Rs.)	Type of Expense
Recreational and learning materials	Rs.5,000 x 5 anganwadies	25,000	Non Recurring
Shelf	Rs. 4,000 x 5 anganwadies	20,000	Non Recurring
Total		45,000	

2. Health

A. There are 239 registered patients in Pain and Palliative Care Unit. The project can support the Unit by providing adequate medicine, water and air beds etc.

Particulars	Total (in Rs.)	Type of Expense
To medicine, water & air beds, wheelchair etc.	30,000	Non Recurring
Total	30,000	

B. The project can support patients those who have chronic ill and taking prolonged medication.

Particulars	Amount (in Rs.)	Total (in Rs.)	Type of Expense
Chronic ill patients	Rs. 25,000 x 4 patients	1,00,000	Non Recurring
Medical help	Rs.500 x 10 x 12 months	60,000	Non Recurring
Total		1,60,000	

3. Community Development

A. The project can support to complete the work of houses and toilets of economically back ward families in the Panchayat.

Particulars	Amount (in Rs.)	Total (in Rs.)	Type of Expense
For construction and maintenance of Houses	Rs.50,000 x 2 houses	1,00,000	Recurring

Construction and maintenance of Toilets	Rs.15,000 x 5 toilets	75,000	Recurring
Total		1,75,000	

B. The project can provide crusher products to the Gram Panchayat to construct and maintain roads.

Particulars	Total (in Rs.)	Type of Expense
Crusher Products for construction and maintenance of roads	2,00,000	Recurring
Total	2,00,000	

4. Environmental Sustainability

A. To enhance the ground water table, the project can introduce well recharge by rain water harvesting in the region of water scarcity. The same will be done in consultation & association with Gram Panchayat.

Particulars	Basis of Calculation	Total (in Rs.)	Type of Expense
Well recharge	Rs. 15,000 x 10 wells	1,50,000	Recurring
Total		1,50,000	

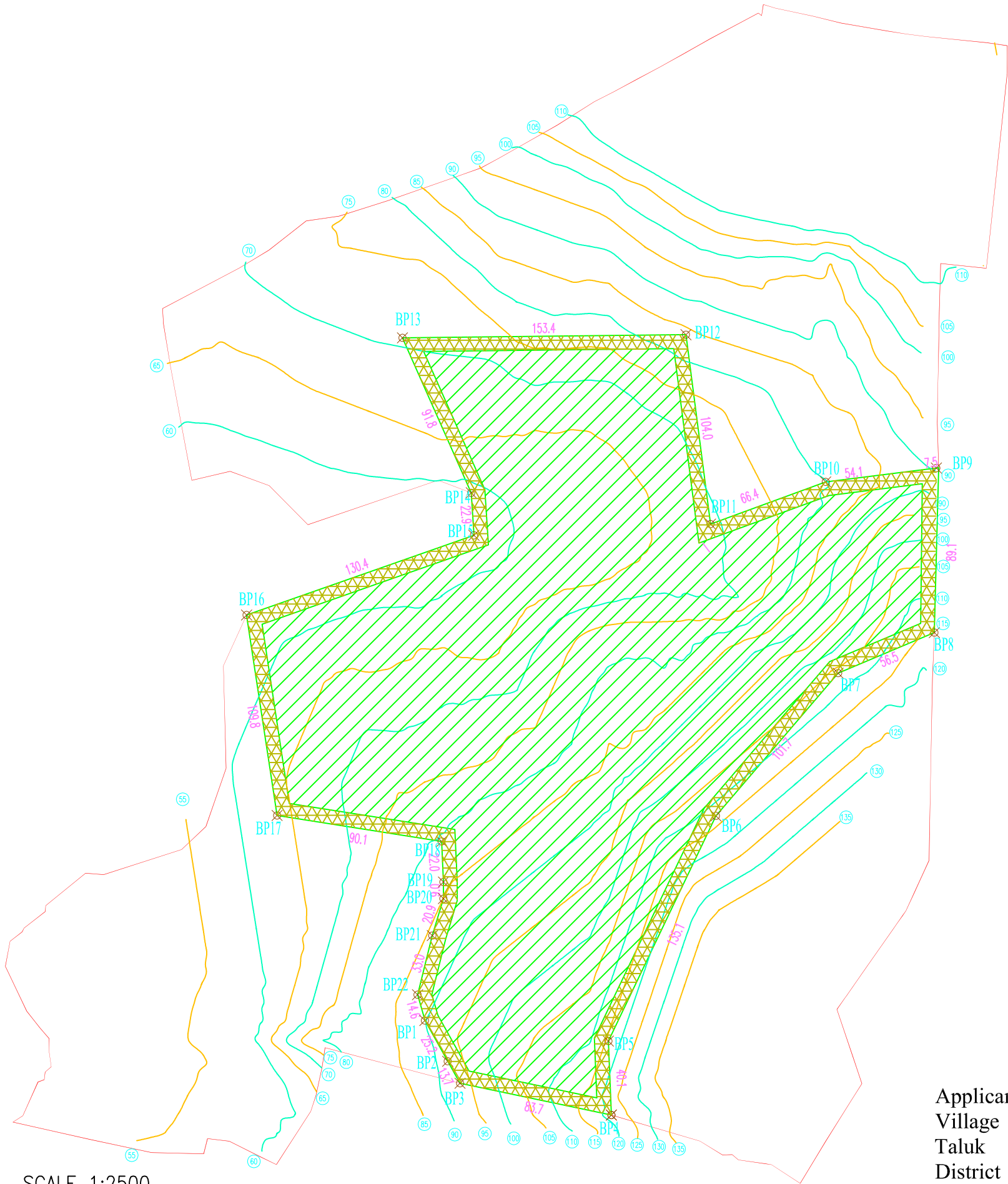
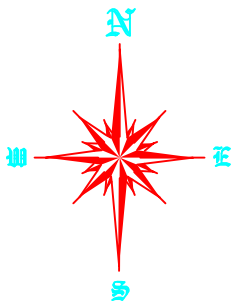
Summary of the above CSR Activities

