

PRE-FEASIBILITY REPORT

**Proposed Granite Building Stone Quarry Owned by M/s. ADANI VIZHINJAM PORT
PVT. LTD. at Koodal Village, Konni Taluk & Pathanamthitta District, Kerala.**

1. EXECUTIVE SUMMARY

The building stone quarry (Minor Mineral) project of Mr. Rajesh Kumar JHA, Chief Executive Officer of M/s. ADANI VIZHINJAM PORT PVT. LTD. is situated at Re Survey No. 341/6 pt of Koodal Village, Konni Taluk, Pathanamthitta District, and Kerala for an area of 4.8556 hectares.

The location of the quarry is shown on the Key plan / Location plan enclosed vide **Plate No – 1** (Mining Plan). Quarrying / Mining Plan is approved by The Geologist, Dept. of Mining & Geology, Pathanamthitta. Vide Letter No.1210/DOPTA/M/2019 dated 06.09.2019. A copy of approved letter is attached as an additional document. The Letter of Intent issued by Directorate of Mining & Geology, Thiruvananthapuram. Vide Letter No.6676/M3/2019 dated 16.07. 2019.. A copy of LOI is enclosed as an additional document

Project Details (*The location map of the lease area has been given in Plate No. 1(Mining plan)*)

Sl no	Particulars	Details
1	Geographical Location	Latitude (N): 9°08'54.81"N to 9°09'04.73"N Longitude (E): 76°52'13.29"E to 76°52'25.10"E
2	Elevation of lease area	102-180 m MSL
3	Survey No.& Villages	341/6 pt Koodal
4	Taluk & District	Konni, Pathanamthitta
5	Extent area	4.8556 hectare
6	Type of Land	Government Land
7	Method of Quarrying	Open cast, semi mechanized mining with a bench height of 6m and bench width of 6m is proposed.
8	Nearest habitation	Nearest habitation is at 64.0 m towards S side
9	Accessibility	7.5m quarry approach road connecting with the Inchappara road.

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10	Nearest town	Koodal-3.0km-SW
11	Nearest Airport	Trivandrum International Airport-85.0km-S
12	Nearest Highway / Roads	SH 8(Punalur to Muvattupuzha)-1.8km-W
13	Nearest Railway Station	Aavaneeshwaram -14.5 km -SW
14	Power supply	KSEB Nedumonkavu,2.0 km NW
15	Water and its Source	Well – 64.0m
16	Nearest Hospital / dispensary	Govt. Hospital, Koodal-2.5km-SW
17	Education facility	Govt. School, Koodal-2.5km-SW
18	Police Station	Koodal Police Station, 2.5 km SW
19	Fire Station	Fire and Rescue Station, Konni ,10.0 km,NW
20	Ambulance	Govt. Hospital, Koodal-2.5km-SW
21	Church / temple / mosque	St.Gregorios Orthodox Church, Inchappara -0.7km-W Juma Masjid, Murinjakal- 3.1 km NW Karakkakupuzhi Sree Bhadrakali Temple- 0.39 km E
22	Ecological sensitive zone (National Park, Sanctuary, Habitat for Migratory Birds, Tiger Reserve)	Achankovil river-6 km NE Konni Reserve Forest -2.5km-SE Thenmala Reserve Forest - 21.8km-SE
23	Interstate Boundary	None within the study area
24	Critically Polluted Area as identified by CPCB	None within the study area
25	Defense installations	None within the study area
26	Archeological Features	None within the study area
27	Nearest Forests	Konni Reserve Forest -2.5km-SE Thenmala Reserve Forest - 21.8km-SE
28	Nearest streams/ rivers/ water bodies (from mine boundary)	Achankovil river-6 km NE Kallar River-11.7km-NE Kallada River-7.30km-S

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29	HLWG Report status	Not Fall in ESA
30	CRZ	Not Applicable

2. INTRODUCTION OF THE PROJECT/BACK GROUND INFORMATION

The project is for obtaining Environment clearance for building stone mining project (Minor Mineral Quarry). The project is proposed by Mr. Rajesh Kumar JHA, Chief Executive Officer of M/s. ADANI VIZHINJAM PORT PVT. LTD, which is situated at Re Survey No. 341/6 pt of Koodal Village, Konni Taluk, Pathanamthitta District, and Kerala for an area of 4.8556 hectares.

Name	M/s. ADANI VIZHINJAM PORT PVT. LTD., (Represented by Mr. RAJESH KUMAR JHA Chief Executive Officer & Authorized Signatory)
Office Address	2nd Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram District, Kerala State- 695 014.
Mob & Email Id	Mobile: +91 9099005722 Email Id: koodalinchapara@gmail.com

Need for the project:

The objective of the project is the effective utilization of minor minerals in public and private projects coming in this region. Granite (Building Stone) is the most commonly used metal in road, railway track construction etc. Rapid industrialization and growth in infrastructure has made global as well as domestic demand for building stone. Being a construction material, the mineral will be used in local market. The excavated mineral will be crushed into required sizes and made ready for use. The mining project will fulfill its end uses in construction purposes. The mining and associated activities in the mineral bearing areas will add to the revenue of the state through royalty on the mineral.

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Employment potential:

As per Mines safety under the provisions of MMR, 1961 under the Mines Act, 1952, whenever the number of workers employed is more than 10, it is preferred to have a qualified Mines Mate to keep all the production workers directly under his control and supervision. A mines clerk shall also be appointed to keep the registers and record of the mine and make necessary entries for the persons employed in the mines. The following man power is proposed for quarrying Building Stone during the five year period to achieve the proposed production and to comply with the provisions of the Government norms.

Table 1: List of Employees and their Designations

1.	Management & supervisory staff		
		Mines Manager	1
		Office Assistant	1
2.	Skilled	Operator	10
		Mechanic	2
		Mate cum Blaster	2
		Magazine Keeper	1
		Mines Foreman	1
3.	Semi – skilled	Driver	12
4.	Unskilled	Musdoor / Labours	10
		Cleaners	6
		Office Boy	1
Total			47 Nos

Allowing 10% absentism, the no. of employees on roll will be around **42**. It will be ensured that child labors will not be engaged for quarrying operation.

3. PROJECT DESCRIPTION

Topography

The proposed area is partially covered with native trees, shrubs, herbs, grass, climbers, bushes, etc. The topography of the area is hilly terrain. The highest elevation of the lease area is 180m MSL and lowest elevation is 102m MSL. As the proposed area is hill rock, the drainage of the lease area is towards south and south- west side. Massive rock is observed in the area. No major river or Pond is found nearby applied area. Rain water flows from the site towards south and south-west side along natural flood tracks.

