TELANGANA STATE MINERAL
DEVELOPMENT CORPORATION LIMITED
(A State Government Undertaking)

TSMDC

P.O. Devapur Cement Works – 504 218,
Dist. Mancherial (T.S)
Phone : 91-08736 – 240661,
Fax : 91-8736 – 240522

ORCEM/TSMDC:2020-21: 179

Date: 29/07/2021

The Member Secretary
Telangana State Pollution Control Board
Paryavarana Bhavan, A-3
Industrial Estate
Sanath Nagar
HYDERABAD – 500 018.

**Sub: -** Submission of Form – V (Environment Statement) of Devapur Limestone Mines of M/s. Telangana State Mineral Development Corporation Ltd, for the year 2020-2021 regarding.

Dear Sir,

We are here with submitting Form – V (Environment Statement-Mines) of Devapur Limestone Mines of M/s. Telangana State Mineral Development Corporation Ltd, Telangana for the year 2020 – 2021.

This is for your kind information and records please.

Thanking you sir,

Yours faithfully,
For **Devapur Limestone Mine.,**
Of M/s. TSMDC Ltd.,

**MINES MANAGER**

Encl.: As above

CC to

Environment Engineer
Telangana State Pollution Control Board
H.No. 6-2-166/A, I st Floor
Subhash Nagar
NIZAMABAD-503002
Telangana (State)

Regd. & Corpt office : Rear Block, 4th floor, HMWSSB Premises, Khairatabad, Hyderabad – 500 004.
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# FORM - V
# ENVIRONMENTAL STATEMENT
# FOR THE FINANCIAL YEAR 2020-2021

**By**


**DEVAPUR LIMESTONE MINES**

**M/s. TSMDC Ltd.**

**PO: Devapur Cement Works, Kasipet (M),**
**Dist.: Mancherial (Dist) – Telangana - 504218**

# CONTENTS

## PART – A

| | | |
|---|---|---|
| i) Name and address of the owner<br><br>Occupier of the industry operation or process. | : | **Dr. G. Malsur**<br>**Vice Chairman & Managing Director**<br>**DEVAPUR LIME STONE MINE,**<br>**Devapur (V), Kasipet (M),**<br>**Mancherial (Dist.)** |
| ii) Date of the last environmental audit report submitted | : | 15th September- 2020 |
| iii) Production Capacity | : | 5.3 Million Ton /year - Lime stone |
| iv) Year of Establishment | : | 1981 |

## PART – B

### WATER AND RAW MATERIAL CONSUMPTION

| | | **2019-20** | **2020-21** |
|---|---|---|---|
| **i) Total water consumption $m^3$/day:** | | 136.65 | 66.31 |
| 1. Dust suppression | : | 61.76 | 33.47 |
| 2. Plantation & Greenbelt | : | 65.40 | 26.95 |
| 3. Domestic | : | 9.84 | 5.89 |

| Name of Product | Water consumption per unit of product (KL/MT) | |
|---|---|---|
| | During the previous financial year (2019-2020) | During the current financial year (2020-2021) |
| Limestone | 0.01302 KL / MT of Limestone | 0.01027 KL / MT of Limestone |

**ii) Raw material consumption:**

| Name of Raw Materials | Name of product | Consumption of raw material per MT of output Lime Stone | |
|---|---|---|---|
| | | During the previous Financial year (2019-2020) | During the current Financial year (2020-2021) |
| HSD | Lime Stone | 0.325 L /MT | 0.389 L/MT |
| Explosives | Lime Stone | 0.089 Kg/MT | 0.087 Kg /MT |

## PART - C

## POLLUTION DISCHARGED TO ENVIRONMENT

| (Parameters as specified in the consent issued)Pollutants | Quantity of Pollutants Discharged (kg/day) | Concentrations Of Pollutants in Discharges (mg/L) | Percentage of variation from prescribed standards with reasons |
|---|---|---|---|