Sl. No	Areas of Intervention	No. of Intervention	Recurring Expenses (in Rs.)	Non Recurring Expenses (in Rs.)
1	Education	4	1,50,000	3,95,000
2	Health	2	Nil	1,90,000
3	Community Development	2	3,75,000	Nil
4	Environmental sustainability	1	1,50,000	Nil
	Total	9	6,75,000	5,85,000

LIST OF PLATES

CONTOUR DRAWING - M/s TRIPTHY GRANITES , PALLIPADAM, PALAKKAD.

PLATE No. 2



SURFACE GEOLOGICAL PLAN& SECTIONS

INDEX

LEASE BOUNDARY WITH FENCING

MINE SAFETY BARRIER

SECTION LINE

CONTOUR LINE

GRANITE ROCK

BP

BOUNDARY PILLAR

SOIL

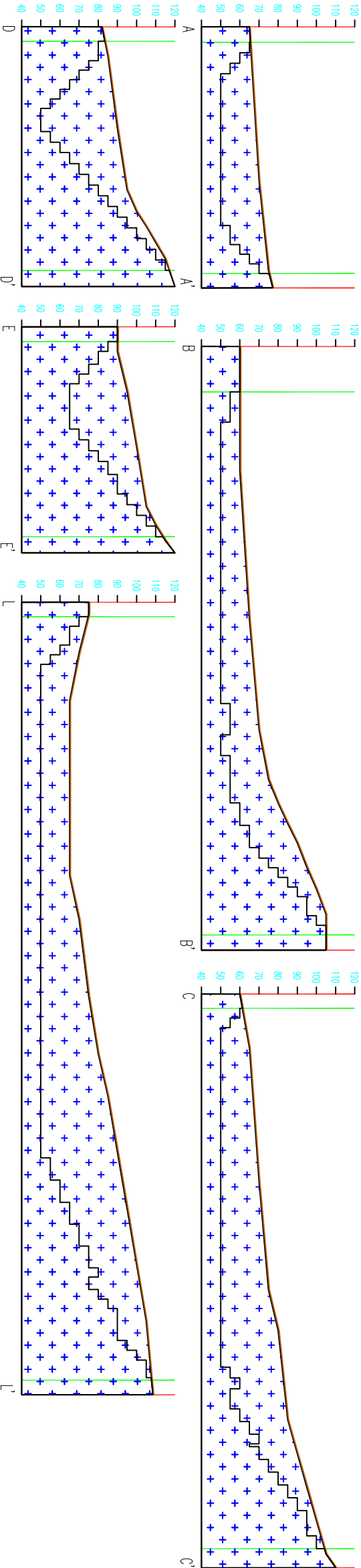
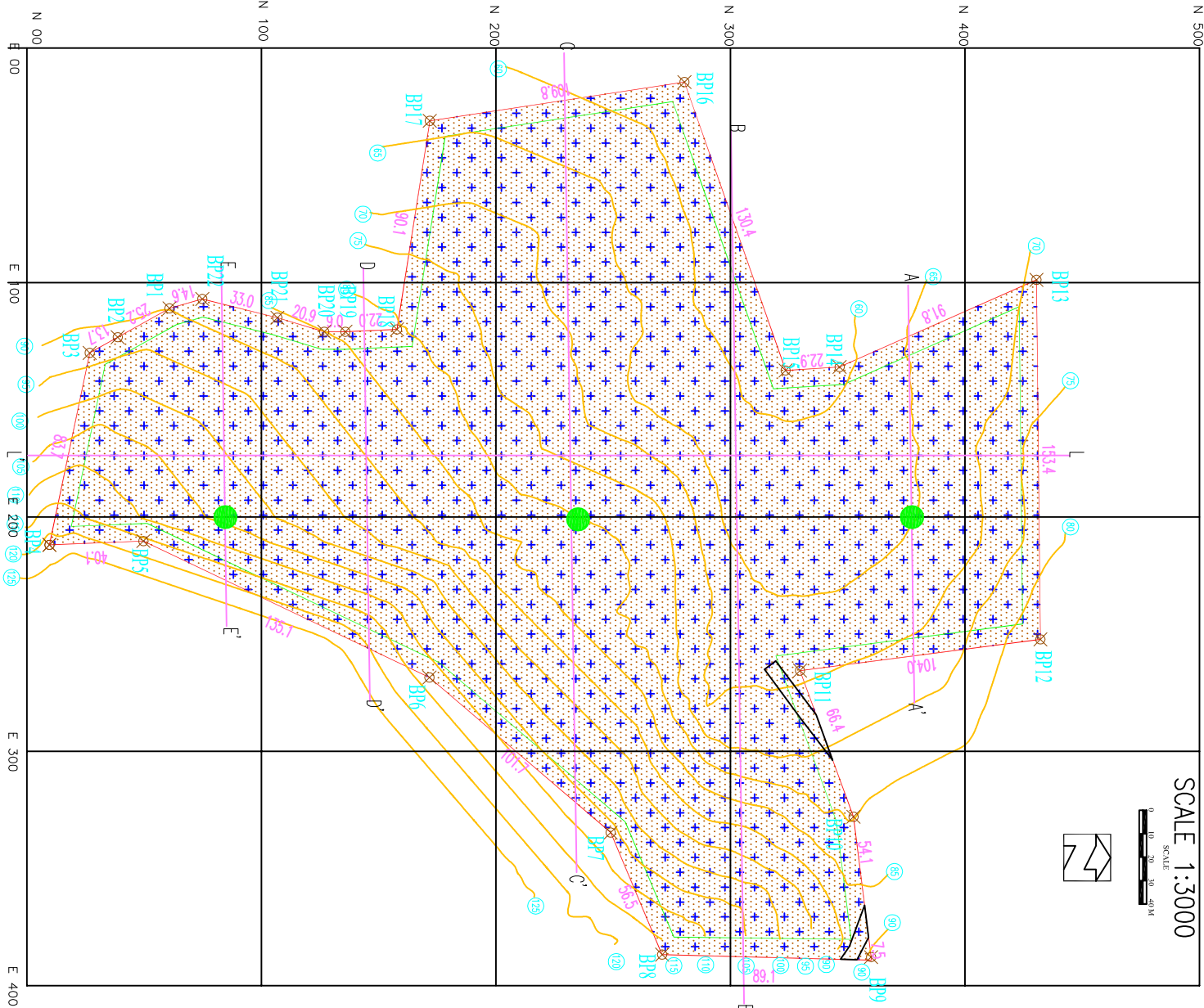
PITTING

