DISTRICT SURVEY REPORT FOR

ROUGH STONE

TIRUNELVELI DISTRICT

தமிழ்நாடு அரசு
புவியியல் மற்றும் சுரங்கத்துறை

GOVERNMENT OF TAMIL NADU
DEPARTMENT OF GEOLOGY AND MINING

TIRUNELVELI DISTRICT

2019

1. INTRODUCTION

In conjunction to the Ministry of Environment, Forest and Climate Change, the Government of India Notification No.SO 3611 (E) dated 25.07.2018 and SO 190 (E) dated 20.01.2016 the District Level Environment Impact Assessment Authority (DEIAA) and District Environment Appraisal Committee (DEAC) were constituted in Tirunelveli District for the grant of Environmental Clearance for category "B2" projects for quarrying of Minor Minerals.

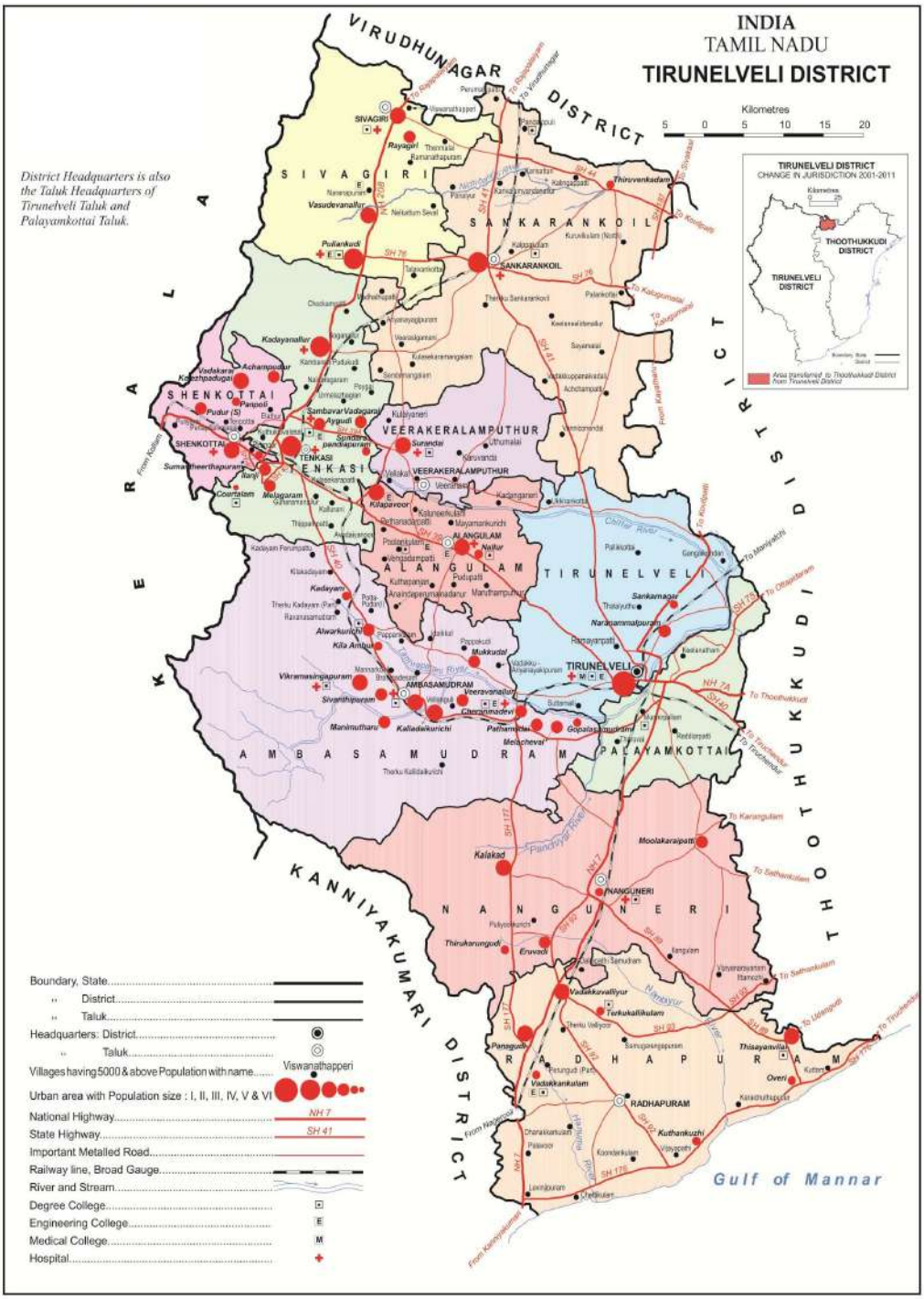
The main purpose of preparation of District Survey Report is to identify the mineral resources and develop the mining activities along with relevant current geological data of the District. The DEAC will scrutinize and screen scope of the category "B2" projects and the DEIAA will grant Environmental Clearance based on the recommendations of the DEAC for the Minor Minerals on the basis of District Survey Report. This District Mineral Survey Report is prepared on the basis of field work carried out in Tirunelveli district by the official from Geological Survey of India and Directorate of Geology and Mining, (Tirunelveli District), Govt. of Tamilnadu.

Tirunelveli district was formed in the year 1790 and is one of the oldest districts in the state, with effect from 20.10.1986 the district was bifurcated and new district Thothukudi was formed carving it. Tirunelveli district has geographical area of 6759 sq.km and lies in the south eastern part of Tamilnadu state. The district is bounded by the coordinates 08°05 to 09°30' N and 77°05' to 78°25 E and shares boundary with Virudunagar district in north, Thothukudi district in east, Kanniyakumari district in south and with Kerala state in the West.

District Abstract			
1.	Area	:	6823 Sq.Kms
2.	No.of Revenue Divisions	:	3 - Tirunelveli, Cheranmadevi and Tenkasi
3.	No.of Taluks	:	16
4.	No.of Revenue Villages	:	559
5.	No.of Panchayat Unions	:	19
6.	No.of Village Panchayats	:	425
7.	No.of Town Panchayats	:	36
8.	No.of Municipalities	:	7
9.	No.of Corporation	:	1 - Tirunelveli

The perennial river Tamiraparani flows almost in the central part of the district and feeds the entire district population. Tirunelveli district has fifteen taluks (Alangulam, Ambasamudram, Nanguneri, Palayamkottai, Radhapuram, Sankarankoil, Shenkottai,

Sivagiri, Tenkasi, Tirunelveli, Thisaiyanvilai, Veerakeralamputhur, Cheranmahadevi, Kadayanallur, Manur and Thiruvenkatam) with total population of 33, 22, 644 (as per 2011



census).

Fig. 1. Tirunelveli district map showing important towns and road connectivity.

2. OVERVIEW OF MINING ACTIVITY IN TIRUNELVELI DISTRICT.

Crystalline Limestone, Multi color dimension stone, rough stonr/gravel, garnet and ilmenite sand are noteble economic importance minerals of found in Tirunelveli District. Minor occurrences of graphite, mica and gemstone are also reported in the district. Mining activities based on rough stone (mostly charnockite) are majorly concentrated in Alangulam, Radhapuram, Nanguneri, Manur and Sankarankovil Taluks in the district under operation for production of construction materials and earth fill as gravel.

The multi color dimension stones occurring at Kaladaikurichi (Ambai White), Poongudiyarkulam, Mannarkovil, Adachani in Ambasamudram Taluk, Kasthurirangapuram, Kannanallur in Radhapuram Taluk and Singikulam, Melacheval in Cheranmahadevi Taluk are recorded in the district which once actively mined by M/s TAMIN Ltd (Govt of Taminadu) and other private miners.

Crystalline Limestone occurring as bands in Talayuttu and Ramaayyanpatti extends over strike length of 2.5 km with average width of 120 m were extensively mined by M/s India Cements Ltd, M/s South India Mines and Minerals Industries Ltd, M/s Krishna Mines etc in recent years. Crystalline limestone intercalated with calc granulite occurring in Padmaneri, Pottasutti, Singikulam, Pandapulli, Terku Seliyanur and Marandai areas were also mined in 1980's by M/s TAMIN Ltd (Govt of Taminadu) and other private agencies.

Rich deposits of garnet and ilmenite sand occurs along the coast part of Radhapuram Taluk, in Tirunelveli district. Red garnet sand occurs along Nambiar River. Vijayapatti, Kuttankuzhi and Idindakarai areas show notable garnet and ilmenite sands occuurrences which were exploited economically in recent times.

The Deputy Director, Geology and Mining, Tirunelveli district functioning under the control of District Collector, Tirunelveli manages and administrates the minerals and mining activity in the district.

3. GENERAL PROFILE OF TIRUNELVELI DISTRICT.

Tirunelveli district has its climate, physiography and culture almost similar to Tamil Nadu State, and as a whole it described as the microcosm of the State. The erstwhile single district which is ancient in history and culture, was divided into two districts, namely Tirunelveli - the western half of the former district, and Thoothukudi district - the eastern half of the former district - through the State Government's Notification G.O.Ms.No.l314, dt.27.09.1986. The erstwhile district, which covered an area of 11,433 sqkms, has been limited to 6,283sqkms, after bifiircation. Tirunelveli is derived from three Tamil words *tiru* (holy), *nel* (paddy), and *veil* (fence), which meant for *Sacred Paddy Hedge* referring to a legend that the God Shiva protected a devotee's rice crop there. Later the city was one amongst the commercial centre under the Pandya Dynasty who ruled Tamil Nadu during medieval period.

The population of this District was 2723988 as per 2001 Census and 30, 72,880 as per 2011 census. The Density of Population per sq.km. was 399 as per 2001 census and 455 persons as per 2011 census . Tirunelveli, Tenkasi and Ambasamudram are the most densely populated Taluks in the District as per 2001 census. The Sex ratio is 1024 females for every 1000 males in the District as per 2011 census. The Literacy rate is 76.09% in the District as per 2001 census. Out of the total population, males are 1333939and females1390049 as per 2001 census. Out of the total population, males are 1518595 and females 1554285 as per 2011 census.The district having Schedule caste population of 481052 which represents 17.66% to total population as per 2001 census. Schedule Tribes are found to be very small in numbers 358 which is 0.31% of the Total population. 4.36% of State population lives in Tirunelveli district, 1415742 live in Rural area and 1308246 live in urban area forming 52% and 48% respectively as per 2001.

There are 25 medium and major industries such as cement, cotton yarn, calcium carbide, sugar, cotton seed oil, printing papers and flour mill etc. Among the other industries in the district pin, clip, matches, beedi, vessels making and engineering industries are important. The important Village industries functioning in the district are handloom, poultry farming, brick making, jaggary (Palm) production. The Handloom products Lungi, Sarees etc are marketed in north India. So also the fine Korai mats one from Pathamadi has world fame. Kallidaikurichi pappads, Karukurichi mud pots, also Tirunelveli “Halva” are specialities which earned many laurels to the District.

Courtallam is situated at the Western Ghats in Tenkasi Taluk. The famous waterfalls on rocks and tiny droplets are sprinkled in the air. The water falls of Courtalam have medicinal value as they run through forest and herbs before their decent. Pappanasam Agasthiar falls also attracts tourist and pilgrims.There is a Wild life sanctuary at Mundanthurai and Kalakadu. Spotted deers, Liontailed monkeys, Elephants and Tigers are plenty.

The Nellaiappar temple at Tirunelveli, Sankaranainar temple at Sankarankoil, Kasiviswanathar temple at Tenkasi and Vanamamalai Temple at Nanguneri are the land marks of the District signifying the Hindu Culture. Palayamkottai has many Christian missions and Athankaraipallivasal & Pottalpudur Darga have considered being important sacred places for Islam.

4. GEOLOGY OF THE DISTRICT

4.1 An Over view of Geology of Tamilnadu

Crystalline rocks of Archaean to late Proterozoic age occupy over 80% of the area of the state of Tamilnadu, while the rest is covered by Phanerozoic sedimentary rocks mainly along the coastal belt and in a few inland River valleys. The hard rock terrain comprises predominantly of Charnockite and Khondalite groups and their migmatitic derivatives, supracrustal sequences of Sathyamangalam and Kolar groups and Peninsular Gneissic Complex (Bhavani Group), intruded by ultramafic-mafic complexes, basic dykes, granites and syenites. The sedimentary rocks of the coastal belt include fluviatile, fluvio-marine and marine sequences, such as Gondwana Supergroup (Carboniferous to Permian and Upper Jurassic to Lower Cretaceous), marine sediments of Cauvery basin (Lower Cretaceous to Paleogene), Cuddalore /Pannambarai Formation (Mio-Pliocene) and sediments of Quaternary and Recent age.

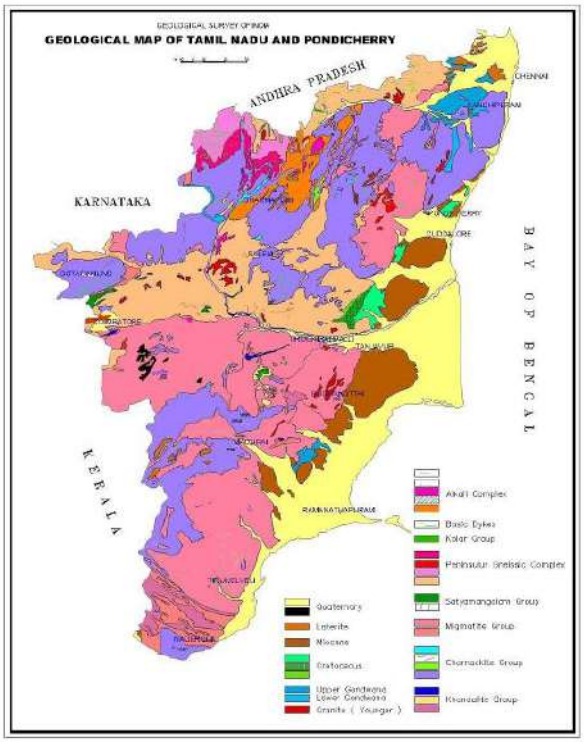


Fig 2. Geological Map of Tamilnadu *(Source: Miscellaneous Publication, GSI, SU: TN&P, Chennai)*

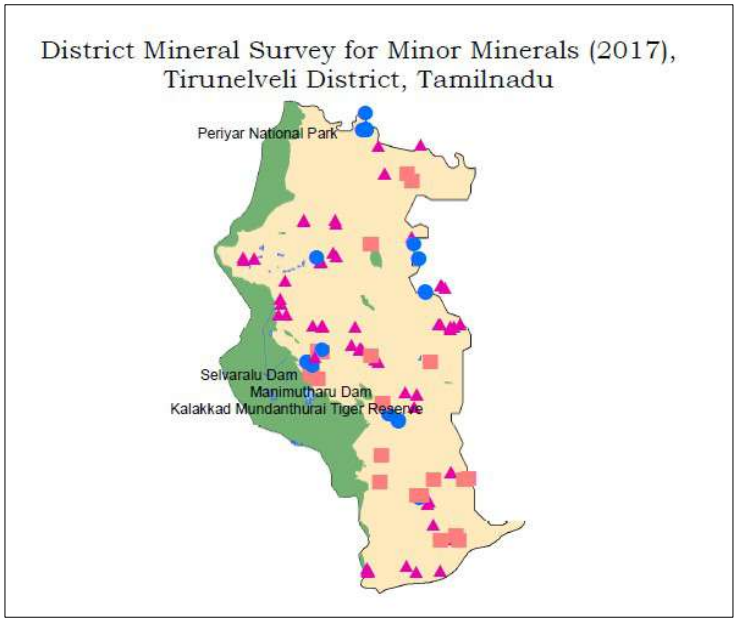
4.2 General Geology of Tirunelveli district:

Southern Granulite Terrain (SGT) of Tamil Nadu lying south of Palaghat-Cauvery shear zone has been divided into two major tectonic blocks by the Madurai block and Nagercoil-Trivandrum Block in the south. It is separated by WNW-ESE trending Achankovil-Tambaraparani Lineament. Tirunelveli and Thothukudi are significantly the only districts in the state to witness the geology and structure of both the blocks.