**a) Waste Water – 2020-2021**

| S.No | | Units | Limits | *Avg* | *Avg* |
|---|---|---|---|---|---|
| | | | | ***I*** | ***II*** |
| 1 | PH | | 6.5-8.5 | 7.55 | 7.61 |
| 2 | Total dissolved solids | mg/L | 2100 | 819.64 | 744.73 |
| 3 | Total Suspended solids | mg/L | 200 | 39.82 | 24.00 |
| 4 | Chemical oxygen demand | mg/L | - | 50.00 | 20.00 |
| 5 | Biochemical oxygen demand | mg/L | 100 | 11.64 | 8.73 |
| 6 | Oil & Grease | mg/L | 10 | 0.81 | 0.49 |
| 7 | Dissolved Phosphates | mg/L | 5 | 1.04 | 0.83 |
| 8 | Zine | mg/L | 5 | 0.61 | 0.52 |

I. Battery Discharge Effluent
II. Oil Separator outlet

**b) Air**

Average values of Ambient air quality data for the year 2020 – 2021 Core Zone

| Direction | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Particulate Matter – PM10 Concentration (ug/m$^3$) | 68.00 | 67.82 | 65.82 | 63.4 |
| Particulate Matter – Concentration PM 2.5 (ug/m3) | 22.36 | 23.09 | 22.55 | 20.5 |
| Sulfur dioxide Concentration (ug/m$^3$) | 10.09 | 11.27 | 9.18 | 10.9 |
| Nitrogen dioxide Concentration (ug/m$^3$) | 21.27 | 22.09 | 19.55 | 21.4 |
| Lead (Pb) | 0.10 | 0.12 | 0.11 | 0.1 |
| Carbon monoxide (Co) | BDL | BDL | BDL | BDL |
| Ammonia (NH3) | BDL | BDL | BDL | BDL |
| Ozone (O3) | 7.00 | 10.09 | 7.82 | 7.55 |
| Benzene (C6 H6) | <0.02 | <0.02 | <0.02 | <0.02 |
| Arsenic (As) | ND | ND | ND | ND |
| Nickel (Ni) | ND | ND | ND | ND |
| Benzo pyrene (Bap) | ND | ND | ND | ND |

1. Near Loading Area
2. Near Unloading Area
3. Near Drilling Area
4. Near Haulage Road

Note: All the values are expressed as (µg/m$^3$

Average values of Ambient air quality data for the year 2020 – 2021 Buffer Zone

| Direction | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Particulate Matter – PM10 Concentration (ug/m$^3$) | 58.18 | 47.55 | 48.18 | 55.00 |
| Particulate Matter – Concentration PM 2.5 (ug/m3) | 20.55 | 16.18 | 17.18 | 19.55 |
| Sulfur dioxide Concentration (ug/m$^3$) | 10.82 | 9.64 | 9.55 | 13.45 |
| Nitrogen dioxide Concentration (ug/m$^3$) | 21.27 | 18.91 | 18.64 | 20.55 |
| Lead (Pb) | 0.07 | 0.04 | 0.05 | 0.09 |
| Carbon monoxide (Co) | BDL | BDL | BDL | BDL |
| Ammonia (NH3) | BDL | BDL | BDL | BDL |
| Ozone (O3) | 7.73 | 3.36 | 3.55 | 7.64 |
| Benzene (C6 H6) | <0.03 | <0.03 | <0.02 | <0.02 |
| Arsenic (As) | ND | ND | ND | ND |
| Nickel (Ni) | ND | ND | ND | ND |
| Benzo pyrene (Bap) | ND | ND | ND | ND |

5. Near Devapur Village
6. Near Forest Area
7. Near Gatralpalli Village
8. Near Maddiamadugu

Note: All the values are expressed as (µg/m$^3$

| Stack Attached to | Pollutant | Pollutants in Emissions discharged (kg/day) 2019-2020 | Concentrations Of Pollutants in Emissions (mg/ N $m^3$ ) 2020-2021 | Percentage of variation from prescribed standards with reasons |
|---|---|---|---|---|
| **Crusher** | SPM | 24.33 | 19.02 | -80.50% |