Regional geology

Geologically, Pathanamthitta district forms part of the Precambrian metamorphic shield comprising (i) Charnockite Group, Khondalite Group and Megmatite Complex of Archaean age, (ii) Acid intrusive of Proterozoic age and (iii) rocks of Cenozoic age (basic intrusive, Neogene and Quaternary). Charnockite group is the dominant formation of the area within which occur concordant, linear and lensoidal bodies of calc granulite and quartzite of Khondalite Group. The Charnockite Group comprises Charnockite (hypersthene granite), pyroxene-granulite and cordierite gneiss. Charnockite is the dominant rock and its variants are charnockite gneiss, massive charnockite and hypersthene-diopside gneiss. The rock is generally dark grey and crudely foliated. Cordierite gneiss occurs as impersistent bands within charnockite, while pyroxene granulite is seen as restites, mostly in the west. At places, charnockite is migmatized resulting in the formation of biotite gneiss, and garnet-biotite gneiss (Migmatite Complex). These rocks are predominant towards south. The area witnessed a period of igneous activity during the Proterozoic as evidenced from the granite and syeno-granite (acid intrusive) bodies. Pegmaite and quartz veins traverse the older rocks parallel to the regional foliation. Basic igneous activity, probably of Late Mesozoic age, is evidenced from the dolerite and gabbro dykes cutting across the older rocks. These dykes have a general NW-SE trend. Warkalli sediment of Neogene age is exposed near Thiruvalla. Along the western margin, the basement and sedimentary rocks have been lateritised. The generalized stratigraphic succession of the geologic formations met within this district is as follows:

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Rock formation	Age
Top soil –Red, Laterite soil	Recent Age
Charnockite (Granite building stone)	Archaean formation
Peninsular gneiss & Migmatite Complex	Archaean formation

Local geology

The area is mainly composed of crystalline metamorphic complex. The area of mining lease contains light pink color Building Stone. Charnockite which mainly composed Hypersthene, Quartz, and Feldspar, with some ferromagnesian minerals. The grain size is medium to course. Almost the formations in the lease area are having the strike parallel to the Western Ghats which is trending deeply and there are no other structural features like fault, folding and joints.

Type of project including interlinked and interdependent projects

This is a semi mechanized open cast mining project. Mineral will be used in the construction works. Building construction and other infrastructural facilities are the areas, where the material will be consumed. The fine mineral is sold to the vendors who manufacture hollow block / solid block and hence they are interdependent projects attached to the mining project.

Location (Map showing general location, specific location, project boundary and project site layout) with coordinates

The proposed quarry site is in Government land with rocky area at Re Survey No. 341/6 pt of Koodal Village, Konni Taluk, Pathanamthitta District, and Kerala for an area of 4.8556 hectares..

The geographical location of the mine with respect to the boundary pillars of the lease area (extreme most points) is given below. The site is geographically located between:

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Latitude (N): 9°08'54.81"N to 9°09'04.73"N

Longitude (E): 76°52'13.29"E to 76°52'25.10"E

The google map superimposed with project boundary showing location of the lease area is provided in **Plate 2 (Mining Plan)**. The Key map of the project site showing the location of quarry site is shown in **Plate 1 (Mining Plan)**. The project site with boundary pillars and GPS Coordinates of the boundary pillars are provided in Contour drawing attached in **Plate 4 (Mining Plan)**.

Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations

Quarrying activities are carried out based on local geology and availability of granite building stone. The proposed site is a building stone quarry and mineral specific hence no alternate site was examined. Moreover, the land is Government land with rocky area and hence no alternate site considered.

Size or Magnitude of operation

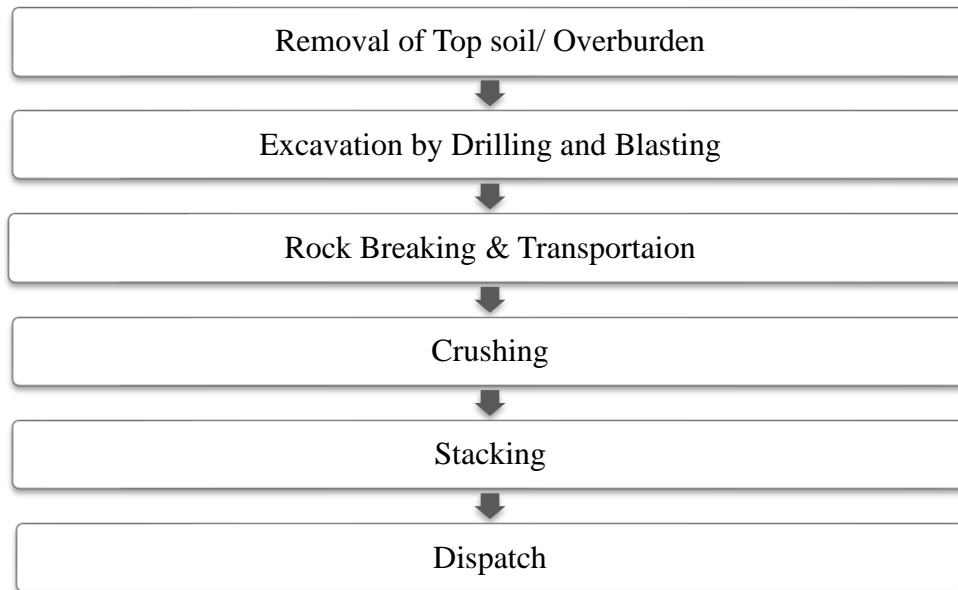
The size and magnitude of the lease area is as given below: -

Table 2: Size or Magnitude of operation

Sr. No.	Particulars	Details
1	Lease Area	4.8556Ha
2	Mineable Reserve	1355780 MT
3	Mine Waste	62458MT
4	Life of Mine	About 5 Years
5	Total Man Power (Nos.)	About 47 Persons

Project description with process details (a schematic diagram/Flow chart showing the project layout, components of the Project etc.).

The proposed mining operations will be carried out by open cast semi-mechanized method. The process flow diagram given below depicts the mining process: -



Method of Quarrying

Open cast semi-mechanized mining will be adopted to extract Building stone of required size. Machineries like tractor mounted compressor attached with jack hammers is proposed for drilling and blasting. Excavators are proposed for lifting and loading of rock. Tippers are proposed for the transportation to the destination.

Mode of working is semi mechanized quarrying operation using shot hole drilling with the help of compressor and jack hammers and smooth blasting. Waste and raw materials is removed using Hydraulic excavator and loaded directly to the tippers. The mineral is transported to the crushing plants, where it is crushed to required sizes. The bench height and width is designed as 6m.

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Drilling & Blasting

Drilling

Drilling of shot-holes will be carried out using compressor and Jack Hammer combination. Depth of holes shall be 1-2m and the spacing shall be 0.75m and burden shall be 0.50m. To estimate a correct blasting geometry and to affect a perfect pre-determined fragmentation and fly rock control, certain amount of trial blast is a prerequisite. Details of drilling equipment are tabulated below,

Type	Nos.	Dia. of hole	Make	Motive
Jack Hammer	8	33mm	Atlas copco	Air
Compressor	2	-	Atlas copco XA 210	Diesel
Wagon drill	2	115mm	Atlas copco	Air

Blasting

The nature of the rock is mainly hard to medium in nature. Hence drilling and blasting is required to dislodge / loosen the material from the main rock mass.

Blasting Pattern

The massive formation shall be broken into pieces of transportable size by drilling and blasting using jack hammers and shot hole blasting. Since the bench height needs to be maintained at 6.0 m, two sub benches will be created of 3 m height each and the benches will be joined / merged together to form 6.00 m height. Blast hole will be, preferably by jack hammer where the diameter is normally 33 mm and the depth of the hole is approximately 2.4 m. Blasting pattern is generally square or rectangle or zig zag with burden of 0.5m and spacing of 0.75 meters. Usually single / double row of holes is blasted along free face to achieve optimum powder factor and best fragmentation. Blasting pattern is generally square or rectangle or staggered, The Burden and Spacing will be decided as per the requirements of the size of the boulders, generally the burden ranging from 2.00 to 2.50 meters and spacing of 2.50 to 3.00 meters.

