

CHAPTER I INTRODUCTION

Environmental Impact Assessment (EIA) study is a process used to identify the environmental, social and economic impacts of a project prior to decision-making. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are considered during the project designing. According to the Ministry of Environment and Forests, Govt. of India, EIA notification S.O. 1533(E) of 14th September 2006 and its subsequent amendments as per Gazette Notification S.O. 3977 (E) of 14th August 2018, all the mining projects are broadly classified into two categories, i.e., category A and category B, based on the spatial extent of the projects. The category B projects are further divided in to B1 and B2 on the basis of the guidelines issued of the Ministry of Environment and Forests. All mining projects included in category B2 require an EIA report for obtaining environmental clearance from the State Environment Impact Assessment Authority (SEIAA). As the proposed project falls within the cluster of quarries of overall extent of greater than 5 ha and less than 100 ha, the proposed project falls under the category B2 and the project requires preparation and submission of an EIA report after public consultation to SEIAA for obtaining environmental clearance.

In compliance with ToR obtained vide letter No. SEIAA-TN/F.No.8091/SEAC/ToR-1140/2022 dated 08.04.2022, this EIA report is prepared for the project proponent, Thiru. P. Velmani applied for Multicolour Granite quarry lease in the patta land falling in S. F. Nos. 456 and 25/1 over an extent of 4.34.0 ha in Nadanthai and Irrukkur Villages, Paramathivelur Taluk, Namakkal District, and Tamil Nadu, considering cumulative load of all the multi-colour granite quarry projects including five existing quarries and one proposed quarry falling in the cluster of 500m radius from the periphery of the proposed project. The total extent of all the quarries in the cluster is 18.71.5 ha. Details of the project proponent and the list of quarries within the cluster of 500m radius have been provided in Tables 1.1 and 1.2, respectively. Location of the existing and proposed quarries have been shown in Figure 1.1.

Table 1.1 Details of Project Proponent

| | |
|--------------------------------------|---|
| Name of the Project Proponent | Thiru.P Velmani |
| Address | Thiru.P Velmani, S/o.Palani Gounder, |

| | |
|---------------|---|
| | Narasingapuram Post, Nethaji Nagar, Attur Taluk, Salem District – 636106. |
| Status | Proprietor |

Table 1.2 List of Quarries within Cluster

| Code | Name of the lease | S.F. Nos, Village & Taluk | Extent in hectare | Date of commencement and Expiry | Status |
|--|-------------------------------|--|-------------------|---------------------------------|--|
| P1 | P. Velmani | 456 & 25/1 & Nadanthai Irrukkur Village, Paramathi – Velur Taluk | 4.34.0 | 02.12.2015 to 01.12.2035 | ToR obtained vide Lr.No. SEIAA-TN/F.No.8091/SEAC/ToR-1140/2022 dated 08/04/2022 |
| Total | | | 4.34.0 | | |
| Code | Name of the Owner | S.F. Nos, & Village and Taluk | Extent in hectare | Date of commencement and Expiry | Status |
| E1 | Tmt.V. Punitha | 482& Nadanthai Village, Paramathi Velur Taluk. | 2.86.5 | 30.01.2018 to 02.01.2038 | Obtained Environmental Clearance vide Letter No DEIAA.TN/F.No.259/Mines /02/EC.No.2/2017 Dated 24.11.2017 |
| E2 | M/s. M.M. Exports | 483/2A& Nadanthai Village, Paramathi Velur Taluk. | 2.75.5 | 05.01.2017 to 04.01.2037 | Environmental Clearance obtained vide Letter No Lr.No. SEIAA-TN/F.No. 5870/1(a)/EC.No:3894/2016 Dated 18.11.2016 |
| E3 | M/s. M.M. Exports | 492/2& Nadanthai Village, Paramathi Velur Taluk. | 2.73.0 | 05.01.2017 to 04.01.2037 | Environmental Clearance obtained vide Letter No Lr.No. SEIAA-TN/F.No. 5823/1(a)/EC.No:3856/2016 Dated 18.11.2016 |
| E4 | Tmt.L.Selvi | 494/1&494/2 & Nadanthai Village, Paramathi Velur Taluk. | 4.40.5 | 25.02.2016 to 24.02.2036 | Environmental Clearance obtained vide Letter No Lr.No. SEIAA-TN/F.No. 4957/1(a)/EC.No:2805/2016 Dated 08.02.2016 |
| E5 | M/s. Siva Sakthi Rock Exports | 480/1(part) & Nadanthai Village, Paramathi Velur Taluk. | 1.62.0 | - | Environmental Clearance obtained in District Environmental Impact Assessment Authority. |
| Total Extent of Existing Quarries | | | 14.37.5 | | |
| Total Extent of Quarries in Cluster | | | 18.71.5 | | |

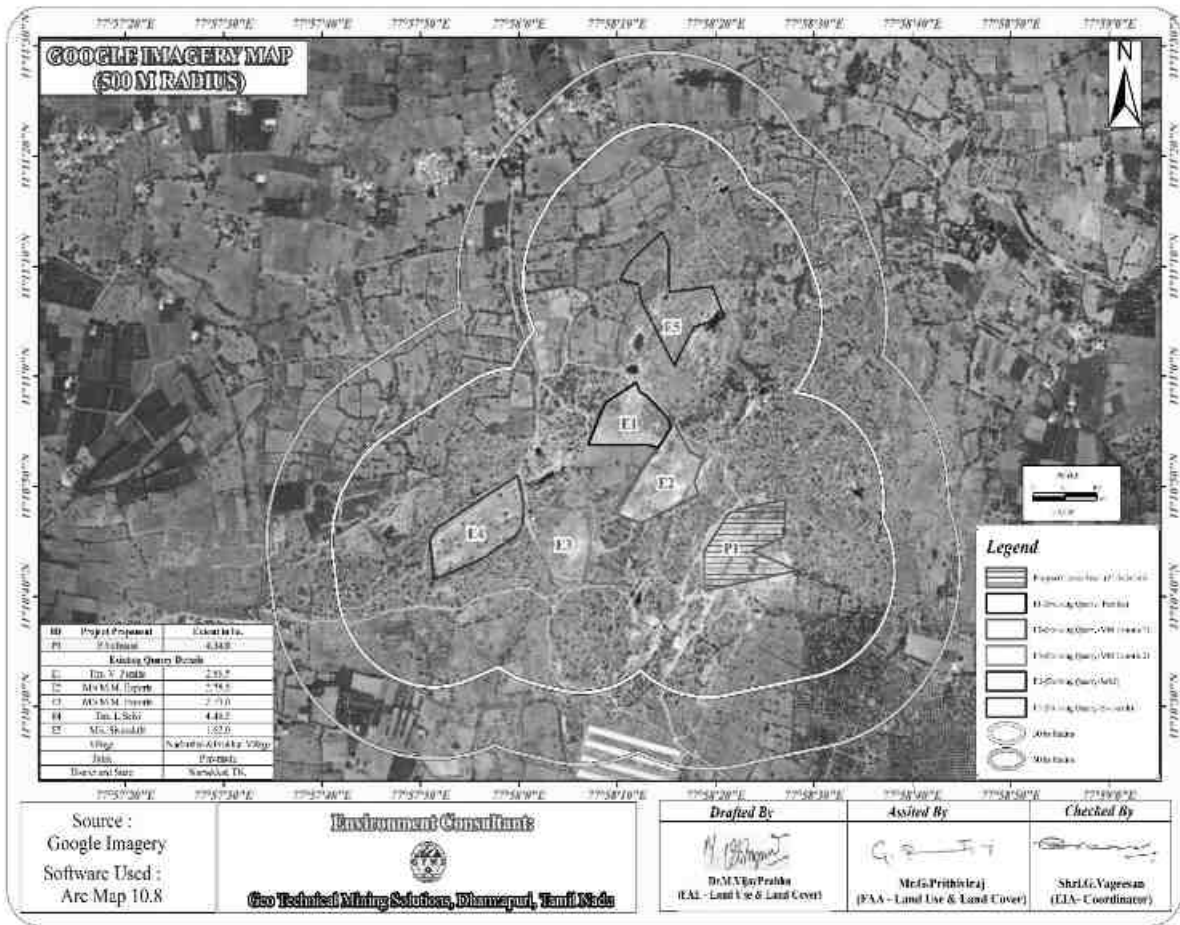


Figure 1.1 Location of existing and proposed quarries in the cluster

CHAPTER II

PROJECT DESCRIPTION

2.0 INTRODUCTION

The quarrying operation is proposed to be carried out by opencast semi-mechanized mining method with the bench height and width of 5m each. The details about the proposed project have been given in Table 2.1. Excavator, eco-friendly diamond wire saw cutting will be used in this method. In addition, shallow drilling with spacing of 1m, burden of 0.8m, and the depth of 1.5m is proposed. After drilling, blasting operation will be carried out to remove overburden and weathered portions. Furthermore, expanding chemicals like calcium carbide powder will be used for splitting the required size of dimensional stone blocks. No workshops are proposed inside the project area. Hence, there will not be any process effluent generation from the proposed lease area. Domestic effluent from the mine office will be discharged to septic tank and soak pit. As there is no toxic effluent expected to generate in the form of solid, liquid or gaseous form, there is no requirement of waste treatment plant.

2.1 LOCATION AND ACCESSIBILITY OF THE PROJECT

The proposed project area is located at about 2 km Northeast of Nadanthai Village, about 22.6 km Northeast of Namakkal District and 8 km southeast of Paramathivelur Taluk of Namakkal District, as shown in Figure 2.1. The project area is marked in the survey of India's toposheet (Toposheet No.58-E/16), as shown in Figure 2.2. The area is located at latitude of 11°10'44.06"N and longitude of 77°58'22.25"E. Accessibility details to the proposed project site have been given in Table 2.1. The extent of the proposed project site is 4.34.0 ha. The number of boundary corners covering the extent and their coordinates are given in Table 2.2 and the 9 boundary corners are shown in Figure 2.3. Lease boundary corner coordinate details of the proposed project site has been provided in Table 2.2. Moreover, all the proposed site related documents are shown in Figures 2.4-2.5b.