**PART – D**

**HAZARDOUS WASTE**

(As specified under hazardous wastes/Management and handling rules, 2016)

| Hazardous wastes | Total Quantity per Year: During the previous Financial year (2019-2020) | Total Quantity per Year: During the current Financial year (2020-2021) |
|---|---|---|
| a) From Process<br>i) Used Oil | 5200 Liters | 7300 Liters |
| b) From Pollution control facilities | Nil | Nil |

**PART - E**

**SOLID WASTES**

| S.No | Solids Waste | Total quantity: During the previous Financial year (2019-2020) | Total quantity: During the current Financial year (2020-2021) |
|---|---|---|---|
| (a) | From Process<br>Top soil generating in mining operation | Nil | NIL |
| (b) | From Pollution Control Facility | -NA- | -NA- |
| (c) 1. | Quantity recycled or re-utilized | 418647 Ton | 660382 Ton |
| 2. | Sold | Nil | Nil |
| 3. | Disposed | 667953 Ton | 262415 Ton |

**PART - F**

**Please specify the characteristics (in terms of concentration and quantum) of Hazardous as well as solid wastes and indicates disposal practice adopted for both these categories of wastes.**

Hazardous waste generated during maintenance of HEMM used for mining operation is in the form of used oil and old batteries. Used oil thus generated is being disposed off to CPCB authorized recyclers only. Old batteries are disposed off on buy back basis.

Solid waste as top soil generated during mining operation is directly used in greenbelt developments. Other overburden and waste rock generated during mining operation is used for backfilling of mined out area for carrying out reclamation and rehabilitation.

| S. No. | Year | Reclamation & Rehabilitation in Ha | |
|---|---|---|---|
| | | By Backfilling | By Afforestation |
| 1 | 2019-20 | 1.513 | 0.94 |
| 2 | 2020-21 | 1.513 | 1.24 |

**PART – G**

**Impact of the pollution abatement measures taken on conservation of natural resources and on the cost of production**

Low grade limestone and sub-grade limestone mineral is used in the manufacturing process thus conserving the natural resources. Reclamation of mined out area and development of water storage reservoirs is done to facilitate increase in water regime in mined out areas.

**PART - H**

**Additional investment for environmental protection including abatement of pollution.**

Rs. **64.95 Lakhs** (Rupees Sixty-Four Lakh & Ninety-Five Thousands only) was spent towards environmental monitoring and its protection expenses.

| S.NO. | NATURE OF WORK | YEAR | | REMARKS |
|---|---|---|---|---|
| | | 2019-20 | 2020-21 | |
| 1 | Water Sprinkling on Haulage roads | 30.97 | 23.22 | Water Sprinkling by Water Tanker |
| 2 | Air, Water & Noise monitoring | 12.24 | 10.91 | Sampling in Core and Buffer Zones |
| 3 | Electricity charges for Pumps | 14.90 | 7.48 | For Bore Wells and Booster Pumps |
| 4 | Maintenance of Gardens near Mines office & Garage | 11.43 | 7.48 | Labour Charges |
| 5 | Maintenance & watering of Plantation in Mines and along roads | 17.51 | 11.64 | Water Tanker Charges |

| | | | | |
|---|---|---|---|---|
| 6 | Civil and maintenance charges | 3.74 | 2.15 | Repair / laying of new Pipe line and maintenance of garden. Cost of Pipes, |
| 7 | Plantation Expenses as per State Govt guidelines under Haritha-Haram Program. | 4.28 | 2.07 | Bag filters, operation and maintenance cost. |
| | | **95.08** | **64.95** | |

**PART – I**

**Any other particulars in respect of environment protection and abatement of pollution.**

In Devapur limestone mine, so far total plantation of **39192** saplings was carried out covering an area of **36.785** ha. In the year 2021-22 as per mining plan we have planned to plant **1175 nos. of saplings .** Forming pits, retaining tanks and bunds in the mining area, improve water resources. Water harvesting pits were dug in the adjoining area. For noise pollution control Non electric delay detonators are used. Over and above greenbelt is developed along the boundary of mine area for reducing the impact of noise due to mining activity on the surrounding Environment. Regular water sprinkling is done at mine face and haulage roads to suppress dust. Conservation of resources is done as per the approved mining plan.