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Diameter of the hole	:	33 mm
Spacing	:	0.75m
Burden	:	0.5m
Depth	:	2.4m
Charge / Hole	:	0.125kg/ stick, 3 stick/ Hole = 0.375Kg
Pattern of hole	:	Zig-Zag
Inclination of hole	:	70 ⁰ from the horizontal.
Quantity of rock broken	:	0.5 x 0.75 x 2.4 x 2.5 = 2.25 MT
Blasting efficiency @ 90%	:	2.25 x 90% = 2 MT / hole

Subsequent to the drilling and blasting, the material so fragmented / loosened from the rock mass will be crushed or broken with the help of the rock breakers. Then material is loaded into tippers with the help of the excavator. There after the material is loaded into trucks / tippers of 10-20 tonnes capacity with the help of the excavator. The loaded material is then transported to the Vizhinjam Port.

➤ **Type of explosive to be used**

Following explosives are recommended for efficient blasting with safe practices. Nitrate mixture of slurry explosives are used for blasting. Powder factor is approximately 4.0 tonnes per kg of explosive.

Sl. No	Description	Class	Division	Type
1.	Nitrate Mixture	2	0	Nitrate Mixtures
2.	Electric Detonators	6	3	MSDD
3.	Safety fuse	6	3	Blue sump fuse coils
4.	Ordinary Detonators	6	3	OD
5.	NONEL	6	3	Non-Electric Detonator

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➤ **Storage of Explosive**

The applicant is advised to store the explosives as per the Indian Explosives Act, 1978. Considering the consumption, a 300 kg magazine will be used for the storage of explosives. 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.

➤ **Loading and Hauling:**

Loading shall be done by Excavator into tippers from the working place. Top soil and Building stones shall be dumped in the site. The applicant is proposed to engage three Hydraulic excavators and one hydraulic rock breakers and 10 tippers of 10/20 Tonnes capacity for transportation of rock and internal transport of top soil.

Type Power	Nos.	Bucket Capacity	Make	Motive	H.P
Hydraulic Excavator	1	1.80 M ³	L&T Komatsu	Diesel	240
Hydraulic Excavator	2	1.20 M ³	L&T Komatsu / JCB	Diesel	180
Hydraulic Rock breaker	1	-	L&T Komatsu / JCB	Diesel	180

Transport of rocks and soil shall be done by Tippers of 10 tonnes capacity,

Type	Nos.	Size/ Capacity	Make	Motive	H.P
Tipper	10	10-20 MT	Tata / Ashok Leyland / Bharath Benz	Diesel	110
Water Tanker	1	10 KL	Ashok Leyland	Diesel	130

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Raw material required along with estimated quantity, likely source, marketing area of final product/s, mode of transport of raw material and finished product

No raw material will be required for mining of Masonry / building stone. The final product will be sent to consumer based on their demand. The mode of transportation of raw material and finished product will be by road only. Tippers/ trucks will be used for transportation to the end users.

Summary of Geological & Mineable Reserves

The Geological and Mineable Reserves are estimated by cross-sectional Methods up to a depth of **51-80m** from the hill top. Highest and lowest elevation is **180m & 102m** respectively above mean sea level. Geological cross sections are drawn across the exposed rock. The volume between the cross section is arrived on the basis of the average area of the parallel cross section method using CAD software and multiplying bi-sectional interval. Tonnage is arrived by multiplying with bulk density (B.D), which is 2.5MT/cum for building stone.

a) GEOLOGICAL RESERVES

The Geological Reserves is estimated by cross sectional method is as **3045188 MT** of Granite building stone up to a depth of **51-80m** from the hill top, having considered the depth of mining, recovery, safety barriers etc. A detail of estimation of geological reserves is given in the Table –I

TABLE-I

SECTION	L (m)	W (m)	D (m)	B.D	Quantity (MT)
AB-X1Y1	16	30	6	2.5	7200.0
	27	44	6	2.5	17820.0
	40	52	6	2.5	31200.0
	53	62	6	2.5	49290.0
	69	63	6	2.5	65205.0
	74	63	18	2.5	209790.0
AB-X2Y2	36	17	6	2.5	9180.0
	118	33	6	2.5	58410.0
	122	41	18	2.5	225090.0

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CD-X1Y1	17	28	6	2.5	7140.0
	39	17	6	2.5	9945.0
	57	33	6	2.5	28215.0
	73	52	6	2.5	56940.0
	83	74	18	2.5	276390.0
EF-X3Y3	40	19	6	2.5	11400.0
	23	36	6	2.5	12420.0
	26	39	10	2.5	25350.0
	40	40	20	2.5	80000.0
	79	66	6	2.5	78210.0
EF-X4Y4	48	18	15	2.5	32400.0
	15	22	47	2.5	38775.0
	53	79	20	2.5	209350.0
EF-X5Y5	15	35	47	2.5	61687.5
	51	111	20	2.5	283050.0
EF-X6Y6	34	39	6	2.5	19890.0
	36	49	6	2.5	26460.0
	74	58	6	2.5	64380.0
	80	67	6	2.5	80400.0
	80	76	6	2.5	91200.0
	80	84	6	2.5	100800.0
	80	93	6	2.5	111600.0
	80	102	6	2.5	122400.0
	80	111	6	2.5	133200.0
	80	114	18	2.5	410400.0
TOTAL					3045188

b) MINEABLE RESERVES

The mineable reserves is estimated by cross-sectional method having considered the recovery factor, depth of mining, safety barriers etc., The mineable reserves is estimated as **1355780 MT** of Granite building stone to a depth of mining **51-80m** from the hill top. Details of estimation of mineable reserves are given in Table no. II.

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TABLE-II

SECTION	BENCH	L (m)	W (m)	D (m)	B.D	Quantity (MT)
AB-X1Y1	II	16	25	6	2.5	6000.0
	III	27	33	6	2.5	13365.0
	IV	39	37	6	2.5	21645.0
	V	44	39	6	2.5	25740.0
	VI	53	31	6	2.5	24645.0
	VII	49	23	6	2.5	16905.0
	VIII	33	16	6	2.5	7920.0
	IX	18	8	6	2.5	2160.0
AB-X2Y2	I	36	22	6	2.5	11880.0
	II	95	34	6	2.5	48450.0
	III	106	49	6	2.5	77910.0
	IV	98	34	6	2.5	49980.0
	V	91	19	6	2.5	25935.0
CD-X1Y1	V	16	28	6	2.5	6720.0
	VI	30	17	6	2.5	7650.0
	VII	40	33	6	2.5	19800.0
	VIII	48	52	6	2.5	37440.0
	IX	51	73	6	2.5	55845.0
	X	35	66	6	2.5	34650.0
	XI	20	51	6	2.5	15300.0
EF-X3Y3	I	40	20	7	2.5	14000.0
	II	21	29	6	2.5	9135.0
	III	26	22	6	2.5	8580.0
	IV	45	15	6	2.5	10125.0
	V	40	9	6	2.5	5400.0
	VI	35	35	6	2.5	18375.0
	VII	30	35	6	2.5	15750.0
	VIII	51	17	6	2.5	13005.0
EF-X4Y4	I	48	17	6	2.5	12240.0
	II	48	16	6	2.5	11520.0
	III	10	9	6	2.5	1350.0
	IV	11	35	6	2.5	5775.0
	V	13	35	6	2.5	6825.0