Table 2.1 Accessibility details to the project site

| | |
|------------------------|--|
| Nearest Roadway | <ul style="list-style-type: none"> ❖ Village approach road – SE ❖ Paramathivelur district road (NH-7) – 5.7km S ❖ Namakkal to Paramathivelur road -4.6km NE |
| Nearest Village | Nadanthai – 2 km NE |
| Nearest Town | Paramathivelur – 8 km SE |

| | |
|---|---------------------------|
| Nearest Railway Station & Railway Line | Kodumudi – 15km SW |
| Nearest Airport | Trichy Airport – 90 km SE |
| Seaport | Thoothukudi 270 km NE |

Source: Survey of India Toposheet & Google Earth image

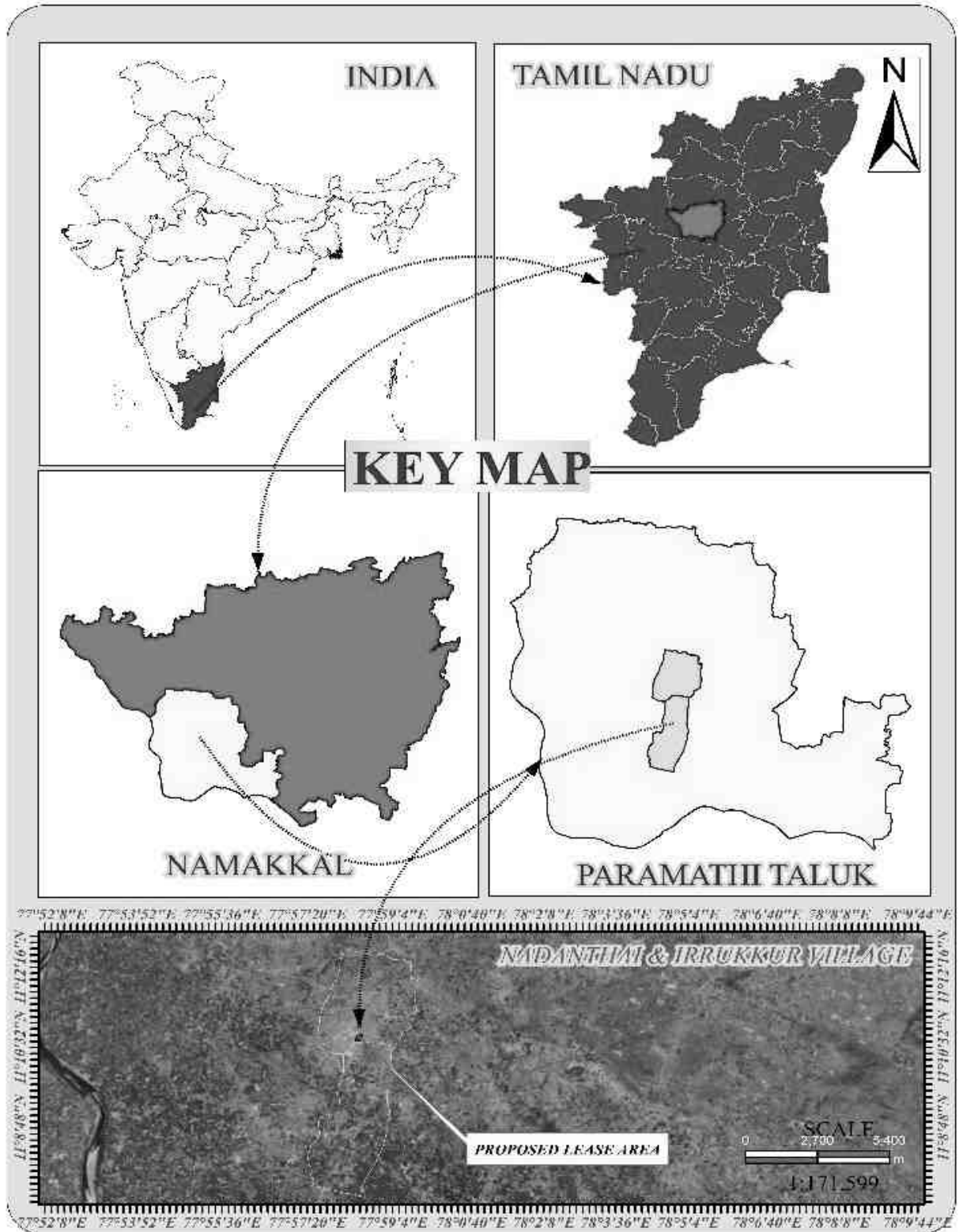


Figure 2.1 Key Map Showing location of the project site

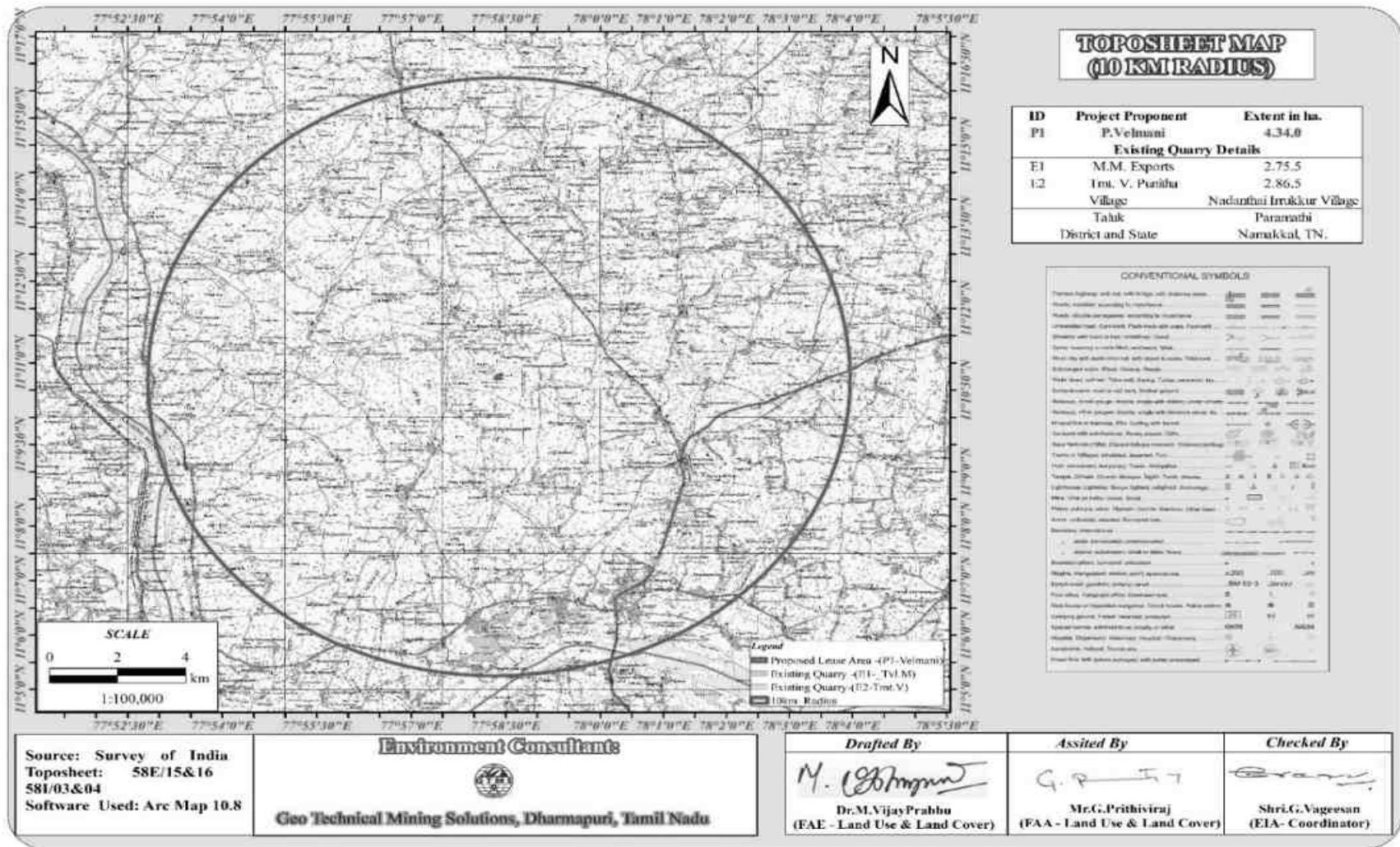


Figure 2.2 Toposheet showing the proposed project site and the 10km radius circle

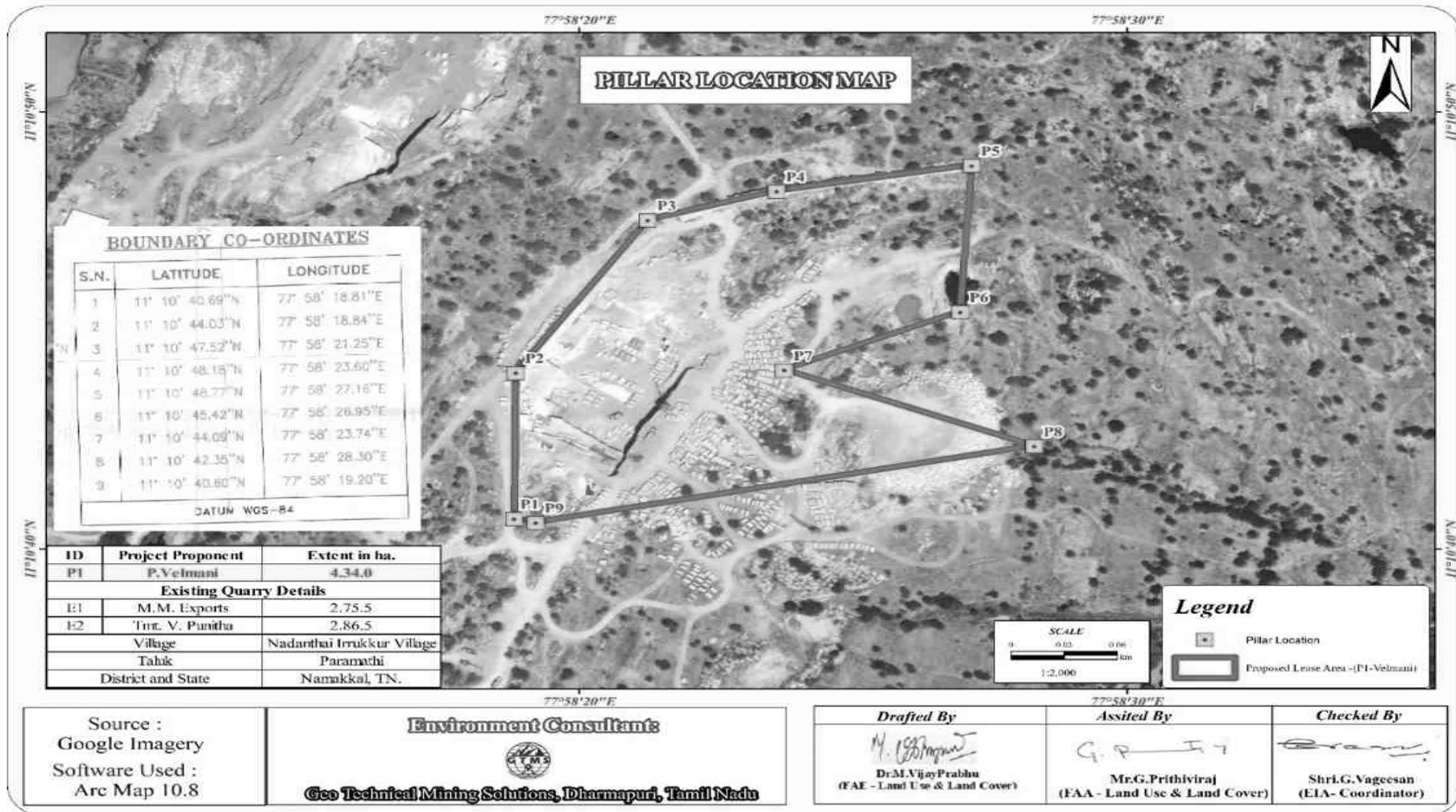


Figure 2.3 Google Image Showing the proposed Project Area and its corners

Table 2.2 Boundary Co-Ordinates of Proposed Project

| Boundary Pillar No. | Latitude | Longitude |
|----------------------------|-----------------|------------------|
| 1 | 11°10'40.69''N | 77°58'18.81''E |
| 2 | 11°10'44.03''N | 77°58'18.84''E |
| 3 | 11°10'47.52''N | 77°58'21.25''E |
| 4 | 11°10'48.18''N | 77°58'23.60''E |
| 5 | 11°10'48.77''N | 77°58'27.16''E |
| 6 | 11°10'45.42''N | 77°58'26.95''E |
| 7 | 11°10'44.09''N | 77°58'23.74''E |
| 8 | 11°10'42.35''N | 77°58'28.30''E |
| 9 | 11°10'40.60''N | 77°58'19.20''E |