1. Year wise plantation details till 2019-20 and accordingly area covered are given in following table–

| Year | Area in Ha | Plantation in Numbers |
|---|---|---|
| Up to 2019-20 | **0.94** | **1230** |
| 2020-21 | **1.24** | **1469** |

**<u>World Environment Day Celebrations - 2021</u>**

World Environment Day 2021 was celebrated at Orient Cement Limited, Devapur in a benefiting manner. Theme for World Environment day is: **"Ecosystem Restoration''.** The World Environment Day 2021 program was organized in a safe and simple manner considering Covid-19 pandemic situation. It was started with speech on Ecosystem Restoration by **President (Manufacturing) and Sr. Vice President (Works)**. Virtual training and quiz competitions were organized to create awareness among Employees and Workmen and further participated in the plantation of tree saplings at Part – 2 area in Mines.

## WORLD ENVIRONMENT DAY – 2021 CELEBRATIONS


Welcome Address


Speech by Sr. VP (Works)

Plantation by President (Mfg.)


Plantation by Sr. VP (Works)

## WORLD WATER DAY, WORLD EARTH HOUR, EARTH DAY – 2021 CELEBRATIONS

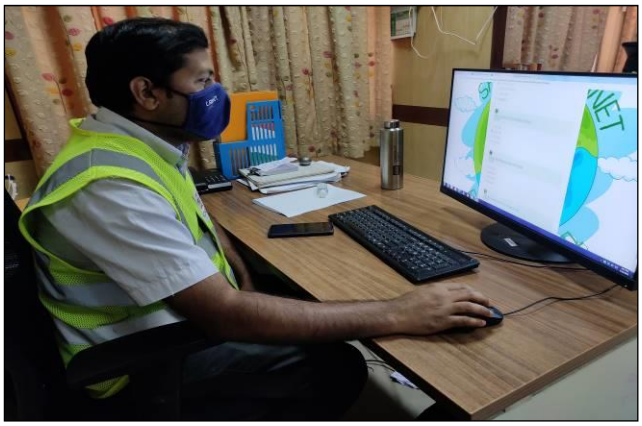
World Water Day, World Earth Hour, World Earth Day – 2021 has been celebrated in benefitted manner. We have organized awareness sessions among employees and colony people.

On Earth Hour all colony residents participated and complete power off in the entire colony for one hour.

Earth day was celebrated with theme “Restore our Earth”. Virtual awareness sessions and quiz competition was organized to create awareness among Employees and Workmen.



World Water Day – 2021

Earth Day – 2021 (Participation of Virtual Quiz Competition)

Earth Hour – 2021 (At Residential Colony)

**CSR Activities**:

| S.No. | Description of CSR Activity | | Details of Expenditure & work done during the reporting year | | Rs. in Lacs |
|---|---|---|---|---|---|
| 1 | Supporting for drinking water & agriculture | Welfare and Socio-economic development programs for local communities | Water storeage tanks, drinking water supply facility & irrigation support to agriculture | RO Water supply to villagers; Water harvesting pits in nearby villages; | 0.10 |
| 2 | Support to Health & Medical Services | Welfare and Socio-economic development programs for local communities | Preventive measures for mitigation of mine related health problems | Regular medical checkup of mine employees | 1.11 |
| 3 | | | Promotion of Hygiene and Sanitation, public health initiatives | To conduct health checkup camps for villagers, expensess for sulabh shouchalaya, dispensary expensess | 24.41 |
| 4 | Support to Skill development & Education | Welfare and Socio-economic development programs for local communities | Skill development & vacational training programs of local communities | Classess conducted for skill development and vocaional training | 2.27 |
| 5 | | | Promotion of Literacy & Education | School running expensess, repairing & providing facilities to nearby govt. schools | 386.85 |

| | | | | | |
|---|---|---|---|---|---|
| 6 | Social & Livelihood Support | Welfare and Socio-economic development programs for local communities | Support to social, cultural, recreation activities | Community devleopment of surrounding villages & recreation activities | 4.20 |
| 7 | | | Livelihood & social economic standard improvement support | Donation to vanavasi kalyan ashram | 1.44 |
| 8 | Support to Transportation Services & Infrastructure | Welfare and Socio-economic development programs for local communities | Improvement of road connectivity and public transport and other infrastructure facilities | ESI hospital rent & repairs; Road repairs of surrounding villages, infrastructure development of gram panchayat office; transportation facility to school children & workers | 10.74 |
| 9 | | | | Environmental Expenditure | |
| | | | | **Total** | **431.12** |
| | | | | | |