ROAD

Applicant :- M/s Triphy Granites
Village :- Thirunittacode-II
Taluk :- Pattambi
District :- Palakkad
State :- Kerala
Plot arca :- 8.2140 Ha.

MUKESH SUROLIYA,
M.Sc. Geology,
Recognition as Qualified Person (RQP),
(RQP No. -RQP/AJM/321/2010/A)
Indian Bureau of Mines &
Accredited Functional Area Expert (FAE),
Hydrology & Ground Water (HG)
and Geology (GEO) from National
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RECLAMATION PLAN& SECTIONS

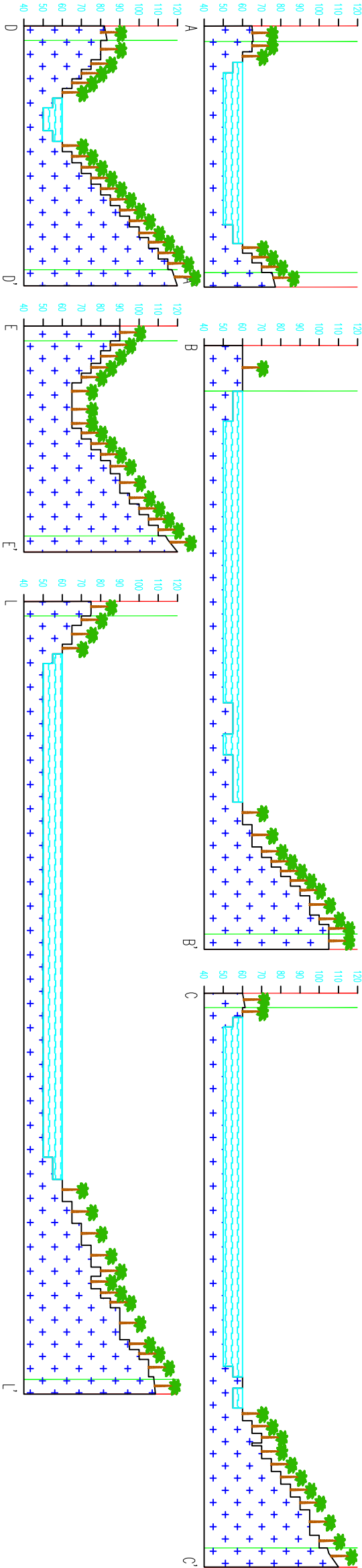
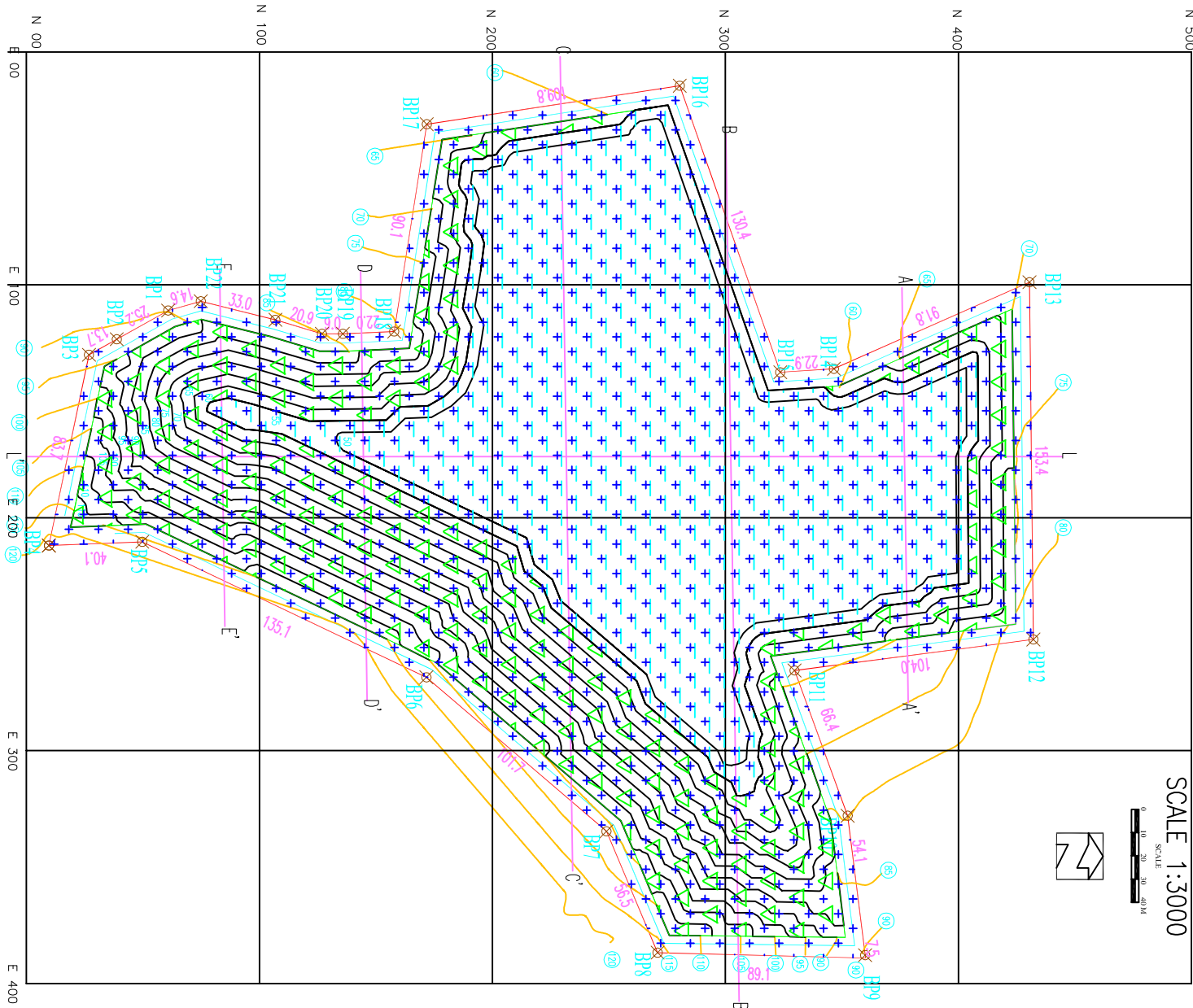
INDEX	
	LEASE BOUNDARY WITH FENCING
	MINE SAFETY BARRIER
	SECTION LINE
	CONTOUR LINE
	GRANITE ROCK
	BOUNDARY PILLAR
	RAIN WATER WAY
	PLANTATION
	RECLAIMED AREA
	WORKING BENCH
	GREEN BELT
	WATER STORAGE/POND