Source: Approved Mining Plan

Table 2.3 Salient Features of the Proposed Project

| | |
|---------------------------|---|
| Name of the Quarry | Nadanthai and Irukku multicolored granite quarry |
| Quarry Owner Name | Thiru. P. Velmani |
| Type of Project | Multi-coloured Granite quarry |
| Survey Nos. | 456 & 25/1 |
| Land Type | Patta land (Patta No: 1265 & 1396) |
| Extent | 4.34.0ha |
| Lease Period | 20 years |
| Mining Plan Period | 5 Years |
| Life of the Mine | 20 years |
| Existing Pit Dimension | Pit-I: 132m (L) x 72m(W) x 12(D) & Pit-II: 50m (L) x 34m(W) x 2(D) |
| Proposed Depth as Per ToR | 39m BGL |
| Ultimate Depth | 44m |
| Toposheet No. | 58 E/16 |
| Latitude | 11°10'44.06"N |
| Longitude | 77°58'22.25"E |
| Average Elevation | 183m AMSL |
| Topography | The area is a flat terrain and altitude of the area ranges from 179m to 187m above MSL. |

2.2 GEOLOGY OF THE PROJECT SITE

The rock type is leucocratic, euhedral, medium to fine grained, equigranular and well-developed gneissic banding of alternate layers of pale grey with white base mineral is the specialty of this area which denotes the indicative of flow pattern of the rock mass in this NE – SW direction (i.e., the cutting direction of the multicolor granite). Some slender pegmatite veins are intruded in a crisscross fashion and strike and dip joints are present on the surface layers. Other rock types in the study area of 10 km radius include charnockite, quartz veins, sandstone, shale, conglomerate, and sand and silt.

2.3 PRODUCTION DETAILS OF PROPOSED PROJECT

2.3.1 Resources and Reserves

The estimated resources and reserves of the proposed project and the estimated production for the period of 5 years are given in Tables 2.4.

Table 2.4 Estimated Resources and Reserves of the Project

| Description | ROM in (m ³) | Granite recovery @ 60 % (m ³) | Granite waste @ 40% recovery(m ³) | Top Soil (m ³) | Weathered Rock (m ³) |
|----------------------|--------------------------|---|---|----------------------------|----------------------------------|
| Geological Resources | 16,61,880 | 9,97,128 | 6,64,752 | 56,572 | 65,236 |
| Mineable Reserves | 6,14,945 | 3,68,967 | 2,45,978 | 40,386 | 42,384 |

2.3.2 Production Estimation

Using geological plan and its vertical cross sections, as shown in Figure 2.6, granite and granite waste production for the 5 years was estimated. The results have been given in Table 2.5.

Table 2.5 Estimated Production for the Period of 5 Years

| | |
|--|-----------------------|
| Total Proposed Mineable Reserves (ROM) | 50,069m ³ |
| Total Recoverable Reserves @ 60% | 30,042m ³ |
| Granite Waste@40% | 20,027 m ³ |
| Yearly Production | 6,008 m ³ |
| Granite Waste Ratio | 1:0.7 |

2.4 LAND USE PATTERN

Land use and land cover information for the proposed project site has been given in Table 2.6.

Table 2.6 Land use data at present, during scheme of mining, and at the end of mine life

| Description | Present Land Use Area (ha) | Land Use Area Required during the Scheme of Mining (ha) | Land Use Area at the end of mine life (ha) |
|-------------------|----------------------------|---|--|
| Area under quarry | 1.02.5 | Nil | 3.59.0 |
| Waste Dump | 0.37.3 | Nil | Backfilled |
| Infrastructure | Nil | Nil | Nil |
| Roads | 0.02.0 | 0.21.9 | 0.04.0 |
| Green Belt | Nil | 2.70.3 | 0.54.2 |
| Stocking Blocks | 2.92.2 | 2.92.2 | 0.16.8 |
| Total | 4.34.0 | 2.92.2 | 4.34.0 |

Source: Approved mining plan

2.5 MINE CLOSURE

As the proposed project has the enormous potential for continuous operations even after the expiry of lease period, mine closure plan is not proposed for now. Based on the progressive mine closure plan for the scheme period, as shown in Figure 2.7, the mine closure cost is given in Table 2.7.

Table 2.7 Mine Closure Budget

| Activity | Year | | | | | Rate | Total Cost in Rs. |
|-------------------------------|-----------|-----------|-----------|-----------|-----------|------------------|-------------------|
| | 2020 - 21 | 2021 - 22 | 2022 - 23 | 2023 - 24 | 2024 - 25 | | |
| Plantation in Nos. | 50 | 50 | 50 | 50 | 50 | 100 Rs/ saplings | 25,000/- |
| Plantation Cost | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | | |
| Barbed Wire Fencing for 1050m | 3,15,000 | - | - | - | - | 300 Rs/ meter | 3,15,000/- |
| Garland Drains for 600m | 1,80,000 | - | - | - | - | 300 Rs/ meter | 1,80,000/- |
| Total | | | | | | | 5,20,000/- |

Source: Mining plan

2.6 PROJECT REQUIREMENT

The proposed project requires water, electricity, fuel, employees, and capital. The electricity from high tension power supply is utilized for diamond wire saw cutting machine, disc double blade cutting machine, air compressor, derrick crane and pumps for de-watering and is also used for mines office and lighting purpose. Other requirement details have been provided in Tables 2.8-2.11.

Table 2.8 Water Requirement for the Project

| Purpose | Quantity Required | Source |
|-----------------------------|-------------------|---|
| Domestic & Drinking purpose | 0.8 KLD | Water for domestic use will be sourced from existing bore wells and drinking water will be sourced from approved water vendors. |
| Dust suppression | 1.2 KLD | |
| Green Belt | 0.5 KLD | |
| Total | 2.5 KLD | |

Source: Prefeasibility Report

Table 2.9 Fuel Requirement Details

| | |
|---|--|
| Excavator fuel consumption | 16 litres / hour |
| Capacity of excavator | 10m ³ / day |
| Quantity of material to be quarried out | 50,069 m ³ |
| Hours required | 50,069 /10 = 5007 hours |
| Total diesel consumption for 5007 hours | 5007 hours x 16 litres = 80,112 litres |

Table 2.10 Employment Potential for the proposed project

| S. No. | Description | Numbers |
|--------------------|----------------------------|-----------|
| Skilled Labour | | |
| 1 | Mines Manager | 1 |
| 2 | Mines Foreman | 1 |
| 3 | Machinery Operators | 5 |
| Ordinary Employees | | |
| 4 | Skilled labour and drivers | 6 |
| 5 | Semi-skilled | 24 |
| 7 | Unskilled | 6 |
| Total | | 43 |

Source: Approved Mining Plan

Table 2.11 Capital Requirement Details

| S. No. | Description | Cost (Rs.) |
|---------------------------|---|----------------------|
| 1 | Operational Cost (as per the mining plan) | 3,17,37,000/- |
| 2 | EMP Cost (as per the EIA report) | 19,21,000/- |
| Total Project Cost | | 3,36,58,000/- |

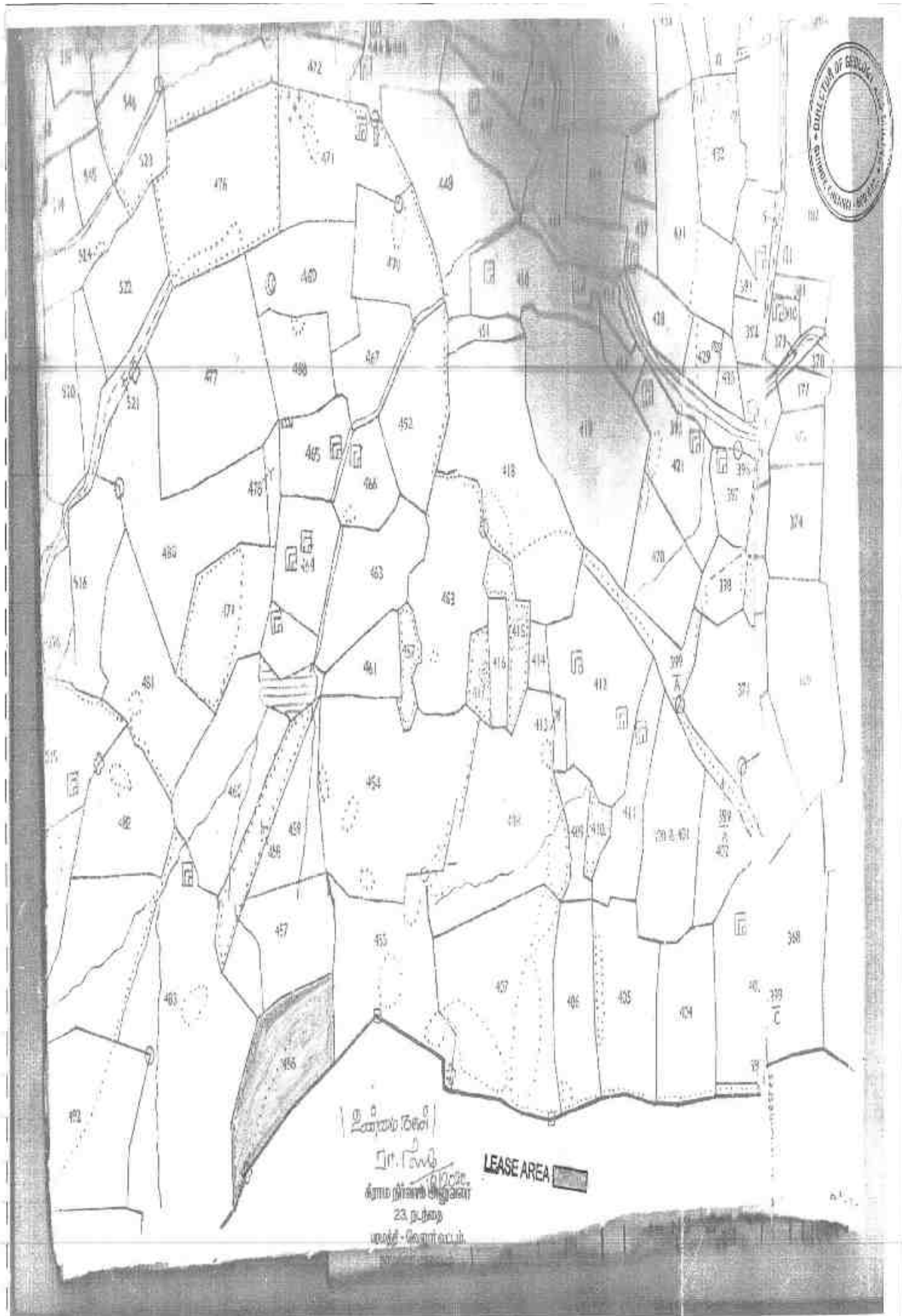


Figure 2.4 village map showing lease area shaded in red colour

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நாந்தை தாலுகா

நாந்தை தாலுகா அரசு



அ - பதிவேடு

1 of 1

சுண்ணாம்பூர் கி.பி.பி.பி.