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		VI	14	35	6	2.5	7350.0
		VII	15	35	6	2.5	7875.0
		VIII	16	35	6	2.5	8400.0
		IX	18	35	6	2.5	9450.0
		X	19	35	6	2.5	9975.0
		XI	53	48	6	2.5	38160.0
		XII	53	33	6	2.5	26235.0
		XIII	45	17	6	2.5	11475.0
	EF-X5Y5	IV	12	35	6	2.5	6300.0
		V	13	35	6	2.5	6825.0
		VI	14	35	6	2.5	7350.0
		VII	15	35	6	2.5	7875.0
		VIII	17	35	6	2.5	8925.0
		IX	18	35	6	2.5	9450.0
		X	19	35	6	2.5	9975.0
		XI	50	99	6	2.5	74250.0
		XII	42	84	6	2.5	52920.0
		XIII	35	69	6	2.5	36225.0
	EF-X6Y6	I	34	38	6	2.5	19380.0
		II	46	41	6	2.5	28290.0
		III	74	42	6	2.5	46620.0
		IV	77	43	6	2.5	49665.0
		V	70	44	6	2.5	46200.0
		VI	63	46	6	2.5	43470.0
		VII	56	47	6	2.5	39480.0
		VIII	49	48	6	2.5	35280.0
		IX	42	50	6	2.5	31500.0
		X	35	44	6	2.5	23100.0
		XI	28	28	6	2.5	11760.0
TOTAL							1355780
TOP SOIL DEVELOPMENT							
AB-X1Y1		I	81	68	1	2	11016.0
AB-X2Y2		I	123	53	1	2	13038.0
CD-X1Y1		I	87	79	1	2	13746.0
EF-X3Y3		I	43	39	1	2	3354.0
EF-X4Y4		I	10	17	1	2	340.0
EF-X5Y5		I	12	35	1	2	840.0

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EF-X6Y6	I	78	129	1	2	20124.0
TOTAL						62458
GRAND TOTAL						1418238

The recovery factor is taken as 100% from the top bench up to the bottom. Depth of mining is taken as **51-80m**. The Proposed life of the mine is **5** years. Already Excavated & Available reserves as following table,

(c) ALREADY EXCAVATED

TABLE- III

SECTION	L (m)	W (m)	D(m) (Avg)	B.D	Quantity (MT)
EF-X3Y3	30	34	21	2.5	53550.0
EF-X4Y4	39	60	39	2.5	228150.0
EF-X5Y5	37	78	32	2.5	230880.0
TOTAL					512580

(d) BUFFER AREA

(e) BLOCKED RESERVES

(d) BUFFER AREA

TABLE-IV

SECTION	L (m)	W (m)	D(m) (Avg)	B.D	Quantity (MT)
AB-X1Y1	7.5	80.5	17	2.5	25659.4
	74	7.5	46	2.5	63825.0
AB-X2Y2	7.5	70.5	34	2.5	44943.8
	122	7.5	21	2.5	48037.5
CD-X1Y1	15	66	30	2.5	74250.0
	83	15	14	2.5	43575.0
EF-X3Y3	7.5	81	24	2.5	36450.0
	79	15	29	2.5	85912.5
EF-X4Y4	73	15	54	2.5	147825.0

**Proposed Granite Building Stone Quarry Owned by M/s. ADANI VIZHINJAM PORT
PVT. LTD. at Koodal Village, Konni Taluk & Pathanamthitta District, Kerala.**

EF-X5Y5	51	15	53	2.5	101362.5
EF-X6Y6	7.5	129	49	2.5	118518.8
	83	15	34	2.5	105825.0
TOTAL					896184

(e) BLOCKED RESERVES

Total Geological Reserves (MT) – Mineable Reserves (MT) = Blocked Reserves (MT)

$$3045188 - 1355780 = \mathbf{1689408 \text{ MT}}$$

SUMMARY OF MINING ACTIVITY

	Quantity (MT)
Geological Reserves	= 3045188
Mineable Reserves	= 1355780
Already Excavated	= 512580
Buffer Area	= 896184
Blocked Reserves	= 1689408

Year wise production details

YEARSWISE PRODUCTION AND DEVELOPMENT

YEAR	SECTION	BENCH	L (m)	W (m)	D (m)	B.D	QUANTITY (MT)
I-YEAR	EF-X6Y6	I	34	38	6	2.5	19380.0
		II	46	41	6	2.5	28290.0
		III	74	42	6	2.5	46620.0
		IV	77	10	6	2.5	11550.0
II-YEAR	EF-X6Y6	IV	77	33	6	2.5	38115.0
		V	70	44	6	2.5	46200.0
		VI	63	46	6	2.5	43470.0
		VII	56	47	6	2.5	39480.0
		VIII	49	48	6	2.5	35280.0
		IX	42	50	6	2.5	31500.0
		X	35	44	6	2.5	23100.0
	XI	28	28	6	2.5	11760.0	
	EF-X3Y3	I	40	20	7	2.5	14000.0

**Proposed Granite Building Stone Quarry Owned by M/s. ADANI VIZHINJAM PORT
PVT. LTD. at Koodal Village, Konni Taluk & Pathanamthitta District, Kerala.**

		II	21	29	6	2.5	9135.0	
		III	26	22	6	2.5	8580.0	
		IV	45	15	6	2.5	10125.0	
		V	40	9	6	2.5	5400.0	
		VI	35	35	6	2.5	18375.0	
		VII	30	35	6	2.5	15750.0	
	EF-X4Y4	I	48	17	6	2.5	12240.0	
		II	48	16	6	2.5	11520.0	
		III	10	9	6	2.5	1350.0	
		IV	11	35	6	2.5	5775.0	
		V	13	35	6	2.5	6825.0	
		VI	14	35	6	2.5	7350.0	
		VII	15	35	6	2.5	7875.0	
		VIII	16	35	6	2.5	8400.0	
		IX	18	35	6	2.5	9450.0	
		X	19	35	6	2.5	9975.0	
		XI	30	48	6	2.5	21600.0	
	EF-X5Y5	IV	12	35	6	2.5	6300.0	
		V	13	35	6	2.5	6825.0	
		VI	14	35	6	2.5	7350.0	
		VII	15	35	6	2.5	7875.0	
		VIII	17	35	6	2.5	8925.0	
		IX	18	35	6	2.5	9450.0	
		X	19	35	6	2.5	9975.0	
		XI	50	99	6	2.5	74250.0	
	III-YEAR	EF-X3Y3	VIII	51	17	6	2.5	13005.0
		EF-X4Y4	XI	23	48	6	2.5	16560.0
		AB-X1Y1	II	16	25	6	2.5	6000.0
			III	27	33	6	2.5	13365.0
			IV	39	37	6	2.5	21645.0
			V	44	39	6	2.5	25740.0
			VI	53	31	6	2.5	24645.0
			VII	49	23	6	2.5	16905.0
VIII			33	16	6	2.5	7920.0	
IX			18	8	6	2.5	2160.0	
AB-X2Y2		I	36	22	6	2.5	11880.0	
		II	95	34	6	2.5	48450.0	