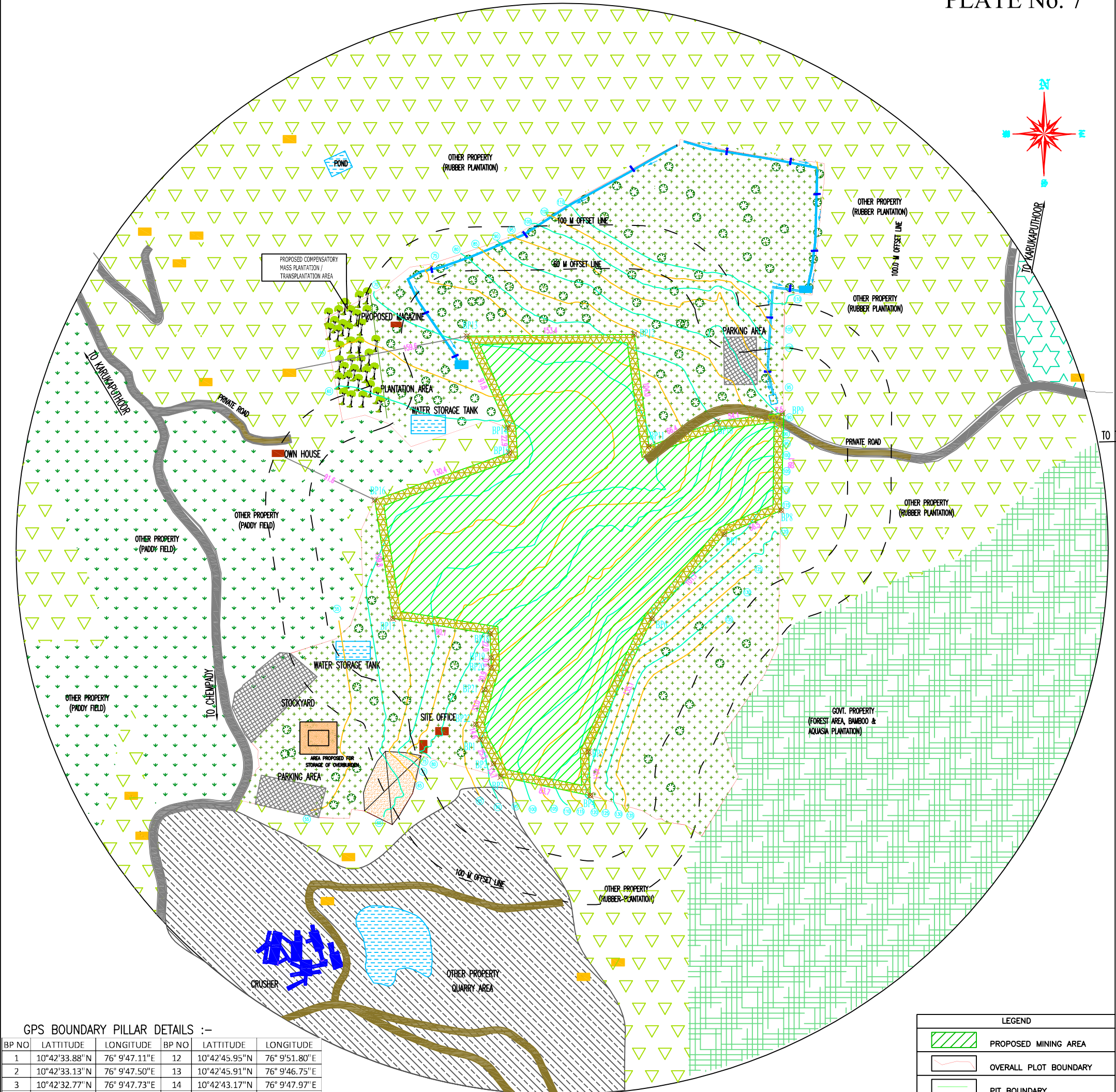
Applicant :- M/s Triphy Granities
 Village :- Thirumittacode-II
 Taluk :- Pattambi
 District :- Palakkad
 State :- Kerala
 Plot area :- 8.2140 Ha.

