

PRE-FEASIBILITY REPORT

**FOR ORIYUR SAND QUARRY
AS PER SAND MINING GUIDELINES, 2020**



Extent : 2.10.0 Hectares
S.F. No : 219 (P)
Village : Oriyur
Taluk : Thiruvadanai
District : Ramanathapuram
State : Tamil Nadu

PROJECT PROPONENT

The Executive Engineer,
Public Work Department,
Water Resources Organization,
Mining and Monitoring Division,
Madurai.



EIA CONSULTANT

AADHI BOOMI MINING AND ENVIRO TECH (P) LTD.

NABET Accredited EIA Consultant – “A” Category.

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PRE-FEASIBILITY REPORT

FOR ORIYUR SAND QUARRY

AS PER SAND MINING GUIDELINES, 2020

in S.No 158/1(P) in Pambar River, Oriyur Village, Thiruvadanai Taluk,
Ramanathapuram District, Tamil Nadu.

1. EXECUTIVE SUMMARY

This project is for quarrying Sand, Minor minerals over an area of 2.10.0 Hectares in SF. No. 219 (P), a part of Pambar river in Oriyur Village, Thiruvadanai Taluk, Ramanathapuram District, Tamil Nadu. The quantity to be Quarried shall be 33,155 m³ as permitted by the Dept. of Geology and Mining, Ramanathapuram for a lease period of One year vide precise area letter No. Rc No. **1418/G&M.1/2018 dated 03.07.2020**, granted under Rule 12 of Tamil Nadu Minor Mineral Concession Rules, 1959 and amended up to date. Mining Plan is prepared under the provisions of Rule 41 of TNMMCR, 1959 and approved by Assitant Director of Dept of Geology and Mining, Ramanathapuram vide Rc No. 1418/G&M.1/2018 Dated. 29.08.2020. The Geological Resources and Mineable reserves are estimated as per the requirement of Sand Mining Guidelines, 2020 with grid levels taken 10m x 10m interval and plans and sections has been prepared with 0.25m contour interval. The Environment Clearance is required under Rule 42 of TNMMCR, 1959 under category B2 for a fresh quarry lease for Sand from Pambar River.

2. INTRODUCTION OF THE PROJECT

As per the Environmental Impact Assessment (EIA) Notification dated 14th September, 2006 and its subsequent amendments and supreme court order of February 27, 2012 the proposed quarry project fall under category B2 which required Environmental Clearance from the State Environmental Impact Assessment Authority (SEIAA), Chennai region.

The lease land\river basin was maintained by Executive Engineer, PWD/WRO Dept, MMD and they are removing such Sand, containing fine and coarse materials for clearing the obstacles of river flow. This project is more beneficial to the public for water supply around the flow direction of the river.

The Executive Engineer, PWD/WRO, MMD has applied to the District Collector, Ramanathapuram to obtain permission for removal of sand and seeking Environmental

clearance from SEIAA, Chennai for grant of fresh Quarry Lease.

2.1 Identification of project and project proponent. In case of Mining project, a copy of Mining lease/letter of intent should be given.

The Executive Engineer, PWD/WRO, Mining and monitoring Division is a Govt. project.

Owner name and address (address for correspondence):

The Executive Engineer,
PWD/ WRO, MMD,
Madurai District.

A copy of Mining lease letter issued by the District Collector (R.C.No. 1418/G&M.1/2018 dated 03.07.2020 is enclosed in Approved Mining plan's Annexure.

2.2 Brief description of nature of project:

The area is represented by Geological Survey of India Topo sheet No. 58 O/1 and falls between Latitude of N9°51'46.26578" N9°51'56.29432" and Longitude of E79°02'24.69910" E79°02'33.28312"..

| P. No | Latitude (N) | Longitude (E) | UTM E(m) | UTM N(m) | Ele(m) |
|-------|-----------------|------------------|------------|-------------|--------|
| 1 | N9°51'55.36330" | E79°02'24.69910" | 285086.553 | 1091158.277 | 5.354 |
| 2 | N9°51'46.26578" | E79°02'31.67435" | 285297.469 | 1090877.476 | 7.841 |
| 3 | N9°51'47.17093" | E79°02'33.28312" | 285346.655 | 1090905.003 | 6.659 |
| 4 | N9°51'56.29432" | E79°02'26.35777" | 285137.264 | 1091186.591 | 7.424 |

| District & State | Taluk | Village | S.F.No | Area (Ha) |
|------------------------------|--------------|---------|---------|-----------|
| Ramanathapuram, TamilNadu | Thiruvadanai | Oriyur | 219 (P) | 2.10.0Ha |

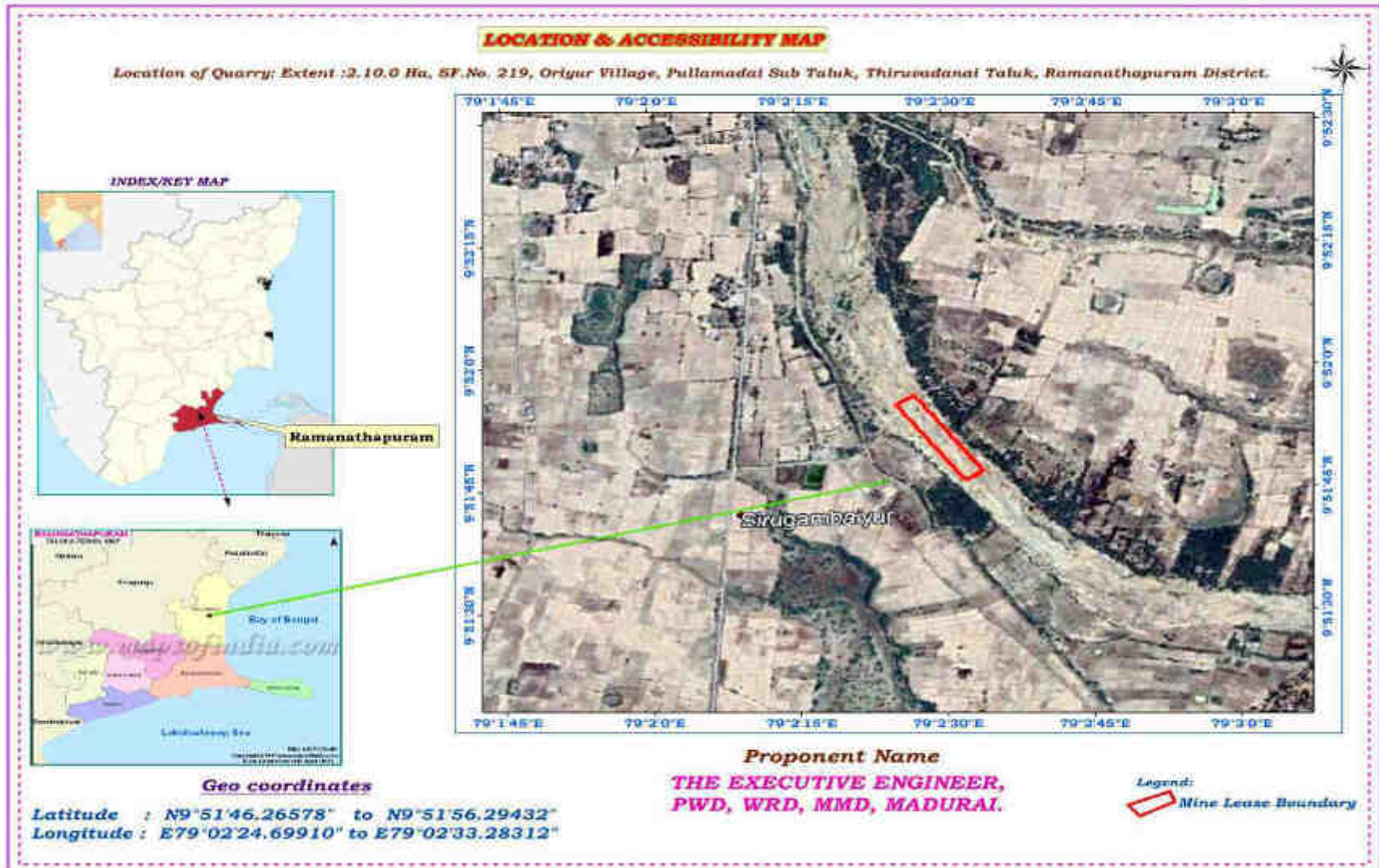


Fig.1.1 Location Map of the proposed sand quarry


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The name of mineral intends to quarry is sand containing fine and coarse materials. No toxic elements or hazardous materials are reported from this river bed. The applicant has received necessary clearance from all concerned authorities for removal of such Sand from the Pambar River. The proposed area for quarry lease is river poramboke land, not a forest land.

Type of Mining: semi-mechanized Open cast, loading by hydraulic excavator and manual. Transport by bullock cart, tractors and tippers. Excavated sand from river site shall be transported to the stocking yard within 500m distance.

Period of Mining: One year from the date of execution of quarry lease.

2.3 Need for the project and its importance to the country and or region:

- i) The Pambar River should be desilted often during off season of rainy period so as to remove obstacles of flowing of water in the river, failing which the rain water will be flooded into down line stream and cause damage of paddy fields and other agricultural lands.
- ii) Water demand and supply can be met during summer season and avoid water scarcity in this area.
- iii) The sand is a non-sticky material which is useful for construction and other civil purposes. Therefore this project is beneficial to the society as well as to the applicant to get some income out of this work.
- iv) No damage of land, no reclamation or back filling is required. Pollution out of this project is absolutely negligible.