Tirunelveli district represents a well-developed lithopackage of meta-sedimentary sequence inter banded with charnockite Group of rocks. The rock types exposed are of quartzite, calc-granulite, garnet-biotite-sillimanite gneiss, garnet quartzo-feldspathic gneiss and garnet-biotite-cordierite gneiss belonging to Khondalite Group of rock. Charnockite and pyroxene granulite are the Charnockite Group. Hornblende-biotite gneiss belongs to Migmatitic Complex. Besides, basic intrusive (pyroxenite) and acid intrusive (granite) are noticed. The younger intrusive are represented by pegmatite and quartz veins. Evidence of development of incipient / patchy charnockite along the shear plane is noticed in the district along the Western Ghat high hills.

	Recent-Sub recent	**Soil and alluvium, calcrete**
		Quartz and pegmatite vein
		Incipient charnockite
700-550 Ma	Younger intrusive	Acidic intrusive – Granite
		Basic intrusive (Pyroxenite, Ultramafic/mafic rocks)
2200-2550 Ma	Migmatite Group	Hornblende-biotite gneiss
2600 Ma	Charnockite Group	Meta gabbro (older Intrusive) Charnockite Pyroxene granulite
	Khondalite Group	Garnet-biotite-quartzofeldspathic gneiss Garnet-biotite gneiss Garnet –biotite –Sillimanite gneiss ± cordierite gneiss Crystalline limestone, Calc granulite Quartzite
		Basement Unknown

Table 7.1 General tectono-stratigraphy of Tirunelveli District



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Rough Stone

After independence mineral survey and exploration work in the country took momentum by Geological Survey of India and other govt agencies. Kanishkan (1981-82) carried out mineral investigation for tungsten and associated ores in Tirunelveli and Madurai district and reported the major band of crystalline limestone with lenses of calc-gneiss and calc-ganulite associated with gneisses and quartzite bands to the north of Talaiyuttu around Seliyanur-Nellaitiruttu in Tirunelveli district. Tungsten upto 600 ppm have been recorded in crystalline limestone from the area. Jayaprakash (1986-87) from GSI carried out investigation for calc tufa occurrences in the areas of Uttumalai and Reddiyarpatti shows 35% of CaO and is restricted to a few patches with total areal extent of 2.85 sq.km.

In Tirunelveli district, bulk of crystalline limestone for cement industry comes from Ramayyanpatti, Talaiyuttu and Pandapalli areas. The total reserves are about 20-30 million tonnes with average CaO 45%, MgO 6% and SiO_2 8%. Tuffaceous limestone and kankar of about 23-24 million tonnes occurs near Vijayapatti in the district. Gypsum associated with kankar is reported from a few localities in the saltpans, located along the east coast between Veppalodai and Ayyanapuram in the district. Minor graphite occurrences are located in Kurinjankulam in Tirunelveli District with a reserve of about 19,000 tonnes on Palakottai Hill. Rough stone (mostly charnockite and Hbl-bt gneiss) are majorly concentrated in Alangulam, Radhapuram, Nanguneri, Manur and Sankarankovil Taluks in the district.

Multi color dimension stones occurrences significantly visited during the field work at Kaladaikurichi (Ambai White), Poongudiyarkulam, Mannarkovil, Adachani in Ambasamudram Taluk, Kasthurirangapuram, Kannanallur in Radhapuram Taluk and Singikulam, Melacheval in Cheranmahadevi Taluk of Tiurnelveli District. Rich deposits of garnet and ilmenite sand occurs along the coast part of Radhapuram Taluk, in Tirunelveli district. Vijayapatti, Kuttankuzhi and Idindakarai areas show notable garnet and ilmenite sands occurrences. Red garnet sand occurs significantly along Nambiar river. The main sources of the heavy minerals are found to garnetiferrous quartzo-feldspathic gneiss and garnet biotite sillimanite gneiss of Khondalite Group of rocks.

Occurrences of Limekankar are identified in Kasthurirengapuram village of Radhapuram Taluk. Where the lime kankar deposit is about 2 to 3 meters thickness with minimum soil cover. Limekankar having CaO from 35% to 40%, it may be used for cement manufacturing.

Occurrences of Clay is identified in Pallikottai village of Manur Taluk. In this area clay deposit thickness varies from 1 to 2 meters and contains Al_2O_3 13% to 18%.

5. DRAINAGE OF IRRIGATION PATTERN

Irrigation is the artificial application of water to soil for the purpose of crop cultivation. As the timing and amount of rainfall are not adequate to meet the moisture requirement of cultivation, irrigation is essential to raise crops and meet the need for food and fiber. In areas where the rainfall is plentiful and well distributed over the year there will be year round production. Indeed, rainfall in certain areas will be very scanty as well as uncertain. This is so in Tirunelveli district. The irrigation system in Tirunelveli district consists of rivers like Tamirabarani, Manimuttaru, Pachaiyaru, Nambiyaru, and Chittaru which originating from Western Ghats and running across the gentle slopes of the mid lands and confluence in Bay of Bengal. The River Tamirabarani is the main source of irrigation which also provides drinking water facilities to a number of places in the district, as well. Pabanasam, Manimuttar and Chervalar are the major reservoirs in the district. Gadana Nathi, Ramanathi, Karuppanathi, Gundaru, Adavi Nainar Koil, Vadakku Pachaiyaru, Kodumudiyaru, and Nambiyaru are the minor reservoirs in the district. Besides these rivers and reservoirs the other different sources of irrigation prevailing in the district are canal, tank and well.

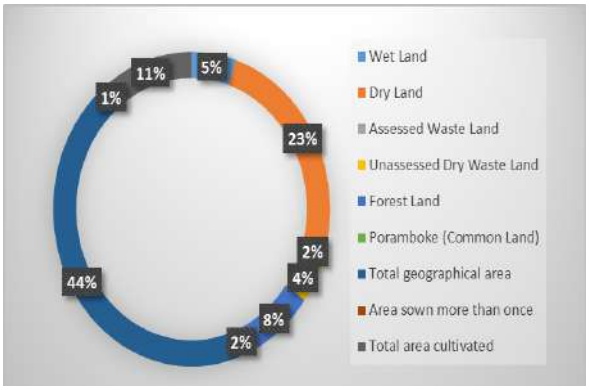
6. LAND UTILISATION PROFILE OF THE DISTRICT

Of the total of 6,82,300 hectares area in Tirunelveli district, about 79,668 (11.7%) hectares are wet lands well suited for the cultivation of paddy and other crops which need adequate water supply, while others are not useful for agricultural purposes. Nearly 3,58,151 (52.5%) hectares is dry land with no irrigation facilities for agriculture, although soil condition is moderate for growing crops, so that it mat be used to grow drought resistant plants which offer firewood.

A block of waste lands which about 39,274 (5.7%) hectares is proclaimed to be not useful for growing crops, because of lack of enough water, poor soil, and undesired topographic conditions. Approximately 57,676 (8.5%) hectares is unassessed wasteland where soil condition is fair while water supply scarcity prevails for several months, so that it is used for agriculture only when rainfall is high. Yet, another 1, 22,055 (17.8%) hectares is occupied by forests which are declared to be reserves as forest resources for liontailed monkeys, rich in deciduous and evergreen plants. Poromboke - common lands, covers about 25,456 (3.8%) hectares, which may be used to create social forests although water is scarce. Fig 4.1 Land use land cover map of Tirunelveli District (after National Natural Resource Management system, ISRO, 2014).

In 2002 as per NRSA data (Bhuvan, Govt. of India), shows that 29% of the total area of urban centers used for residential purposes while in rural centers only 14% of areas used for this purposes. The area of agricultural lands and open spaces gets reduced every year in the district owing to the rapid conversion in these areas for residential purposes. The land use pattern in the district is shown in the Table No.5.1.

Land Use Pattern in Tirunelveli District		
Land Category	**Area (in Hectares)**	**Percentage**
Wet Land	79,668	11.7
Dry Land	3,58.151	52.5
Assessed Waste Land	39,274	5.7
Unassessed Dry Waste Land	57,696	8.5
Forest Land	1,22,055	17.8
Poramboke (Common Land)	25,456	3.8
Total geographical area	6,82,300	100
Area sown more than once	30,163	1.50
Total area cultivated	1,61,976	23.74



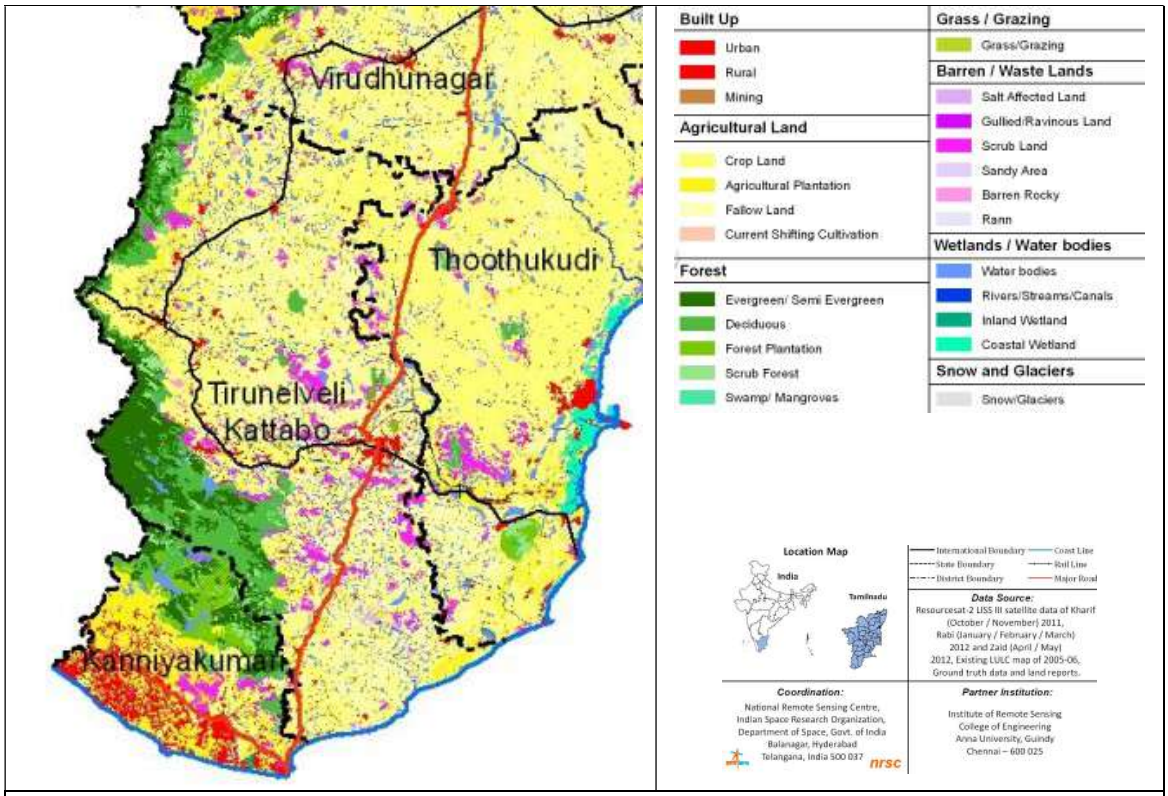
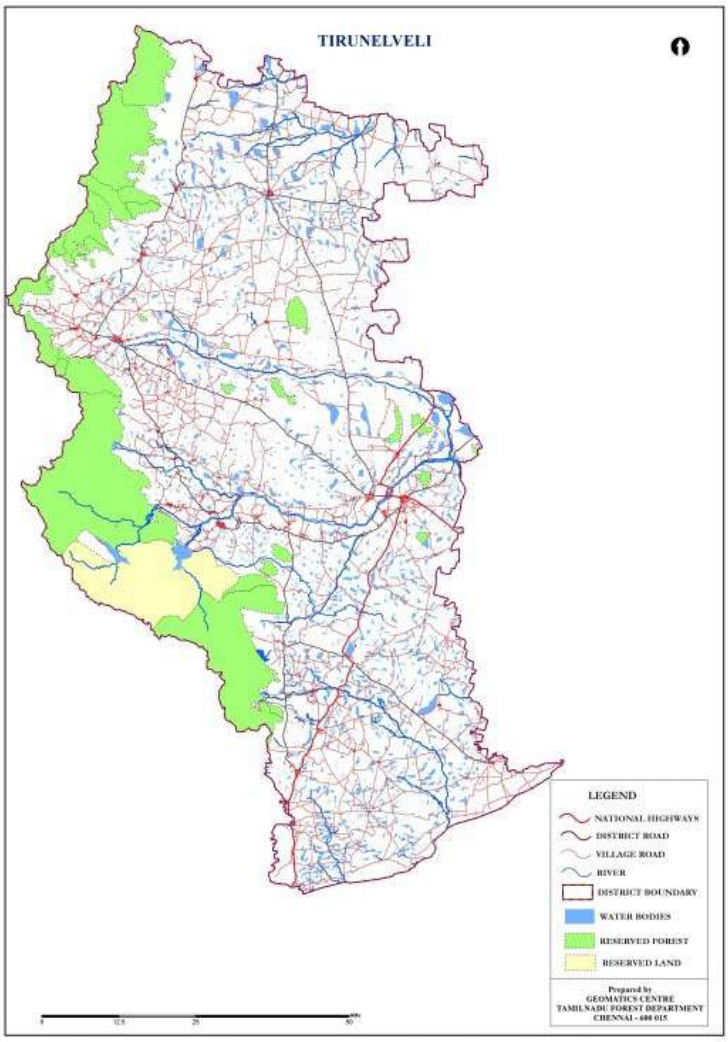


Fig 4. Land use land cover map of Tirunelveli District (after National Natural Resource Management system, ISRO, 2014).

FOREST:

The total area of the forest of the district is 1,22,055 ha of which 81700 ha is set apart for Tiger reserves of Mundanthurai and Kalakadu. The entire forest of the district stretches along the Western ghats. Various types of forests from luxuriant tropical wet evergreen forests to southern thorn scrub forests occur in the district. Owing to its diverse geographical factors,the forests in the district are technically classified as southern hill top tropical evergreen forests, west coast tropical evergreen forests, southern moist mixed deciduous forests, ochlandra reed forests,carnatic umbrella thorn forests, southern Euphorbia scrub and southern thorn scrub.



The forest areas in the district are mostly in the ghat region on the western part of the district.The ghat regions are under the influence of the southwest monsoon and have thick forest. The forest is of light dry deciduous forest growth in the lower slopes and dense masses of short trees from an elevation of 1000 to 4000 feet height. At high peak region of the ghats, evergreen forest with very tall trees are found.Teakwood, blackwood, rosewood etc are the most important among them. Honey, wax, mango, cashew,palmyrah, cane, pepper, tamarind, bamboo etc are the important forest products in the district.