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 and Training (NABET),
 Quality Council of India (QCI)

Year	Bench
I	7.5 m barrier zone
II	115-90
III	90-80
IV	80-75
V	75-65
VI- VIII	65
IX-XI	60

BP NO	LATITUDE	LONGITUDE	BP NO	LATITUDE	LONGITUDE
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GPS BOUNDARY PILLAR DETAILS :-

BP NO	LATTITUDE	LONGITUDE	BP NO	LATTITUDE	LONGITUDE
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Applicant :- M/s Tripty Granites
Village :- Thirumittacode-II
Taluk :- Pattambi
District :- Palakkad
State :- Kerala
Plot area :- 8.2140 Ha.

NOTE:-

- PROPOSED MINING AREA = 08.2140 HA.
- STATUS OF MINING AREA = FRESH QUARRY AREA
- INTERNAL ROADS ARE OF 7M WIDTH (AVERAGE)
- COMPENSATORY MASS PLANTATION = 0.500 HECTARE
- PLOT OWNED BY THE PROJECT PROPONENT=13.1522 HECTARE
- CURRENT LAND USE OF THE PROPOSED MINING AREA = PLANTATION OF MIXED PLANTATION & ROCK AREA

SCALE 1:4000
ALL DIMENSIONS ARE IN METERS

Prepared by:
Locus Survey Specialists
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FAX: 0484-2524361
G-147, Near GCDA Shopping Complex,
Panampilly Nagar, Ernakulam-36.
TEL: 0484-3223755,2322755
email : mail@locussurvey.com
Mobile : +9194470 67055.

LEGEND	
	PROPOSED MINING AREA
	OVERALL PLOT BOUNDARY
	PIT BOUNDARY
	OTHER HOUSES/BUILDINGS
	OWN HOUSES/BUILDINGS
	STORAGE OF OVERBURDEN/TOP SOIL
	OTHER AREAS EARMARKED
	ANCILLARY UNITS
	7.5 m. SAFETY ZONE
	EXISTING MINING AREA
	WATER BODIES/ CHANNELS
	DE SILTATION TANK
	GREEN AREA
	PUBLIC ROAD
	PRIVATE ROAD

CONCEPTUAL PLAN& SECTIONS
(POST MINE CLOSURE PLAN)