2.4. Demand-Supply Gap

Demand of sand required for civil and other construction purposes is very high in this district.

2.5. Export Possibility

It is a low cost product and therefore the Lessee would like to sale out the sand in domestic market through bullock cart on royalty basis as per the order of state Govt.

2.6 Domestic Export / Markets

Lessee will like to sale out in domestic market as per requirement. No export is proposed.

2.7 Employment generation (direct and indirect) due to the project.

For the purpose of Mines safety under the provisions of MMR, 1961 under the Mines Act, 1952 the workers are employed more than 10, it is preferred to have a qualified Mining Mate to keep all the


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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.

| Supervisory & Skilled Persons | | | |
|--|------------------------|----------------|---|
| S.No | Designation | Nos | |
| 1 | PWD Assistant Engineer | 1 | |
| 2 | Technical Assistant | 1 | |
| 3 | Poclain Operator | 2 | |
| 4 | Poclain Assistant | 2 | |
| Total | | 6 | |
| Unskilled | | | |
| S.No | Designation | Nos | |
| 5 | Permit Slip issuer | 3 | |
| 6 | Traffic Regulator | Entrance | 2 |
| | | Exist | 2 |
| | | Quarrying Site | 3 |
| 7 | Bullock Cart persons | 12 | |
| 8 | Bucket Watcher | 3 | |
| 9. | Office Helper | 1 | |
| 10 | Track Maintainer | 6 | |
| | Watchman(Two Shift) | 4 | |
| Total | | 36 | |
| Grand Total | | 42 | |

3. PROJECT DESCRIPTION

3.1 Type of project interlinked and interdependent projects, if any.

This project is located in Oriyur village, Thiruvadanai taluk, Ramanathapuram District. It is mandatory to obtain environmental clearance for all mining project of minor minerals irrespective of mining area as per the order of the Honorable Supreme Court of India in I.A.No. 12-/13/2011 in S.L.P.No. 19628-19629 of 2009 etc., dated 27.02.2012, the Ministry of Environmental and Forest Office Memorandum dated 18.05.2012 clearance has to be obtained from the State Level Environmental Impact Assessment Authority, Tamil Nadu.

As per above order all projects less than 5 hectares falls in 'B2' Category of Schedule 1 (a). The extent of this lease area is 2.10.0 hectares, and falls in 'B2' Category of Schedule 1 (a).

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

The area is represented by Geological Survey of India Topo sheet No. 58 O/1 and falls between Latitude of N9°51'46.26578" N9°51'56.29432" and Longitude of E79°02'24.69910" E79°02'33.28312"..

Table no. 3.1 Latitude and longitude

| P.No | Latitude (N) | Longitude (E) | UTM E(m) | UTM N(m) | Ele (m) |
|------|-----------------|------------------|------------|-------------|---------|
| 1 | N9°51'55.36330" | E79°02'24.69910" | 285086.553 | 1091158.277 | 5.354 |
| 2 | N9°51'46.26578" | E79°02'31.67435" | 285297.469 | 1090877.476 | 7.841 |
| 3 | N9°51'47.17093" | E79°02'33.28312" | 285346.655 | 1090905.003 | 6.659 |
| 4 | N9°51'56.29432" | E79°02'26.35777" | 285137.264 | 1091186.591 | 7.424 |

The area is accessible from Ramanathapuram to reach Thiruvadanai by 49Km via SH536 Road. Then 16Km travel to reach Oriyur via SH 916 Road. Further 1.3Km travel to reach the site. A Village road is available nearby the site. The PWD make temporary road which connects the village road for transportation of Materials,


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Table No.3.2. Details of infrastructures and communication

| S.No. | Description | Place | Distance (km) | Direction |
|-------|-----------------------|---------------------------|---------------|-----------|
| 1 | Railway | Karaikudi Railway Station | 35 | NW |
| 3 | Post office | Oriyur | 1.7 | SE |
| 4 | Airport | Madurai | 108 | W |
| 5 | Police station | S.P. Pattinam | 6 | E |
| 6 | Fire service | Thiruvadana | 16 | SW |
| 7 | Primary Health centre | Thirupunavasal | 3 | E |
| 8 | DSP Office | Thiruvadana | 18 | SW |
| 9 | School | Oriyur | 1.6 | SE |
| 10 | Nearest Town | Thiruvadana | 16 | SW |
| 11 | Villages | | | |
| | i) | Oriyur | 1.2 | SE |
| | ii) | Sirugambaiyur | 0.6 | SW |
| | iii) | Chittamanglam | 2.9 | W |
| | iv) | Kannamangalam | 1.5 | E |

3.3 Details of alternate sites considered and the basis of selecting the proposed site.

This is a mining project, which is site specific due to availability of sand. Hence the site cannot be shifted. The opencast mining is proposed in the area for excavation of minerals and overburden.

3.4 Size or Magnitude of operation

Targeted production of Sand removal will be 33,155m³ by open cast mining.

3.5 Project description with Process Details

Mining Process Details

- 1) Fixing boundaries of lease area covering an extent of 2.10.0Hectares using DGPS and Drone Technology as per the requirement of Sand Mining guidelines, 2020. Reduced levels (RL) were taken at 10mx 10m interval with cm accuracy. Contour lines were made at 0.25m interval.
- 2) Loading of sand by hydraulic excavator and manual into Bullock Carts, Tipper and tractor respectively.
- 3) Transport of sand from river site to the stocking yard and further to the Consumer Construction site based on the demand

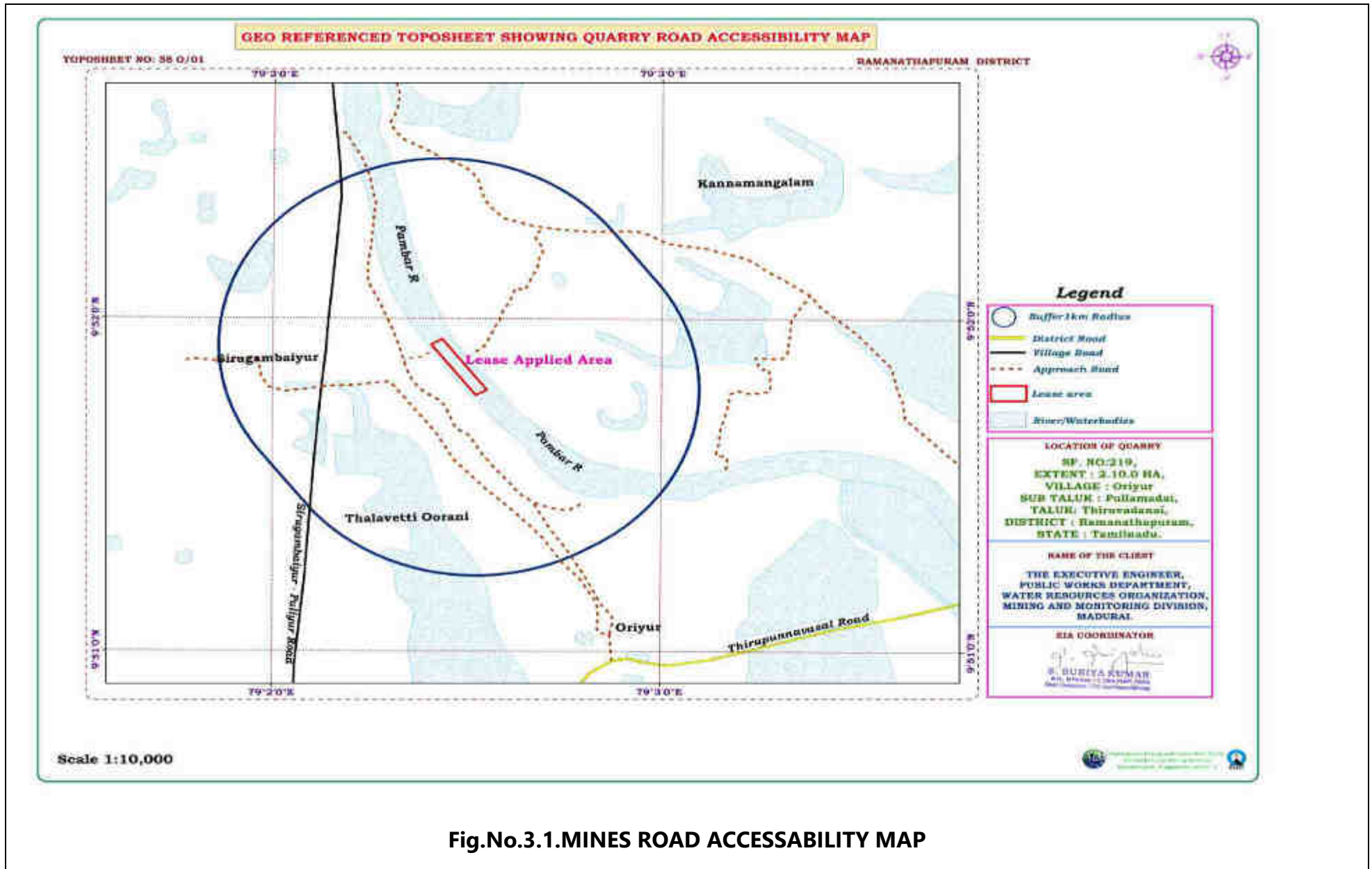


Fig.No.3.1.MINES ROAD ACCESSABILITY MAP

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4) Mined out land shall be used for refilling of same type of sand by natural replenishing.