Tiger Reserve Forest with an extent of 817 sq.kms in Ambasamudram Taluk is established which is known as 'Kalakad-Mudanthurai Tiger Reserve'. This Tiger Reserve Forest is extremely rich and diverse in nature, ranging from wet evergreen forest, mixed deciduous forest, dry teak forests to forests and thorny bushes in many places. The animals found in this Reserve forests are Tiger, Leopard, Jungle, Cat, Civet, Hyena, Jackal, Elephant, Guar, Sambar, Mouse, Deer, Nilgris Talir the lion-tailed monkeys etc.

AGRICULTURE

The major crop cultivated in the district is paddy. Other crops like cumbu, cholam, kuthiraivali and ragi are cultivated as dry land crops in the district. Cotton is cultivated in Sankarankoil. Sugarcane is being raised in Sivagiri and Tenkasi taluks. Banana and vegetables are grown in the river belt areas of Ambasamudram, Tenkasi and Tirunelveli taluks. Manimuthar main canal and Papanasam reservoir are the irrigation source for the cultivation of different crops. There is a Farmers Training centre at Palayankottai run with the aid of Danish International Development Agency. Rice Research Station in Urkad near Ambasamudram and a parasite breeding centre for coconut at Tenkasi play a crucial role for the development of the farmers in the district.

SOIL:

The soil condition of the district may be grouped into two main varieties namely red loam soil and black soil. The black soil is of a higher value compared to the red loam soil and the black soil of the Tamirabarani River Valley overlies a stiff yellow colour. The red loam found in Tenkasi, Shenkottai, Sivagiri, and Radhapuram Taluks. The black soil is found in Sankarankoil, Palayamkottai, and Tirunelveli Taluks. The other soils like lateritic, sandy coastal alluvial soil and red-sand soil are not found much in the district. In the south-east coast, the soil is deep, loose and red loam surfaced by sand with its depth varying from a few inches to 20 feet.

Soil Types found in Tirunelveli District	
Soil Type	**Places in Tirunelveli District**
Red Loam	Alangulam, Tenkasi, Shenkottai, Sivagiri, Veerakeralam Puthur and Radhapuram Taluks
Lateritic	Nil.
Black Soil	Sankarankoil, Thiruvengadam, Kuruvikulam, Palayamkottai, Manur, and Tirunelveli.
Sandy Coastal Alluvium and Red Sandy Soil	In coastal areas of Tirunelveli district

HORTICULTURE:

Major horticulture crops cultivated in this district are fruits crops like mango, banana, lime and aonla, vegetables like bhendi, tomato, brinjal, onion, spices and condiments like chillies and tamarind and flower crops like jasmine and rose.

MINERALS AND MINING

Khondolites and the Charnockites with Pyroxene granulites and the associated migmatitic/ rocks are the two major groups of rocks found in the district. Limestones occur within the genesis and are found around Tirunelveli and Ambasamudram. Pink coloured granites, pegmatites and quartz veins are

also found to occur within the above mentioned rocks. Tertiary formations consisting of calcareous sand stones and limestones are also exposed all along the coastal area overlying the Charnockites and genissic rocks particularly around Koondankulam Rocks probably connected with the Deccan trap activity occur as thin veins and dykes within the genissic rocks around Koondankulam. The crystalline limestone deposit located around Tirunelveli is the main mineral supplied to M/s. India Cements at Thalaiyuthu with a capacity of 3000 tonnes per day. Large reserves of limestones of the crystalline, sedimentary and tafaccous types amounting to 59 million tonnes are found in Nanguneri, Ambasamudram, Sankarankoil and Tenkasi taluks. Limenite and associated minerals occur in Nanguneri taluk and garnet sands occur widely in Radhapuram taluk.

7. SURFACE WATER AND GROUND WATER SCENARIO OF THE DISTRICT

SURFACE WATER

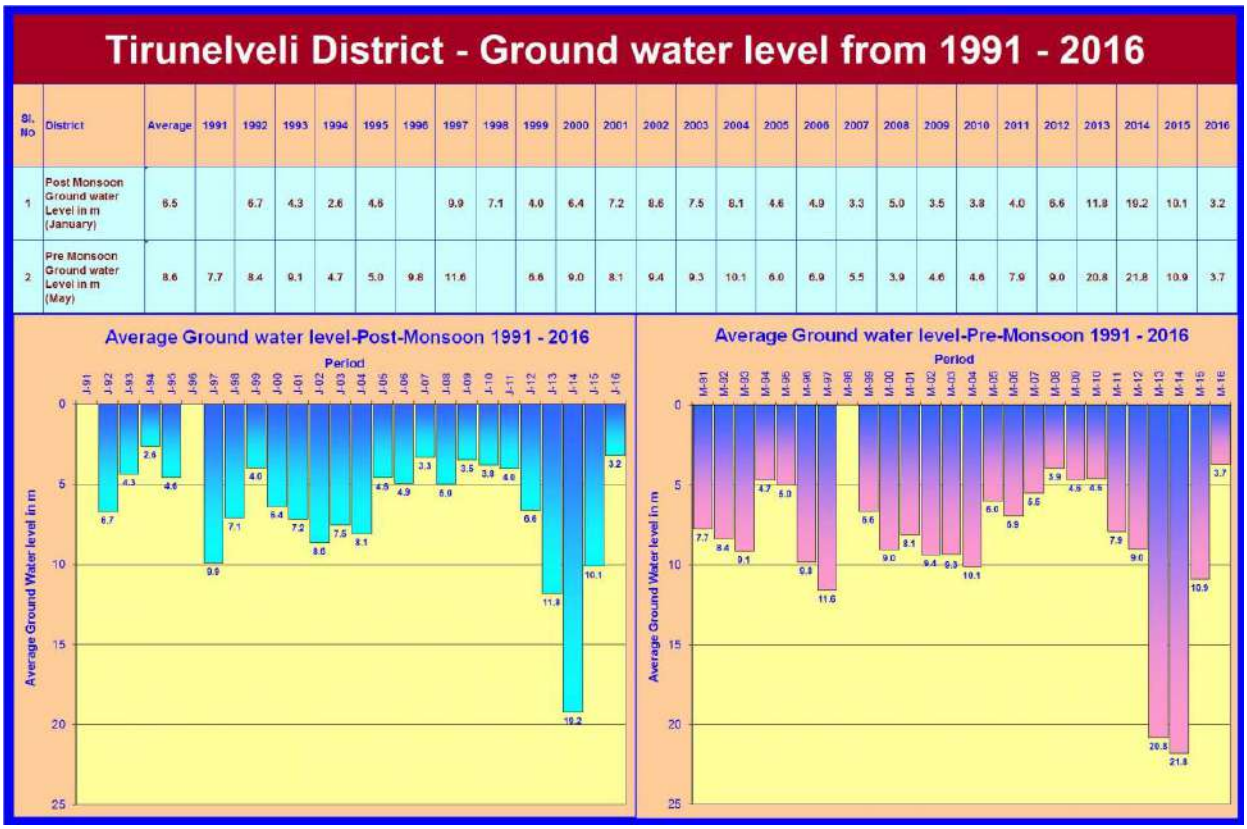
Tirunelveli district enjoys the benefit of the early showers of south west monsoon and of the later rains of the north-east monsoon. The district is chiefly irrigated by rivers rising in Western ghats. The dams and anaicuts constructed on Tamiraparani and Manimuthar rivers serve both agriculture and power generation. The total rain fall, though is light, averaging about 814.8 mm per annum, is generally well distributed. The Tamiraparani river affords perennial irrigation to a fairly large area on which two crops are normally raised. Several tanks and wells form part of the other sources of irrigation.

The Tamiraparani is a symbol of Tamil culture and civilization and an identity of the far south of India. In Tamil and Sanskrit literature of earlier times, the Pandyas were referred to as the rulers of the land where the Tamiraparani flowed. Tamiraparani is the chief river of the district which has a large network of tributaries which include the Peyar, Ullar, Karaiyar, Servalar, Pampar, Manimuthar, Varahanathi, Ramanathi, Jambunathi, Gadananathi, Kallar, Karunaiyar, Pachaiyar, Chittar, Gundar, Aintharuviar, Hanumanathi, Karuppanathi and Aluthakanniar. The two rivers of the district which are not linked with Tamiraparani are the Nambiar and the Hanumanathi of Nanguneri taluk.

GROUND WATER SCENRIO

The district is underlain by both porous and fissured formations. The important aquifer systems in the district are constituted by i) Weathered and fractured hard rock formations of Archaean age. ii) Porous sedimentary formations ranging in age from Tertiary and Recent. The porous formations are found as small patch in the southeastern part of the district and include sandstones, Limestones, Laterite and Clays from Tertiary to Quaternary. Isolated occurrence of calcareous sandstone and fossiliferous limestone are seen in coastal area on the southeastern side. The fossiliferous limestone is

found south west of Kudankulam covering an area of 3 sq.km. Laterites are exposed as patches along Radhapuram-Edakkadu, Vijayanarayanam-Kumarapuram, Ittamoli, Nanguneri and Uramozi area. Beach sand occurs as a patch along the coast with a width varying from 50-250m in Idindakarai-Ovari Belt. The river alluvium is found along the river courses and the thickness of alluvium is restricted to 5-6m The exploration in sedimentary tract has revealed that the depth to basement occurs at a depth of 120m bgl and granular zones are encountered between the depths of 20 to 92 m bgl. The aquifer at the shallow depth is under unconfined condition and aquifer at depth is under semi-confined to confined condition. The shallow aquifer is developed through dug wells and deeper aquifer through tube wells. The groundwater exploration in the district down to a depth of 200m bgl has revealed that in the western part of the district potential fractures are encountered beyond 100m bgl while in the rest of the area, potential fractures are restricted to 100m bgl. The yield of the wells varies from 1 to 3.6 lps. In general, the wells drilled by various State agencies mainly for domestic purposes have yield in the range of 63 to 270 lpm. (Source :CGWB).



Sl. No	District	Average	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1	Post Monsoon Ground water Level in m (January)	6.5		6.7	4.3	2.6	4.6		9.9	7.1	4.0	6.4	7.2	8.6	7.5	8.1	4.6	4.9	3.3	5.0	3.5	3.8	4.0	6.6	11.8	19.2	10.1	3.2
2	Pre Monsoon Ground water Level in m (May)	8.6	7.7	8.4	9.1	4.7	5.0	9.8	11.6		6.6	9.0	8.1	9.4	9.3	10.1	6.0	6.9	5.5	3.9	4.6	4.6	7.9	9.0	20.8	21.8	10.9	3.7

Souce: https://www.twadboard.tn.gov.in/content/tirunelvelli

Fig.No. District level ground water level

8. RAINFALL OF THE DISTRICT AND CLIMATIC CONDITIONS

Rainfall: Main rainy season is from October to the middle of January. During this southwest monsoon season the rainfall is more in the western parts of the district. November is generally the rainiest month. The heaviest rainfall in 24 hours recorded in the district was 371.5 mm at Sivagiri on 29/10/1929. The average rain fall in the district is 814.8 mm per annum.

Month	Normal	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
January	50.2	80.16	6.40	0.58	36.57	4.92	54.49	24.80	9.28	8.89	37.16
February	30.2	26.54	75.83	104.25	16.62	27.50	1.80	3.52	83.3	NIL	0.08
March	41.3	9.53	29.30	100.72	5.82	68.17	124.23	7.44	377.19	31.63	40.48
April	59.8	118.79	91.00	0.78	91.15	180.49	25.51	131.64	103.4	72.01	36.91
May	38.0	26.73	82.91	29.55	135.02	25.46	35.95	10.97	4.94	24.07	39.4
June	29.6	24.43	4.12	20.18	59.16	20.28	28.60	87.78	10.32	21.38	29.67
July	26.4	29.58	5.14	19.19	9.53	80.50	26.80	46.49	35.22	59.94	60.56
August	23.3	10.80	35.68	15.48	26.12	19.91	25.38	33.11	72.00	25.97	18.43
September	30.2	22.03	13.66	10.34	101.48	32.77	63.04	79.70	20.63	30.56	77.53
October	166.0	141.32	213.12	185.84	220.09	84.68	361.28	187.03	345.6	126.59	107.56
November	208.2	195.97	241.82	256.57	260.55	248.45	287.23	181.90	183.1	431.59	293.38
December	111.6	79.52	17.85	56.89	32.37	178.36	19.31	126.16	94.78	153.29	168.53
Total Rainfall	**814.8**	**765.40**	**816.83**	**900.37**	**994.48**	**971.49**	**1179.66**	**920.54**	**1339.76**	**985.93**	**873.6**

6.1. Table Comparative Statement of monthly Rainfall data in Tirunelveli district in mm (Source: http://www.nellai.tn.nic.in)

Month	Normal	2011	2012	2013	2014	2015	2016	2017
January	50.2	25.26	40.54	2.19	57.20	4.75	4.85	38.56
February	30.2	46.37	29.03	98.50	9.24	13.48	6.31	3.44
March	41.3	40	35.95	142.14	60.30	71.80	10.62	40.29
April	59.8	65	65.12	24.94	36.28	133.36	14.26	19.63
May	38.0	4.25	9.82	25.72	206.55	93.09	80.23	61.75
June	29.6	63.31	2.31	103.92	7.88	56.32	71.72	50.1
July	26.4	22.08	15.68	46.58	12.98	13.15	24.23	5.3
August	23.3	23.43	12.66	28.35	52.52	10.55	1.15	40.9

September	30.2	14.93	8.35	41.05	38.45	71.62	0.38	116.3
October	166.0	311.84	304.41	57.01	391.66	234.59	47.22	83.6
November	208.2	275.7	144.8	256.66	316.91	448.89	103.26	344
December	111.6	79.52	100.2	86.80	150.89	269.47	33.22	273.9
Total Rainfall	**814.8**	**971.69**	**768.87**	**913.86**	**1340.86**	**1421.07**	**396.95**	**1077.77**

6.1. (contd) Table Comparative Statement of monthly Rainfall data in Tirunelveli district in mm (Source: http://www.nellai.tn.nic.in)

CLIMATE:

The district, in general experiences tropical climate with minor changes. The normal temperature varies between 24.4°C and 27.1°C at mean minimum, whereas the hottest climate experiences from March to May with mercury reaching 38.5°C at the highest. The climate is comparatively cool during the months from November to February. The average rainfall during 2005-06 is 917.86 mm and the number of rainy days varies from 98 to 110 in a year. The relative humidity, in general around the year is between 55 and 65% in most parts of the district, except during the north-east monsoon season when it is over 65%. However, the coastal areas will be comparatively more humid.