INDEX

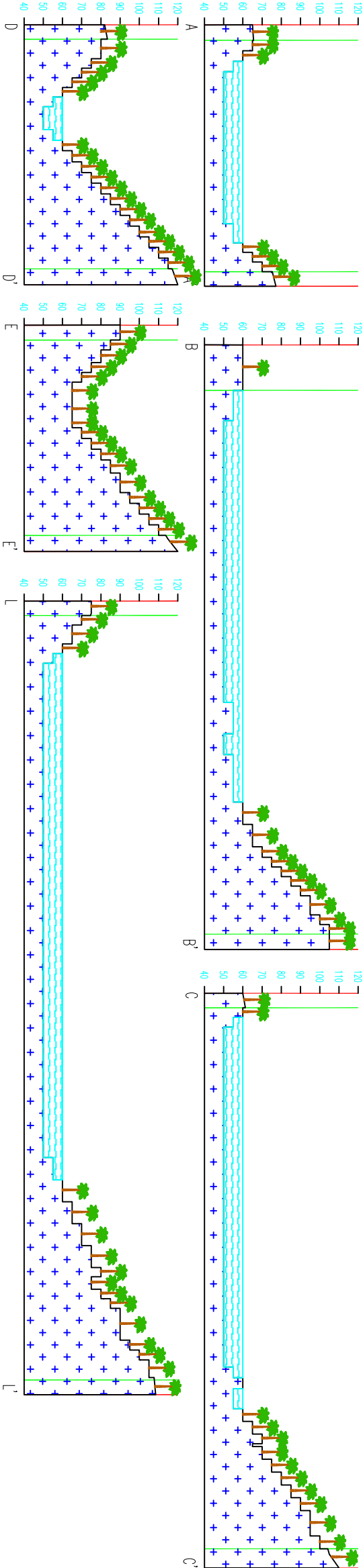
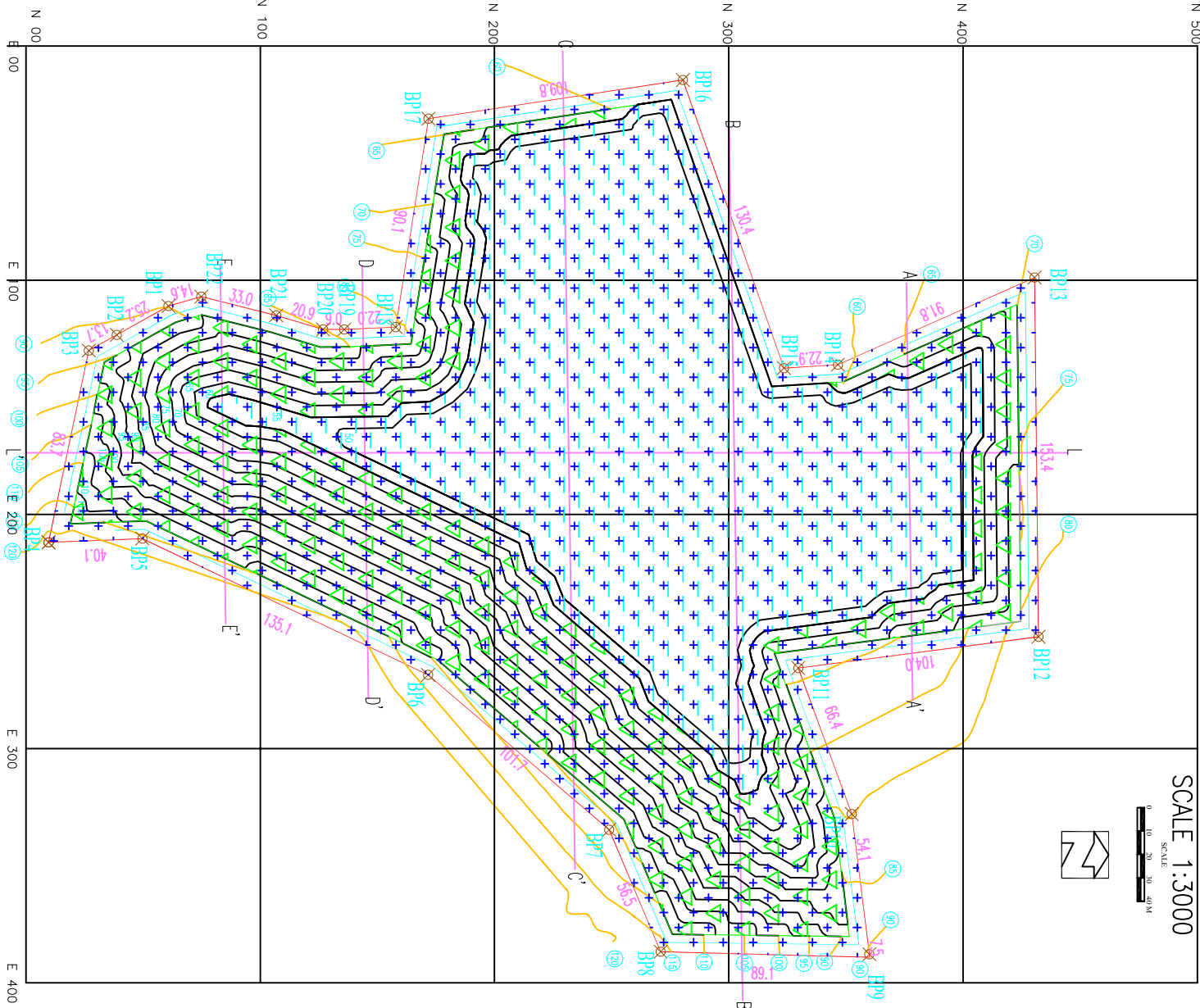
- LEASE BOUNDARY
- WITH FENCING
- MINE SAFETY BARRIER
- SECTION LINE
- CONTOUR LINE
- GRANITE ROCK
- BP