Proposed Method of Mining:

Being loose sand, it is proposed to remove the materials by Bullock Carts and loading directly into the Consumer Construction Site shall be connected by proper approach roads. The Layout of infrastructure such as workings and its sections are shown in the approved Mining Plan.

Removal of over burden

No overburden is proposed in the approved Mining plan.

Extent of Mining

a) Mining

Open cast, Mining would be carried out by opencast semi-mechanized method. Excavation of sand by using hydraulic excavator into the tipper and partly manual method using hand shovel and load into Bullock Cart, As the sand is loose granular material, it does not require any drilling.

b) Loading equipment

Loading of sand by manual as well as hydraulic excavator and manual.

c) Transportation

Transportation by means of Bullock Carts, Tipper and tractor combination. The bullock transport sand from river site directly to the consumer point whereas tippers may not able to transport to its rated capacity and therefore sand will be transported upto the stock yard, located within 500m from the river bank.

Table No.3.3 Production detail

| Year | Production in m ³ |
|----------|------------------------------|
| One year | 33,155 |

3.6 Raw Material required along with estimated quantity, likely source, Marketing area of final product/s, Mode of transport of raw Material and finished products.

This is a mining project for mining of sand, therefore no need of raw material except water for drinking and utilities. The Product is natural river sand; it will be transported to the Stock point directly. No stocking is permitted any where inside the lease area the area of lease.

3.7. Resource optimization/recycling and reuse envisaged in the project.

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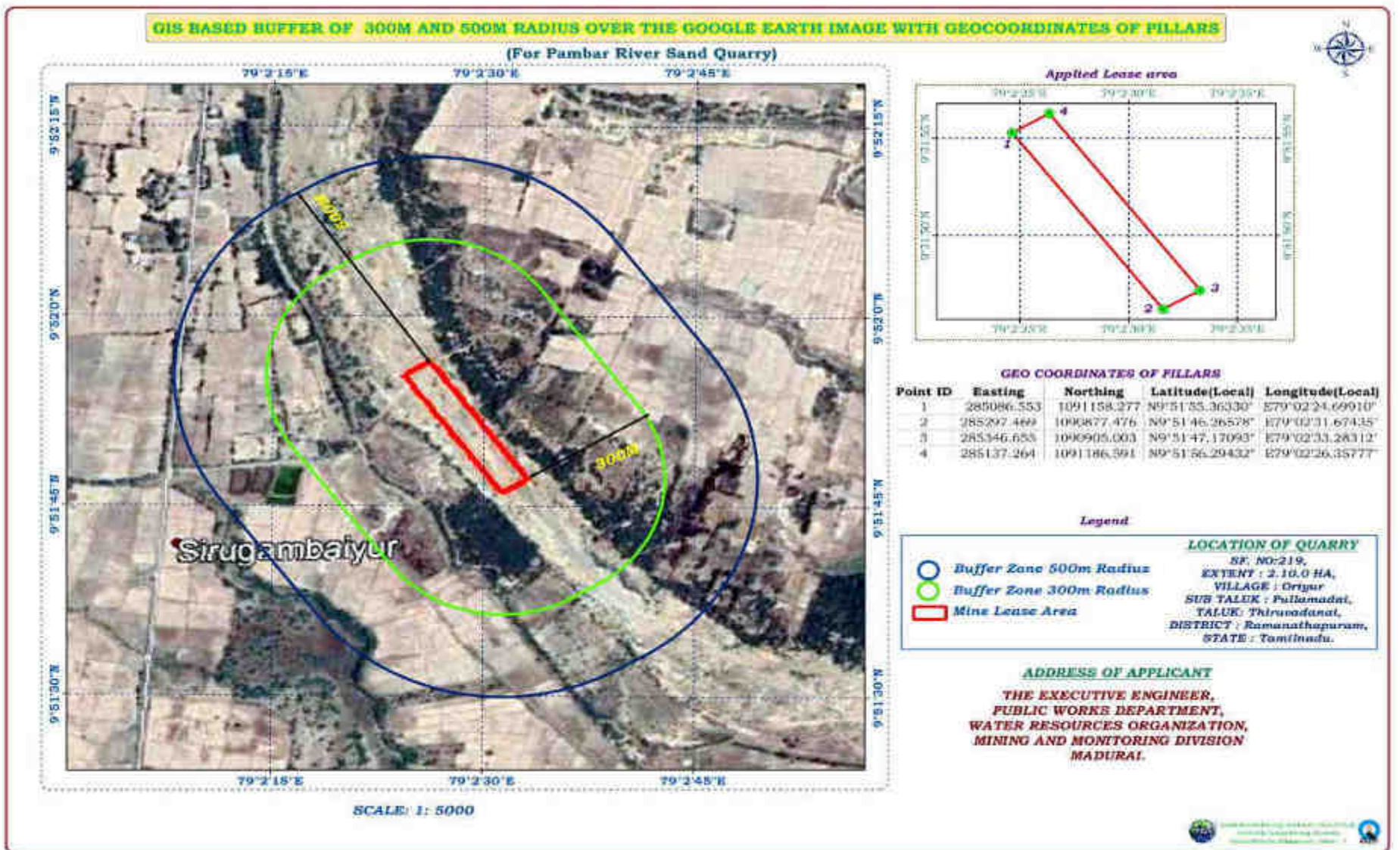


Fig.3.3: Google earth Image showing 300m/500m radius from the sand quarry lease boundary

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Removal of sand is made for the purpose of clearing the obstacles of the river for free flowing of water. The sand will be replenished being a natural resource and therefore recycling is not possible for this project.

3.8. Availability of water its source, energy/power requirement and source.

Whole some drinking water shall be provided as per the Mines Rules, 1955. Quantity for Drinking and utilities is 2.0KLD. Dust suppression and Green belt of water is 3.0KLD. Minimum quantity of 5.0KLD has to be maintained as per the Rule. Drinking water is obtained by Mineral water industries by water canes. Dust suppression and green belt is obtained from the open wells of proponent site. Water will be drawn from the adjacent open well in The Pambar river itself. No separate arrangements shall be made to bring water from external sources or by pumping. No electricity or fuel is required for this project.

3.9. Water balance chart:

Water balance chart on per day basis is given as under:

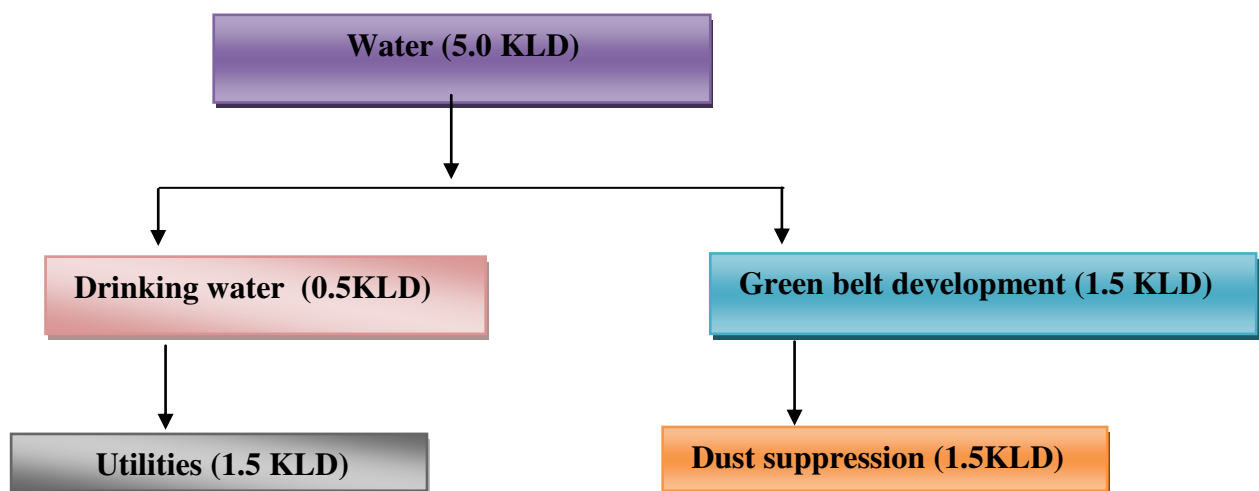


Fig. 3.4 Water Balance Chart

3.9 Quantity of waste to be generated (liquid and solid) and scheme for their Management/disposal.

There is no waste material to be removed from this river basin.

3.10 Schematic representations of the feasibility drawing which give information of EIA purpose.

As per the order of the Honorable Supreme Court of India in I.A.No. 12-/13/2011 in S.L.P.No. 19628-19629 of 2009 etc., dated:27.02.2012, the Ministry of Environmental and Forest Office Memorandum dated:18.05.2012 clearance has to be obtained for Minor

Minerals from the State Level Environmental Impact Assessment Authority, Tamil Nadu. Form I and Pre-Feasibility report is required to get Environmental Clearance for the project from SEAC. EIA Report identifies all of the issues and technical requirements of a proposed operation, with particular attention to potential Environmental, Health and Safety, Social and Economic Impacts.

The purpose of EIA is to ensure the protection and conservation of the environment and natural resources including human health aspects against uncontrolled development. The long-term objective is to ensure a sustainable economic development that meets present needs without compromising future generation ability to meet their own needs. EIA is an important tool in the integrated environmental management approach.