9. DETAILS OF MINING LEASES IN THE DISTRICT IN THE DISTRICT

Table No. **Mineral:Roiugh Stone**

Sl. No	Name of the mineral	Name of the lessee	Address & Contact No. of lessee	Mining lease grant order No. and date	Area of mining lease (Ha)	Period of mining lease (Initial)		Period of mining lease (1st & 2nd renewal)		Date of commencement of Mining Opera-tion	Status (Wor-king / Non-Wor-king / Temp. Wor-king for dispatch etc.)	Captive / Non-Captive	Obtain-ed Enviro-nmen- tal Clear-ance (Yes / No)	Location of the Mining Lease (Latitude & Longitude)	Method of Mining (Open cast / Under ground)
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1	**Rough Stone**	Tmt.LakshmiRajam,	W/o. Babu Aravinth, Ramana Bhavan, 36, South, Melagaram,Tenkasi	M1/33629/2015, 14.06.2016	2.59.0	**14.06.2016**	**13.06.2021**	-	-	**14.06.2016**	working	Non-captive	Yes	08°49'04" N to 08°49'10" N & 77°26'06" E to 77°26'15" E	Open-cast
2.	**Rough Stone**	Thiru.B.Thangammal,	W/o. R.Balamuruga n, 8/105, Mariammanko vil Street, Lakshmiyoor, Koviloothu post, Alangulam	M1/13785/2016, dated: 24.12.2016	2.47.0	**20.03.2017**	**19.03.2022**			**20.03.2017**	working	Non-captive	Yes	08°49'12.14"N to 08°49'06.26"N & 77°26'26.08"E to 77°26'17.85"E	Open-cast
3.	**Rough Stone**	G.Karuppasamy,	S/o. Gurusamy, 271A,	M1/6395/2014 Dt: 04.01.2016	3.76.0	**08.01.2016**	**07.01.2021**			**08.01.2016**	working	Non-captive	Yes	08°49'7" N to	Open-cast

			Kannimaran Amman Kovil St, Tenkasi											08°49'14.8"N & 77°31'21.5"E to 77°31'29.6"E	
4	**Rough Stone**	Tmt. R.Minnalkodi,	W/o. S.S.Ramasubbu, No.72/V, Ambasamudram Road, Alangulam	M1/40481/2013 Dt: 16.12.2016	2.76.5	**08.03.2017**	**07.03.2022**			**08.03.2017**	working	Non-captive	Yes	08°48'56" N to 08°49'05" N & 77°31'16" E to 77°31'26" E	Open-cast
5	**Rough Stone**	Thiru.S.Ajimon	307, Parampilvila Veedu, Kampaladi Porvali Post, Quilon	M1/36063/13, Dt: 24.03.2015	4.81.0	**24.03.2015**	**23.03.2020**			**24.03.2015**	working	Non-captive	Yes	08°49'16" N to 08°49'21" N & 77°24'48" N to 77°24'51" N	Open-cast
6	**Rough Stone**	Thiru K.Selvakumar,	136/46, LRS, Palayam, Tenkasi	M1/11147/2013, dt: 10.06.2014	2.00.0	**10.06.2014**	**09.06.2019**			**10.06.2014**	working	Non-captive	Yes	08°51'07"N to 77°19'35"E	Open-cast
7	**Rough Stone**	Thiru.Sadacharavel,	S/o. Muthusamy, 8-23-J-7, Sivabhavan, Melamathapuram, Mathapuram Post, Ambasamudram Taluk	M1/23938/2014, Dt: 24.04.2015	0.24.0	**03.05.2015**	**02.05.2020**			**03.05.2015**	working	Non-captive	Yes		Open-cast

8	**Rough Stone**	P.Arun Gopinath,	4/136, Sidar Street, Mettur, Ambai	M1/16644/12, dt: 19.5.12	1.85.0	**11.06.2012**	**10.06.2022**			**11.06.2012**	working	Non-captive	Yes	08°50'59" N to 08°51'03" N & 77°21'22" E to 77°21'30" E	Open-cast
9	**Rough Stone**	M.K.Kuperasundar,	6/67B, Kottai st, Athalanallur, Ambai	M1/16635/12, dt: 20.05.2012	2.06.5	**30.06.2012**	**29.06.2022**			**30.06.2012**	working	Non-captive	Yes	08°45'32" N to 08°45'40" N & 77°31'58" E to 77°32'04" E	Open-cast
10	**Rough Stone**	Tmt.Hedwig Raj,	W/o. Joseph Antony, 9/250, Ilanthaikulam Road, Singamparai	M1/2827/2012 dt: 08.09.2014	1.00.0	**08.09.2014**	**07.09.2019**			**08.09.2014**	working	Non-captive	Yes	08°45'44" N to 08°45'39" N & 77°32'04" E to 77°32'09" E	Open-cast
11	**Rough Stone**	Thiru. S.Arunachalam	S/o. A.Subbiah Chettiar,295, Main Road,Krishnapuram,Kadayanallur Taluk, Tirunelveli District	M3/67787/2004DATED. 19.01.2016	2.00.0	**08.02.2016**	**07.02.2021**			**08.02.2016**	working	Non-captive	Yes	9°5'39" & 77°23'30"	Open-cast
12	**Rough Stone**	Thiru.S.Arunachalam,	S/o. A.Subbiah Chettiar,295, Main	M3/67787/2004DATED. 19.01.2016	3.00.0	**08.02.2016**	**07.02.2021**			**08.02.2016**	working	Non-captive	Yes	9°5'39.52" &	Open-cast

			Road,Krishnapuram,Kadayanallur Taluk, Tirunelveli District											77°26'31.14"	
13	**Rough Stone**	Thiru M. Murugaiah,	S/O. Muthiayah Thevar, 32-B1 Kattabomman Street, Kayathar	M1/5539/2013 dt:14.06.2014	2.26.0	**14.06.2014**	**13.06.2019**			**14.06.2014**	working	Non-captive	Yes	08°55'35.01"N to 08°55'30.36"N & 77°44'34.85"E to 77°44'31.02"E	Open-cast
14	**Rough Stone**	Thiru.S.Vellapandi,	Mainroad, Kayathar,	M1/25662/2016, Dt. 05.03.2016	1.92.0	**14.06.2016**	**13.06.2021**			**14.06.2016**	working	Non-captive	Yes	08°55'04"N to 08°55'10"N & 77°45'06"E to 77°45'12"E	Open-cast
15	**Rough Stone**	Thiru.V.Karuppasamy,	S/o. Velayutha Thevar, 3/4A, Sannathi Pudhukudi, Blcok No. 1, Rajaputukudi Post, Kovilpatti,	M1/36935/202, dated. 10.12.2016	1.16.0	**07.03.2017**	**06.03.2022**			**07.03.2017**	working	Non-captive	Yes	08°53'27"N to 08°53'32"N & 77°45'37"E to 77°45'40"E	Open-cast
16	**Rough Stone**	Thiru. M.Maridurai,	S/o. Maruthappapandian, 3/189, A.Maruthappapuram, Nettur Post,	M1/43605/2014, dt. 24.08.2016	1..29.0	**24.08.2016**	**23.08.2021**			**24.08.2016**	working	Non-captive	Yes	08°53'30"N to 08°53'35"N & 77°38'21"	Open-cast

			Alankulam,											E to 77°38'25" E	
17	**Rough Stone**	Thiru. B. Pramsivam,	S/o Esakkiappan, 749A/2, Main Road, NellaiThiruthu	M1/25864/2013 dt: 22.06.2014	1.58.5	**22.06.2014**	**21.06.2019**			**22.06.2014**	working	Non-captive	Yes	08°53'18" & 77°38'27"	Open-cast
18	**Rough Stone**	Thiru. Y.Arulraj,	S/O.Yesaiah, Kanarpatti Village, Therku Theru, Manur	M1/27276/2013 dt: 29.09.2014	2.68.0	**29.09.2014**	**28.09.2019**			**29.09.2014**	working	Non-captive	Yes	08°53'24" N to 08°53'30" N & 77°38'27" E to 77°38'35" E	Open-cast
19	**Rough Stone**	Thiru.A.Kanagaraj,	Palayamkottai	M1/20703/2016, 16.02.2016	1.42.0	**10.06.2016**	**09.06.2021**			**10.06.2016**	working	Non-captive	Yes	08°53'31" N to 08°53'35" N & 77°38'27" E to 77°38'37" E	Open-cast
20	**Rough Stone**	Thiru N.Ganesa Raja,	Tirunelveli	M2/76818/2008, dt:12.06.2002	4.08.5	**12.06.2012**	**11.06.2022**			**12.06.2012**	working	Non-captive	Yes		Open-cast
21	**Rough Stone**	Thiru.S.Backiyaraj,	S/o. Santhos Nadar, 298/2, Church Street, Parappadi - 627110	M1/48829/2013, dt. 10.10.2015	1.22.0	**16.10.2015**	**15.10.2020**			**16.10.2015**	working	Non-captive	Yes		Open-cast
22	**Rough Stone**	Thiru.S.Backiyaraj,	S/o. Santhos Nadar, 298/2, Church Street, Parappadi -	M1/48829/2013-1, dt. 24.11.2015	0.47.0	**28.11.2015**	**27.11.2020**			**28.11.2015**	working	Non-captive	Yes	08°26'41" N to 08°26'37"	Open-cast

			627110											N & 77°46'12" E to 77°46'09" E	
23	**Rough Stone**	Thiru.A.Kirupanithi,	S/o. Arumuga Nadar, 8-180, Tiruchendur Main Road, K.Uvari Village, Radhapuram Taluk	M1/7014/2014, Dated: 01.04.2015	1.92.0	**15.04.2015**	**14.04.2020**			**15.04.2015**	working	Non-captive	Yes	08°11'15" N to 08°11'20" N & 77°40'44" E to 77°40'49" E	Open-cast
24	**Rough Stone**	Thiru.A.K.A.Rajan,	S/o. Kirupanithi, 8-180, Tiruchendur Main Road, K.Uvari Village, Radhapuram Taluk	M1/7012/2014, dated: 01.04.2015	0.96.0	**15.04.2015**	**14.04.2020**			**15.04.2015**	working	Non-captive	Yes	08°11'11" N to 08°11'15" N & 77°40'44" E to 77°40'48" E	Open-cast
25	**Rough Stone**	Thiru.M.Selvaraj,	S/o.Mariya Nadar, 25/33A, Muthunagar, Thovalai	M1/27274/2013, dated:22.01.2016	0.61.0	**08.02.2016**	**07.02.2021**			**08.02.2016**	working	Non-captive	Yes	08°12'11" N to 08°12'13" N & 77°39'11" E to 77°39'15" E	Open-cast
26	**Rough Stone**	Thiru. D. Esakiappan,	12/51, Odaitheru, Vadakkankulam	M1/62128/2010, dated : 22.09.2010	2.50.0	**01.11.2010**	**31.10.2020**			**01.11.2010**	working	Non-captive	Yes	08°11'08" N to 08°11'16" N &	Open-cast

														77°33'11" E to 77°33'16" E	
27	**Rough Stone**	Thiru. K. Dinesh,	Avaraikulam, Radhapuram Taluk	M1/74015/2010, Dt: 22.11.2010	2.50.0	**15.11.2010**	**14.11.2020**			**15.11.2010**	working	Non-captive	Yes	08°11'08" N to 08°11'17" N & 77°33'16" E to 77°33'21" E	Open-cast
28	**Rough Stone**	Thiru.Sakthipeeriyakumaran,	Koodankulam, Radhapuram	M1/5944/2012, Dt. 21.06.2016	4.16.5	**21.06.2016**	**20.06.2021**			**21.06.2016**	working	Non-captive	Yes	08°11'14" N to 08°11'23" N & 77°44'23" E to 77°44'31" E	Open-cast
29	**Rough Stone**	Tmt. Sakunthala, ,	W/o. S.T.Dhanapal, Sankarankovil	M1/18548/2013, Dt: 24.08.2016,	1.41.0	**20.09.2016**	**19.09.2021**			**20.09.2016**	working	Non-captive	Yes	09°12'59" N to 09°13'2.4 "N & 77°30'22" E to 77°30'27" N	Open-cast
30	**Rough Stone**	Thiru S. Kasipandiyan,	S/o. Sundariyah Thevar, Pillaiyarkovil Street, Naduvakurichi	M1/33384/2013 dt: 23.06.2014	1.79.5	**23.06.2014**	**22.06.2019**			**23.06.2019**	working	Non-captive	Yes	09°05'10" N & 77°28'20" E	Open-cast

			Major, Sankarankovil												
31	**Rough Stone**	Thiru S. Kasipandiyan,	S/o. Sundariyah Thevar, 1-7-160, Pillaiyarkovil Street, Naduvakurichi Major, Sankarankovil	M1/33382/2013 Dated: 17.07.2015	2.03.5	**26.07.2015**	**25.07.2020**			**26.07.2015**	working	Non-captive	Yes		Open-cast
32	**Rough Stone**	Thiru P.Paulraj,	S/o. Pilliyar, 2/174 Malayadipatti, Karichathan.	M1/59706/2010 dt: 04.07.2014	0.79.5	**04.07.2014**	**03.07.2019**			**04.07.2014**	working	Non-captive	Yes	09°17'15" E to 09°17'11" E & 77°34'55" E to 77°34'59" E	Open-cast
33	**Rough Stone**	Thiru.T.Kombaiah,	S/o. Thangapandian, 10-33A, Main Road, Panavadalichathiram Village, Sankarankovil	M1/1114/2014, dated: 04.04.2015.	4.57.5	**07.04.2015**	**06.04.2020**			**07.04.2015**	working	Non-captive	Yes	09°02'56" N to 09°03'03" N & 77°40'02" E to 77°40'12" E	Open-cast
34	**Rough Stone**	K.Karuppasamy, Street, Visvanathapuram, Senkottai.	48/445, E.K. Thevar	M1/6637/12, dt: 20.05.12	0.86.0	**30.06.2012**	**29.03.2022**			**30.06.2012**	working	Non-captive	Yes	08°59'44" N to 08°59'48" N & 77°14'08" E to 77°14'14" E	Open-cast

35	**Rough Stone**	K.J.Ajaidulasidaran	S/o. K.A.Jeyadevaraja, State bank colony, melagaram, tenkasi	M1/64857/2015, Dt: 24.08.2016	3.98.5	**23.09.2016**	**22.09.2021**			**23.09.2016**	working	Non-captive	Yes	08°56'14" N to 08°56'23" N & 77°20'33" N to 77°20'41 N	Open-cast
36	**Rough Stone**	Thiru.C.Azhayakoothan,	66, North Street, Rajavallipuram, Tirunelveli	M1/18823/2013, dt. 16.12.2015	3.37.0 hects.	**19.12.2015**	**18.12.2020**			**19.12.2015**	working	Non-captive	Yes	08°49'27" N & 77°45'56" E	Open-cast
37	**Rough Stone**	Thiru.David,	S/o. M.Gnanasundaram, 11-E, Blessing Cottage, (Behind) Shanmuga Theatre, Ettayapuram Road, Kovilpatti	M1/37378/2013, dated. 10.12.2016	1.61.0	**14.03.2017**	**13.03.2022**			**14.03.2017**	working	Non-captive	Yes	08°49'30" N to 08°49'34" N & 77°44'10" E to 77°44'17" E	Open-cast
38	**Rough Stone**	M.Abdul Ali,	Vadakari	M1/19230/2015, dt:20.02.2016	4.00.0	**10.06.2016**	**09.06.2021**			**10.06.2016**	working	Non-captive	Yes	08°59'58" N to 09°00'05" N & 77°28'26" E to 77°28'36" E	Open-cast
39	**Rough Stone**	Thiru V.Chandhran,	Sambavar Vadakarai	M1/15990/2016, dt:05.03.2016	0.98.0	**10.06.2016**	**09.06.2021**			**10.06.2016**	working	Non-captive	Yes	09°00'02" N to 08°59'57" N &	Open-cast