| வட்டம் | 04 | புறத்தி வேலூர் | சீரமைப்பு | 023 | நடந்தவை | மனை தரம் | திசை - வெயல் | புரட்டி | பொத்த தீர்வை | பட்டி எண் | குறியீடு |
|-----------|-----|----------------|----------------------|-------------|----------|----------|--------------|----------|--------------|-----------|----------|
| புறம் எண் | 456 | பயத்தலூர் | பாசன இடு ஆற்றம் போவா | மண்வயலுமேல் | மனை தரம் | 8 - 2 | 2.47 | 3 - 0.50 | 7.42 | 1265 | |
| புறம் எண் | 456 | பயத்தலூர் | பாசன இடு ஆற்றம் போவா | மண்வயலுமேல் | மனை தரம் | 8 - 2 | 2.47 | 3 - 0.50 | 7.42 | 1265 | |
| மொத்தம் | | | | | | | | | | | |
| மொத்தம் | | | | | | | | | | | |
| மொத்தம் | | | | | | | | | | | |

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புறத்தி வேலூர்
19.5.14

Figure 2.4b A-register showing details of lease area of Nadanthai

| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-------|---|---|-----|-----|-----|------|--------|-----------|--|-------|
| | | | | | | | கு. பை | தொ. சர்ஸ் | கு. பை | |
| 452-6 | ச | 4 | ... | 8-2 | 7 | 3 09 | 0 11.0 | 0 34 | 869 நா. பிழை கவுண்டர் (1), நா. கருப்பு கவுண்டர் (2), நா. வெய்ப்பு கவுண்டர் (3), இம. செங்கோட்டர் (4). | |
| -7 | ச | 4 | ... | 8-2 | 7 | 3 09 | 0 22.5 | 0 69 | 875 வீப்பகவுண்டர் (1), வெய்ப்பு, செங்கோட்டர் (2), நா. வீரமன் (3), வீரப்பன் (4). | |
| -8 | ச | 4 | ... | 8-2 | 7 | 3 09 | 0 26.5 | 0 83 | 489 ஐ. நின்ற கருவாய்க்கு எந்திர வீரப்ப கவுண்டர். | |
| | | | | | | | 2 36.5 | 6 81 | | |
| 453-1 | ச | 4 | ... | ... | ... | ... | 0 10.5 | ... | ... | யாதை. |
| -2 | ச | 4 | ... | 8-2 | 7 | 3 09 | 3 22.0 | 10 25 | 801 மாளியை (1), கன்னடபார் (2), ம. தந்தை (3), கவுண்டர் (3). | 8) |
| | | | | | | | 3 42.5 | 10 25 | | |
| 454 | ச | 4 | ... | 8-2 | 7 | 3 09 | 6 91.0 | 21 34 | 1000 நா. குள் பெரியசாமிநாதர் கருப்பு கவுண்டர் போகிறது. * | |
| 455 | ச | 4 | ... | 8-2 | 8 | 2 47 | 4 55.0 | 11 34 | 1012 கோல கவுண்டர் எந்திர (1) திருவாரூர் கவுண்டர் (2), எந்திர (1), எந்திர (1) கவுண்டர். * | |
| 456 | ச | 4 | ... | 8-2 | 8 | 2 47 | 3 00.5 | 7 42 | 799 நா. கோ. பழையகவுண்டர் (1), நா. கருப்பு கவுண்டர் (2), நா. வெய்ப்பு கவுண்டர் (3). | |
| 457 | ச | 4 | ... | 8-2 | 7 | 3 09 | 3 55.5 | 10 98 | 1011 ஐ. பெருமார் நா. கவுண்டர் கருப்பு கவுண்டர் போகிறது. * | |

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 கிராம நிர்வாக அலுவலர்
 23, நடந்த

மாமலை மாவட்டம்
 நடந்த மாவட்டம்.

Figure 2.4c A-register showing details of lease area of Nandanthai

சென்னை மாநகராட்சி

மாநகராட்சி அறம்



அ - பத்திரம்

19/05/2014

சென்னை மாநகராட்சி

| பகுதி | பகுதி எண் | பகுதி பெயர் | பகுதி விவரம் | பகுதி எண் | பகுதி பெயர் | பகுதி விவரம் | பகுதி எண் | பகுதி பெயர் | பகுதி விவரம் | |
|---|-----------|-------------|--------------|-----------|-------------|--------------|-----------|-------------|--------------|------|
| 25 | 1 | புத்தூர் | புத்தூர் | 0 | 9-3 | 10 | 1.24 | 1-33.5 | 1.70 | 1396 |
| <p>மொத்தம் 1 - 33.5 1.70</p> <p>புத்தூர் 1 - 33.5 1.70</p> <p>மொத்தம் 1 - 33.5 1.70</p> | | | | | | | | | | |

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சென்னை மாநகராட்சி
மாநகராட்சி அறம்

Figure 2.5 A-register showing details of lease area of Irrukkur Village

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | |
|----|-----|------|----|-----------|-----|-----|-----------|------------|-----------|--------|-------|---|-------------|
| | | | | | | | கு. வ. ப. | செறு ஏர்ஸ் | கு. வ. ப. | | | | |
| 25 | ... | 25 | ர | 4 | ... | 8-3 | 10 | 1 | 24 | 2 90.0 | 3 60 | 784 சின்னா கவுண்டர் மற்றும் மூன்று பேர்களும்.* | 27/ |
| 26 | ... | 26 | ர | 4 | ... | 8-3 | 10 | 1 | 24 | 3 83.5 | 4 75 | 816 வெ. பழனி கவுண்டர் மற்றும் நான்கு பேர்களும்.* | 28/1 -15 |
| 27 | ... | 27 | ர | 4 | ... | 8-3 | 10 | 1 | 24 | 2 05.0 | 2 55 | 514 கு. ராமசாமி கவுண்டர் (1), சி. துரைசாமி கவுண்டர் (2). | |
| 28 | ① | 28-1 | ர | 4 | ... | 8-3 | 10 | 1 | 24 | 2 11.0 | 2 60 | 847 டி. காளிமுத்து கவுண்டர் மற்றும் நான்கு பேர்களும்.* | |
| | ② | -2 | ர | 4 | ... | 8-3 | 10 | 1 | 24 | 3 31.0 | 4 10 | 545 க. சங்கராமி(1), க. பழனி யப்பன் (2). | |
| | | | | | | | | | | 5 42.0 | 6 70 | | |
| 29 | 1 | 29-1 | சு | சு. ஏ. த. | ... | ... | ... | ... | ... | 1 77.5 | ... | ... | சு. ச. த. |
| | | 2 | ர | 4 | ... | 8-3 | 10 | 1 | 24 | 0 33.0 | 0 40 | 706 வி. பொங்கியாக்க கவுண்டர் (1), க. பொன்னம்மாள் (2), க. சின்னா சாமி (3). | |
| | | | | | | | | | | 2 10.5 | 0 40 | | |
| 30 | 1 | 30-1 | ர | 4 | ... | 8-2 | 7 | 3 | 09 | 1 19.5 | 3 70 | 707 வெ. தொழத்தாக்க கவுண்டர் (1), வெ. தொழன் (ர) கருப்ப கவுண்டர் (2), வெ. யாப்ப கவுண்டர் (3). | 28/ |
| | | 2 | ர | 4 | ... | 8-2 | 7 | 3 | 09 | 2 87.0 | 8 85 | 546 மா. வத்தன் (ர) ம. ரட்டைக்க கவுண்டர் (1), சி. அத்தியப்ப கவுண்டர் (3). | 28/ |
| | | | | | | | | | | 4 04.5 | 12 55 | | |

(Signature)
BIRTH AND HEALTH REGISTRAR
AND VILLAGE ADMINISTRATIVE OFFICER
IRUKKUR VILLAGE,
PARAMATHI V-1 TALUK,
NAMAKKAL DISTRICT.

விவரப்படி மாண்பு பார்ச்சுரை.

Figure 2.5a A-register showing details of lease area of Irukkur Village

| No | Date | Day | Time | Age | Sex | Weight | Height | Temp | Pulse | BP | Remarks |
|-------|----------|-----|------|--------|------|--------|--------|-------|------------|---|---------|
| 25/1 | 25/VII | D | 4... | 8.3 | 10 | 1.24 | 1.33.5 | 1.70 | 139.6 | U. 620/100 | |
| -2 | 25/VII | D | 4... | 8.3 | 10 | 1.24 | 1.56.5 | 1.90 | 132.4 | B. 284/95 | |
| | | | | | | | 2.90.0 | 3.60 | | | |
| 27/1 | 27-VII | D | 4... | 8.3 | 10 | 1.24 | 0.08.0 | 0.10 | 139.6 | U. 620/100 | |
| -2 | 27/VII | D | 4... | 8.3 | 10 | 1.24 | 1.97.0 | 2.50 | 132.4 | B. 284/95 | |
| | | | | | | | 2.05.0 | 2.60 | | | |
| 28/18 | 28/18VII | D | 4... | 8.3 | 10 | 1.24 | 0.81.5 | 1.00 | 139.6 | U. 620/100 | |
| -182 | 28/18VII | D | 4... | 8.3 | 10 | 1.24 | 0.09.0 | 0.20 | 132.6 | U. 620/100 | |
| | | | | | | | 0.90.5 | 1.20 | | Weight 4.50 | |
| | | | | | | | | | | Charged as per TK 8A/247/1423 dt 10/11 | |
| | | | | | | | | | | | 8.5.14 |
| | | | | | | | | | | | 2.506 |
| 28-17 | 28-17VII | S.4 | ... | 8.3.10 | 1.24 | 1.20.5 | 1.50 | 132.8 | 57. 284/95 | | |
| (18) | " | S.4 | ... | 8.3.10 | 1.24 | 0.90.5 | 1.10 | 132.6 | 57. 284/95 | | |
| | | | | | | 2.11.0 | 2.60 | | | | |
| 281 | 281VII | S.4 | ... | 8.3.10 | 1.24 | 0.19.5 | 0.15 | 132.8 | 57. 284/95 | | |
| 282 | " | S.4 | ... | 8.3.10 | 1.24 | 2.06.0 | 2.55 | 132.6 | 57. 284/95 | | |
| | | | | | | 2.20.5 | 2.70 | | | | |
| | | | | | | | | | | | 2.611 |