The aim of Environmental Impact Assessment (EIA) is to enable the approving authority, the public, local and central government and the developer to properly consider the potential environmental consequences of a proposal, and to make recommendations to reduce the environmental consequences if necessary. It is important to provide sufficient information for the approving authority to make a decision on whether to approve a proposal and if so, under what conditions. The EIA provides the basis for sound ongoing environmental management.

4. SITE ANALYSIS

4.1 Location and Connectivity:

The area is accessible from Ramanathapuram to reach Thiruvadanai by 49Km via SH536 Road. Then 16Km travel to reach Oriyur via SH 916 Road. Further 1.3Km travel to reach the site. A Village road is available nearby the site. The PWD make temporary road which connects the village road for transportation of Materials.

4.2. Land form, land use and land ownership.

Table No.4.1 Land ownership details

| District & State | Tehsil | village | Area in Hect. | Type of land |
|---------------------------------------|--------------|---------|---------------|--------------|
| Ramanathapuram District, Tamilnadu | Thiruvadanai | Oriyur | 2.10.0 | Pambar river |

4.3. Topography (along with Map):

The area applied for mining lease is a River Bed, with elevation vary from 6.761m – 6.227m above MSL. It is represented in the Geological Survey of India 58 O/1. The applied Lease area lies between Latitude of N9°51'46.26578" N9°51'56.29432" and Longitude of E79°02'24.69910" E79°02'33.28312".

This is a river bed with huge amount of sand deposit. The area receives only scanty rainfall mostly during the northeast monsoon period of October to December. There is no RF, wild life sanctuary, national monument etc nearer to the area around 10kms.

4.4 Existing land use pattern (agriculture, non-agriculture, forest, water bodies (including area under CRZ), shortest distances from the periphery of the project to periphery of the forest, national park, wild life sanctuary, eco sensitive areas, water bodies(distance from the HFL of the river), CRZ. In case of notified industrial area, a copy of the gazette notification should be given.

The lands applied for removal of sand is a part of Pambar River which carries rain and flood water to the sea during rainy season. It should be deepened or the silted area should be removed periodically for free flow of water without any obstacles.

Table No.4.2 LAND USE PATTERN

| S. No. | Description | Area of Land Use (In Hec.) | |
|--------------|--------------------------|----------------------------|------------------------|
| | | As at Present | At the end of One year |
| 1. | Mining | 0.0 | 2.10.00 |
| 2. | Waste Dump | 0.0 | 0.00.0 |
| 3. | Infrastructure | 0.0 | 0.00.0 |
| 4. | Safety zone & Plantation | Nil | 0.00.0 |
| 5. | Mine Roads | 0.00 | 0.00 |
| 6. | Undisturbed area | 2.10.00 | 0.00 |
| Total | | 2.10.00 | 2.10.00 |

4.5. BASELINE ENVIRONMENT

4.5.1. Land environment

In the proposed Mining activity there will not be much impact on the land environment due to the following reasons.

- There is no removal of vegetation such as plants, bushes in the reach area
- No effluent generation as any further processing of mineral is proposed. Hence no ground water contamination due to the proposed mining activity.

However, the quarrying activity will result in disturbance of the land use pattern of the quarry lease area. The land degradation is unavoidable during mining activities like excavation, overburden dumping, etc. Land requirement for the project has been assessed considering functional needs.

4.5.2. Sources of Air Pollution

Table No.4.3 Sources of Air Pollution

| S.No | Activities in Mines | Air Pollutants |
|------|---------------------------|---------------------------------------|
| 1. | Drilling | Nil |
| 2. | Blasting | Nil |
| 3. | Loading & Unloading | SPM |
| 4. | Haul Road | SPM |
| 5. | Transportation | PM, SO ₂ , NO _x |
| 6. | Waste / Top soil handling | Nil |

4.5.3 Air Pollution Control Measures

Some of the air pollution control measures are mentioned below. The APC system requirement should be assessed based on the mining activity and location aspects.

Table No.4.4 Air Pollution Control Measures

| Potential sources of air pollution | Magnitude of air pollution | Control Measures |
|------------------------------------|--|--|
| Drilling | High Dust Generation Risk of occupational hazard | No drilling |
| Blasting | Air emission | No blasting |
| Loading of material on dumper | Air emission | Closed Air conditioned cabin for loading operator and provide mask and ear muffles in addition to helmet for persons working |

| | | |
|----------------|---------------------|---|
| | | nearby. |
| Transportation | High dust potential | <ul style="list-style-type: none"> • Water spraying over haul road using sprinklers. • Development of Green belt with the native species of trees having leaves and dense growth to control spreading of dust to villages and minimize noise level from vehicles operation. |
| Storage | High dust emission | No storage applicable for this project |

4.5.4. Mine Drainage

The natural flow of water will not be affected any way and drainage will improve by proper gradient.

4.5.5. Noise Levels

Noise level has to be studied prior to mining and after opening the quarry for production. Ambient noise level on threshold is 41.8dB.

4.5.6. Vibration Levels

It is a manual mining. Hence, no vibration is anticipated.

4.5.7. Measures for Ground Vibrations Due to Blasting: Not applicable

4.5.8. Solid waste Management:

Solid Waste Generated: No solid waste removal

Disposal of waste

Overburden waste Management: No overburden shall be removed or dumped elsewhere.

Top soil Management: No top soil removal

Other wastes: The removed bushes on the site clearings are conveyed and dumped along the bank of the river.

4.5.9 Power requirement & supply/source. No power requirement. Manual quarrying method shall be adopted for sand excavation.

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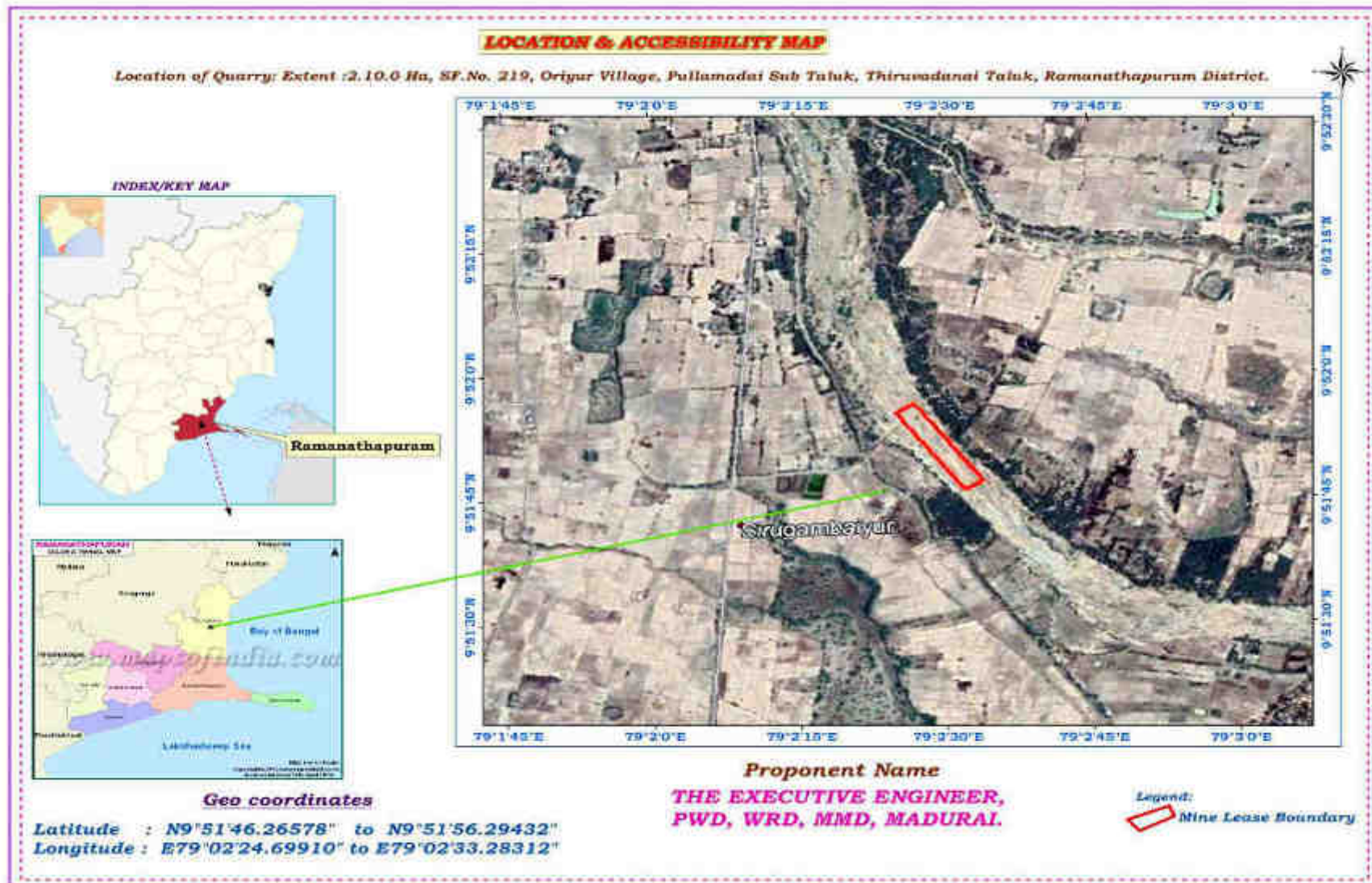


Fig.4.1: Satellite image showing lease boundary of Sand quarry in Pambar River


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4.5.10 Water quality

- The quality of ground water is fairly good. There is no liquid waste discharge from quarrying activity, which is likely to pollute water.
- Drinking water will be utilized from the Mineral water Industries.