**1. INTRODUCTION**

**M/s. Devapur Lime Stone Mine** is catering lime stone for cement plant of **M/s. Orient Cement Ltd.** The present production capacity is 5.3 million tonnes per annum. The mine is located at Devapur (V), Kasipet (M), Manchiral (Dist). of Telangana State.

**2. LOCATION**

The Devapur Limestone mine is situated in Kasipet mandal, Manchiral district of Telangana State. The mine area is located in the Rally reserve forest, Luxettepet Range, Mancherial Division of Telangana State Forest. The area is located between Latitude 19° 00’15” to 19° 03’16” N and Longitude 79° 18’ 30” to 79° 21’ 44” E.

The nearest airport is Hyderabad, which is about 300 km away. The nearest railway stations are Mandamarri and Bellampalli towns which are located on the South Central Railway between Kazipet and Ballarshah stations. There is a private siding for the transport of cement wholly owned by the Cement Company joining the above main line at Mandamarri. This is solely used for transport of cement and clinker. The mine area is 17 km away from the state highway between Mancherial and Bellampalli. Bellampalli town is at a distance of 22 km and Mancherial Distant place is at a distance of 35 km from the mine area.

**3. MINING PROCESS**

Devapur limestone mine is operated by the method of mechanized open cast mining. The operations are conducted as per the mining plan approved by IBM. The operations involved are:

i) Drilling of deep blast holes of 150 mm dia using DTH drill machines with matching capacity air compressors. The spacing and burden is 8m and 5m respectively.

ii) Blasting the holes using slurry explosives and ammonium nitrate-fuel oil mixture.

iii) The blasted material is loaded into dumpers using excavators.

iv) The dumpers shall be hauled to the crushing plant located near the pit top. After crushing, the material shall be conveyed to the stockpile in the factory using a belt conveyor (1700 m long and 1 m wide).

B.C soil that covers the limestone deposit is dozed off and separately stacked for afforestation purposes in the worked out top bench around ultimate pit limit and mine avenue roads. This soil is occurring at some places only and is thin. A list of mining machinery used at Devapur Limestone Mine is furnished in below table .

**List of Mining Machine**

| Description of Equipment | Rated Capacity | Engine Capacity | Current deployment (No) | Capacity for 3 Shifts (tons) | Requirement /Adequacy |
|---|---|---|---|---|---|
| **Major Equipment** | | | | | |
| 1)**Drilling Machine**<br>a) Ingersol Rand 4"<br>b) HRB 150 & IBH10 with Air Compressors<br>c) CP Ravathi | 115 mm dia<br>150 mm dia<br>150 mm dia | 180 HP<br>216 HP<br>320 HP | 1<br>1<br>1 | 100 m<br>120 m<br>200 m | Current deployment is quite adequate for the planned capacity. |
| 2) **Excavator** for Loading Hydraulic Excavator T/Hitachi-350<br>T/Hitachi-370<br>Kobelco- 350,<br>Kobelco- 380 | 1.7 cu.m bucket capacity<br>2 cu.m bucket capacity | 250 HP<br>270 HP<br>270 HP<br>280 HP | 2<br>1<br>2<br>2 | 20000 TPD | Existing excavators are adequate to handle the limestone, waste and the sub grade material (including 2 Nos stand by) |
| **3) Tippers** 17 tonner capacity /trip /vehicle | 17 T capacity | 165 HP | 28 | 20000TPD | Present deployment 24 Tippers are adequate (excluding 4 Tippers stand by). |
| **4) Vibro Ripper** | 30 MT | 250 HP | 1 | 100 TPH | Adequate |
| **5) Rock breaker** | Attachment with 210 Excavator | 168 HP | 1 | 40 TPH | Adequate |
| **6) Road Compactor** | L & T Make | 102 HP | 1 | -------- | Adequate |
| **7) Dozer** | BEML-D155 | 324 HP | 2 | 1350 TPH | Adequate |