Figure 2.5b A-register showing details of lease area of Irrukkur Village

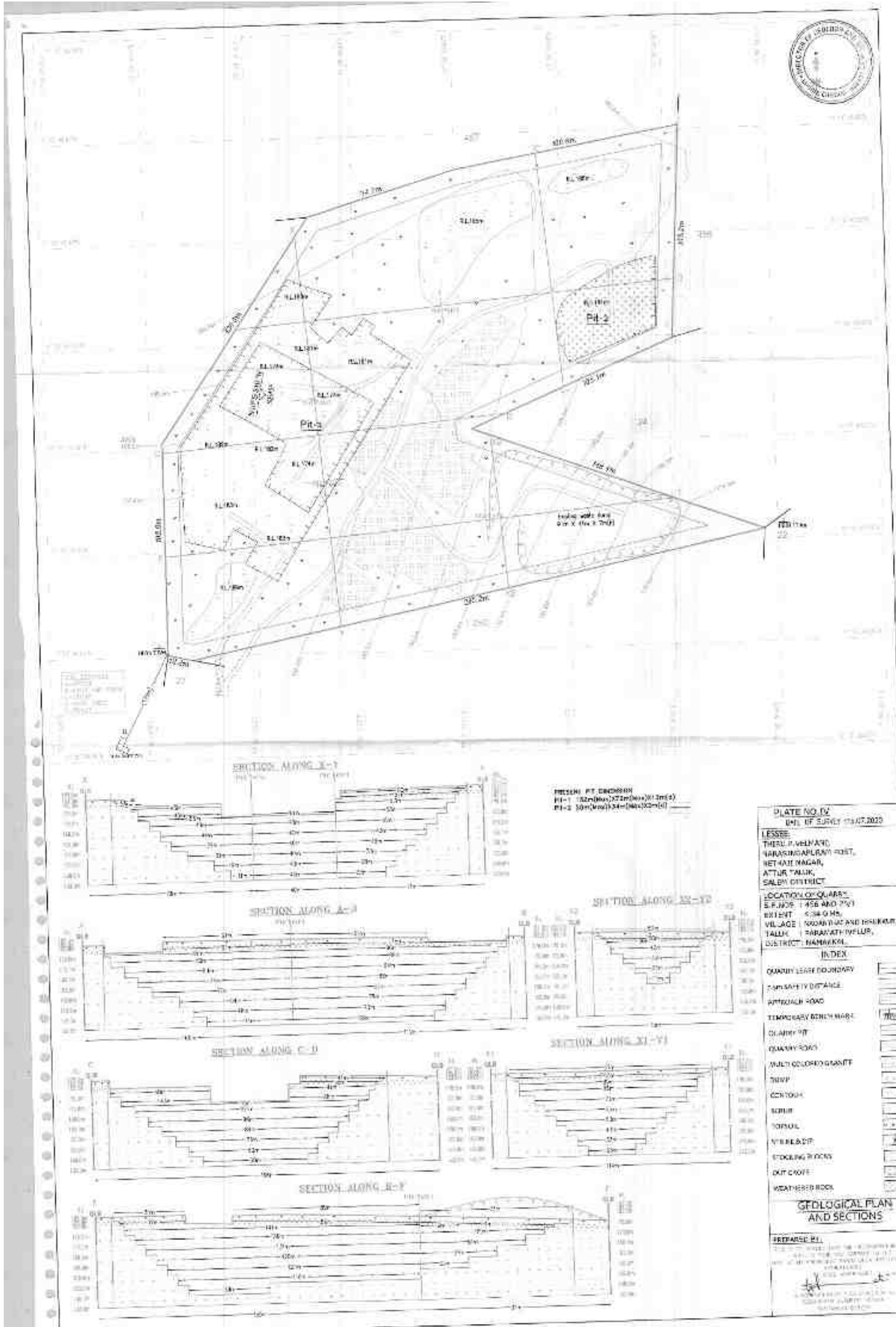


Figure 2.6 Surface and Geological plan with sections for the project

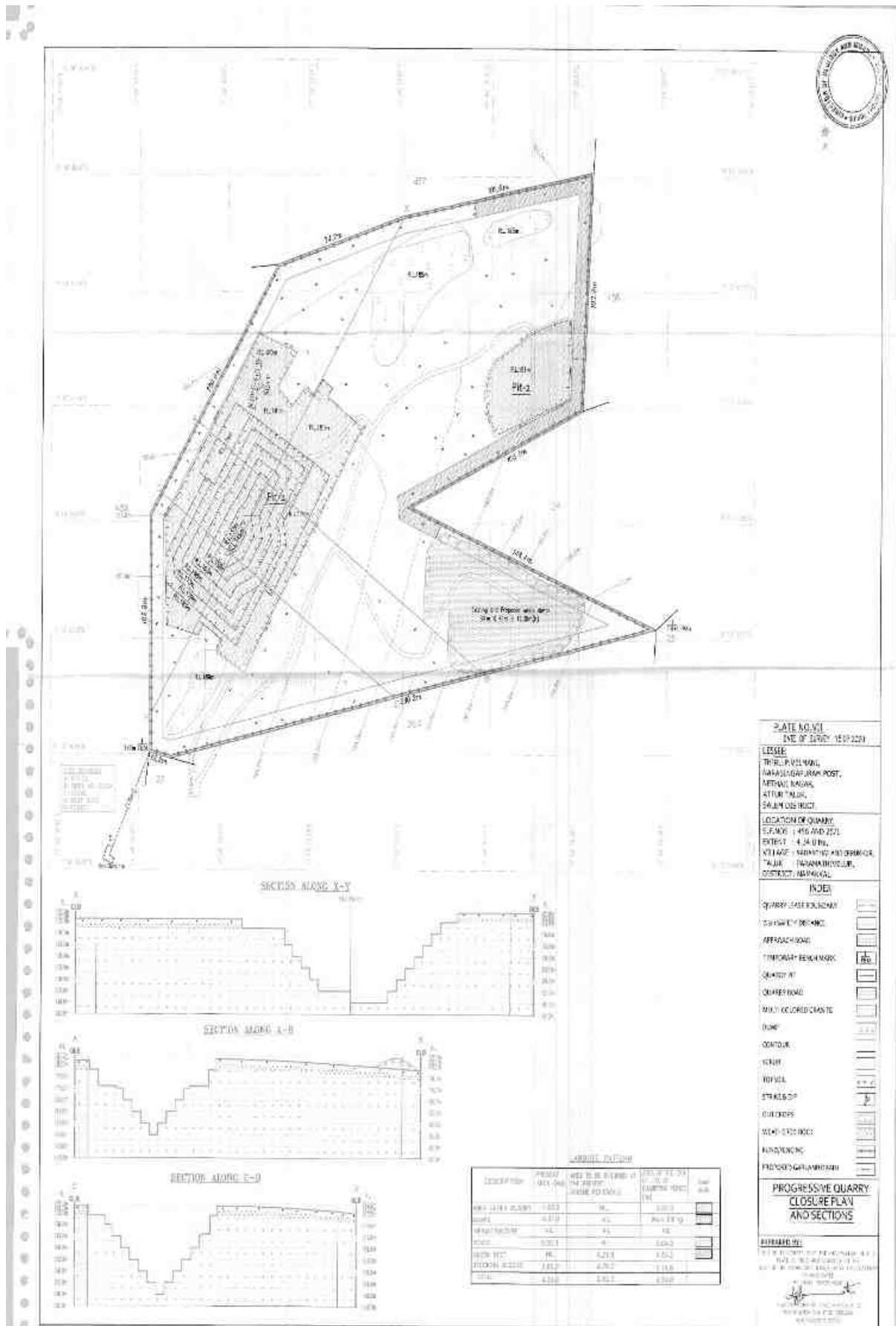


Figure 2.7 Progressive mine closure plan

Table 2.12 Mine Closure Budget

| Activity | Year | | | | | Rate | Total Cost in Rs. |
|-------------------------------|-----------|-----------|-----------|-----------|-----------|---------------------|-------------------|
| | 2020 - 21 | 2021 - 22 | 2022 - 23 | 2023 - 24 | 2024 - 25 | | |
| Plantation in Nos. | 50 | 50 | 50 | 50 | 50 | 100 Rs/ saplings | 25,000/- |
| Plantation Cost | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | | |
| Barbed Wire Fencing for 1050m | 3,15,000 | - | - | - | - | 300 Rs/ meter | 3,15,000/- |
| Garland Drains for 600m | 1,80,000 | - | - | - | - | 300 Rs/ meter | 1,80,000/- |
| Total | | | | | | | 5,20,000/- |

Source: Mining Plan Report

CHAPTER III
DESCRIPTION OF THE ENVIRONMENT

3.0 INTRODUCTION

Field monitoring studies were carried out to evaluate the existing environmental condition of the project site during March 2022 – May 2022 as per the CPCB guidelines. Data on the existing environmental condition were collected by Excellence Laboratory, ISO 9001: 2015 and ISO/IEC 17025:2017 certified & NABL accredited laboratory for the main environmental components including land, water, air, ecology, and socio-economy.

3.1 LAND ENVIRONMENT

Land use pattern of the area of 10km radius was studied using LISS III image of Bhuvan (ISRO). LULC map was prepared using ArcGIS software and the information obtained from the LU/LC map has been provided in Table 3.1.

Table 3.1 Land Use / Land Cover Statistics for the Area of 10km Radius

| S. No. | Classification | Area in ha | Area in % |
|---------------|--|-------------------|------------------|
| 1 | Barren Rocky/Stony waste/ sheet rock area | 110 | 0.36% |
| 2 | Crop Land | 24161 | 79.58% |
| 3 | Dense Forest | 483 | 1.59% |
| 4 | Fallow Land | 1681 | 5.54% |
| 5. | Land affected by salinity | 6 | 0.02% |
| 6 | Land with or without scrub | 271 | 0.89% |
| 7 | Mining/Industrial waste lands | 344 | 1.13% |
| 8 | Plantations | 2682 | 8.83% |
| 9 | Sands-Desertic/coastal | 40 | 0.13% |
| 10 | Settlement | 369 | 1.21% |
| 11 | Water bodies | 215 | 0.71% |
| Total | | 30361 | 100 |

3.2 SOIL ENVIRONMENT

Seven locations were selected for soil sampling on the basis of soil types, vegetative cover, and industrial and residential activities to assess the existing soil conditions such as physical and chemical properties in and around the project site.

3.2.1 Physical Characteristics

The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is clay loam. The bulk density of soils in the study area varies between 1.06 and 1.35 g/cc. The water holding capacity varies from 41.0 to 47.5 and porosity from 29.5 to 34.5%.

3.2.2 Chemical Characteristics

- The nature of soil is slightly alkaline to strongly alkaline with pH ranging from 7.21 to 8.18
- The nitrogen ranges between 153 and 210kg/ha
- The phosphorus ranges between 0.88 and 1.21 kg/ha
- The potassium ranges between 30.2 and 52.1mg/kg

3.3 WATER ENVIRONMENT

The water resources, both surface and ground water play a significant role in the development of the area. The water samples were collected and transported as per the norms in pre-treated sampling cans to laboratory for chemical analysis. The purpose of this study is to assess the present water quality of the water resources in and around the project site.