Table No.4.5 Water quality test report

| S.No | Parameters | Protocol | Units | Result | Limits |
|---|------------------------------|---------------------|-------|---------------|-------------------|
| GROUND WATER / BOREWELL and WELL WATER | | | | | |
| 1 | Acidity as CaCO ₃ | IS3025(Part22):1986 | mg/l | 10 | 2mg/l to 1000mg/l |
| 2 | Bicarbonate | IS3025(Part51):2001 | mg/l | 26.3 | 1mg/l to 5000mg/l |
| 3 | Calcium as Ca | IS3025(Part40):1991 | mg/l | 45.87 | 0.4mg/l to |
| 4 | Carbonate | IS3025(Part51):2001 | mg/l | 39.45 | 1mg/l to 5000mg/l |
| 5 | Chloride as Cl- | IS3025(Part32):1988 | mg/l | 56.666 | 1mg/l to 5000mg/l |
| 6 | Electrical | IS3025(Part14):1984 | µS/cm | 459 | 0.1µS/cm to |
| 7 | Magnesium as Mg | IS3025(Part46):1994 | mg/l | 10.60 | 0.4mg/l to |
| 8 | pH | IS3025(Part11):1983 | - | 7.41 | 8.05 ± 0.011 |
| 9 | Total Alkalinity as | IS3025(Part23):1986 | mg/l | 65.75 | 1mg/l to 1000mg/l |
| 10 | Total Dissolved Solids | IS3025(Part16):1983 | mg/l | 138 | 500mg/l to |
| 11 | Total Hardness as | IS3025(Part21):2009 | mg/l | 159.14 | 1mg/l to 5000mg/l |
| 12 | Total Suspended | IS3025(Part17):1984 | mg/l | 0.012 | 2mg/l to 5000mg/l |
| 13 | Turbidity | IS3025(Part10):1984 | NTU | 0.006 | 1 NTU to 100NTU |

| S. No | Parameters | Protocol | Unit | Result | Range |
|-------|-------------------------|------------------------|-----------|---------------|-------------|
| 1. | <i>Escherichia coli</i> | IS 5887 (Part 1): 1976 | Per 100ml | Absent | Qualitative |
| 2. | Total Coliforms | IS 5401 (Part 2): 2012 | Per 100ml | Absent | Qualitative |

4.5.11 Air Quality

Drilling and blasting operations are source of fugitive dust emission but its effect is more or less localized. The major part of the dust generated during such operations usually gets settle down and thus the effect of such operation will be localized phenomenon. The generation of dust is controlled and suppressed at source by sprinkling of water on haul roads, loading points at regular intervals.


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Table No.4.6 Air Quality test report





| SI. No | PARAMETERS | PROTOCOL | UNIT | RESULT | NAAQS* |
|--------|--|-----------------------|---------------------|------------------|--------|
| 1 | Particulate Matter (PM _{2.5}) | SOP-EA-001 | µg / m ³ | 33 | 60 |
| 2 | Respirable Particulate Matter (PM ₁₀) | IS 5182 Part 23-2017 | µg / m ³ | 47 | 100 |
| 3 | Sulphur Dioxide (SO ₂) | IS 5182 Part 2 - 2017 | µg / m ³ | 8 | 80 |
| 4 | Nitrogen Dioxide (NO ₂) | IS 5182 Part 6-2017 | µg / m ³ | 15 | 80 |
| 5 | Ozone (O ₃) | IS 5182 Part 9-2014 | µg / m ³ | 26 | 180 |
| 6 | Lead (Pb) | IS 5182 Part 22-2017 | µg / m ³ | BDL (DL=0.1) | 1 |
| 7 | Carbon Monoxide (CO) (1 Hour) | IS 5182 Part 10-2014 | mg/m ³ | BDL (DL=1.17) | 4 |
| 8 | Ammonia (NH ₃) | SOP-EA-009 | µg / m ³ | 28 | 400 |
| 9 | Arsenic (As) | SOP-EA-010 | ng / m ³ | BDL (DL=1.0) | 6 |
| 10 | Nickel (Ni) | SOP-EA-011 | ng / m ³ | BDL (DL=0.1) | 20 |
| 11 | Benzene (C ₆ H ₆) | IS 5182 Part 11-2017 | µg / m ³ | BDL (DL=0.1) | 5 |
| 12 | Benzo (a) Pyrene | IS 5182 Part 12-2014 | ng / m ³ | BDL (DL=0.1) | 1 |

4.5.12 Flora and Fauna

a) Flora


Table No.4.7. A. List of Flora of the lease area


| S. No. | Tamil /English Name | Botanical Name | Number of Trees | Photograph |
|--------|---------------------|----------------|-----------------|---|
| 1. | Vivasaaya Maram | Acasia bushes | Innumerable |  |

| | | | | |
|----|------------------------------------|----------------------|-------------|---|
| 2. | Panai/ Palmyra tree | Borassus fiabellifer | Innumerable |  |
| 3. | Eechamaram/ Melaleuca Alternifolia | Sylvestries. | 30 |  |
| 4. | Karuvelamaram | Prosopis juliflora | Innumerable |  |
| 5 | Avaram poo | Cassia Auricuiata | Innumerable |  |

c) HERBS:

Table No.4.7.C. List of Herbs of the lease area

| S.No. | Tamil Name | Botanical Name | Number of Plants | Photograph |
|-------|--------------|---------------------|------------------|---|
| 1. | Erukku Chedi | Calotropis Gigantea | Innumerable |  |

| | | | | |
|----|-----------|--|-------------|--|
| 2. | koraipull | (coco-grass, <i>Cyperus rotundus</i>) | innumerable |  |
|----|-----------|--|-------------|--|

2. Fauna:

The fauna species may be found around the project site is given below,

a) Mammals:

Table No.4.8.A. List of Mammals of the lease area

| S.No. | Tamil & English Name | Zoological Name |
|-------|--|----------------------------|
| 1. | Keeri(<i>Common Mongoose</i>) | <i>Herpestes edwardsii</i> |
| 2. | Anil (<i>Three Striped Squirrel</i>) | <i>Funambulus palmarum</i> |
| 3. | Thavalai (Frog) | Cane toad |

b) Avian Fauna:

Table No.4.8.B. List of Avian Fauna of the lease area

| S.No. | Tamil & English Name | Zoological Name |
|-------|--------------------------------------|-------------------------------|
| 1. | Kalugu (<i>Black kite</i>) | <i>Milvis migrans</i> |
| 2. | Myna (<i>Black drogue</i>) | <i>Dicrurus macrocercus</i> |
| 3. | Kakka (<i>House crow</i>) | <i>Corvus splendens</i> |
| 4. | Chittukuruvi (<i>Indian Robin</i>) | <i>Saxicoloides fulicatus</i> |
| 5. | Parunthu(Brahminy Kite) | <i>Haliastur indus</i> |

c) Butterfly/Insects:

Table No.4.8.C List of Butterfly/Insects of the lease area

| S.No. | Tamil & English Name | Zoological Name |
|-------|-------------------------------------|-------------------|
| 1. | Theil (<i>Scorpion</i>) | <i>Scorpiones</i> |
| 2. | Vannthupoochi (<i>Millipedes</i>) | <i>Diplopoda</i> |

4.6. OTHER PERMANENT STRUCTURES

4.6.1 Habitations / Village:

Table No.4.9. Habitation details

| Name of Village | Distance from Mines in Km (Approx) | Direction | Population |
|-----------------|------------------------------------|-----------|------------|
| oriyur | 1.3 | South | 5065 |
| Sirugambaiyur | 0.6 | NorthWest | 1726 |

| | | | |
|----------------|-----|------|------|
| Chittamangalam | 2.9 | West | 358 |
| Kannamangalam | 1.5 | East | 1306 |

4.6.2 Power Lines (HT / LT): There is no HT or LT lines is found nearby the site

4.6.3 Water Bodies: The site is a part of river basin.

4.6.4 Archaeological / historical Monuments: There are no archaeological monuments around 500m radius.

4.6.5 Road (NH, SH others):

1. Nearest NH is NH210, connecting Ramanathapuram- Trichirappalli, located about 17.9km on SW side.
2. Nearest SH is SH 33, connecting Madurai – Thondi, located about 14km on south side.
3. MDR Puliyur road is situated about 4.5 km on southwestern side.
4. Village road is located about 500m on western side.

4.6.6 Places of worship: Nil

4.6.7 Reserved forest / Forest / Social forest / wild life sanctuary etc: None in 10km radius

4.7 Climatic Conditions

a) Temperature

Climatic Conditions

Ramanathapuram Weather

Ramanathapuram Weather Forecast. Providing a local 3 hourly Ramanathapuram weather forecast of rain, sun, wind, humidity and temperature.

The Long-range 10 day forecast also includes detail for Ramanathapuram weather today. Live weather reports from Ramanathapuram weather stations and weather warnings that include risk of thunder, high UV index and forecast gales. See the links below the 10-day Ramanathapuram weather forecast table for other cities and towns nearby along with weather conditions for local outdoor activities.