														77°25'28" E to 77°25'33" E	
40	**Rough Stone**	Thiru S.Palani Nadar,	S/o. Subbiah, 1-7-65, Nadar Therkku Street, Surandai.	M1/30208/2014, dt:04.08.2014	0.98.5	**12.07.2016**	**11.07.2021**			**12.07.2016**	working	Non-captive	Yes	08°59'58" N to 09°00'02" N & 77°25'35" E to 77°25'39" E	Open-cast
41	**Rough Stone**	Thiru P.Rajendran,	S/o. Ponnusamy Nadar, 18-7-23, Kamaraj Nagar, Surandai.	M1/30206/2014, dt:20.06.2016	0.85.0	**12.07.2016**	**11.07.2021**			**12.07.2016**	working	Non-captive	Yes	08°59'58" N to 09°00'01" N & 77°25'39" E to 77°25'42" E	Open-cast
42	**Rough Stone**	Thiru.A.Ayyalusamy,	S/o. Ayyasamy, 1/5, Chithirampatti, Kovilpatti Taluk, Tirunelveli District.	M1/18824/2013, dated. 08.08.2017	1.37.0	**22.08.2017**	**21.08.2022**			**22.08.2017**	working	Non-captive	Yes	08°51'05" N to 08°51'08" N & 77°45'05" E to 77°45'10" E	Open-cast
43	**Rough Stone**	Thiru.K.Ganesan,	S/o. Kathappathevar, 2/3, Pathu Veetu Street, Rastha, Mathavakuric	M1/70340/2010, dated. 08.08.2018	1.74.0	**22.08.2017**	**21.08.2022**			**22.08.2017**	working	Non-captive	Yes	08°48'28" N & 77°38'56" E	Open-cast

			hi Post, Tirunelveli District.												
44	**Rough Stone**	Tmt. D.Mercy Mary,	W/o. G.Jebarajan, 54, Sivan Mela Ratha Veethi, Palayamkottai Taluk, Tirunelveli District	M1/54558/2014, dated. 16.10.2017	2.51.5	**25.10.2017**	**24.10.2022**			**25.10.2017**	working	Non-captive	Yes	08°38'16" N to 08°38'22" N & 77°41'15 E to 77°41'23 E"	Open-cast
45	**Rough Stone**	Tvl. Success Granites Pvt Ltd, Prop: Pasil Joseph,	Padanilath House, Thuthiyur Kara, Valakkala Village, Ernakulam Taluk, Kerala State	M1/22451/2014, dated. 11.09.2017	1.92.5	**25.10.2017**	**24.10.2022**			**25.10.2017**	working	Non-captive	Yes	09°07'30" N to 09°07'36" N & 77°28'56" E to 77°29'02" E	Open-cast
46	**Rough Stone**	Thiru.N.Esakkiappan,	S/o. Narayanan, Vattarakathan Kovil Street, Ambalavanapuram, Palavoor Village, Radhapuram Taluk, Tirunelveli District	M1/48377/2015, dated. 19.02.2018	2.41.0	**28.02.2018**	**27.02.2023**			**28.02.2018**	working	Non-captive	Yes	08°12'05" N to 08°12'11" N & 77°39'52" E to 77°39'59" E	Open-cast
47	**Rough Stone**	Thiru.M.sundaravel,	S/o. Muthusekarapandian, 19/2, Seethapal, Poothapandi Post, Thovalai	M1/48376/2015, dated. 19.02.2018	2.70.0	**28.02.2018**	**27.02.2023**			**28.02.2018**	working	Non-captive	Yes	08°18'15" N to 08°18'21" N & 77°42'02"	Open-cast

			Taluk, Kanniyakumari District											E to 77°42’10” E	
48	**Rough Stone**	Thiru.S.Syed Ibrahim,	S/o. Sahool Hameethu, 95, Malampatti Road Street, Krishnapuram Village, Kadayanallur Taluk	M1/22269/2016, dated. 27.02.2018	4.95.5	**13.03.2018**	**12.03.2023**			**13.03.2018**	working	Non-captive	Yes	08°51'40" N to 08°51'50" E & 77°27'01" E to 77°27'12" E	Open-cast
49	**Rough Stone**	Thiru.H.Mohamed Kadar Meeran Mohideen,	S/o. Hanifa, 31, Pavalar Street, Kayathar, Thothukudi District	M1/30791/2016, dated. 02.03.2018	1.90.0	**13.03.2018**	**12.03.2023**			**13.03.2018**	working	Non-captive	Yes	08°55'08" N to 08°55'13" N & 77°44'03" E to 77°44'08" E	Open-cast
50	**Rough Stone**	Tvl. Hi-Tech Rock Products Agreegates ltd,	Mount Poonamalle Road, Manapakkam Post Box 979, Chennai - 600 089	M1/36278/2017, dated. 21.03.2018	4.96.5	**04.04.2018**	**03.04.2023**			**04.04.2018**	working	Non-captive	Yes	08°11’44” N to 08°11’56” N & 77°38’12” E to 77°38’20” E	Open-cast
51	**Rough Stone**	Thiru.S.Somasundaram,	s/o. K.Subbiah, Akka Salai, Pillaiyar Kovil Street, Valliyur, Radhapuram	M1/41046/2017, dated. 20.03.2018	4.90.5	**04.04.2018**	**03.04.2023**			**04.04.2018**	working	Non-captive	Yes	08°15'57" N to 08°16'09" N & 77°37'18" E to	Open-cast

			Taluk, Tirunelveli District											77°37'25" E	
52	**Rough Stone**	G.Inbarajan,	S/o. Grurusamy, 4/21-C, Sri Ram Nagar, Ponnagaram, Rajapalayam - 626 108, Virudhunagar District	M1/5931/2013, dated. 21.03.2018	2.03.05	**16.04.2018**	**15.04.2023**			**16.04.2018**	working	Non-captive	Yes	09°11'35.47"N to 09°11'43.60"N & 77°30'41.63"E to 77°30'45.86"E	Open-cast
53	**Rough Stone**	Thiru.V.Chandrasekaran	S/o. Velu, 4/119-C, Achampatti Road, Vadakkupudur Village, Sankarankovil Taluk, Tirunelveli district	M1/4509/2014, dated. 18.03.2018	2.00.0	**16.04.2018**	**15.04.2023**			**16.04.2018**	working	Non-captive	Yes	09°13'02.01"N to 09°13'07" N & 77°30'42.66"E to 77°30'46.82"E	Open-cast
54	**Rough Stone**	Thiru.M.Vairavan,	S/o. Muthu, Old No. 2/22, New No. 1/410, Vaithiyar Street, Thirisoolam, Chennai - 43	M1/31993/2012, dated. 21.03.2018	2.98.5	**16.04.2018**	**15.04.2023**			**16.04.2018**	working	Non-captive	Yes	09°12'57.90"N to 09°13'06.38"N & 77°30'31.97"E to 77°30'39.72"E	Open-cast
55	**Rough Stone**	Thiru.N.Abdul Gani,	S/o.S.M.Nagoor Meeran, No.2, Kulathur Ayyanar Kovil Street, Tenkasi Taluk, Tirunelveli District	M1/25661/2014, DATED: 22.03.2018.	1.05.65	**16.04.2018**	**15.04.2023**			**16.04.2018**	working	Non-captive	Yes	08°58'12.11"N to 08°58'16.02"N & 77°21'5.00"E to	Open-cast

														77°21'9.17"E	
56	**Rough Stone**	Thiru.N.Mohamed Mahaboob,	S/o. Nagoor Pitchai, No. 8/143, Main Road, Pottalpudur Village kaspa, Ambasamudram Taluk, Tirunelveli District	M1/44736/2016, DATED: 20.03.2018.	3.74.5	**16.04.2018**	**15.04.2023**			**16.04.2018**	working	Non-captive	Yes	08°48'01" N to 08°48'09" N & 77°26'16" E to 77°26'29" E	Open-cast
57	**Rough Stone**	Tmt.C.Maheswari,	W/o. M.Jesurajan, No:14/1/23, Anna Nagar, Surandai, Veerakeralampudur Taluk, Tirunelveli District	M1/22319/2016, DATED: 21.03.2018.	1.81.5	**17.04.2018**	**16.04.2023**			**17.04.2018**	working	Non-captive	Yes	09°00'35" N to 09°00'40" N & 77°27'54" E to 77°28'02" E	Open-cast
58	**Rough Stone**	Thiru.R.P.Arunachala Pandian,	S/o. R.Ponnusamy Nadar, No.4/37, Madianoor, Avudaiyanoor, Tenkasi Taluk, Tirunelveli District	M1/40906/2016, DATED: 22.03.2018.	1.89.0	**17.04.2018**	**16.04.2023**			**17.04.2018**	working	Non-captive	Yes	08°51'27" N to 08°51'32" N & 77°24'49" E to 77°24'55" E	Open-cast
59	**Rough Stone**	Thiru.K.Sasikumar,	S/o. Kalangiam, Door No.	M1/34173/2016, DATED: 20.03.2018.	1.99.0	**17.04.2018**	**16.04.2023**			**17.04.2018**	working	Non-captive	Yes	08°47'59" N to 08°48'05"	Open-cast

			203/1, New No. 321/9, Nainar Kovil Street, Ariyappapuram Vellappanaiyaneripatti, Thippanampatti Village, Tenkasi Taluk, Tirunelveli District										N & 77°26'29" E to 77°26'35" E	
60	**Rough Stone**	Thiru.S.Shankar,	S/o. R.Subramaniam, residing at 131/1, A.P.T.Road, Erode – 638 003	M1/43375/2015, DATED: 31.03.2018.	1.60.0	**17.04.2018**	**16.04.2023**			**17.04.2018**	working	Non-captive	Yes	08°38'43" N to 08°38'48" N & 77°40'44" E to 77°40'49" E	Open-cast
61	**Rough Stone**	Thiru.P.Marimuthu,	S/o. Petchi Thevar, residing at 1/3-A, Kasba Melbagam, Ponnakudi Village, Palayamkottai Taluk Tirunelveli District	M1/36802/2014, DATED: 22.03.2018.	4.73.5	**19.04.2018**	**18.04.2023**			**19.04.2018**	working	Non-captive	Yes	08°38'43" N to 08°38'52" N & 77°40'49" E to 77°40'58" E	Open-cast
62	**Rough Stone**	Thiru.N.Maria Robin,	S/o. Nasaren Martin, No:48, Xavier Colony, Melapalayam Post, Palayamcottai Taluk,	M1/47664/2016, DATED: 20.03.2018.	2.00.0	**19.04.2018**	**18.04.2023**			**19.04.2018**	working	Non-captive	Yes	08°11'01" N to 08°11'05" N & 77°40'16"	Open-cast

			Tirunelveli District											E to 77°40'22" E	
63	**Rough Stone**	Thiru.S.Rajendran,	S/o. Sreedharan, residing at D.No. 13-43A, Preetha Bavan, Pathittavilai, Chitharal Post, Kanniyakumari District,	M1/12755/2016, DATED: 04.04.2018.	2.45.48	**17.04.2018**	**16.04.2023**			**17.04.2018**	working	Non-captive	Yes	08°16'18" N to 08°16'24" N & 77°46' 59"E to 77°47'04" E	Open-cast
64	**Rough Stone**	Thiru.C.Sugu,	S/o. Chellappan, residing at No. 12-1B, Vellancode, Chitharal Post, Kanniyakumari District	M1/12757/2016, DATED: 04.04.2018.	1.26.25	**17.04.2018**	**16.04.2023**			**17.04.2018**	working	Non-captive	Yes	08°16' 09"N to 08°16'17" N & 77°46'46" E to 77°46'49" E	Open-cast
65	**Rough Stone**	Tvl. Hi-Tech Rock Products & Aggregates Limited,	Registered Office: Mount Poonamalle Road, Manapakkam P.B. No. 979, Chennai – 600 089.	M1/36279/2017, dated. 05.06.2018	3.18.0	**22.06.2018**	**21.06.2020**			**22.06.2018**	working	Non-captive	Yes		Open-cast
66	**Rough Stone**	Thiru.J.Shaboor Bathusha,	S/o. Jabhar Sha, 1, Geethanjali House, Courtallam, Tenkasi	M1/11473/2014, dated. 09.07.2018	1.40.50	**06.07.2018**	**05.07.2023**			**06.07.2018**	working	Non-captive	Yes	08°57'57 .95"N to 08°58'01. 60"N & 77°20'32. 25"E to 77°20'36.	Open-cast

														90”E	
67	**Rough Stone**	Thiru.A.Sankaranarayanan @ Sankaran,	S/o. Arunachalam, 24-B, Pillamar Street,Tisaiyanvilai, Radhapuram, Tirunelveli District- 627 657	M1/27262/2016, dated. 13.07.2018	2.36.5	**17.07.2018**	**16.07.2023**			**17.07.2018**	working	Non-captive	Yes	08°38’15”N to 08°38’21”N & 77°41’22”E to 77°41’28”E	Open-cast
68	**Rough Stone**	Tmt. D.Mercy Mary,	W/o. G.Jebarajan, No. 54-Sivan West Car Street, Palayamkottai, Tirunelveli District	M1/3939/2017, dated. 13.07.2018	1.62.5	**17.07.2018**	**16.07.2023**			**17.07.2018**	working	Non-captive	Yes	08°38’10”N to 08°38’15”N & 77°41’20”E to 77°41’25”E	Open-cast
69	**Rough Stone**	Thiru.S.Subbiah,	S/o. Sornathevar, 760, Pazhar Street,Seevalaperi, Palayamkottai Taluk, Tirunelveli District.	M1/3390/2017, dated. 18.07.2018	1.38.5	**24.07.2018**	**23.07.2023**			**24.07.2018**	working	Non-captive	Yes	08°49'04"N to 08°49'10"N & 77°26'06"E to 77°26'15"E	Open-cast
70	**Rough Stone**	Thiru.K.S.R.J.Rajkumar,	S/o. K.S.R.Jeyakumar, residing at K.S.R.Illam, Peruratchi Theru, Kambam Puthupatti Village,	M1/18028/2016, DATED: 07.09.2018	2.02.5	**15.11.2018**	**14.11.2023**			**15.11.2018**	working	Non-captive	Yes	08°49'12.14"N to 08°49'06.26"N & 77°26'26.08"E to 77°26'17.85"E	Open-cast

			Uthamapalayam Taluk, Theni District												
71	**Rough Stone**	Thiru.N.K.S.Anbazhagan,	S/o. (late) Subramania Nadar, residing at No. 96, North Car Street, Aladipatti, Nallur Post, Sivalarkulam Village, Alangulam Taluk, Tirunelveli District	M1/2464/2016, dated. 31.03.2018	1.42.5	**17.04.2018**	**16.04.2023**			**17.04.2018**	working	Non-captive	Yes	08°49'7"N to 08°49'14.8"N & 77°31'21.5"E to 77°31'29.6"E	Open-cast
72	**Rough Stone**	Tvl.V.V.Mineral,	Keeraikaranthattu, Tisaiyanvilai	M1/54004/2010, Dated: 11.07.2011	3.72.5	**09.08.2018**	**08.08.2023**			**09.08.2018**	working	Non-captive	Yes	08°48'56"N to 08°49'05"N & 77°31'16"E to 77°31'26"E	Open-cast