3.3.1 Surface Water

The pH varies from 7.27 to 7.71, while turbidity is found within the acceptable limits. TDS varies from 417 to 459 mg/l. Chloride varies from 70.2 to 90.1 mg/l; nitrate varies from 3.5 to 7.1 mg/l.

3.3.2 Ground Water

The pH (7.20 to 8.10) of the water samples falls within the acceptable limit of 6.5 to 8.5. Sulphates and chlorides of water samples from all the sources are within the acceptable limits as per the water quality standard. Turbidity in the water samples meets the requirement. TDS are found in the range of 364 – 460mg/l in all samples. The total hardness varies between 110.77 and 185.36 mg/l for all samples. When speaking about microbiological parameters, the water samples from all the locations meet the requirement. When compared to IS 10500:2012 all the parameters thus analysed fall within the prescribed limits.

3.4 AIR ENVIRONMENT

The existing ambient air quality of the area is important for evaluating the impact of mining activities on the ambient air quality. The baseline studies on air environment include identification of specific air pollutants and their existing levels in ambient air. The ambient air quality in the study area of 10 km radius around the proposed quarry sites provides the baseline ambient air quality information.

3.4.1 Wind Pattern

Local wind pattern will largely influence the dispersive pattern of air pollutants and noise from the proposed project sites. Wind pattern study requires hourly site-specific data of

wind speed and wind direction over a period of 3 months. The wind pattern analysis indicates the following information.

- ❖ The measured average wind velocity during the study period was 2.67m/s
- ❖ Predominant wind direction during the study period was NE to SW, followed by NNE to SSW.

3.4.2 Ambient Air Quality

Ambient air quality was monitored for the period of March 2022 – May 2022 at 8 locations within 10 km radius from the project site. As per the monitoring data, PM_{2.5} ranges from 21.38 µg/m³ to 25.68 µg/m³; PM₁₀ from 42.18 µg/m³ to 46.60µg/m³; SO₂ from 6.79 µg/m³ to 8.93 µg/m³; NO_x from 22.54 µg/m³ to 27.31 µg/m³. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

3.5 NOISE ENVIRONMENT

Ambient noise levels were measured at 8 locations around the proposed project area. During day time in core zone, noise levels varied from 47.7 to 48.4 dB (A) Leq and during night time, from 39.9 to 41.1 dB (A) Leq. During day time in buffer zone, noise levels varied from 44.5 to 49 dB (A) Leq and during night time, from 37.6 to 41.6 dB (A) Leq. Thus, the noise level for industrial and residential areas meets the requirements of CPCB.

3.6 ECOLOGICAL ENVIRONMENT

The main objective of biological study is to collect the baseline data regarding flora and fauna in the study area and identify ecologically sensitive areas and whether there are any rare, endangered, endemic or threatened (REET) species of flora and fauna in the core zone as well as buffer zone. The study has also been designed to suggest suitable mitigation measures, if necessary, to protect wildlife habitats and conservation of REET species if any.

3.6.1 Flora

The result of flora studies in core zone shows that Fabaceae, and Apocynaceae are the main dominating species in the study area. No species are found in threatened category. The result of flora studies in buffer zone shows that Solanaceae, Fabaceae and Poaceae are the main dominating species in the study area. There is no rare, endangered and threatened flora species in mining area and their surrounding area.

3.6.2 Fauna

The faunal survey was carried out as per the methodology to identify and count Mammals, Birds, Reptiles, Amphibians and Butterflies. In the faunal survey, 28 varieties of species were observed in the core zone. Among them are 6 Insects, 7 Reptiles, 4 Mammals and

11 Avian, whereas in the buffer zone, 41 species belonging to 32 families were recorded. Of the total species, there were 14 Birds, 12 Insects, 9 Reptiles, 5 Mammals, and 1 Amphibians.

From the study of biological environment, it is concluded that there was no schedule I species of animals observed within study area as per Wildlife Protection Act, 1972 and no species were found in vulnerable, endangered or threatened category as per IUCN and that there is no endangered red list species found in the study area. Hence, this small mining operation over short period of time will not have any significant impact on the surrounding flora and fauna.

3.7 SOCIO ECONOMIC ENVIRONMENT

Socio-economic study is an essential part of environmental study. It includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication, transportation, prevailing diseases pattern as well as features like temples, historical monuments etc., at the baseline level. This will help in visualizing and predicting the possible impact depending upon the nature and magnitude of the project.

It is also found that a part of population is suffering from lack of permanent job to run their day-to-day life. Their expectation is to earn some income for their sustainability on a long-term basis. The proposed project will aim to provide preferential employment to the local people there by improving the employment opportunity in the area and in turn the social standards will improve.

CHAPTER IV

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 INTRODUCTION

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans for sustainable resource extraction.

4.1 LAND ENVIRONMENT

4.1.1 Anticipated Impact

The main anticipated impact on the land environment due to quarrying operation is changes in landscape and land use pattern. The size of lands used for mining is insignificant when compared to the size of other LULCs. This small size of mining activities shall not have any significant impact on the land environment. While speaking the impact of the mining project on groundwater resources, the mining activity will not reach the groundwater aquifers. Therefore, it will not affect groundwater quality and quantity.

4.1.2 Mitigation Measures

The mining activity will be progressively implemented along with other mitigative measures as discussed below:

- ❖ Garland drains will be constructed all around the quarry pit and a check dam will be constructed at the suitable location in lower elevations to prevent erosion due to surface runoff during heavy rainfall and to collect the storm water for various uses.
- ❖ Green belt will be developed in safety zone. The water stored in the quarry will be used for greenbelt.
- ❖ Thick plantation will be done on unutilized area, top benches, safety barrier, etc.,
- ❖ At conceptual stage, the land use pattern of the quarry will be changed into greenbelt area and temporary reservoir.
- ❖ Natural vegetation surrounding the quarry will be retained to minimize dust emissions.
- ❖ Proper fencing will be established at the conceptual stage and security will be posted round the clock to prevent inherent entry of the public and cattle.

4.2 SOIL ENVIRONMENT

4.2.1 Impact on Soil Environment

The project area is covered by gravel formation of 2m thickness and the excavated gravel will be directly sold to needy customers in open market.

4.2.2 Mitigation Measures for Soil Conservation

- ❖ *Run-off diversion* – Garland drains will be constructed all around the project boundary to prevent surface flows from entering the quarry area. The water from garland drainage system will be discharged into vegetated natural drainage lines, or as distributed flow across an area stabilised against erosion.
- ❖ *Sedimentation ponds* - Run-off from working areas will be routed towards sedimentation ponds. These ponds trap sediments and reduce suspended sediment loads before runoff is discharged from the quarry sites. Sedimentation ponds will be designed based on runoff, retention times, and soil characteristics. There may be a need to provide a series of sedimentation ponds to achieve the desired outcome.
- ❖ *Retention of vegetation* – Retain existing vegetation or replant the vegetation at the site wherever possible.
- ❖ *Monitoring and maintenance* –Erosion control systems will be maintained to make sure seamless performance of the systems during rainy season.

4.3 WATER ENVIRONMENT

4.3.1 Anticipated Impact

The impact of mining on the water quality is insignificant because of no use of chemicals or hazardous substances during quarrying process. The quarrying activity will not intersect ground water table as the proposed depth for P1 & P2 is 20 m each below ground level and water table is found at depths of 40-45m below ground level.

There is no intersection of surface water bodies in the project area. As there is no proposal for granite processing or workshop within the project area there will be no effluent anticipated from the mines.

4.3.2 Mitigation Measures

- ❖ Water softening will be adopted to make it fit for drinking purposes. But it can be used for other domestic purposes.
- ❖ Rainwater will be collected in the mining pit and the water will be pumped out to surface settling tank of the dimension of 15m x 10m x 3m to remove suspended solids if any. The water stored in the settling tank will be used for dust suppression, greenbelt development and rainwater harvesting.
- ❖ A drainage network, known as garland drains will be constructed to divert surface run-off into the quarrying area.

- ❖ The quality of water in the quarry will be analysed periodically.
- ❖ Domestic sewage from site office and latrines in the mining site will be discharged to septic tanks followed by soak pits.
- ❖ Wastewater from the mining site will be treated in settling tanks before using it for dust suppression and tree plantation purposes.
- ❖ Desilting will be carried out before and immediately after the monsoon season.
- ❖ The quality of water in open and bore wells, and surface water bodies will be monitored regularly.

4.4 AIR ENVIRONMENT

The air borne particulate matter is the main air pollutant in the opencast mining involving drilling, blasting, and loading.

4.4.1 Anticipated Impact

The emission of sulphur dioxide (SO₂), oxides of nitrogen (NO₂) due to excavation and loading equipment and vehicles plying on haul roads are marginal. But, loading/unloading and transportation of granite, wind erosion of the exposed area and movement of vehicles will be the main polluting sources releasing Particulate Matter (PM₁₀) affecting ambient air quality of the area.

Anticipated increase of the air pollutants due to the proponents' quarrying activities and the existing quarrying activities within the area of 500m radius around the project sites have been predicted by modelling using AERMOD software and the modelling results shown in Tables 4.1 to 4.4 will be used in providing mitigation measures.

Table 4.1 Incremental & Resultant GLC of PM_{2.5}

| Station Code | Location | Average Baseline PM _{2.5} (µg/m ³) | Incremental value of PM _{2.5} due to mining (µg/m ³) | Total PM _{2.5} (µg/m ³) |
|--------------|-----------------------------|---|---|--|
| AAQ1 | 11°10'46.42"N 77°58'23.87"E | 23.90 | 10 | 33.9 |
| AAQ2 | 11°10'41.08"N 77°58'20.53"E | 22.59 | 10 | 32.59 |
| AAQ3 | 11°11'17.05"N 77°57'49.98"E | 23.74 | 1 | 24.74 |
| AAQ4 | 11° 9'50.08"N78° 0'53.82"E | 20.84 | 0.5 | 21.34 |
| AAQ5 | 11°11'54.78"N78° 1'14.52"E | 24.40 | 0.5 | 24.9 |
| AAQ6 | 11°8'46.47"N 77°57'58.71"E | 23.98 | 1 | 24.98 |
| AAQ7 | 11°11'33.35"N 77°55'33.37"E | 22.21 | 1 | 23.21 |
| AAQ8 | 11°14'1.89"N 77°58'7.32"E | 26.67 | 0 | 26.67 |

Table 4.2 incremental and Resultant GLC OF PM₁₀

| Station Code | Location | Average Baseline PM ₁₀ (µg/m ³) | Incremental value of PM ₁₀ due to mining (µg/m ³) | Total PM ₁₀ (µg/m) |
|--------------|-----------------------------|--|--|-------------------------------|
| AAQ1 | 11°10'46.42"N 77°58'23.87"E | 44.00 | 10 | 54 |
| AAQ2 | 11°10'41.08"N 77°58'20.53"E | 44.17 | 10 | 54.17 |
| AAQ3 | 11°11'17.05"N 77°57'49.98"E | 46.74 | 1 | 47.74 |
| AAQ4 | 11° 9'50.08"N78° 0'53.82"E | 42.95 | 1 | 43.95 |
| AAQ5 | 11°11'54.78"N78° 1'14.52"E | 44.20 | 0.5 | 44.7 |
| AAQ6 | 11°8'46.47"N 77°57'58.71"E | 44.65 | 1 | 45.65 |
| AAQ7 | 11°11'33.35"N 77°55'33.37"E | 42.61 | 1 | 43.61 |
| AAQ8 | 11°14'1.89"N 77°58'7.32"E | 46.78 | 0 | 46.78 |