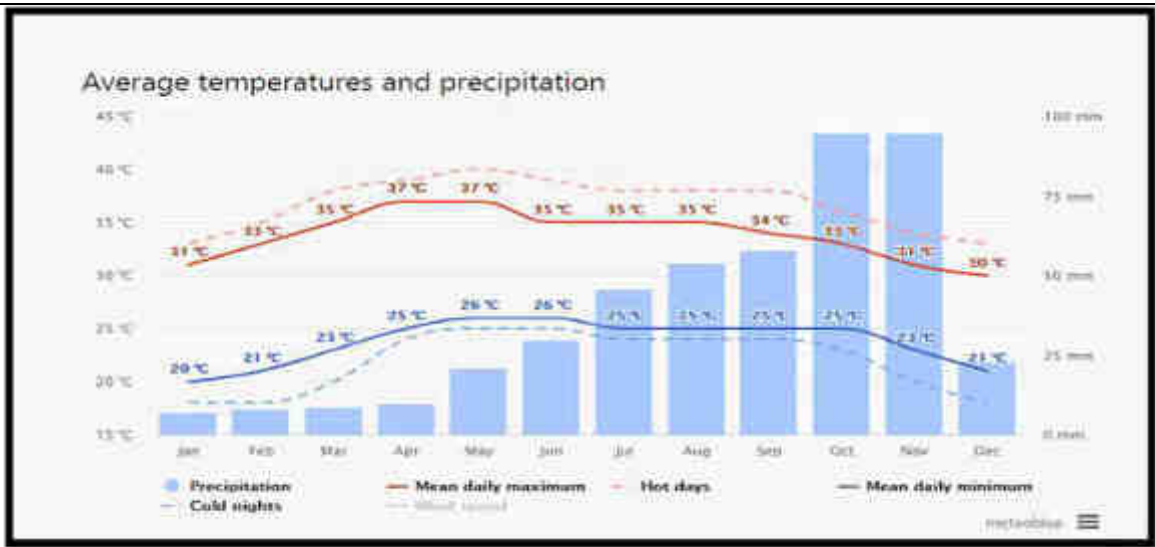


Fig no.4.2 average Temperature and precipitation

The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Ramanathapuram. Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years. For vacation planning, you can expect the mean temperatures, and be prepared for hotter and colder days. Wind speeds are not displayed per default, but can be enabled at the bottom of the graph.

The precipitation chart is useful to plan for seasonal effects such as monsoon climate in India. Monthly precipitations above 150mm are mostly wet, below 30mm mostly dry.

The graph shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast.

The maximum temperature diagram for Ramanathapuram displays how many days per month reach certain temperatures. Dubai, one of the hottest cities on earth, has almost none days below 40°C in July.

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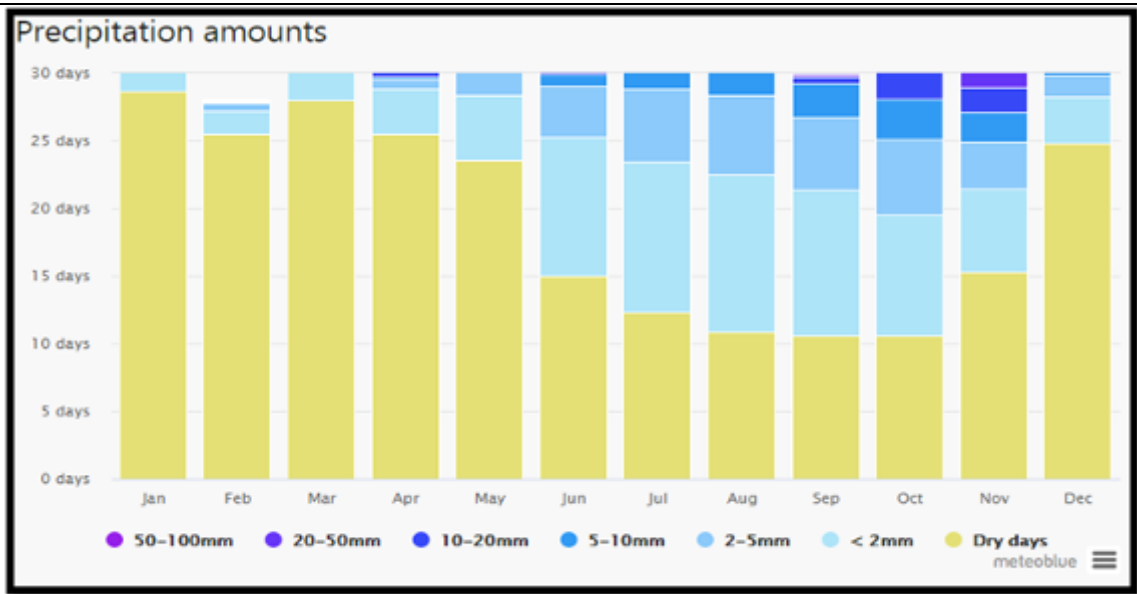


Fig no.4.3 precipitation amount

The precipitation diagram for Ramanathapuram shows on how many days per month, certain precipitation amounts are reached. In tropical and monsoon climates, the amounts may be underestimated.

The diagram for Ramanathapuram shows the days per month, during which the wind reaches a certain speed. An interesting example is the Tibetan Plateau, where the monsoon creates steady strong winds from December to April, and calm winds from June to October.

The wind rose for Ramanathapuram shows how many hours per year the wind blows from the indicated direction. Example SW: Wind is blowing from South-West (SW) to North-East (NE).

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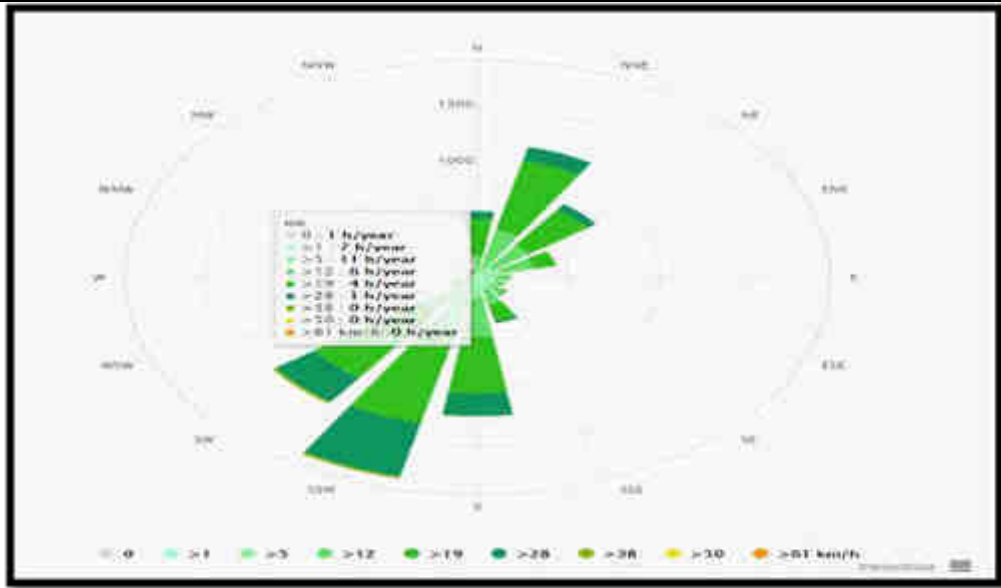


Fig No.4.4. Wind rose pattern

5. PLANNING BRIEF

5.1 Planning concept (type of industries, facilities, transportation etc) town and country planning/development authority classification.

It is opencast mining project. The mine is proposed to work for a period of One year only. The proposed working is by opencast manual mining method and which will also continue in future. The mining will be carried out by removing and transporting the sand found in the project area.

Mining will be done by open cast method to a depth of 1.0m after scrapping a thin layer of sludge materials containing bushes. Being a shallow mining with single bench no much planning required for slope stability issues. However the proponent shall maintain 45° slope as per safety practices.

5.2 Population Projection

In Ramanathapuram Oriyur village had a total household 883 in 2001 which is increased to 1171 in according to census 2011. Village had a total person of 5065 in 2011 census previous census 4350 persons in 2001. There were about 2470 men (48%) according to 2011 census and 2093 men in 2001 census marking an increase of 377 men over the previous census. During 2001 there were about 2595 women (51 %), which is decrease to 2257 in 2011 census. (Table no. 3.16)

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Sex Ratio (number of Females per 1000 Males) is an important population characteristic that highlights the social attention provided to women. Though the sex ratio has been a matter of concern for the all population, the same has been good in the case of Population. From Census 2001 to Census 2011 there has been an increase from 1078 to 1051 females per 1000 males

The lowest sex ratio may be either due to the migrants for educational purpose and employment other opportunities. Compare to male more than female population is high in this village. 2001 and 2011 census gradually increasing the population.