| Other Equipment | | | | | |
|---|---|---|---|---|---|
| **1.Mobile Lighting Tower** | In each tower having 5no ,MH light fitting | 400 Watts | 21 | Total connected capacity 42000 watts | Adequate |
| **2. Fixed Lighting Tower** | In each tower having 6 no of 2, MH light fitting | 400 Watts | 2 | Total connected capacity960 watts | Adequate |
| **3. Mobile Maintenance Van** | 12 Ton<br>3 Ton<br>2 Ton | 108 HP<br>75 HP<br>46 HP | 1<br>1<br>1 | ------ | Adequate |
| **4. Water tanker** | 12 KL | 114 HP | 3 | ------ | Adequate |
| **5. De - Watering Pump** | 100 HP | 100 HP | 6 | ------- | Adequate (including 3 Nos stand by) |
| **6. Jeeps** | Bolero jeep and camper | 46 HP | 4 | ------ | Adequate |
| **7. Explosive Van** | 3 Ton<br>6 Ton | 23.3 HP<br>67.5 HP | 1<br>1 | ------<br>------ | Adequate |

## 4. WATER ENVIRONMENT

Atmospheric precipitation in the form of rain is the only source for both surface water and ground water in the mining area. Presently, no groundwater is drawl, all the water quantity required for mines for dust suppression, green belt development etc is being met from mines rain water harvesting sump. Water quality testing is carried out with the help of MOEF certified third party laboratory on quarterly basis. Water levels are being recorded in two open wells of buffer zone and two piezometers are constructed in mines area as per recommendations of Central Ground Water Board (CGWB). The water quality data is presented in below tables.

The data thus collected for water quality shows that all the samples meet the standards prescribed by statutory authorities.

## AVERAGE VALUES OF WATER ANALYSIS 2020-2021

| Locations | 1 | | | 2 | | | 3 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg |
| Colour (Hazen units) | 3 | 8 | **5** | 2 | 6 | **3.8** | <01 | <01 | **<01** |
| Turbidity (NTU) | 8.1 | 10.7 | **9.1** | 0.3 | 1.3 | **0.9** | <01 | <01 | **0.0** |
| pH | 7.3 | 7.5 | **7.4** | 7.56 | 7.83 | **7.7** | 7.6 | 7.86 | **7.7** |
| E.C. (Micromhos/cm) | 602.0 | 784.0 | **683.5** | 1079 | 1256 | **1174.8** | 161 | 192 | **177.3** |
| Total dissolved solids | 351.0 | 489.0 | **407.0** | 581 | 734 | **656.8** | 86 | 103 | **95.3** |
| Phenolphthalein alkalinity as $CaCo_3$ | 0.0 | 0.0 | **0** | 0 | 0 | **0.0** | 0 | 0 | **0.0** |
| Methyl orange alkalinity as $CaCo_3$ | 152.6 | 299.0 | **198.5** | 138 | 161 | **150.5** | 28 | 34 | **31.3** |
| Total hardness as $CaCo_3$ | 236.0 | 300.0 | **266.0** | 397 | 465 | **434.3** | 61 | 73 | **67.5** |
| Calcium as Ca | 47.0 | 73.0 | **56.3** | 101 | 130 | **114.8** | 16 | 21 | **18.8** |
| Magnesium as Mg | 28.6 | 33.3 | **30.5** | 28.67 | 41.32 | **35.9** | 4.16 | 20 | **8.9** |
| Sodium as Na | 26.1 | 58.0 | **36.8** | 52 | 60 | **56.3** | 4.68 | 11 | **8.7** |
| Potassium as K | 2.6 | 3.8 | **3.3** | 2.24 | 2.63 | **2.5** | 0.44 | 10 | **2.9** |
| Chloride as Cl | 60.0 | 72.0 | **65.8** | 183 | 214 | **200.0** | 0.5 | 18 | **12.6** |
| Sulphate as $So_4$ | 44.0 | 51.0 | **46.8** | 180 | 213 | **198.5** | 12 | 17 | **14.5** |
| Nitrate as $NO_3$ | 16.0 | 20.5 | **18.4** | 12.13 | 14.18 | **13.3** | 3.63 | 14 | **6.5** |
| Carbonates as $CaCO_3$ | 0.0 | 0.0 | **0.0** | 0 | 0 | **0.0** | 0 | 4.08 | **1.0** |
| Bicarbonates as $CaCO_3$ | 186.0 | 364.0 | **241.8** | 167 | 196 | **183.0** | 0 | 59 | **33.5** |
| Residual Chlorine | 0.1 | 0.5 | **0.4** | 0 | 0 | **0.0** | 0 | 38 | **9.5** |
| Copper as Cu | 0.0 | 0.1 | **0.0** | 0.03 | 0.06 | **0.0** | 0 | 0 | **<0.05** |
| Manganese as Mn | 0.0 | 0.1 | **0.1** | 0 | 0 | **<0.01** | 0 | 0 | **<0.02** |
| Iron as Fe | 0.2 | 0.3 | **0.2** | 0.17 | 0.27 | **0.2** | 0.14 | 0.25 | **0.2** |
| Fluoride as F | 0.6 | 0.8 | **0.7** | 0.45 | 0.6 | **0.5** | 0.25 | 0.39 | **0.3** |