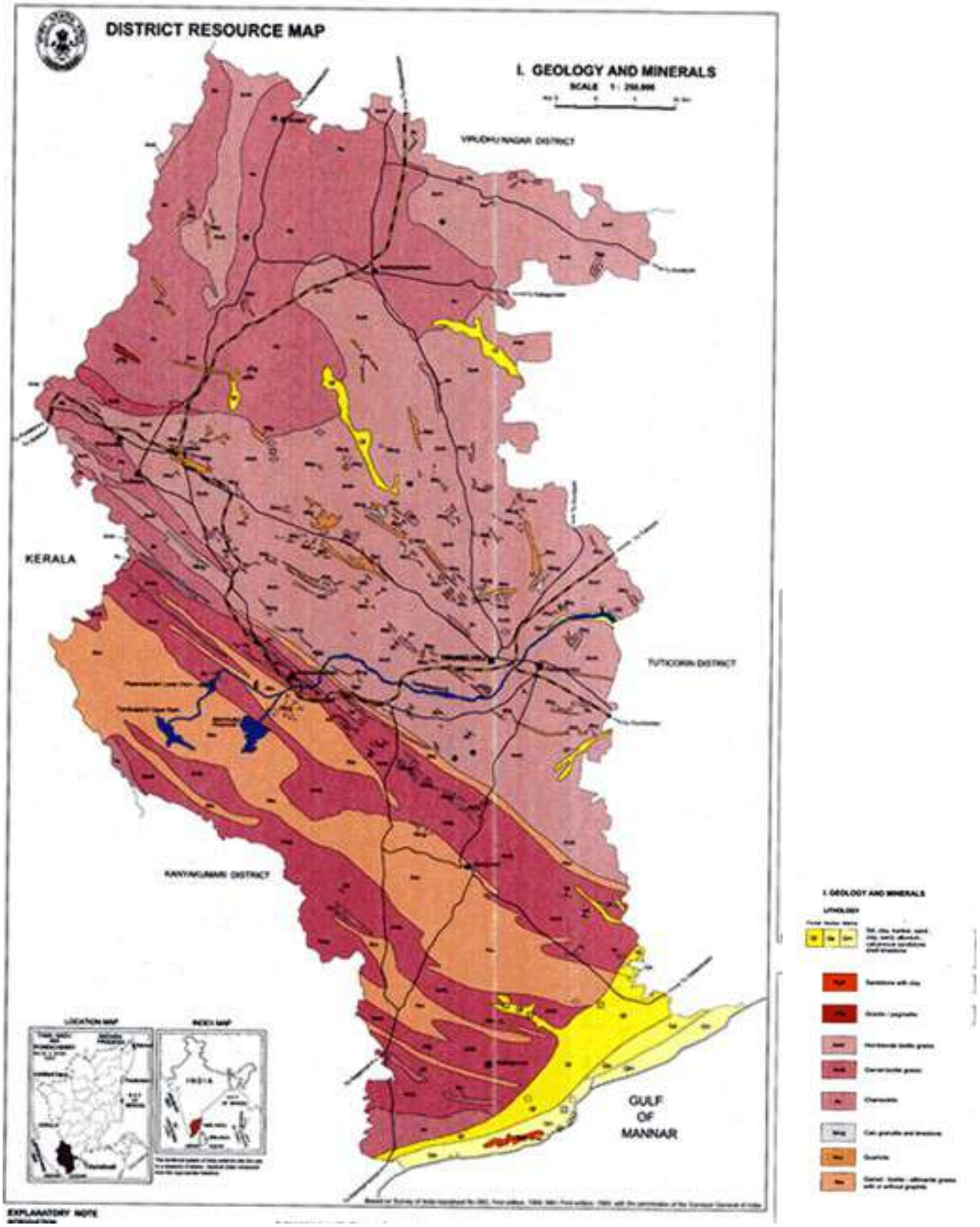
10. DETAILS OF ROYALTY/SEINIORAGE FEE RELEASED IN THE LAST THREE YEARS.

Sl. No.	Name of the mineral	Royalty/Seiniorage fee collected (In Rupees)		
		2015-16	2016-17	2017-18
1.	Rough Stone	99688026	127126612	171150277

11. DETAILS OF PRODUCTION OF MINOR MINERALS IN LAST THREE YEARS.

Sl. No.	Name of the mineral	Quantity produced (Cubic meter)		
		2015-16	2016-17	2017-18
3	Rough Stone	2125138	2825205	3470931

12. MINERAL MAP OF DISTRICT:



13.0 LIST OF LETTER OF INTENT (LOI) HOLDER IN THE DISTRICT ALONG WITH ITS VALIDITY

Sl. No	Name of the Mineral	Name of the Lessee	Address & Contact No. of Letter of Intent Holder	Letter of Intent Grant Order No. & date	Area of Mining lease to be allotted	Extent	Validity of LoI	Use (Captive/Non-Captive)	Location of the Mining lease (Latitude & Longitude)
1	Rough Stone	S.Sundaramahalingam	S.Sundaramahalingam, S/o.Subbiah, 465A, Bazar Road, Mavadikkal, Kadayanallur Taluk, Tirunelveli.	M1/25687/2017, dt.22.05.2018	Kambaneri Pudukudi Part - II Village, Kadayanallur Taluk in SF.No. 1061/1(P), 1061/2(P), 1061/3(P) & 1062/1(P)	5.00.0	-	Non - Captive	09°02'53"N to 09°03'03"N & 77°22'00"E to 77°22'07"E
2	Rough Stone	S.Sundaramahalingam	S.Sundaramahalingam, S/o.Subbiah, 465A, Bazar Road, Mavadikkal, Kadayanallur Taluk, Tirunelveli.	M1/28404/2017, dt.22.05.2018	Idaigal Part - I village, Ambasamudram Taluk in SF.No. 361/1	4.99.0	-	Non - Captive	08°47'52"N to 08°48'01"N & 77°27'45"E to 77°27'56"E
3	Rough Stone	C.Ramesh	C.Ramesh, S/o.Chokkalinga Thevar, Perumal Kovil Street, Palamadai Village, Tirunelveli Taluk, Tirunelveli District.	M1/41429/2016, dt.09.07.2017	Palamadai Village, Tirunelveli Taluk in SF.No. 375	4.89.5	-	Non - Captive	08°48'17"N to 08°48'26"N & 77°45'41"E to 77°45'48"E

4	Rough Stone	A.Kothar Mydeen	A.Kothar Mydeen, S/o.Ahamed Ravoothar, 18, Nallammalpuram, Thenkulam Village, Tirunelveli Taluk & District.	M1/31268/2016 , dt.09.07.2017	Gangaikondan Part - II village, Tirunelveli Taluk in SF.No. 1660/4	1.62.0	-	Non - Captive	08°48'38"N to 08°48'48"N & 77°45'17"E to 77°45'20"E
5	Rough Stone	M.Marutharaj	M.Marutharaj, S/o.Murugaiah, 32, B1, Kattapomman Street, kayathar, Kovilpatti Taluk, Tuticorin District.	M1/18647/2017 , dt.27.02.2018	Pranjeri Village, Manur Taluk in SF.No. 720	1.99.5	-	Non - Captive	08°55'35"N to 08°55'38"N & 77°44'27"E to 77°44'31"E
6	Multi Colour Granite	Tvl.Winner Minerals Exim India Private Limited	Tvl.Winner Minerals Exim India Private Limited, 2/4, Second Floor, 1st Cross Street, Indira Nagar, Adayar, Chennai.		Urumankulam Village, Radhapuram Taluk in SF.No. 712/3	4.00.0	-	Captive	08°19'09.79"N to 08°19'19.95"N & 77°49'06.65"E to 77°49'14.76"E
7	Rough Stone	D.Arunachalasamy	D.Arunachalasamy, S/o.Dharmaraja, 777, NGO Colony, Kalappakulam, Sankarankovil Taluk, Tirunelveli Distirct.	M1/5315/2015, dt.15.12.2016	Vadikottai Village, Sankarankovil Taluk in SF.Nos. 44/10, 11, 12 & 13	0.72.0	-	Non - Captive	09°12'59"N to 09°13'02"N & 77°30'50"E to 77°30'54"E
8	Rough Stone	A.Mumthaj	A.Mumthaj, W/o.Azad, 10B, Periya Kothithupu, Pallivasal Vadakku Keela Puthu Theru, Malapalayam Village, Palayamkottai Taluk, Tirunelveli District.	M1/27624/2014 , dt.11.01.2018	Melaseval Part - I village, Ambasamudram Taluk in SF.Nos. 419/1B & 419/2	1.78.5	-	Non - Captive	08°39'08"N to 08°39'17"N & 77°37'21"E to 77°37'26"E

9	Rough Stone	T.Balasubramanian	T.Balasubramanian, S/o.Thangamuthu Pandian, 214/1, Poonathotta Street, Chathiramkudiyiruppu, Sankar Nagar, Tirunelveli District.	M1/39664/2016, dt.09.07.2017	Alangaraperi Village, Tirunelveli Taluk in SF.Nos. 37/1 & 37/2	1.59.0	-	Non - Captive	08°48'45"N to 08°48'50"N & 77°46'24"E to 77°46'27"E
10	Rough Stone	I.Ananth	I.Ananth, S/o.Iyappan, 3/853, East Street, Sounthiralingapuram, Avaraikulam Post, Radhapuram Taluk, Tirunelveli District.	M1/28487/2017, dt.21.12.2017	Panagudi Part - I Village, Radhapuram Taluk in SF.Nos. 281 & 282	1.54.0	-	Non - Captive	08°19'54"N to 08°19'58"N & 77°32'26"E to 77°32'32"E
11	Rough Stone	M.Murugaiah	M.Murugaiah, S/o.Muthiah, 1/36A, Mela Theru, Thirumalaikolunthupuram Village, Palayamkottai Taluk, Tirunelveli District.	M1/50561/2017, dt.19.02.2018	Melathidiyur Village, Palayamkottai Taluk in SF.No. 27/7B1A	1.27.5	-	Non - Captive	08°38'10"N to 08°38'18"N & 77°39'06"E to 77°39'10"E
12	Rough Stone	T.Lakshmi	T.Lakshmi, W/o.Thirumalaisamy, 83-B, North Street, Dharmathoorani Village, Pattadaikatti Panchayat, Sankarankovil Taluk, Tirunelveli District.	M1/10042/2015, dt.21.06.2018	South Sankarankovil Village, Sankarankovil Taluk in SF.No. 163/1	1.64.0	-	Non - Captive	09°06'38"N to 09°06'41"N & 77°30'49"E to 77°30'59"E

13	Rough Stone	HI TECH ROCK PRODUCTS & AGGREGATES LIMITED	Tvl.Hi Tech Rock Products & Aggregates Limited, Mount Poonamalee Road, Manapakkam, P.B.No.979, Chennai - 600 089.	M1/39681/2017, dt.14.11.2018	Irukkandurai Part - II Village, Radhapuram Taluk in SF.No.		-	Non - Captive	8 10'40.40" to 8 10'50.20" & 77 39'23.90" to 77 39'34.50"
17	Rough Stone	G.Karuppasamy	G.Karuppasamy, S/o.Gurusamy, 249, Sivanthinagar, Kuthukkal Valasai, Tenkasi Taluk, Tirunelveli District.	M1/24418/2017, dt.06.09.2018	Maruthamputhur Part - I village, Alangulam Taluk in SF.Nos. 35/4A, 4B, 4C, 4D, 4E, 4F, 4G, 4H & 4I	3.99.0	-	Non - Captive	08°49'11"N to 08°49'19"N & 77°31'22"E to 77°31'31"E
21	Rough Stone	A.Kirubanidhi	A.Kirubanidhi, S/o.Arumuga Nadar, 8/180, Tiruchendur Main Road, K.uvari village, Radhapuram Taluk, Tirunelveli District.	M1/7014/2014, dt.25.06.2014	Irukkandurai Part - II Village, Radhapuram Taluk in SF.No. 181/2A2	1.92.0	-	Non - Captive	08°11'14"N to 08°11'19"N & 77°40'44"E to 77°40'49"E
23	Rough Stone	A.K.A.Rajan	A.K.A.Rajan, S/o.Kirubanidhi, 8/180, Tiruchendur Main Road, K.Uvari Village, Radhapuram Taluk, Tirunelveli District.	M1/7012/2014, dt.25.06.2014	Irukkandurai Part - II Village, Radhapuram Taluk in SF.No. 181/2B	0.96.0	-	Non - Captive	08°11'11"N to 08°11'14"N & 77°40'43"E to 77°40'48"E
24	Rough Stone	M.Chinnathambi	M.Chinnathambi, S/o.Muthusamy, 67-A, Samba Street, Tenkasi Taluk, Tirunelveli District.	M1/1570/2015, dt.23.06.2018	Thippanampatti Village, Tenkasi Taluk in SF.Nos. 1377/1C, 1F, 1G, 2I, 2B, 2F, 2H & 1137/2E,	1.81.0	-	Non - Captive	08°53'03"N to 08°53'10"N & 77°20'09"E to 77°20'17"E

25	Rough Stone	C.Sugu	C.Sugu, S/o.Chellappan, 12-1B, Vellancode, Chitharal Post, Kanniyakumari District.	M1/12757/2016 , dt.29.12.2017	Kasthurirengapuram Part - II village, Radhapuram Taluk in SF.No. 193(P)	1.42.0	-	Non - Capti ve	08°16'09"N to 08°16'17"N & 77°46'46"E to 77°46'49"E
26	Rough Stone	S.Rajendran	S.Rajendran, S/o.Sridharan, 13-43-A, Preetha Bavan, Vellancode, Chitharal Post, Kanniyakumari District.	M1/12755/2016 , dt.29.12.2017	Kasthurirengapuram Part - II village, Radhapuram Taluk in SF.No. 181/1A(P)	2.45.48	-	Non - Capti ve	08°16'18"N to 08°16'24"N & 77°46'59"E to 77°47'04"E
28	Rough Stone	Tvl. Triveni Real Estate & Developers (P) Ltd	Tvl.Triveni Real Estate & Developers Pvt Ltd, Prop.Sajan K.Thomas, 11/312, Kulangaramuriy, Valakagam, Chirakadavu Post, Cheruwally village, Kanjirapalli Taluk, Kottayam District, Kerala	M1/6165/2012, dt.31.08.2017	Therkku Madathur Village, Ambasamudram Taluk in SF.No. 102(P)	2.16.0	-	Non - Capti ve	08°49'48"N to 08°49'55"N & 77°23'44"E to 77°23'46"E
29	Rough Stone	V.Maripandi	V.Maripandi, S/o.Velusamy Thevar, 4/66, Pillaiyar Kovil Main Road, Sundaresapuram Post, Kadayanallur Taluk, Tirunelveli District.	M1/61043/2009 , dt.11.05.2017	Kambaneri Pudukudi Part - I Village, Kadayanallur Taluk in SF.Nos. 155/3, 8B, 11, 13, 14, 15 & 16	2.23.0	-	Non - Capti ve	09°05'32"N to 09°05'38"N & 77°23'03"E to 77°23'11"E
32	Rough Stone	P.K.S.Ahamad Meeran	P.K.S.Ahamed Meeran, 18, Puthu Amman Kovil Street, Sindhupundhurai, Tirunelveli Taluk & District.	M1/30717/2016 , dt.09.07.2017	Gangaikondan Part - II village, Tirunelveli Taluk in SF.Nos. 1665/1B	2.10.5	-	Non - Capti ve	08°48'24"N to 08°48'39"N & 77°45'11"E to 77°45'13"E

33	Rough Stone	K.Sasikumar	K.Sasikumar, S/o.Kalaigiam, 9/303, Nainar Kovil Street, Vellapanaiyaneripatti, Thippanampatti village, Tenkasi Taluk, Tirunelveli District.	M1/34173/2016 , dt.09.07.2017	A.P.Nadanoor village, Alangulam Taluk in SF.Nos. 433/1 and 433/2	1.99.0	-	Non - Capti ve	08°47'59"N to 08°48'05"N & 77°26'29"E to 77°26'35"E

14. TOTAL MINERAL RESERVE AVAILABLE IN THE DISTRICT

The District Collector has vested with powers for the grant of licence for minor minerals like, Rough Stone, as per Rule 19 of TNMMCR 1959. The minor minerals noticed in poromboke lands are leased out through tender cum auction system. With regard to major minerals, in patta lands powers vested with Commissioner of Geology and Mining for the grant of mining leases. In poromboke lands power is vested with Government. Apart from major minerals, the minor minerals like Rough stone are noticed.