Table No.4.10.A. Population Characteristics-Oriyur Village, Thiruvadanai, Ramanathapuram District (2001-2011)

| Sno | Characteristics | 2001 | % | 2011 | % |
|-----|-------------------|------|-------|------|-------|
| 1 | Total Household | 883 | | 1171 | |
| 2 | Total Population | 4350 | | 5065 | |
| 3 | Male Population | 2093 | 48.11 | 2470 | 48.77 |
| 4 | Female Population | 2257 | 51.89 | 2595 | 51.23 |
| 5 | Total Literacy | 3127 | 71.89 | 3853 | 76.07 |
| 6 | Male Literacy | 1674 | 79.98 | 2049 | 82.96 |
| 7 | Female Literacy | 1453 | 64.38 | 1804 | 69.52 |
| 8 | Sex Ratio | | 1078 | | 1051 |

Source: As per census 2001, 2011 Ramanathapuram district

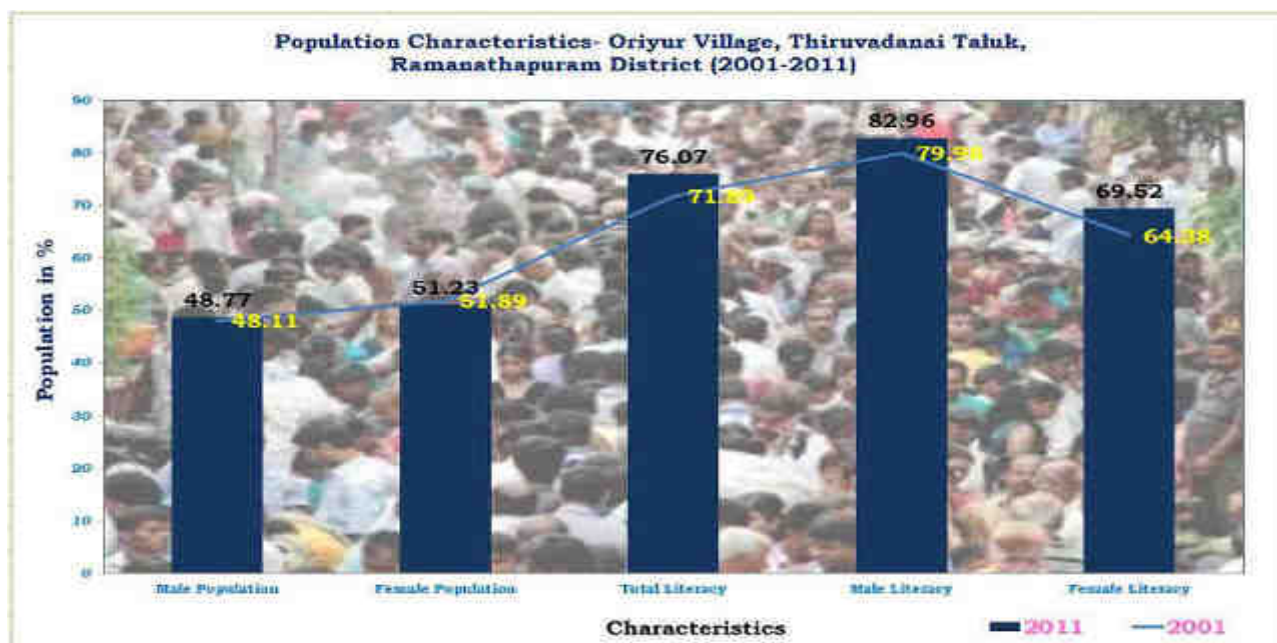


Fig No.4.5- Population Characteristics

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c) Literacy Characteristics - Oriyur Village

Literacy has been a marked improvement in the proportion of literates in the last decade. Literates in 2001 constitute 71 per cent of the total population aged seven and above as compared to 76 percent in 2011 (Fig.3.20). On the other hand, illiterates form 23 per cent of the total population in 2011 as compared to 28 percent in increase the previous census 2001. The effective literacy rate for Oriyur village, works out to 56%. The corresponding figures for male and females are 64 % & 69 % respectively. (Table no.3.18)

Table No: 4.10B Literacy Characteristics - Oriyur Village

| Sno | Characteristics | 2001 | % | 2011 | % |
|------------|------------------------|-------------|----------|-------------|----------|
| 1 | Total Literacy | 3127 | 71.89 | 3853 | 76.07 |
| 2 | Male Literacy | 1674 | 79.98 | 2049 | 82.96 |
| 3 | Female Literacy | 1453 | 64.38 | 1804 | 69.52 |
| 4 | Total Illiteracy | 1223 | 28.1 | 1212 | 23.9 |
| 5 | Male Illiteracy | 419 | 20.0 | 421 | 17.0 |
| 6 | Female Illiteracy | 804 | 35.6 | 791 | 30.5 |

d) Occupational Characteristics - Oriyur Village

The work participation rate for total workers is defined as the percentage of total workers to total population. In a similar way, it is defined for main and marginal workers. In the year 2011, it is recorded that 43 percent of population is working population.

Out of the total working population, male participation rate in the village is 59%. It may be observed that percentage of total working population in 2001 was 34 percent, the percentage male working population in 2001 was 42%, which has increased to 59% in the year of 2011. But female working population also decreased from (26% as per 2001) to 27%. (Table no.3.19, Fig. 3.21)

The analysis clearly indicates that the share of total working population of male has found increased and female working population had decreased but percentage of Female population still remain higher than male working population.

The analysis clearly indicates that primary and secondary sectors have decreasing trend of working population during last decades. Similarly the percentage of workers in the tertiary sector is higher than those of secondary and primary sector.

Some manufacturing units were shifted outside the city limits due to problems like transportation, pollution, effluent disposal etc. some workers have engaged in the occupations like, construction of buildings, roads, bridges etc. through this increase was not substantial to counter balance, the decrease that took place due to reasons mentioned above. The table no.3.19 Shows decrease secondary sector. It is only 3.40to 1.42 percent occurred in the span of 10 years in the village, and it has not affected the occupational structure as a whole of the village.(Fig. 3.21)

The percentage of workers in the tertiary sector is higher than those of secondary and primary sector. This is definitely percentage of workers in the tertiary sector is higher than those of secondary and primary sector. This is definitely showing an increasing trend. The percentage of the tertiary sector decreased. It may be noted that employment opportunities in the categories like, trade and commerce, transport and communication and other services have increased enormously due to the opening of new means of communication and transportation offices and related activities during last decades.

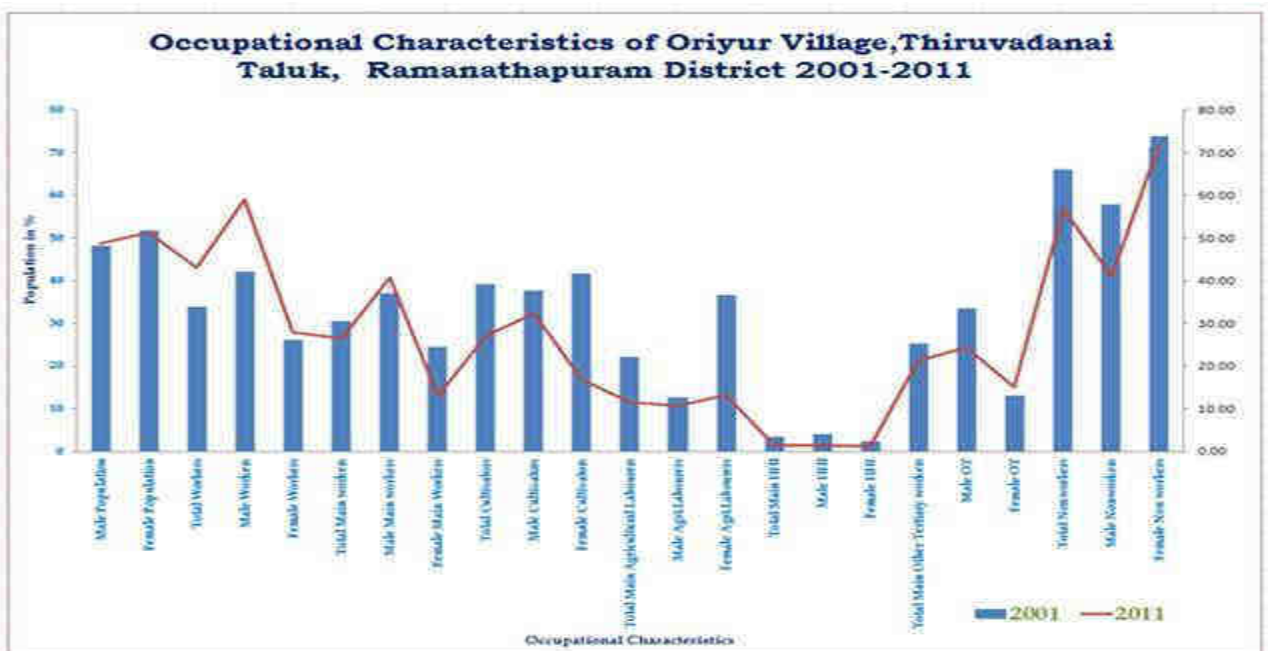


Fig no.4.7 - Occupational Characteristics of Oriyur Village

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**Table No.4.11. Occupational Characteristics of Population -Oriyur Village,
Thiruvadanaai, Ramanathapuram District (2001-2011)**

| Sno | Characteristics | 2001 | % | 2011 | % |
|------------|-----------------------------------|-------------|----------|-------------|----------|
| 1 | Total Population | 4350 | | 5065 | |
| 2 | Male Population | 2093 | 48.11 | 2470 | 48.77 |
| 3 | Female Population | 2257 | 51.89 | 2595 | 51.23 |
| 4 | Total Workers | 1471 | 33.82 | 2184 | 43.12 |
| 5 | Male Workers | 883 | 42.19 | 1460 | 59.11 |
| 6 | Female Workers | 588 | 26.05 | 724 | 27.90 |
| 7 | Total Main workers | 1326 | 30.48 | 1340 | 26.46 |
| 8 | Male Main workers | 775 | 37.03 | 1004 | 40.65 |
| 9 | Female Main Workers | 551 | 24.41 | 336 | 12.95 |
| 10 | Total Cultivators | 577 | 39.23 | 593 | 27.15 |
| 10 | Male Cultivators | 332 | 37.60 | 471 | 32.26 |
| 11 | Female Cultivators | 245 | 41.67 | 122 | 16.85 |
| 12 | Total Main Agricultural Labourers | 327 | 22.23 | 252 | 11.54 |
| 13 | Male Agri.Labourers | 112 | 12.68 | 156 | 10.68 |
| 14 | Female Agri.Labourers | 215 | 36.56 | 96 | 13.26 |
| 15 | Total Main HHI | 50 | 3.40 | 31 | 1.42 |
| 16 | Male HHI | 36 | 4.08 | 22 | 1.51 |
| 17 | Female HHI | 14 | 2.38 | 9 | 1.24 |
| 18 | Total Main Other Tertiary workers | 372 | 25.29 | 464 | 21.25 |
| 19 | Male OT | 295 | 33.41 | 355 | 24.32 |
| 20 | Female OT | 77 | 13.10 | 109 | 15.06 |
| 21 | Total Non workers | 2879 | 66.18 | 2881 | 56.88 |
| 22 | Male Non workers | 1210 | 57.81 | 1010 | 40.89 |
| 23 | Female Non workers | 1669 | 73.95 | 1871 | 72.10 |