BOUNDARY PILLAR
- RAIN WATER WAY
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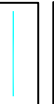
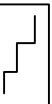
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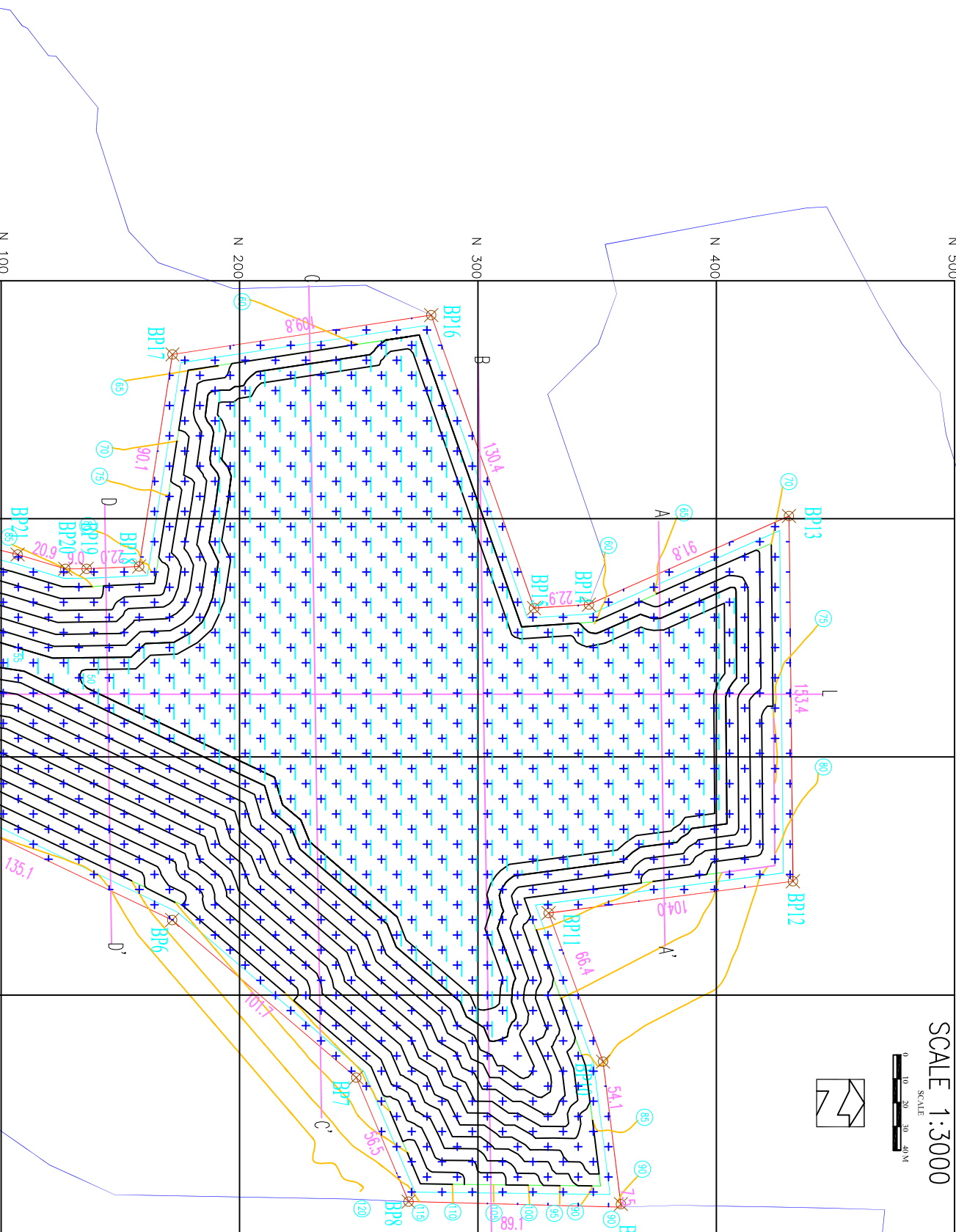
SURFACE RUNOFF DRAINAGE PLAN

INDEX

-  LEASE BOUNDARY WITH FENCING
-  MINE SAFETY BARRIER
-  SECTION LINE
-  CONTOUR LINE
-  GRANITE ROCK
-  BOUNDARY PILLAR
-  RAIN WATER WAY
-  WORKING BENCH
-  WATER STORAGE/POND
-  PLOT BOUNDARY

Applicant :- M/s Triptthy Granites
Village :- Thirumittacode-II
Taluk :- Pattambi
District :- Palakkad
State :- Kerala
Plot area :- 8.2140 Ha.

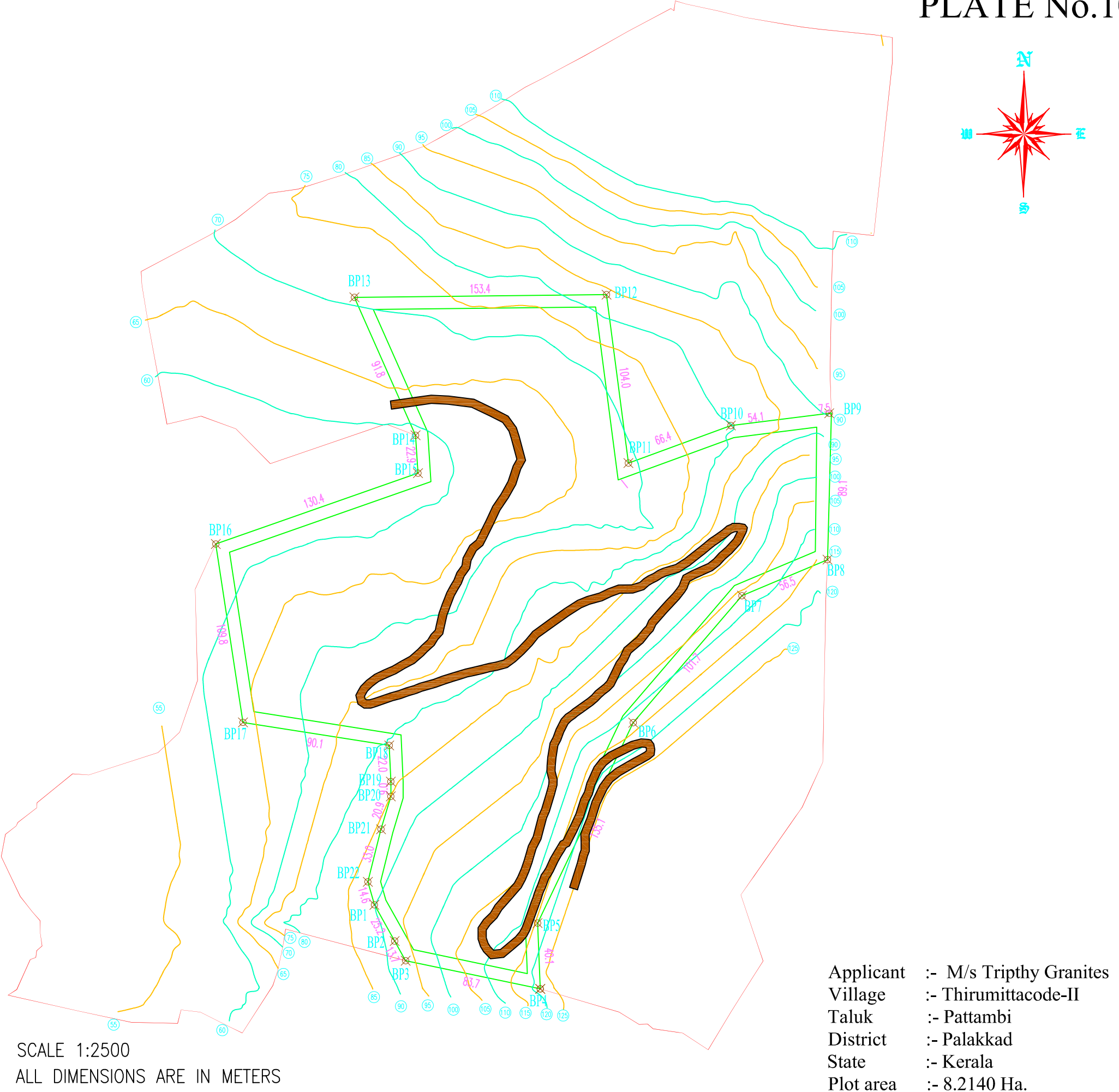
MUKESH SUROLIYA,
M.Sc. Geology,
Recognition as Qualified Person (RQP),
(RQP No. -RQP/AJM/321/2010/A)
Indian Bureau of Mines &
Accredited Functional Area Expert (FAE),
Hydrology & Ground Water (HG)
and Geology (GEO) from National
Accreditation Board for Education
and Training (NABET),
Quality Council of India (QCI)