Sl.No.	Name of the Mineral	Classification of Land	No.of Existing leases
1	Rough Stone	Patta Land	75
		Government Land	09

15. QUALITY /GRADE OF MINERAL AVAILABLE IN THE DISTRICT.

The Charnockite includes felsic and rich in quartz and microcline, others mafic and full of pyroxene and olinine, a special feature, recurring in many members of the group, is the presence of a strongly pleochroic, reddish or green orthopyroxene (formerly known as hypersthene).

Rocks of the Charnockite series may be named by adding orthopyroxene to the normal igneous nomenclature. Chemical composition of the charnockite available in the district is given below.

Chemical composition	Ranges in %
SiO_2	46-49
Al_2O_3	1-3
Fe_2O_3	1.16
FeO	21-33
MgO	12-20
MnO	0.3-0.8
CaO	0.04-2.0
Na_2O	0.02-0.50
K_2O	0.02-0.30

Gneiss is a high grade metamorphic rock. This means that gneiss has been subjected to more heat and pressure than schist. This banding has alternating layers that are composed of different minerals.

Chemical composition	Ranges in %
SiO_2	55
Al_2O_3	15-18
Fe_2O_3	2-3
MgO	2.5-3.5
CaO	1.5-2
Na_2O	0.50-1
K_2O	3.5-4.0
Specific Gravity	1.5 gm/cc
Bulk Density	2.7 gm/cc

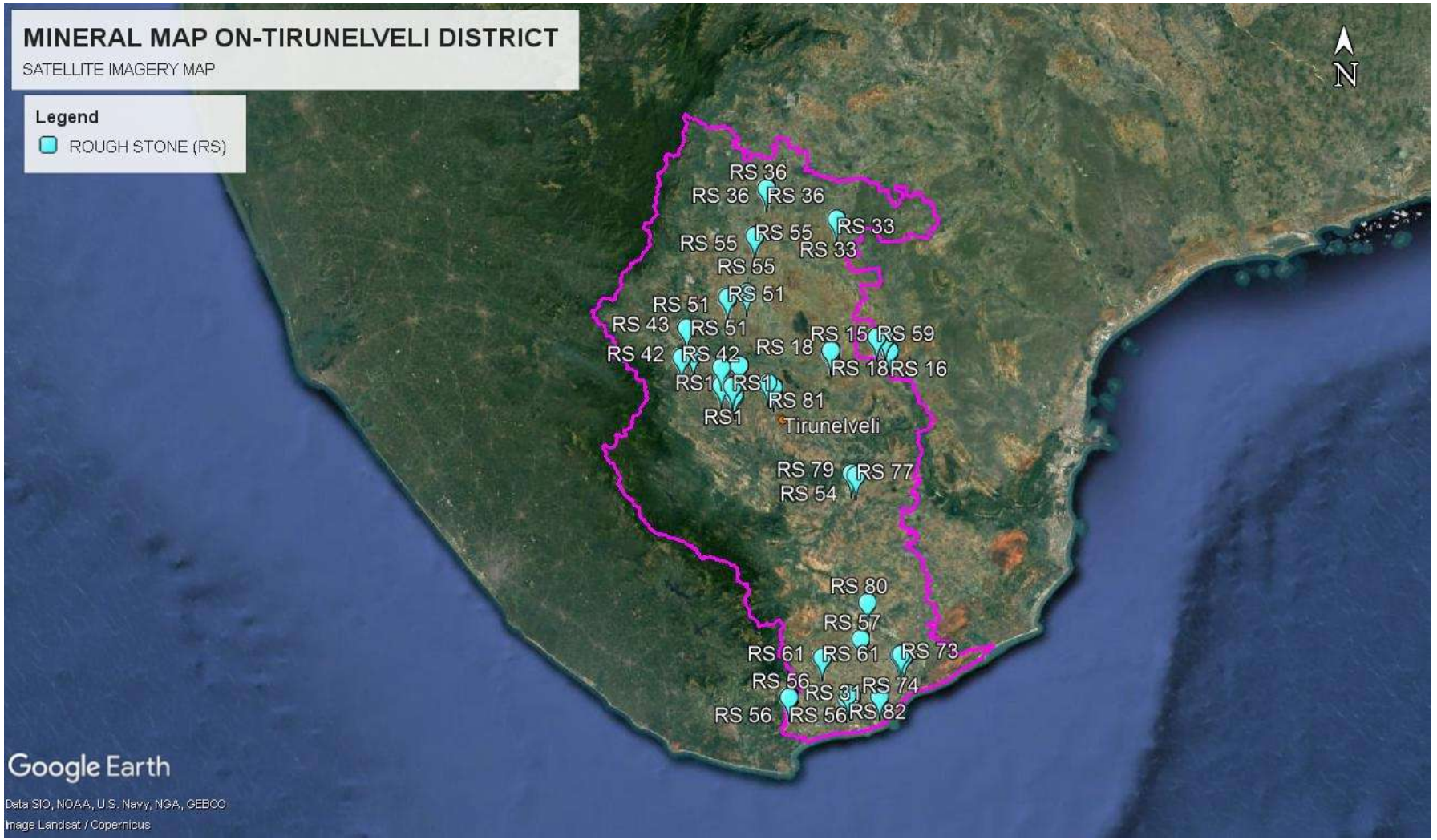
16. USE OF MINERAL

Charnockite and granitic gneisses are extensively quarried as rough stone which is used as aggregates for construction of building, laying of roads and for preparation of value added products like hollow blocks, pillar stones, M-sand etc.

17. DEMAND AND SUPPLY OF THE MINERALS IN THE LAST THREE YEARS.

Sl. No.	Name of the mineral	Demand 2015-16	Supply 2015-16	Demand 2016-17	Supply 2016-17	Demand 2017-18	Supply 2017-18
1	Rough Stone	2125138	2125138	2825205	2825205	3470931	3470931

18.0 MINING LEASE MARKED ON THE MAP OF THE DISTRICT


MINERAL MAP ON-TIRUNELVELI DISTRICT
SATELLITE IMAGERY MAP
Legend
ROUGH STONE (RS)
N
RS 36
RS 36
RS 36
RS 33
RS 55
RS 55
RS 33
RS 55
RS 51
RS 51
RS 43
RS 51
RS 15
RS 59
RS 42
RS 42
RS 18
RS 18
RS 16
RS1
RS1
RS 81
RS1
Tirunelveli
RS 79
RS 77
RS 54
RS 80
RS 57
RS 61
RS 61
RS 73
RS 56
RS 31
RS 74
RS 56
RS 56
RS 82
Google Earth
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus

19.0 Details of the area where there is a cluster of mining leases viz., number of mining leases, location (latitude & longitude)

As per the Ministry of Environment, Forest and Climate Change Notification No. S.O. 3933(E) dated 18.12.2017, the quarries situated in the following villages are in cluster situation and to follow the conditions stipulated in the Government of India Notification.

S. No	Taluk	Village
1.	Alangulam	Vengatampatti - II
		Maruthampudur - I
		A.P. Nadanoor
2.	Kadayanallur	Ariyanayagipuram
3.	Manur	Pirancheri
		Vagaikulam
		Kanarpatti
4.	Palayamkottai	Tharuvai
5.	Radhapuram	Irukkandurai
		Therkku Karunkulam
		Kasthurirengapuram Part - II
6.	Tirunelveli	Kodaganallur
		Gangaikondan Part - I & II
7.	V.K.Pudur	Surandai - I

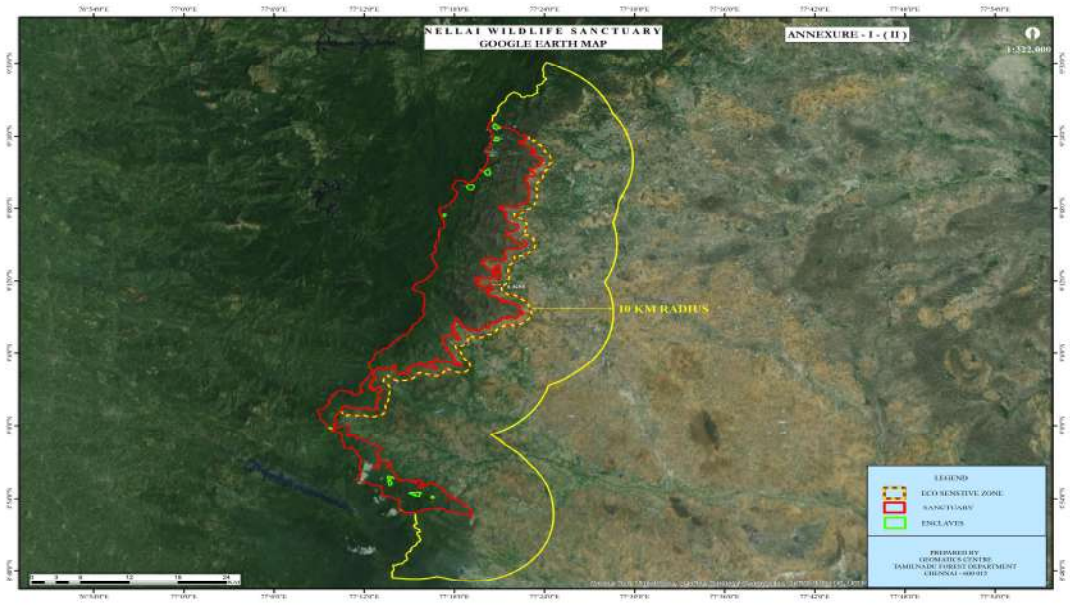
20. DETAILS OF ECO-SENSITIVE AREA.

The Indian board for Wildlife in its 'Wildlife Conservation Strategy-2002' envisaged 'lands falling within 10 km of the boundaries of National parks and sanctuaries should be notified as eco-fragile zones under section 3 (v) of the Environment (Protection) Act and Rule 5 Sub rule (vii) & (x) of the Environment (Protection) Rules'. With concerns over applicability of the 10 km range, the National Board for Wildlife decided that 'delineation of eco-sensitive zones would have to be site specific and relate to regulation, rather than prohibition, of specific activities'.

The purpose of declaring Eco-sensitive zones around National Parks and sanctuaries is to create some kind of **'Shock Absorber'** for the protected areas and they would also act as a transition zone from areas of high protection to areas involving lesser protection.

20.1 Nellai Wildlife Sanctuary

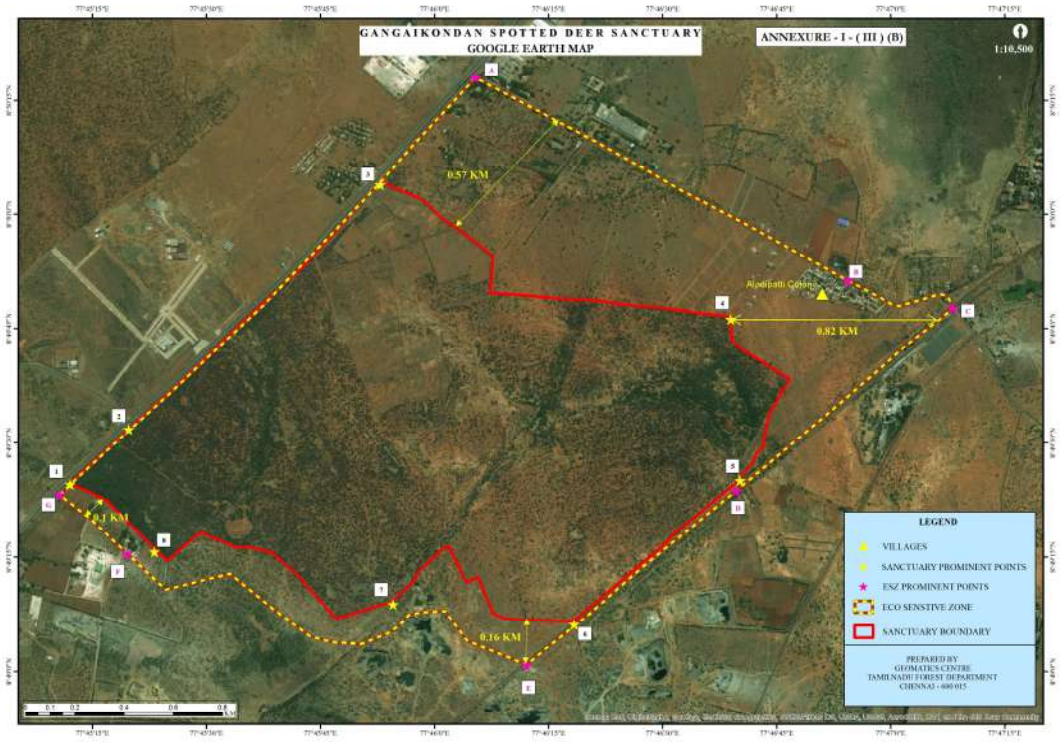
Nellai Wildlife Sanctuary spread over an area of 35,673.33 ha comes under Tenkasi, Shenkottai, Kadayanallur, and sivagiri taluk of Tirunelveli District in Tamilnadu.



(Eco Sensitive Zones are showed in Red and Yellow dotted lines in this figure)

20.2 Gangaikondan spotted Deer Sanctuary

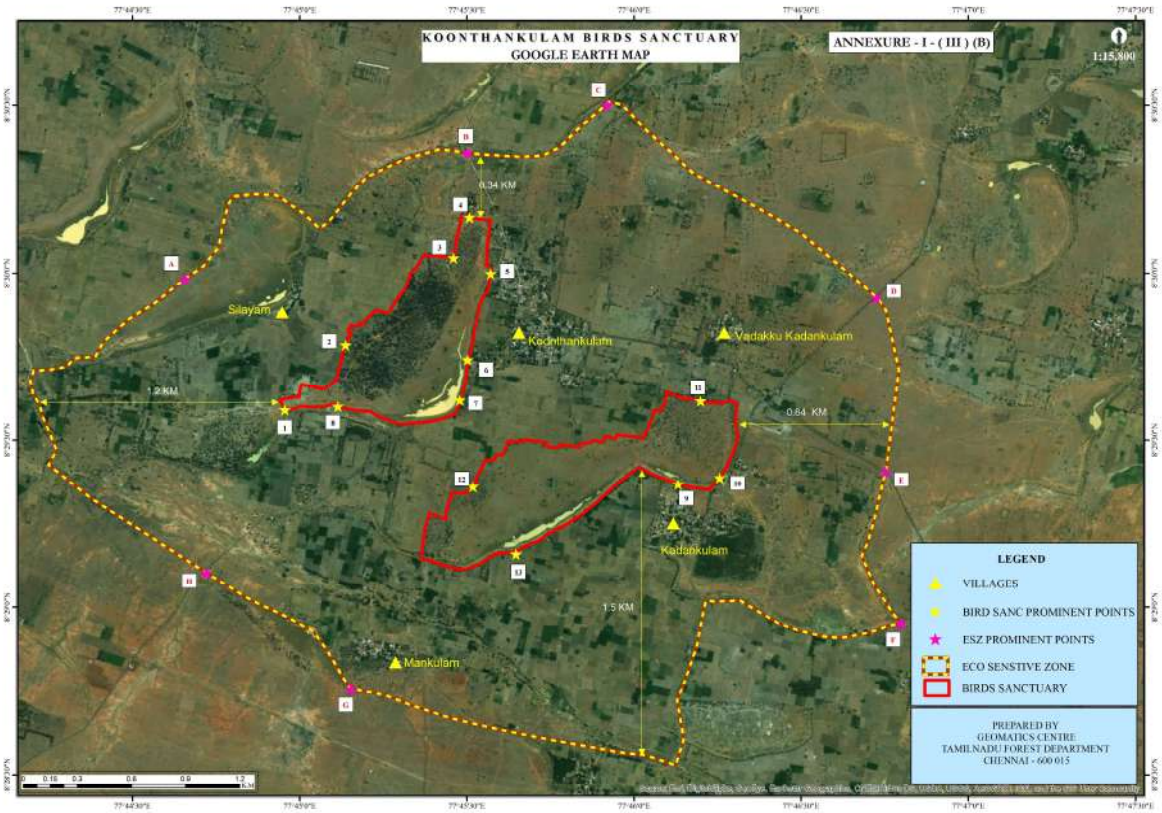
Gangaikondan spotted Deer Sanctuary spread over an area of 288.40 ha comes under Tirunelveli taluk of Tirunelveli District in Tamilnadu. It is located at on the N.H.7 towards Kanyakumari to Madurai.