Source: As per census 2001, 2011, Ramanathapuram district

Assessment of infrastructure demand (physical & social):

Physical Infrastructure

The road facility is already available which shall be used and maintained. The labour requirement is taken from the nearest villages like Oriyur . Other requisite infrastructure as transport of mine labours is available by way of jeep and two-wheeler. Medical facility is available for first aid at project site. Government Dispensary is available nearest to ML area in Thirupunna vasal in addition facilities in Ramanathapuram. Rest room to meet the demand of shelter and Office room for project management will be made with portable container in the project area.

The will convey the excavated sand outside the quarry site to the end users.

The following measures may be taken for temporary soil erosion of bank:

Initiate stabilization measures as soon as practicable by dumping top soil over bank of the river for stability and afforestation purposes. General safety precaution shall be taken as per mining practices.

Access Roads

. A Village road is available nearby the site. The PWD make temporary road which connects the village road for transportation of Materials.

Usage of public road for transport shall be done as per approved practices and any damage it will be intimated to the Panchayat or concerned authorities for immediate remedies.

Social Infrastructure

The area is accessible from Ramanathapuram to reach Thiruvadanaï by 49Km via SH536 Road. Then 16Km travel to reach Oriyur via SH 916 Road. Further 1.3Km travel to reach the site.

(iv) Amenities/facilities:

As the workers are from nearby villages, the shelter room with toilet facilities & the first aid room will be built in a portable container since the project area itself a river bed and therefore all sanitary provisions shall be made outside of Pambar river or in a portable container with disposal system. An office-cum-store shall be constructed. The water is required for drinking purpose as well as Drinking water is available by the water tankers from nearby area. Power is available at proximity. First aid box with all necessary materials will be kept all time in the office building for use as and when required.

6. PROPOSED INFRASTRUCTURE

6.1 Industrial area (processing area):

No processing unit is required; the sand material can be directly consumed. An office-cum-store will be constructed at mine site. A shelter room with toilet facilities & the first aid facilities will be built in a portable container.

6.2 Residential area (non processing area):

Not applicable, local personnel will be employed and there is no residential area proposed.

6.3 Greenbelt:

There would not be any adverse impact in the existing environment arising from the mining activities. To protect the environment, the Applicant Company would do adequate a forestation program with 150 trees per annum along the bank of the river.

Suggested plant species for Greenbelt development around the project:

Table No.4.12. Suggested plant species

| S.No | Botanical Name | Tamil Name | Characteristics |
|------|--------------------|----------------|---|
| 1. | Azadirachta indica | Vepa or Neem | Semi ever-green, 5-8m height and spreading type |
| 2. | Thespesia populnea | Poovarasam | Quick growing evergreen tree of 18m |
| 3. | Samanea saman | Thoongu moonji | 15-20m tall spreading tree |
| 4. | Pongamia pinnata | Pongam | 15-20m evergreen tree |
| 5. | Albizzia lebbak | Vagai | 15-20m tall tree |
| 6. | Prosopis juliflora | Neer Karuvai | A bushy thorny tree |

6.4 Social infrastructure:

Positive community relationship proposed will be adopted by following methods:

- Care will be taken to ensure Mining Industrial Traffic not degrading public roads or jeopardize public safety
- Consulting with local people in a sincere manner

- Protecting drinking water and all water sources
- Minimize visual impacts to the landscape
- Minimize disruption of local footpaths and public areas
- Mine Supervisor and Workers will be aware and at all times meet the following requirements:
 - Usage of Personal Protective equipments
 - Necessary signage at mine access point
 - First Aid Kits
 - Gates, Fences, Signs (Or) Other barriers to ensure the mine site is secured against unauthorized and / or accidental entry
 - Ensure the mine site is not used for any other purpose other than mining

6.5 Connectivity:

1. Nearest NH is NH210, connecting Ramanathapuram- Trichirappalli, located about 17.9km on SW side.
2. Nearest SH is SH 33, connecting Madurai – Thondi, located about 14km on south side.
3. MDR Puliur road is situated about 4.5 km on southwestern side.
4. Village road is located about 500m on western side.

6.6 Drinking water Management (source & supply of water):

The requirement of water will be of drinking water need for the labours, which will be around 5 KLD. Drinking water is obtained by Mineral water industries by water canes. Dust suppression and green belt is obtained from the open wells of proponent site.

6.7 Sewerage system:

There is no Sewerage System available in the Mining proposed area. No sewage will be generated from this project.

6.8 Industrial waste Management:

No wastes are anticipated

7. REHABILITATION AND RESETTLEMENT (R&R) PLAN

(i) **Policy to be adopted (central/state) in respect of the project affected persons including home owners, land owners, and landless labours.**

a) PAP

There is no hutment in the lease area. No human being will be displaced from the project area so no person will be affected contrary local people will get job opportunities and better facilities. There is no rehabilitation & resettlement of people is required.

Mine Closure

Once the process of economical extraction of a mine is complete there is need for scientific mine closure which will not only restore ecology and regenerate bio mass but also take into account the socio-economic aspects of such closure. When mining activities carries out, mining communities get established and closure of the mine means not only loss of jobs but also disruption of community life. At the mine closure, it will be orderly and systematic and so planned as to help the workers and the dependent community to rehabilitate them without undue hardship. But in this case the excavation is made to deepen the water tank for storage and avoid flooding of storm water into villages and paddy fields. Therefore Mine closure plan should have proper leveling of the area before closing is advisable for this project.

8. PROJECT SCHEDULE AND COST ESTIMATION

(i) **Likely date of start of construction and likely date of Completion**

The proposed mining operation will commence from the date of execution of quarry lease.

(ii) **Estimated project cost along with analysis in terms of Economic viability of the project.**

PROJECT COST & EMP BUDGET

a) Project cost

| | | |
|----------------------------------|---|--------------|
| i) Land Cost | : | Nil |
| ii) Machinery to be used | : | Rs 20,00,000 |
| iii) Construction of bank reiver | : | Rs 2,00,000 |
| iv) Laboures Shed | : | Rs 1,00,000 |
| v) Sanitary facility | : | Rs 1,20,000 |

vi) Other items : Rs 80,000

Total Rs 25.0 lakhs

EMP Cost

i. Environmental Monitoring = Rs 1,50,000

ii. Sanitary arrangements = Rs 50,000

iii. Safety kits, = Rs 100,000

iv. Internal road & Maintenance = Rs 100,000

v. Afforestation etc. = Rs 1,00,000

Total = Rs 5.0 lakhs

9. ANALYSIS OF PROPOSAL AND FINAL RECOMMENDATIONS

(i) Financial and social benefits with special Emphasis on the benefit to the local people including tribal population, if any in the area.

Social Benefits:

Mining in the project area will provide employment to nearby villagers. This employment will help in raising the standard of living on the people in the area. The mining activity in this belt will benefit the locals both directly and indirectly. The direct beneficiaries will be those who get employed in the mines as skilled and un-skilled workers. The indirect beneficiaries will be those who open small business to sell goods required by the residents whose "Per Capita income will be enhanced by the

Mining activity, and thereby their purchasing power. In the long run a lot of social goods are expected in the comparatively backward area when the inhabitants will be able to send their children to school, the change, though slow, is bound to be perceptible.

Financial Benefits:

It is clear from the objectives of the project that it will have significant positive impacts since it will:

- Provide filling material to the society.
- Give a boost to economic development in the region.
- Make a significant contribution to the construction and infrastructure sector of India.
- The Management will ensure good production and in turn there will be good revenue to the Government of Tamil Nadu and Government of India through taxes. The industry is an asset to the nation.


This project is planned keeping in view the above mentioned advantages.

The quarrying operations will be carried out scientifically and systematically with an integrated mining plan and mine design may not disturb the environment and ecology of the area.

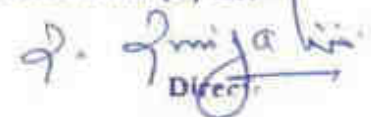
Signature of Project Proponent

Signature of EIA- Coordinator

Along with signature


Executive Engineer, WRD.,
Mining and Monitoring Division,
Madurai

For Aadhi Boomi Mining &
Enviro Tech (P) Ltd


Director

The Executive Engineer

(S.Suriyakumar)

Project Proponent

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Water Resources Organization,

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Mining and Monitoring Division,

Madurai- 625 002

Date: 14.02.2022

Place : Salem


Executive Engineer, WRD.,