**Proposed Granite Building Stone Quarry Owned by M/s. ADANI VIZHINJAM PORT
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		III	106	49	6	2.5	77910.0
		IV	98	34	6	2.5	49980.0
		V	91	19	6	2.5	25935.0
	CD-X1Y1	V	16	28	6	2.5	6720.0
		VI	30	17	6	2.5	7650.0
		VII	40	33	6	2.5	19800.0
		VIII	48	52	6	2.5	37440.0
		IX	51	73	6	2.5	55845.0
		X	35	66	6	2.5	34650.0
		XI	20	51	6	2.5	15300.0
	EF-X4Y4	XII	53	33	6	2.5	26235.0
	EF-X5Y5	XII	14	84	6	2.5	17640.0
IV-YEAR	EF-X5Y5	XII	28	84	6	2.5	35280.0
	EF-X4Y4	XIII	6	69	6	2.5	6210.0
V-YEAR	EF-X4Y4	XIII	45	17	6	2.5	11475.0
	EF-X5Y5	XIII	29	69	6	2.5	30015.0
TOTAL							1355780
TOP SOIL DEVELOPMENT							
I-YEAR	EF-X6Y6	I	78	79	1	2	12324.0
II-YEAR	AB-X2Y2	I	78	50	1	2	7800.0
	EF-X3Y3	I	43	39	1	2	3354.0
	EF-X4Y4	I	10	17	1	2	340.0
	EF-X5Y5	I	12	35	1	2	840.0
III-YEAR	AB-X1Y1	I	81	68	1	2	11016.0
	AB-X2Y2	I	123	53	1	2	13038.0
	CD-X1Y1	I	87	79	1	2	13746.0
TOTAL							62458
GRAND TOTAL							1418238

Resource optimization / recycling and reuse envisaged in the project

Top Soil and Building Stone for crushing will be removed periodically by hydraulic excavator and tipper combination. Top soil along with Overburden which amounts to **62458 MT** will be generated for the first **5** years will be stored in Re-Survey No. 346/1 (Consented Property of Shoshama), which will be used for refilling over the mined-out benches during the time of afforestation. The Five Years Dump

**Proposed Granite Building Stone Quarry Owned by M/s. ADANI VIZHINJAM PORT
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Dimension is show on Plate-VI(A-D). The Maximum height and spread of the temporary dump is given as under.

Top Soil along with Overburden (69 X 46 X 9.839 X 2.0)	62458 MT
-----------------------------------------------------------	-----------------

The Building Stones will be stacked at the entry of mine within the lease boundary for transport to crushing units.

Availability of water its source, energy / power requirement and it source

WATER: Drinking water shall be provided to the nearby public. Quantity for Drinking and utilities is **2 KLD**. Dust suppression and Green belt of water is **12 KLD**. Minimum quantity of **14 KLD** is required. Drinking water will be purchased and water for dust suppression and green belt development will be sourced from wells in site.

S. No.	Particulars	Quantity (KLD)	Source
1	Domestic purpose – for workers	2.0	Tanker Water supply on Contract basis and nearby wells
2	Dust Suppression / Water sprinkling at mine	12.0	
3	Green belt / Plantation		
	Total	14.0	

POWER: The total power requirement will be 75 kW for compressors which will be operated by Diesel Engine. The source of electricity for domestic consumption within the quarry site is from the supply of Kerala State Electricity Board (KSEB).

Quantity of wastes to be generated (liquid and solid) and scheme for their management / disposal.

SOLID WASTE: The development involves only removal of 1m top soil and over burden to be generated out of production. Here, the recovery is taken as 100% of total excavation since the area is covered with a thin layer of weathered gneiss. This will also be used for filling in the proposed site of

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Adani port. The total production for five years is 1355780 MT. Production plan is shown in plate VI to VII.

TABLE-I

Year	Top Soil (MT)	Rom ore/ Mineral (MT)	Average production per day (MT), (300 days/year)
I	12324	105840	353
II	12334	583580	1945
III	37800	583380	1945
IV	---	41490	138
V	---	41490	138
Total	62458	1355780	

Top Soil and Building Stone for crushing will be removed periodically by hydraulic excavator and tipper combination. Top soil along with Overburden which amounts to **62458 MT** will be generated for the first **5** years will be stored in Re-Survey No. 346/1 (Consented Property of Shoshama), which will be used for refilling over the mined out benches during the time of afforestation. The Five Years Dump Dimension is show on Plate-VI(A-D). The Maximum height and spread of the temporary dump is given as under.

Top Soil along with Overburden (69 X 46 X 9.839 X 2.0)	62458 MT
-----------------------------------------------------------	-----------------

The Building Stones will be stacked at the entry of mine within the lease boundary for transport to crushing units.

The topsoil excavated from the quarry will be dumped separately at pre-determined place and subsequently will be utilized in spreading over reclamation 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. Also, we shall provide a retaining wall surround the dumping area having height of 2-3 m, which help to avoid the soil erosion. It will be suitably protected from soil erosion and infertility by planting fodder grass and leguminous plants during temporary storage. A good mining practice is to store the topsoil for reuse. The topsoil is the most valuable resource for re-vegetation after mining, as it contains the majority of the seeds, roots and microorganisms. Simultaneously replanting (which begins during mining operations- after first year onwards) is very important because if topsoil is stockpiled for a long

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period of time, its quality deteriorates. Therefore, conservation and protection of topsoil is crucial. The best practices involved in the topsoil management are as follows;

- Scrap the topsoil prior to drilling and blasting.
- Scraped topsoil should be used immediately for the plantation work.
- If topsoil is not used immediately then it should be staked at designated area.
- Stacked topsoil area should be surrounded by embankment (2-3 m height of retaining wall) to prevent erosion.
- Height of stacking should not exceed more than six meters.
- Drainage should be considered to handle heavy rainfall.
- Stacked topsoil should be stabilized further by grasses and bush to protect from the wind.

The OB 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. Preventive measures to arrest erosion particularly at the initial stage of overburden management while stacking the same at the designated area:

- Excavation from a new pit should begin only after an existing pit has been exhausted. This would ensure that the overburden and interburden generated is used for backfilling the exhausted pit, instead of being dumped elsewhere.
- Till a pit is exhausted, the overburden should be properly compacted and stacked in specified locations in low-lying non-mineralised zones within the lease area.
- The height and slope of the overburden dumps should be maintained to prevent accidents.
- Drainage should be considered to handle heavy rainfall.
- Sedimentation tanks should be constructed to treat run-offs

General Dumping Practices

- During the planning stage identification of waste storage yard and topsoil should be done based on slope and runoff characteristics. The individual dump will have maximum slope of 37° and an overall slope not exceed 28°.
- The completed dumps and the back-filled areas will be afforested in a planned way to increase their stability.

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- The top soil prior to drilling and blasting will be stacked at designated area surrounded by embankment to prevent erosion. The over burden and top soil dumps will be stabilized by plantation and retaining wall.
- The external dump will have stretches of retaining wall at suitable locations and the wall will be constructed with suitable height (2.5m) and top surface.
- The wall will have weep holes to drain out water to the garland drain.
- Runoff from the mine and waste dumps should be regulated by constructing check dams and garland drains. Garland drains should be constructed on all side of quarries and dumping yards. All the garland drains should be routed through adequately sized catch pits or settling pits to remove suspended solids from flowing into storm water.
- Plantation on the overburden dumps can only be taken up after dumping activity is stopped and the site is proposed for plantation. A layer of topsoil should be spread over the area and roughly leveled. Coir net / blanket should be spread and native grass seed mix should be broadcasted uniformly on prepared slope.