(Eco Sensitive Zones are showed in Red and Yellow dotted lines in this figure)

20.3 Koonthankulam Bird Sanctuary

Koonthankulam Bird Sanctuary spread over an area of 129.33 ha comes under Nanguneri taluk of Tirunelveli District in Tamil Nadu and comprises of two fresh water wetlands, namely Koonthankulam and Kadankulam. It is located at Koonthankulam village, about 15 km west of Nanguneri and 35 km from Tirunelveli city. The approach road from Tirunelveli is through Moolakaraipatti, which is 6kms away from the sanctuary.



(Eco Sensitive Zones are showed in Red and Yellow dotted lines in this figure)

21. IMPACT ON THE ENVIRONMENT (AIR, WATER, NOISE, SOIL, FLORA & FAUNA, LAND USE, AGRICULTURE, FOREST ETC.) DUE TO MINING ACTIVITY

Mining and allied operations may affect the existing environmental setup in the area unless proper mitigation measures are not taken. Hence it is essential to assess the impacts of mining on various environmental parameters so that abatement measures could be planned in advance for systematic, sustainable and eco-friendly mining in the area.

21.1 Air Environment

The mining and allied operations may cause deterioration of air quality due to pollution if prompt care is not taken. The principal sources of air pollution in general due to mining and allied activities will be the dust generation in the mine due to:

- Excavation of Minerals and overburden.
- Movement of HEMM such as Excavators, tippers etc.
- Loading and unloading operation
- Overburden & Mineral transportation

Besides the above mentioned fugitive dust emissions, atmospheric pollution can occur as a result of emission of SO2, NOx, CO etc., from diesel driven mining equipment, compressors, generator sets, etc. Larger suspended particles are generally filtered in the nose and throat and do not cause problems.

Particulate matter smaller than 10 microns, referred to as PM10, can settle in the bronchi and lungs and cause health problems like Bronchitis, Emphysema, Bronchial Asthma, Irritation of mucus membranes of eyes, etc. Particles smaller than 2.5 micrometers (PM2.5), tend to penetrate into the lungs and very small particles (<100 nanometers) may pass through the lungs to affect other organs.

21.2 Water Environment

The major sources of water pollution normally associated due to mining and allied operations are:

- Generation of industrial effluent water from workshop, service building.
- Disturbance to drainage course or water bodies in the project area, if any.
- Washouts from waste dumps / embankment, if any.
- Domestic effluent
- Mine discharge water pumped out from opencast mines, if any and effect on ground water table.

Direct impact on human beings due to poor water quality consequent to mining operation can lead to various water borne diseases like diarrhea, jaundice, dysentery, typhoid, etc. Besides, the polluted water may not be useful for animal or human consumption, vegetation and may affect aquatic life, if effluents are not properly treated to remove the harmful pollutants.

21.3 Noise & Vibration

The impact prediction and control measure for noise environment due to mining and allied activities are described below:

Noise is one of the inevitable causes of pollution in mining operations, largely due to the extensive mechanization adopted. Since the Limekankar/Clay (others) in the District is in friable form, no drilling and blasting is required for the excavation. Hence the major source of noise will be from the equipment‟s, such as, Excavation, loading & unloading & movement of vehicles, etc. will produce noise of considerable magnitude in mining operations. Prolonged exposure to a high noise level is harmful to the human auditory system and can create mental fatigue, rebellious attitude, annoyance and carelessness, which may lead to neglect of work and also result in accidents.

The Limekankar/Clay (others) in this region is in friable form and can be excavated directly by using hydraulic excavator and there will not be any drilling and blasting involved in the mining operation. Hence, vibration due to blasting is not envisaged.

21.4 Impact on Land Environment

Due to mining and its allied activities there will some changes to the pre mining land status due to the following activities:

- Excavation of Ore and Waste / Overburden.
- Temporary side casting / Backfilling of Waste / Overburden.
- Construction of infrastructure facilities such as, office, road. Site services, etc.

21.5 Impact on Biological Environment

The major possible impact on biological environment due to mining are given below

- Clearance of vegetation due to mining and allied activities

- Retardation of tree growth, tip burning, etc., due to deposition of dust and the Particulate matter generated from the mining operation.
- Presence of Schedule-I fauna in the mining area
- Proposed impact on surface water quality that also provides water to wildlife
- Risk of fall/slip or cause death to wild animals due to project activities
- The project releases effluents into water bodies that also supplies water to wildlife
- Diversion of Agricultural lands for mining
- Diversion of Forest Lands for mining

22. REMEDIAL MEASURES TO MITIGATE THE IMPACT OF MINING ON THE ENVIRONMENT

The following remedial measures to be taken during mining

22.1. Remedial Measures to mitigate Air Pollution

- Water sprinkling on mineral transport road from the mines to the main road
- Black topping of the main transportation roads to the possible extent
- Avoiding crowding of trucks by properly spacing them to avoid the concentration of dust emission at any time
- Covering the trucks by tarpaulin sheets during ore transportation
- Proper maintenance of HEMM to minimize gaseous emission
- Imparting sufficient training to operators on safety and environmental parameters
- Proper maintenance of haul road and other roads
- Development of green belt/ plantation around mine, along the roads, backfilled area, in various undisturbed areas within the mine lease areas etc.

22.2. Remedial Measures to mitigate Water Pollution

- Industrial effluent treatment systems wherever necessary to be introduced and maintained properly.
- Saftey barriers to be provided for all water bodies and no mining activities should be carried out in the safety barrier area
- Mitigative measures like construction of garland drains formation of earth bunds to be followed in the waste dumping areas to avoid wash off.
- Domestic effluents to be treated in scientific manner.
- Required statutory clearances to be obtained and all precautionary measures to be adopted wherever punping of ground water is involved.

22.3 Remedial Measures to reduce Noise & Vibration

- Planting rows of native trees around mine, along the roads, other noise generating centres to act as acoustic barriers.
- Sound proof operator's cabin for equipment like Excavators, tippers etc.
- Proper and regular maintenance of equipment may lead to less noise generation.
- Air silencers of suitable type that can modulate the noise of the engines of machinery to be utilized and will be maintained effectively.

- Providing in-built mechanism for reducing sound emissions.
- Providing earmuffs to workers exposed to higher noise level and to those persons operating or working close to any machine.
- Conducting regular health check-up of workers including Audiometric test for the workers engaged in noise prone area.

22.4 Remedial Measures to reduce Impact on Land Environment

Scientific reclamation measures to be adopted to reduce the impact of land environment due to mining. Limekankar/Clay(Others) being shallow deposit backfilling of mined out voids may be practiced to avoid land degradation.

22.5 Remedial Measures to reduce Impact on Biological Environment

- The mineral bearing areas in the District is mostly of dry areas, afforestation to be carried out in the mining areas.
- Necessary mitigative measures like dust suppression, proper maintenance of equipments, black topping of roads etc., to be carried out to prevent dust generation & any further impact on the vegetation
- Conservation plan for schedule-I species if any to be prepared in consultation with Forest Department and the proposals given in the conservation plan to be strictly implemented.
- Effluents generated in the mining areas to be treated properly.

23. RECLAMATION OF MINED OUT AREA (BEST PRACTICE ALREADY IMPLEMENTED IN THE DISTRICT, REQUIREMENT AS PER RULES AND REGULATION, PROPOSED RECLAMATION PLAN)

In the post mining period, the mined out pit it will be used for Rain Water Harvesting. Waste dumps will be reclaimed with suitable type of plantation with necessory garland drain system.

24. RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

Risk Assessment and Disaster Management Plan in connection with mining and allied operations should be spelt out in detail to cover possible dangers /risks/explosions/accidents, etc. likely to arise from the project operations, including onsite and off-site emergency plans to meet the disastrous situations if any.

The mine management should be able to deal with the situation efficiently to reduce confusion keeping in view of the likely sources of danger in the project.

1) Outline of Disaster Management Plan :-

The purpose of disaster management plan is to restore the normalcy for early resumption of mining operation due to an unexpected, sudden occurrence resulting to an abnormality in the course of mining activity leading to a serious danger to workers or any machinery or the environment.

2) System of Communication:-

An internal communication system should be provided. Telephone nos and addresses of adjoining mines, rescue station, police station, fire service station, local hospital, electricity supply agency and standing consultative committee members should be propely updated and displayed.

3) Consultative Committee:-

A standing consultative committee should be formed under the Head of Mines. The members consists of Mines Manager / Safety Officer / Medical Officer / Public Relation Officer/ Foreman/ and Environmental Engineer.

4) Facilities & Accommodation:-

Accommodation and facilities for medical centre, rescue room and for various working groups should be provided. Regular checking of these facilities shall be undertaken.

5) First Aid & Medical Facilities:-

The mine management should be having first aid / medical centre for use in emergency situation. All casualties should be registered and should be given first aid. The centre should have facilities for first aid & minor treatment, resuscitation, ambulance and transport. Proper telephone / wireless set should be provided for quick communication with hospitals where the complicated cases are to be referred. Regular checking of these facilities shall be under taken by the doctor and the in-charge of the first aid room.

6) Stores and Equipment :-

A detailed list of equipment available, its type and capacity and items reserved for emergency should be maintained.

7) Transport Services:-

A well-defined transport control system should be provided to deal with the situation.

8) Functions of Public Relations Group:-

Liaison with representatives of the mine workers is required to ameliorate the situation of panic, tension, sentiments, grievances and misgivings created by any disaster. Management is required to ameliorate the injured, survivors and family members of affected persons by providing material, finance, moral support and establishing contact with relatives of victims.

The consultative committee formed, especially the nominated public relation officer shall look into these aspects.

9) Security:-

Manning of security posts is very essential during the disaster management.

10) Catering & Refreshment: -

Arrangement will be made for the victims, rescue teams and others.

25.Details of occupational health issue in the district (last five –year data of number of patients of silicosis & tuberculosis is also needs to be submitted)

Sl.No.	Year	Number of patients treated for silicosis	Number of patients treated for Tuberculosis
1	2015	Nil	Nil
2	2016	Nil	Nil
3	2017	Nil	Nil
4	2018	Nil	Nil
5	2019	Nil	Nil

26.Plantation and green belt development in respect of leases already granted in the district

It is necessary to develop Green belt in and around the polluted site with suitable species to reduce the air pollution effectively. Implementation of afforestation program is of paramount importance. In addition to augmenting existing vegetation, it also checks soil erosion, make the ecosystem more complex and functionally more stable and make the climate more conductive.

Simultaneous backfilling method will be followed in most of the mining areas. During the operations, the plantation will be proposed and will be carried out on the safety barrier areas and also on the mined out and backfilling areas.

27. Any other Information

Kudankulam Nuclear Power Project situated in Kudankulam village, Radhapuram Taluk, Tirunelveli District as per AERB guidelines No Quarries can be started within 5 kilo meters radius and will be scrutinised by Kudankulam Local Committee.

SITE PHOTOS

ROUGH STONE Village ; Kovankulam Latitude ; 08° 22' 44"N Longitude ; 77° 42' 53"E 	**ROUGH STONE** Village ; Thippanampatti Latitude ; 08° 53' 08"N Longitude ; 77° 20' 09"E 

ROUGH STONE

Village ; Tharuvai

Latitude ; 08°38'28"N

Longitude ; 77°40'53"E

ROUGH STONE

Village ; Therkkumadathur

Latitude ; 08°49'48"N

Longitude ; 77°23'44"E

ROUGH STONE

Village ; Irukkandurai Part-2

Latitude ; 08° 11' 14"N

Longitude ; 77° 40' 44"E

ROUGH STONE

Village ; Idaigal Part-I

Latitude ; 08° 47' 58"N

Longitude ; 77° 27' 46"E

ROUGH STONE

Village ; Poigai

Latitude ; 09°07'30"N

Longitude ; 77°28'57"E

ROUGH STONE

Village ; Venkadampatti Part-1

Latitude ; 08° 51' 27"N

Longitude ; 77° 24' 49"E

Conclusion and Recommendations

This District Survey Report has been prepared by doing field work in a short span of ten working days. The details related to the occurrence of mineral resources and other data of the district are subject to updation of district mineral inventory from time to time. It may be periodically done every five (05) years with the help of GSI and other govt/non-govt geoscience exploration organisations.

Considerable amount of crystalline limestone deposit is the Tirunelveli District is occurs in Talaiyuttu-Nanjakulam-Terkuseiyanur areas are known from previous histories. Around Usilangulam, Ottavidu and Tadiyampatti areas, linear band of crystalline limestone is exposed with quartzite and Charnockite. This area may be taken up for geological survey in view of future mining prospects. Crystalline limestone occurrences south of Tirunelveli around Padmaneri-Devanallur-Pottaisutti areas may be reapparaised and to be developed for cement grade deposits.

Charnockite rock the raw material for the production of building/construction aggregates, road metal and M-sand is more concentrated spatially. With respect to the need for public utility is it locally quarried/mined in the entire district proportionately and to be continued in the same manner.

The entire Tirunelveli district has high hills of quartzite exposed in Talaiyuttu, Marandai Malai, Reddiyarpatti hill, Krishnapuram-Nochikulam and Uttumalai hills but due to its high metamorphic nature and its impurities it attracts very less importance. The River Sand in the Chittar and Tamarabarani River is very small in quantity which cannot be exploited for public purpose. The gemstone reported in Kalakadu and Manimuthar Dam area may be explored in collaboration with GSI or any govt organisations.

The introduction of e-permit system and serious implementation of Mineral Dealers Rule and the despatch slips / transit permits with tampered proof security features will enhance sustainable mining activity in the district.

GPS/Auto Tags installed tracking of mined out mineral vehicles will fetch more revenue to the state exchequer and over exploitation.

An appreciable work carried out by Deputy Director (Mines)/ Tirunelveli District and his office in considering all parameters related to ground geology and environmental issues before granting of any quarrying lease is highly commendable and to be continued.