1. Open well (Near Devapur Vagu) 2. Bore well Near Magazine

3.Drinking Water Near Crusher

Note: All the values except pH, E.C, Turbidity & colour are expressed in mg/L.

## AVERAGE VALUES OF WATER ANALYSIS 2020-2021

| Locations | 4 | | | 5 | | | 6 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg |
| Colour (Hazen units) | 2 | 8 | **4.3** | <01 | <01 | <01 | <01 | <01 | <01 |
| Turbidity (NTU) | 2.5 | 10.7 | **3.4** | 0.4 | 1.2 | **0.9** | 0.2 | 1.5 | **0.9** |
| pH | 7.1 | 7.52 | **7.3** | 7.2 | 7.5 | **7.3** | 7.4 | 7064.0 | **1771.7** |
| E.C. (Micromhos/cm) | 602 | 1022 | **937.3** | 1001.0 | 1143.0 | **1073.8** | 1069.0 | 1175.0 | **1126.5** |
| Total dissolved solids | 351 | 599 | **555.5** | 574.0 | 651.0 | **619.5** | 560.0 | 668.0 | **606.8** |
| Phenolphthalein alkalinity as $CaCo_3$ | 0 | 0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 0.0 | **0.0** |
| Methyl orange alkalinity as $CaCo_3$ | 152.63 | 299 | **270.0** | 232.0 | 264.0 | **248.8** | 341.0 | 375.0 | **359.5** |
| Total hardness as $CaCo_3$ | 236 | 384 | **351.8** | 289.0 | 327.0 | **309.3** | 377.0 | 414.0 | **398.0** |
| Calcium as Ca | 47 | 114 | **104.3** | 75.0 | 85.0 | **80.5** | 105.0 | 126.0 | **114.3** |
| Magnesium as Mg | 20.54 | 33.3 | **22.2** | 24.7 | 28.0 | **26.3** | 20.2 | 30.8 | **26.1** |
| Sodium as Na | 26.1 | 60 | **55.0** | 95.0 | 108.0 | **101.8** | 40.0 | 44.0 | **42.0** |
| Potassium as K | 2.06 | 3.8 | **2.2** | 3.2 | 3.6 | **3.4** | 1.2 | 42.0 | **11.4** |
| Chloride as Cl | 60 | 110 | **100.3** | 143.0 | 162.0 | **153.0** | 1.3 | 72.0 | **51.8** |
| Sulphate as $So_4$ | 44 | 54 | **49.5** | 52.0 | 59.0 | **55.8** | 56.0 | 69.0 | **61.5** |
| Nitrate as $NO_3$ | 16 | 21 | **19.5** | 19.0 | 22.0 | **20.5** | 27.0 | 60.0 | **36.5** |
| Carbonates as $CaCO_3$ | 0 | 0 | **0.0** | 0.0 | 0.0 | **0.0** | 0.0 | 29.0 | **7.3** |
| Bicarbonates as $CaCO_3$ | 186 | 364 | **328.8** | 283.0 | 321.0 | **303.0** | 0.0 | 458.0 | **329.3** |
| Residual Chlorine | 0.13 | 0.5 | **0.4** | 0.0 | 0.0 | **0.0** | 0.0 | 441.0 | **110.3** |
| Copper as Cu | 0.02 | 0.1 | **0.1** | 0.0 | 0.1 | **0.0** | 0.1 | 0.1 | **<0.05** |
| Manganese as Mn | 0.03 | 0.4 | **0.2** | 0.0 | 0.1 | **0.1** | 0.0 | 0.1 | **<0.02** |
| Iron as Fe | 0.18 | 0.33 | **0.3** | 0.2 | 0.3 | **0.2** | 0.2 | 0.2 | **0.2** |
| Fluoride as F | 0.58 | 0.85 | **0.8** | 0.4 | 0.6 | **0.5** | 0.5 | 0.7 | **0.6** |