Reclamation Practices

The overburden and top soil stabilisation is important from the environmental and aesthetic point of view. The most common method of stabilisation is reusing by plantation. Back filled Overburden and Top soil are generally reclaimed by tree species as plantation improves the moisture contents, bulk density, pH and overall nutrient contents of soils. Maintain a reverse slope in all benches during the operational phase to avoid the erosion of back filled OB and Soil and maintain a small channel in the bottom terrain of the benches.

Tree species like *Dalbergiasissoo* (rose Wood), *Eucalyptus*, *Cassiaseamea*, *Acacciamangium* (*Accasia*) and *Peltaphorum* (commonly known as **Copperpod, Yellow-flamboyant**) are found to be ideal for bioreclamation of back fills. (*Source: Environmental Impact Assessment Guidance Manual for mining of minerals, prepared by Administrative Staff College of India, Hyderabad*)

LIQUID WASTE:

Domestic Sewage: The sewage to a tune of 1.0 KLD generated from the mine office.

Schematic representation of the feasibility drawing which give Information of EIA purpose

Not Applicable

4. SITE ANALYSIS

The Site is situated at Re Survey No. 341/6 pt of Koodal Village, Konni Taluk, Pathanamthitta District, and Kerala for an area of 4.8556 hectares in favor of Mr. Rajesh Kumar JHA, Chief Executive Officer of M/s. ADANI VIZHINJAM PORT PVT. LTD. The geographical location of the mine with respect to the boundary pillars of the lease area (extreme most points) is given below. The site is geographically located between:

Latitude (N): 9°08'54.81"N to 9°09'04.73"N

Longitude (E): 76°52'13.29"E to 76°52'25.10"E

Slope Stability

Currently site having slope approximately 24.2°, shall become approximately 38.2°, after the period of mining. Final slope is less than 45°. Hence it is safe.

Hazard Zone Map

Due to steep slopes, a large part of the district is prone to landslides, especially during the rainy season but our proposed site does not belong in the landslide prone area. The Pathanamthitta district falls under seismic zone III of ISI Classification. The Landslide map is shown below:

Landslide Map

A part of proposed area is belonging in low hazard zone and distance from the lease area to the nearest medium hazard area is 1.4km

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Connectivity

Sl No	Particulars	Distance and Direction
1	Nearest town	Koodal-3.0km-SW
2	Connecting Road	7.5m quarry approach road connecting with the Inchappara road.
3	Nearest Airport	Trivandrum International Airport-85.0km-S
4	Nearest Highway / Roads	SH 8(Punalur to Muvattupuzha)-1.8km-W
5	Nearest Railway Station	Aavaneeshwaram -14.5 km -SW

➤ **Land Form, Land Use and Land ownership**

The lease Area does not involve any forest, agriculture or grazing land. The land is Government patta, the land is not viable for agricultural purpose.

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Table 4: Land Use Details of project area

No.	Land Use	Pre-Operational (Ha)	Operational (Ha)
1	Mining area	1.2266	3.9430
2	Road	0.0030	0.0180
3	Safety and Plantation area	0.8946	0.8946
4	Virgin Area	2.7314	-
Total		4.8556	4.8556

➤ **Land use**

The land use pattern of the proposed mining project is given below:

Distances from the periphery of the project to the periphery of the forests, national park, wild life sanctuary, eco sensitive areas, water bodies, notified industrial areas, crz area etc.

SI No	Particulars	Distance and Directions
1	Ecological sensitive zone (National Park, Sanctuary, Habitat for Migratory Birds, Tiger Reserve)	Achankovil river-6 km NE Konni Reserve Forest -2.5km-SE Thenmala Reserve Forest - 21.8km-SE
2	Interstate Boundary	None within the study area
3	Critically Polluted Area as identified by CPCB	None within the study area
4	Defense installations	None within the study area
5	Archeological Features	None within the study area
6	Nearest Forests	Konni Reserve Forest -2.5km-SE Thenmala Reserve Forest - 21.8km-SE
7	Nearest streams/ rivers/ water bodies (from mine boundary)	Achankovil river-6 km NE Kallar River-11.7km-NE Kallada River-7.30km-S
8	HLWG Report status	Not Fall in ESA
9	CRZ	Not Applicable

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PVT. LTD. at Koodal Village, Konni Taluk & Pathanamthitta District, Kerala.**

Existing infrastructure

The existing infrastructure around the project site includes tarred roads, electricity supply from Kerala Electricity Board, water supply from Kerala Water Authority / Panchayat supply, storm water drains along the roads.

Soil Classification

Based on the morphology, physical and chemical properties, the soils of the district are classified as Forest Loam, Lateritic, Brown hydromorphic, Riverine alluvium and Greyish Onattukara soils.

The diversity of the parental rock, the climatic conditions and differential weathering has led to the formation of these different soil types. Forest loam is the product of weathering of the country rock under forest cover. Forest loamy soil is encountered in the eastern parts of the district, in major parts of Ranni and Konni blocks. Lateritic soil is the most widely occurring soil type in the district. This soil is the product of lateralization of the crystallines and sedimentaries under humid tropical conditions. Brown hydromorphic soil occurs mostly in valley portions in the midland area of the district. The soil is formed as a result of transportation and deposition of material from the adjoining hill slopes under impeded drainage conditions. Riverine alluvium occurs mostly along the banks of rivers and their tributaries. Greyish Onattukara soil is having very limited occurrence in the district and is restricted to the western parts of Pulikeezh block. *(Source: District Survey Report, Department of Mining & Geology).*

Climatic Data

PATHANAMTHITTA district receives rain under the influence of both southwest and northwest monsoons. The southwest monsoon chiefly contributes to the rainfall in the district. Most of the precipitation occurs in the form of cyclonic storms caused due to the depressions in Arabian Sea. Average rain fall of the district is **3133mm** a year. The south west monsoon from June to September contributes nearly **56.8%** of the total rainfall. The northeast monsoon season from October to December contributes about **21.7%** and balance **21.5%** is received during the month of January to May pre-monsoon showers. Most of rainy days occur during the South west monsoon season.

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Wind

The wind speed ranges from **6.7** to **10.9** km/hour. The wind speed is high during the months of March to September.

Temperature

The temperature is more during the months of March to May and is less during December and January. Annual temperature of the region is reported to be minimum **22.6°C** to **25.5°C** maximum temperature ranges from **28.5°C** to **32.7°C** during sum.

Humidity

The Humidity is higher (about 87%) during the monsoon period from June to September.

Biological environment

A primary study of flora & fauna was conducted and no endangered/endemic species were identified in this area. A detailed study of Flora & Fauna will be conducted with the approved agencies and a report will be submitted accordingly.

The Proposed site is having steep slope and mainly consists of rubber plantation. No animals were spotted or reported in the site. A primary investigation was carried out to assess the floral and faunal diversity. There were no direct sightings of any animals and the locally found faunal species is analyzed in consultation with local people. Plants, Mammals, birds etc. were assessed by Standard biodiversity assessment methods. There is rubber plantation in and around the area applied for quarry lease.