Table 4.3 Incremental & Resultant GLC of SO₂

| Station Code | Location | Average Baseline SO ₂ (µg/m ³) | Incremental value of SO ₂ due to mining (µg/m ³) | Total SO ₂ (µg/m ³) |
|--------------|-----------------------------|---|---|--|
| AAQ1 | 11°10'46.42"N 77°58'23.87"E | 8.93 | 5 | 13.93 |
| AAQ2 | 11°10'41.08"N 77°58'20.53"E | 8.63 | 1 | 9.63 |
| AAQ3 | 11°11'17.05"N 77°57'49.98"E | 6.95 | 0.1 | 7.05 |
| AAQ4 | 11° 9'50.08"N78° 0'53.82"E | 7.17 | 0.1 | 7.27 |
| AAQ5 | 11°11'54.78"N78° 1'14.52"E | 7.04 | 0.1 | 7.14 |
| AAQ6 | 11°8'46.47"N 77°57'58.71"E | 7.48 | 0.1 | 7.58 |
| AAQ7 | 11°11'33.35"N 77°55'33.37"E | 6.51 | 0.1 | 6.61 |
| AAQ8 | 11°14'1.89"N 77°58'7.32"E | 9.17 | 0 | 9.17 |

Table 4.4 Incremental & Resultant GLC of NO_x

| Station Code | Location | Average Baseline NO _x (µg/m ³) | Incremental value of NO _x due to mining (µg/m ³) | Total NO _x (µg/m ³) |
|--------------|-----------------------------|---|---|--|
| AAQ1 | 11°10'46.42"N 77°58'23.87"E | 26.59 | 5 | 31.59 |
| AAQ2 | 11°10'41.08"N 77°58'20.53"E | 26.15 | 1 | 27.15 |
| AAQ3 | 11°11'17.05"N 77°57'49.98"E | 26.01 | 0.1 | 26.11 |
| AAQ4 | 11° 9'50.08"N78° 0'53.82"E | 23.33 | 0.1 | 23.43 |
| AAQ5 | 11°11'54.78"N78° 1'14.52"E | 23.60 | 0.1 | 23.7 |
| AAQ6 | 11°8'46.47"N 77°57'58.71"E | 23.51 | 0.1 | 23.61 |
| AAQ7 | 11°11'33.35"N 77°55'33.37"E | 23.31 | 0.1 | 23.41 |
| AAQ8 | 11°14'1.89"N 77°58'7.32"E | 26.95 | 0 | 26.95 |

The values of cumulative concentration i.e., background + incremental concentration of pollutant in all the receptor locations are still within the prescribed NAAQ limits without effective mitigation measures. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be controlled further.

4.4.2 Mitigation Measures

4.4.2.1 Drilling

- ❖ Wet drilling will be practiced to control dust at source. Where water is unavailable, suitably designed dust extractor will be provided for dry drilling.

4.4.2.2 Blasting

- ❖ Blasting will be carried out only to remove the overburden and weathered portion
- ❖ Establish time of blasting to suit the local conditions and water sprinkling on blasting face
- ❖ Controlled blasting includes Adoption of suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone and restricting blasting to a particular time of the day i.e., at the time lunch hours, controlled charge per hole as well as charge per round of hole

4.4.2.3 Haul Road and Transportation

- ❖ Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation.
- ❖ Granite will be properly transported during the day time.
- ❖ The speed of tippers plying on the haul road will be limited to below 20 km/hr to avoid generation of dust.
- ❖ Main source of gaseous pollution will be from vehicle used for transportation of mineral; therefore, weekly maintenance of vehicles and other machines will be done to improve combustion process and reduce the emission of pollutants.
- ❖ The haul roads will be compacted weekly before being put into use.
- ❖ Over loading of tippers will be avoided to prevent spillage.
- ❖ It will be ensured that all transportation vehicles carry a valid PUC (Pollution Under Control) certificate.

4.4.2.4 Green Belt

- ❖ Trees will be planted all along the main haul roads and haul roads will often be levelled to prevent the generation of dust due to movement of tippers.
- ❖ Green belt of adequate width will be developed around the project areas.

4.4.2.5 Occupational Health

- ❖ Dust masks will be provided to the workers and their use will be strictly monitored.
- ❖ Annual medical check-ups, trainings and campaigns will be arranged to create awareness about the importance of wearing dust masks among all mine workers and tipper drivers.
- ❖ Ambient air quality monitoring will be conducted six months once to assess the effectiveness of mitigation measures proposed for the projects.

4.5 NOISE ENVIRONMENT

4.5.1 Anticipated Impact

Noise pollution poses a major health risk to the mine workers. Drilling, blasting, loading and movement of vehicles are the sources of noise in the existing open cast mining projects.

4.5.2 Mitigation Measures

- ❖ Sharp drill bits will be used while drilling to reduce noise.
- ❖ Secondary blasting will be avoided and hydraulic rock breaker are utilized for breaking boulders;
- ❖ The blasting will be carried out during favourable atmospheric condition and less human activity timings by using nonelectrical initiation system (NONEL).
- ❖ Proper maintenance, oiling and greasing of machines will be done every week to reduce generation of noise.
- ❖ Sound insulated chambers will be provided for the workers working on machines producing higher levels of noise.
- ❖ Silencers / mufflers will be installed in all machineries.
- ❖ Green belt will be developed around the project area and along the haul roads to minimize propagation of noise.
- ❖ Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of heavy machines and persons working near the heavy machines and their use will be ensured through training and awareness.
- ❖ Regular medical check-up and proper training will be provided to personnel to create awareness about adverse noise level effects.

4.6 BIOLOGICAL ENVIRONMENT

4.6.1 Anticipated Impact

- ❖ None of the plants will be cut during operational phase of the projects.
- ❖ There shall be negligible air emissions or effluents from the project sites. Dust generation during loading will be a temporary effect and is not anticipated to affect the surrounding vegetation significantly.
- ❖ Most of the land in the buffer area consists of crop lands, grass patches and small shrubs. Hence, there will be no effect on the flora.
- ❖ Wildlife except few domestic animals, reptiles, hares and some common birds is not found in the cluster and its immediate surrounds because of lack of vegetal cover and surface water.

4.6.2 Mitigation Measures

The proposed projects will develop the green belt within the lease area, along roads and other vacant areas to provide a barrier between the source of pollution and the surrounding areas. Although the project will not lead to any tree cutting, it is proposed to improve the greenery of the locality by plantation. During green belt development,

- ❖ Plants that grow fast will be preferred.
- ❖ High canopy plants with local varieties will be preferred.
- ❖ Perennial and evergreen plants will be preferred.

Green belt development plan and the cost for the greenbelt development for the proposed project have been given in Table 4.5 and 4.6, respectively.

Table 4.5 Green Belt Development Plan

| Year | No. of trees proposed to be planted | Survival % | Area to be covered in sq.m. | Name of the species | No. of trees expected to be grown |
|-------------|--|------------|-----------------------------|--|--|
| I | 50 | 80% | 420 | <i>Azadirachta indica</i> <i>Albizia lebbeck</i> <i>Delonix regia</i> <i>Tectona grandis</i> , etc., | 40 |
| II | 50 | 80% | 420 | | 40 |
| III | 50 | 80% | 420 | | 40 |
| IV | 50 | 80% | 420 | | 40 |
| V | 50 | 80% | 420 | | 40 |
| Year | Plantation in quarry approach road side (In Nos.) | | | | No. of trees expected to be grown |
| I | 22 | 80% | 200 | | 17 |
| II | 22 | 80% | 200 | | 17 |
| III | 22 | 80% | 200 | | 17 |
| IV | 22 | 80% | 200 | | 17 |
| V | 22 | 80% | 200 | 17 | |

Table 4.6 Preparation of Green belt details

| S. No. | Details of work | Year wise details plantation for each area | | | | | | | |
|--------|--|--|----------|-----------|-----------|-----------|---------------------|------------------|-----------------|
| | | 1st year | 2nd year | 3rd years | 4th years | 5th years | Rate | Total Cost (Rs.) | |
| 1 | Plantation under safety zone (In Nos.) | 50 | 50 | 50 | 50 | 50 | @100 Rs Per sapling | 25,000 | |
| | Plantation cost | 5000 | 5000 | 5000 | 5000 | 5000 | | | |
| 2 | Plantation in quarry approach road Side (In Nos) | 22 | 22 | 22 | 22 | 22 | | 11,000 | |
| | Plantation cost | 2200 | 2200 | 2200 | 2200 | 2200 | | | |
| 3 | Maintenance (Rs.) (Manuring, Fertilizer, Insecticide application, watchman etc.) | Cost (Rs. 30000/-) per year for five-year period | | | | | | 150,000 | |
| | | Total | | | | | | | 1,86,000 |

4.7 SOCIO ECONOMIC ENVIRONMENT

4.7.1 Anticipated Impact

The projects including P1 and P2 will generate employment for about 52 persons and indirectly will get employment around 45 persons

4.7.2 Mitigation Measures

- ❖ Good maintenance practices will be adopted for plant machinery and equipment to avert potential noise problems.
- ❖ Green belt will be developed in and around the project sites as per Central Pollution Control Board (CPCB) guidelines.
- ❖ Appropriate air pollution control measure will be provided to minimize the environmental impact within the core zone.
- ❖ For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices will be provided as per the mines act and rules.
- ❖ Both the State and the Central governments will be benefited through financial revenues by way of royalty, tax, DMF, NMET etc. from the projects directly and indirectly.

4.8 OCCUPATIONAL HEALTH MEASURES

All the persons will undergo pre-employment and periodic medical examination. Employees will be monitored for occupational diseases by conducting the following tests

- ❖ General physical tests

- ❖ Audiometric tests
- ❖ Full chest, X-ray, Lung function tests, Spiro metric tests
- ❖ Periodic medical examination – yearly
- ❖ Lung function test – yearly, those who are exposed to dust
- ❖ Eye test

Essential medicines will be provided at the site. The medicines and other test facilities will be provided at free of cost. The first aid box will be made available at the mine for immediate treatment. First aid training will be imparted to the selected employees regularly. The lists of first aid trained members shall be displayed at strategic places.

4.9 MINE WASTE MANAGEMENT

The overburden in the form of topsoil will be safely removed during the mining plan period. The quarried-out topsoil will be preserved within the applied area and utilized for construction of bund and backfilled in the part of the quarry pit also spread out the quarried out top bench to facilitate the greenbelt development. The Weathered rock will be directly loaded into tippers for filling and levelling of low-lying areas. No hazardous waste production is anticipated due to the development.

CHAPTER V

ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

The mineral deposits are site specific in nature; hence question of seeking alternate sites do not arise for the projects.