BP NO	LATITUDE	LONGITUDE	BP NO	LATITUDE	LONGITUDE
1	10°42'33.88"N	76°9'47.11"E	12	10°42'45.95"N	76°9'51.80"E
2	10°42'33.13"N	76°9'47.50"E	13	10°42'45.91"N	76°9'46.75"E
3	10°42'32.77"N	76°9'47.73"E	14	10°42'43.17"N	76°9'47.97"E
4	10°42'32.20"N	76°9'50.42"E	15	10°42'42.42"N	76°9'48.01"E
5	10°42'33.50"N	76°9'50.38"E	16	10°42'41.04"N	76°9'43.96"E
6	10°42'37.47"N	76°9'52.31"E	17	10°42'37.50"N	76°9'44.49"E
7	10°42'39.97"N	76°9'54.49"E	18	10°42'37.03"N	76°9'47.42"E
8	10°42'40.68"N	76°9'56.21"E	19	10°42'36.32"N	76°9'47.45"E
9	10°42'43.58"N	76°9'56.26"E	20	10°42'36.02"N	76°9'47.45"E
10	10°42'43.34"N	76°9'54.29"E	21	10°42'35.37"N	76°9'47.25"E
11	10°42'42.61"N	76°9'52.23"E	22	10°42'34.33"N	76°9'46.98"E

HOULAGE ROAD MAP - M/s TRIPTHY GRANITES , PALLIPADAM, PALAKKAD.

PLATE No.10



GPS BOUNDARY PILLAR DETAILS :-

BP NO	LATTITUDE	LONGITUDE	BP NO	LATTITUDE	LONGITUDE
1	10°42'33.88"N	76° 9'47.11"E	12	10°42'45.95"N	76° 9'51.80"E
2	10°42'33.13"N	76° 9'47.50"E	13	10°42'45.91"N	76° 9'46.75"E
3	10°42'32.77"N	76° 9'47.73"E	14	10°42'43.17"N	76° 9'47.97"E
4	10°42'32.20"N	76° 9'50.42"E	15	10°42'42.42"N	76° 9'48.01"E
5	10°42'33.50"N	76° 9'50.38"E	16	10°42'41.04"N	76° 9'43.96"E
6	10°42'37.47"N	76° 9'52.31"E	17	10°42'37.50"N	76° 9'44.49"E
7	10°42'39.97"N	76° 9'54.49"E	18	10°42'37.03"N	76° 9'47.42"E
8	10°42'40.68"N	76° 9'56.21"E	19	10°42'36.32"N	76° 9'47.45"E
9	10°42'43.58"N	76° 9'56.26"E	20	10°42'36.02"N	76° 9'47.45"E
10	10°42'43.34"N	76° 9'54.29"E	21	10°42'35.37"N	76° 9'47.25"E
11	10°42'42.61"N	76° 9'52.23"E	22	10°42'34.33"N	76° 9'46.98"E

Prepared by:

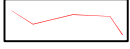
 Locus Survey Specialists
CADDPLUS,VI 281,Sree Krishna Vilas,
Near Temple, Perumbavoor.
TEL: 0484-2524361,3293322
FAX: 0484-2524361

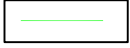
G-147, Near GCDA Shopping Complex,
Panampilly Nagar, Ernakulam-36.
TEL: 0484-3223755,2322755
email : mail@locusurvey.com
Mobile : +9194470 67055.

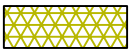
 PROPOSED HOULAGE RAOD

LEGEND

 PROPOSED MINING AREA

 OVERALL PLOT BOUNDARY

 PIT BOUNDARY

 7.5 m. SAFETY ZONE