Greenbelt Development

Greenbelt is an important sink of air pollutants including noise. Green cover in mining area not only help in reducing pollution level, but also improves the ecological conditions and prevent soil erosion to great extent. It further improves the aesthetics and beneficially influences the microclimate of the surrounding. It also helps to stabilize the slope of external overburden dumps.

Many a times, it attracts the animals to re-colonize the area when the mine is abandoned. However, green belts may be developed with plant species suitable to the area. Plant species, selected for greenbelt should have rapid growth, ever green, large crown volume and small/pendulous leave with smooth

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surface. All these characteristics are difficult to get in a single species. Therefore, a combination of these is sought while selecting trees for vegetation cover.

Greenbelt should be developed in following areas:

- Along mine lease boundary
- Along the side of major roads
- On external overburden dump

The species of plantation should be selected considering the soil quality, place of plantation, chances of survival, commercial value etc. Only indigenous species should be planted. Mixed plantation should be done keeping optimum spacing between the saplings. The species suitable and guideline for greenbelt development given in Central Pollution Control Board's publication "Guidelines for Development of Greenbelt CPROBES/75/1999-2000" should be followed.

Example of some of the species that can be planted in buffer zone and nearby owned land is listed below:

Sl. No.	Scientific Name	Common Name
01.	<i>Albizia chinensis</i> (Osbeck) Merr.	Vaaka
02.	<i>Albizia lebbbeck</i> (L.) Benth.	Kunnivaka
03.	<i>Alstonia scholaris</i> (L.) R. Br.	Ezhilam pala
04.	<i>Aporosa lindleyana</i> (Wight) Baill.	Vetti
05.	<i>Artocarpus heterophyllus</i> Lam.	Plavu
06.	<i>Artocarpus hirsutus</i> Lam.	Ayini
07.	<i>Bombax ceiba</i> L.	Ilavu
08.	<i>Briedelia retusa</i> (L.) A. Juss.	Mulluvenga
09.	<i>Callicarpa tomentosa</i> (L.) L.	Naithekkku
10.	<i>Chionanthes mala-elengi</i> (Dennst.) P. S. Green	Mala- elengi, Kalledela
11.	<i>Cinnamomum malabattrum</i> (Burm.f.) Blume	Ilavangam, Karuppa
12.	<i>Garcinia gummi-gutta</i> (L.) Robs.	Kudampuli
13.	<i>Grewia tiliifolia</i> Vahl	Chadachi, Unnam
14.	<i>Holarrhena pubescens</i> (Buch.-Ham.) Wall.	Kudakappala
15.	<i>Kydia calycina</i> Roxb.	Vellachadachi

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16.	<i>Lagerstroemia microcarpa</i> Wight	Venthekku
17.	<i>Lannea coromandelica</i> (Houtt.) Merr.	Kalayam
18.	<i>Litsea coriaceae</i> (Heyne ex Meisner) Hook. f.	Maravettithali
19.	<i>Mangifera indica</i> L.	Maavu
20.	<i>Melia dubia</i> Cav.	Malaveppu
21.	<i>Melicope lunu-ankenda</i> (Gaertn.) Hartley	Kambili, Nasakam
22.	<i>Olea dioica</i> Roxb.	Karivetti, Edala
23.	<i>Persea macrantha</i> (Nees) Kosterm.	Kulirmavu
24.	<i>Phyllanthus emblica</i> L.	Nelli
25.	<i>Pterocarpus marsupium</i> Roxb.	Venga
26.	<i>Stereospermum colais</i> (Buch.-Ham. ex Dillw.) Mabb.	Pathiri
27.	<i>Syzygium cumini</i> (L.) Skeels	Njaval
28.	<i>Tabernaemontana alternifolia</i> L.	Koonampala
29.	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Thaanni
30.	<i>Terminalia paniculata</i> Roth	Maruthu
31.	<i>Toona ciliata</i> Roem.	Chandanavembu
32.	<i>Trema orientalis</i> (L.) Blume	Pottama
33.	<i>Wrightia tinctoria</i> (Roxb.) R. Br.	Danthappala

Social Infrastructure Available

The project area is easily accessible in all seasonal conditions. The quarry lease area is around 1.8 kms aerial distance from State highway 8. Site has a good access (7.5 m wide) from Road, around 55m distance. The nearest rail head on Broad Gauge is Aavaneeshwaram which is at a distance of 14.5 kms approximately and the nearest Airport is Trivandrum International Airport about 85.0kms.

Table 13: Social Infrastructures Details

SI No	Particulars	Distance and Direction
1	Power supply	KSEB Nedumonkavu,2.0 km NW
2	Water and its Source	Well – 64.0m
3	Nearest Hospital / dispensary	Govt. Hospital, Koodal-2.5km-SW
4	Education facility	Govt. School, Koodal-2.5km-SW

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5	Police Station	Koodal Police Station, 2.5 km SW
6	Fire Station	Fire and Rescue Station, Konni ,10.0 km,NW
7	Ambulance	Govt. Hospital, Koodal-2.5km-SW
8	Church / temple / mosque	St.Gregorios Orthodox Church, Inchappara -0.7km-W Juma Masjid, Murinjakal- 3.1 km NW Karakkakupuzhi Sree Bhadrakali Temple- 0.39 km E

5. PLANNING BRIEF

Planning concept

Open cast method of semi-mechanized mining will be adopted to extract Building stone of required size. Machineries like tractor mounted compressor attached with jack hammers is proposed to drilling and blasting. Excavators are proposed for quarrying of Granite Building Stone and Tippers / Lorries are proposed for the transportation of Building Stone to the destination.

Population projection

About 47 persons of employees proposed for the quarrying operation. Most of the person will be sourced from neighboring villages. Thus, there will be no increase in population due to the project.

Land use planning

No.	Land Use	Pre-Operational (Ha)	Operational (Ha)
1	Mining area	1.2266	3.9430
2	Road	0.0030	0.0180
3	Safety and Plantation area	0.8946	0.8946
4	Virgin Area	2.7314	-
Total		4.8556	4.8556

Assessment of infrastructure demand (physical and social)

The mine site has its own approach road and well connected to the nearest public road / highway, which will help in commutation of workers and transportation of minerals. As such there is no major

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infrastructure facilities planned in this project and does not call for importance. The main mining site and secondary access road will be kept in a sufficient condition to allow access. On the basis of the site visit, the infrastructure demand in the nearby villages will be assessed on the basis of need and priority. Job opportunities are limited and newer avenues of skill development for income generation are required.

Amenities/ Facilities

Following facilities are provided for the smooth working of the mine: -

- Mine office / Site office
- Magazine area for storage of explosive
- Storm water collection pond
- First aid room
- Store facility
- Toilet facility
- Drinking water facilities
- Rest shelters: Rest shelter room is provided to take lunch and rest for the mine workers.

Proposed infrastructure

The extent of lease area 4.8556 Ha of Government land is recommended for grant and is under process at the Department of Mining & Geology. The proposed method of quarry operation will be semi mechanized opencast method with jackhammer drilling & blasting with tipper/tractors for internal transport. The lease area does not have any public roads, railway lines, telephone lines, public buildings etc.

Present infrastructure will meet the requirement of the project. The conditions of the roads in the buffer zone are unlikely to be impacted due to the proposed medium scale expansion. The project authorities in association with the adjacent quarry owners & district administration will also contribute to development & maintenance of roads.