CHAPTER VI

ENVIRONMENT MONITORING PROGRAM

6.0 PURPOSE

Regular monitoring program of environmental components is essential to take into account the changes in the environmental components as shown in Table 6.1. The Objectives of monitoring is:

- ❖ To check or assess the efficiency of the controlling measures;

- ❖ To establish a data base for future impact assessment studies.

Table 6.1 Post Environmental Clearance Monitoring Schedule

| S. No. | Environment Attributes | Location | Monitoring | | Parameters |
|--------|--------------------------|--|----------------|------------------------------|---|
| | | | Duration | Frequency | |
| 1 | Air Quality | 8 locations (2 core & 6 buffer) | 24 hours | Once in 6 months | Fugitive dust, PM _{2.5} , PM ₁₀ , SO ₂ and NO _x . |
| 2 | Meteorology | At mine site before start of Air Quality Monitoring & IMD Secondary Data | Hourly / Daily | Continuous online monitoring | Wind speed, Wind direction, Temperature, Relative humidity and Rainfall |
| 3 | Water Quality Monitoring | 8 locations (3 SW & 5 GW) | - | Once in 6 months | Parameters specified under IS:10500, 1993 & CPCB Norms |
| 4 | Hydrology | Water level in open wells in buffer zone around 1 km at specific wells | - | Once in 6 months | Depth in bgl |
| 5 | Noise | 8 locations (2 Core & 6 Buffer) | Hourly – 1 Day | Once in 6 months | Leq, Lmax, Lmin, Leq Day & Leq Night |
| 6 | Vibration | At the nearest habitation (in case of reporting) | – | During blasting Operation | Peak Particle Velocity |
| 7 | Soil | 5 locations (1 core & 5 Buffer) | – | Once in six months | Physical and Chemical Characteristics |
| 8 | Greenbelt | Within the Project Area | Daily | Monthly | Maintenance |

Source: Guidance of manual for mining of minerals, February 2010

6.2 BUDGETARY PROVISION FOR EMP

The cost in respect of monitoring of environmental components has been shown in Table 6.2.

Table 6.2 Environmental Monitoring Budget

| S. No. | Parameter | Capital Cost | Recurring Cost per annum |
|--------|---------------|--------------|--------------------------|
| 1 | Air Quality | - | Rs 70,000/- |
| 2 | Meteorology | - | Rs 10,000/- |
| 3 | Water Quality | - | Rs 30,000/- |
| 4 | Hydrology | - | Rs 25,000/- |

| | | | |
|---|-----------------|--------------------|--------------------|
| 5 | Soil Quality | - | Rs 25,000/- |
| 6 | Noise Quality | - | Rs 20,000/- |
| 7 | Vibration Study | - | Rs 1,50,000/- |
| 8 | Greenbelt | Rs 40,000/- | Rs 50,000/- |
| | Total | Rs 40,000/- | Rs 3,80,000 |

CHAPTER VII

ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

Risk assessment is all about prevention of accidents and to take necessary steps to prevent it from happening. The methodology for the risk assessment is based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad

vide circular no.13 of 2002 dated 31st December 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and assess the risk levels of those hazards in order to prioritize those that need an immediate attention. Further, mechanisms responsible for these hazards are identified and control measures are recorded along with pinpointed responsibilities. The whole quarry operation will be carried out under the direction of a qualified competent mine manager certified by the DGMS, Dhanbad.

7.2 DISASTER MANAGEMENT PLAN

The objective of the disaster management plan is to make use of the combined resources of the mine and the outside services to:

- ❖ Rescue and treat casualties;
- ❖ Safeguard other people;
- ❖ Minimize damage to property and the environment;
- ❖ Initially contain and ultimately bring the incident under control;
- ❖ Secure the safe rehabilitation of affected area; and
- ❖ Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.

7.3 CUMULATIVE IMPACT STUDY

This section deals with the cumulative impacts of the mining projects in the cluster area on the environment. For this study, the data provided in the tables 7.1-7.4 were used.

Table 7.1 Cumulative Production Load of Granite

| Quarry | Proposed Production of ROM for 5 years (m ³) | Proposed Production of ROM/Day (m ³) | Daily Production of Granite (m ³) | Daily Production of Granite waste (m ³) | Number of Lorry Loads/Day (Granite) |
|--------------|--|--|---|---|-------------------------------------|
| P1 | 50,069 | 33.38 | 20 (@ 60%) | 13.35 (@ 60%) | 3.33 |
| E1 | 17,100 | 11.4 | 6.84 (@ 60%) | 4.56 (@ 40%) | 1.14 |
| E2 | 60,050 | 40.03 | 20 (@ 50%) | 20 (@ 50%) | 3.33 |
| E3 | 15,300 | 10.20 | 6.12 (@ 60%) | 40.08 (@ 40%) | 1.02 |
| E4 | 17,083 | 11.38 | 6.83 (@ 60%) | 4.55 (@ 40%) | 1.14 |
| E5 | 51,570 | 34.38 | 10.31 (@ 30%) | 24.07 (@ 60%) | 1.72 |
| Total | 2,11,172 | 140.77 | 70.10 | 70.67 | 11.68 |

Table 7.2 Incremental and Resultant Ground Level Concentration from the Quarries

| Incremental and resultant ground level concentration from the proposed project-P1 | | | |
|--|--|---|---------------------------------------|
| Pollutants | Average Baseline Value (µg/m³) | Incremental Value (µg/m³) | Total Value (µg/m³) |
| PM2.5 | 23.24 | 10 | 33.24 |
| PM10 | 44.08 | 10 | 54.08 |
| SO2 | 8.78 | 3 | 11.78 |
| NOX | 26.37 | 3 | 29.37 |
| Incremental and resultant ground level concentration from the project area-E1 | | | |
| PM2.5 | 23.24 | 16.06 | 39.30 |
| PM10 | 44.08 | 16.06 | 60.14 |
| SO2 | 8.78 | 4.82 | 13.60 |
| NOX | 26.37 | 4.82 | 31.19 |
| Incremental and resultant ground level concentration from the project area-E2 | | | |
| PM _{2.5} | 23.24 | 5.62 | 28.86 |
| PM ₁₀ | 44.08 | 5.62 | 49.70 |
| SO ₂ | 8.78 | 1.68 | 10.46 |
| NO _x | 26.37 | 1.68 | 28.05 |
| Incremental and resultant ground level concentration from the project area-E3 | | | |
| PM _{2.5} | 23.24 | 7.49 | 30.73 |
| PM ₁₀ | 44.08 | 7.49 | 51.57 |
| SO ₂ | 8.78 | 2.25 | 11.03 |
| NO _x | 26.37 | 2.25 | 28.62 |
| Incremental and resultant ground level concentration from the project area-E4 | | | |
| PM _{2.5} | 23.24 | 5.08 | 28.32 |
| PM ₁₀ | 44.08 | 5.08 | 49.16 |
| SO ₂ | 8.78 | 1.52 | 10.30 |
| NO _x | 26.37 | 1.52 | 27.89 |
| Incremental and resultant ground level concentration from the project area-E5 | | | |
| PM _{2.5} | 23.24 | 3.96 | 25.73 |
| PM ₁₀ | 44.08 | 15.49 | 60.15 |
| SO ₂ | 8.78 | 3.96 | 12.86 |
| NO _x | 26.37 | 1.98 | 22.29 |

Table 7.3 Predicted Noise Incremental Values for 6 Quarries

| Location ID | Distance (m) | Direction | Background Value (Day) dB(A) | Incremental Value dB(A) | Total Predicted dB(A) | Residential Area Standards dB(A) |
|--------------------|---------------------|------------------|-------------------------------------|--------------------------------|------------------------------|---|
| Habitation Near P1 | 1395 | NW | 49 | 34.26 | 49.14 | 55 |

| | | | | | |
|--------------------|------|-----|----|-------|-------|
| Habitation Near E1 | 838 | NW | 49 | 38.69 | 49.38 |
| Habitation Near E2 | 1042 | NW | 49 | 36.8 | 49.25 |
| Habitation Near E3 | 810 | N | 49 | 38.98 | 49.41 |
| Habitation Near E4 | 960 | NNW | 49 | 37.51 | 49.29 |
| Habitation Near E5 | 460 | NW | 49 | 43.90 | 50.17 |

Source: Lab Monitoring Data

Table 7.4 Socio Economic Benefits from 6 Quarries

| Location code | Employment | Project Cost | CER @ 2% |
|----------------------|-------------------|-------------------------|-----------------------|
| P1 | 43 | Rs. 3,21,17,000/- | Rs. 6,43,000/- |
| E1 | 40 | Rs.72,28,000/- | Rs.1,44,560/- |
| E2 | 40 | Rs. 55,55,000/- | Rs.1,11,100/- |
| E3 | 40 | Rs. 58,30,000/- | Rs.1,16,600/- |
| E4 | 39 | Rs. 3,10,26,000/- | Rs.6,21,000/- |
| E5 | 20 | Rs.88,25,000/- | Rs.1,76,500/- |
| Total | 222 | Rs.9,05,81,000/- | Rs.18,11,620/- |

CHAPTER VIII

PROJECT BENEFITS

This multi color granite quarry will enhance the socio-economic activities in the adjoining areas and due to the project:

- ❖ Employment will be offered to about 43 local people;

- ❖ Socio-Economic welfare will be improved;
- ❖ Physical Infrastructure will be improved;
- ❖ Social infrastructure will be improved.
- ❖ Funds will be allocated for Corporate Environment Responsibility (CER), as shown in Table 8.1.

Table 8.1 Corporate Environment Responsibility (CER)

| Activity | Beneficiaries | Total in Rs |
|---|--|--------------------|
| Water Management – Construction of rainwater harvesting structures | Nadanthai & Irrukkur village | 2,00,000/- |
| Sanitation – Maintenance & repairs of toilets in nearby schools | One school in Nadanthai & Irrukkur village | 2,50,000/- |
| Solar Power – Installation of Solar Street Lamps | Nadanthai & Irrukkur village roads | 1,93,000/- |
| Total | | 6,43,000/- |

CHAPTER IX

ENVIRONMENT MANAGEMENT PLAN

Environment Management Plan (EMP) aims at the preservation of ecological system by considering in-built pollution abatement facilities at the proposed site. Good practices of Environmental Management plan will ensure to keep all the environmental parameters of the

project in respect of Ambient Air quality, Water quality, Socio – economic improvement standards.

Mitigation measures at the source level and an overall environment management plan at the study area are elicited so as to improve the supportive capacity of the receiving bodies. The EMP presented in this chapter discusses the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored after approval of the EIA. According to the detailed environmental management plan, in order to implement the environmental protection measures, an amount of Rs. 19.21 lakhs as capital cost and Rs.5.62 lakhs as recurring cost is proposed considering present market scenario.

CHAPTER X

CONCLUSION

Various aspects of mining activities were considered and related impacts were evaluated. Considering all the possible ways to mitigate the environmental issues, environmental management plan (EMP) was prepared and fund has been allocated for the same. The EMP is dynamic, flexible and subjected to periodic review. For project where the major environmental impacts are associated, EMP will be under regular review. Senior management responsible for the project will conduct a review of EMP and its implementation to ensure that the EMP remains effective and appropriate. Thus, the proper steps will be taken to accomplish all the goals mentioned in the EMP and the project will bring the positive impact in the study area.