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Social Infrastructure

The Social Infrastructure facility available around the site is provided at Table No. 13.

Drinking Water Management

Drinking water shall be provided to the nearby public. Quantity for Drinking and utilities is **2 KLD**. Dust suppression and Green belt of water is **12 KLD**. Minimum quantity of **14 KLD** is required. Drinking water will be purchased and water for dust suppression and green belt development will be sourced from wells in site.

Sewage System

Latrines & urinals shall be maintained at convenient places for use of labours separately for males and females. Washing facilities shall also be arranged.

Industrial Waste Management

There is no generation of affluent/toxic substance; hence treatment of quarry water doesn't arise.

Solid Waste management

Top Soil and Building Stone for crushing will be removed periodically by hydraulic excavator and tipper combination. Top soil along with Overburden which amounts to **62458 MT** will be generated for the first **5** years will be stored in Re-Survey No. 346/1 (Consented Property of Shoshama), which will be used for refilling over the mined out benches during the time of afforestation. The Five Years Dump Dimension is show on Plate-VI(A-D). The Maximum height and spread of the temporary dump is given as under.

Top Soil along with Overburden (69 X 46 X 9.839 X 2.0)	62458 MT
-----------------------------------------------------------	-----------------

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The Building Stones will be stacked at the entry of mine within the lease boundary for transport to crushing units. No waste is generated during the mining period as the recovery is considered as 100%. All the excavated mineral will be transported to Vizhinjam port for refilling.

Power requirement and supply

There will not be any requirement of power supply to the project site. The quarry activities are envisaged to be carried out only during day time. For drilling, loading, unloading by excavators & with tippers for transport & all the equipment shall be operated with diesel as motive power. The power supply which will be required for office and work shop will be met through Kerala State Electricity Board.

7. REHABILITATION AND RESETTLEMENT (R & R PLAN)

The proposed site is Government land and there is no rehabilitation and resettlement. It is a fresh granite quarry and there is no habitation in the lease area, therefore rehabilitation & resettlement plan is not required / applicable for this project. The nearest habitations with the population is given as under,

Direction	No of Houses	Distance in meters	Population (Approx.)
N-NE	2	485	5
E-SE	24	230-490	90
S-SW	26	100-480	100
W-NW	3	120-330	9

8. PROJECT SCHEDULE AND COST ESTIMATES

Likely date of start of production and likely date of completion

Sl No	Particulars of	Time Schedule (in Month)			Remark
		1-3	4th	5th	
1	Environmental Clearance				

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	from SEIAA				
2	Consent to Establish from Statutory bodies				Project Establishment Period
3	Consent To operate from statutory bodies				Production Start Period
*schedule plan may vary; subjected to rules & regulation / & other unforeseen circumstances					

PROJECT COST

Proposed financial estimate / budget for (EMP) Environment Management

a) Fixed Asset Cost

i)	Land Cost	:	---	(Govt. Land)
ii)	Refilling / Fencing	:	Rs	1,00,000
iii)	Laborers Shed	:	Rs	1,00,000
iv)	Canteen facility	:	Rs	1,00,000
v)	Other items	:	Rs	1,00,000
	Total		Rs	4,00,000/-

b) Operational Cost:

i)	Machinery cost			
	L&T Komatsu PC 300	:	Rs	1,20,00,000
	L&T Komatsu PC 200 (2 Nos)	:	Rs	1,20,00,000
	Tata Tipper (5 Nos) + 7 Rented	:	Rs	2,00,00,000
	Compressor, Jack Hammer, Pump etc. :		Rs	1,00,00,000
	Auxiliary equipments (Jeep, JCB			
	Water tanker, Water sprinklers Etc.):		Rs	1,00,00,000
	Total	:	Rs.	6,40,00,000/-

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c) EMP Cost:

i)	Drinking water facility for the laborers	: Rs 1,00,000
ii)	Sanitary arrangement	: Rs 1,00,000
iii)	Safety kits,	: Rs 2,00,000
iv)	Dust control	: Rs 50,000
v)	Afforestation etc.	: Rs 2,50,000
	Total	Rs 7,00,000/-

Total Project Cost : Rs 6,51,00,000/-

9. ANALYSIS OF PROPOSAL

- Due to steep slopes, a large part of the district is prone to landslides, especially during the rainy season but our proposed site does not belong in the landslide prone area. The Pathanamthitta district falls under seismic zone III of ISI Classification. Our proposed site (Konni Taluk) does not belong in any hazard zone.
- The project construction will involve cutting and removal of different trees from the project site. These species are commonly found in the region, and none of them belong in the rare category plants of IUCN. Regarding the conservation status of the fauna, none of the animal species identified from the site belonged to the threatened categories identified by the International Union for Conservation of the Nature and Natural Resources (IUCN). Most of them are common and widely distributed and the range of occurrence extended to wide geographical area.
- Mining operation will terminate much before the water table hence there will be no intersection with the water table. Since the working is above the general ground water table, it does not affect the ground water.
- Currently site having slope approximately 24.2° , shall become approximately 38.2° , after the period of mining. Final slope is less than 45° . Hence it is safe.

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- The topsoil excavated from the quarry will be dumped separately at pre-determined place and subsequently will be utilized in spreading over reclamation areas for plantation. The OB excavated from the quarry will be utilized within the pit for lying of haul roads. At the end use, OB can be reutilized as soil base for plantation. The over burden and top soil dumps will be stabilized by plantation and retaining wall. The wall will have weep holes to drain out water to the garland drain. Garland drains should be constructed on all side of quarries and dumping yards. All the garland drains should be routed through adequately sized catch pits or settling pits to remove suspended solids from flowing into storm water. The storm water should pass through weep holes to the garland drains.
- Proper and safe storage of explosives in approved and Licensed Magazine. Proper, safe and careful handling and use of explosives by competent Blasters having Blaster's Certificate of Competency issued by DGMS.
- During mining activities, proper measures will be taken to ensure safety at site. In order to handle disaster/ emergency situations, Management entrusting responsibility to Emergency Response Team will be prepared with their specific roles during emergency.
- This proposed CSR/CER report was prepared in accord with the latest Memo regarding Corporate Environment Responsibility (F.No.22-65/2017-1A.III). And the funding allocated for the community activities is more than 2% of the capital investment.
- All necessary mitigation measures will be taken to reduce the impact of mining on air, water, noise and land environment.
- The project provides direct and indirect employment opportunities to the people of the surrounding areas. There is no rehabilitation involved in this project.
- Maximum possible area will be reclaimed and green belt will be provided. Thus, the proposed project will help in improving the ecosystem of the area.
- The project will benefit marginally to the state revenue through royalty on the stone and other taxes.
- The mine owner will carry out various socio-economic welfare activities in the nearby villages.

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- An added benefit of the proposed project will result in considerable growth of stimulating the industrial and commercial activities in the area. Small scale industries may be further developed as a consequence.

Place: Pathanamthitta

Date: 24-09-2019

RQP:



MAHESH. S

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S N Nager, Pettah (p.o),

Trivandrum – 695024

Kerala

Applicant:

Mr. RAJESH KUMAR JHA

Chief Executive Officer

M/S. ADANI VIZHINJAM PORT PVT. LTD.