4. Open Well (Near Devapur Village)
5. Bore Well water (Near Maddimadugu Village)
6. Borewell (Devapur Village)

Note: All the values except pH, E.C, Turbidity & colour are expressed in mg/l

**SOIL ANALYSIS REPORTS 2020-2021**

| Sl.No | | Avg | Avg | Avg | Avg |
|---|---|---|---|---|---|
| 1 | pH | 7.3 | 7.6 | 7.4 | 7.7 |
| 2 | E.C. | 302.0 | 272.8 | 280.5 | 310.3 |
| 3 | Calcium as Ca | 36.8 | 35.3 | 31.3 | 27.8 |
| 4 | Magnesium as Mg | 12.0 | 9.7 | 8.3 | 8.5 |
| 5 | Sodium as Na | 43.3 | 36.0 | 13.5 | 17.3 |
| 6 | Potassium as K | 59.0 | 45.0 | 126.3 | 117.8 |
| 7 | Phosphorous as P | 8.8 | 6.8 | 21.8 | 17.5 |
| 8 | Nitrogen as N | 114.5 | 117.8 | 240.0 | 221.0 |
| 9 | Organic Carbon | 0.3 | 0.4 | 0.6 | 0.6 |
| 10 | Sulphates as $So_4$ | 0.3 | 0.4 | 0.2 | 0.2 |
| 11 | Chlorides as Cl | 0.5 | 0.6 | 0.1 | 0.3 |
| 12 | Silt & Clay | 56.5 | 57.3 | 56.5 | 54.8 |
| 13 | Sand | 43.5 | 42.8 | 43.5 | 49.8 |
| 14 | Textural Class | Loamy sand | Silty clay | Silty Clay | Loam sand |
| 15 | Physical Appearance | Mixed soil | Black cotton soil | Black cotton Soil | Mixed soil |

1 Maddimada
2 Agriculture Land Devapur Village
3 Agriculture Land Gatlara Pally
4 Colony

## 5. POLLUTION CONTROL IN THE MINE

### 5.1 Pollution control measures

- Formation of Separate Environment cell headed by qualified Environment Engineer, who is directly reporting to top management.
- Green belt development in and around mine by native species.
- Regular dust suppression on haul roads with sprinkler and water tankers.
- Compulsory wet drilling to arrest dust during operation.
- Installation of auto sprinklers to produce mist at crusher for dust suppression.
- Installation of bag filters at crusher for dust control

- Regular monitoring of ambient air, noise, water levels and quality, soil, etc. by MoEF authorized laboratory.
- Dedicated garage for regular maintenance of HEMM
- Installed oil water separator for washing of mine equipment.
- Controlled blasting and regular monitoring of vibration, etc.
- Use of PPE by all workmen in mines like helmet, ear plugs, dust mask, safety shoes, goggles etc.

**5.2 Ambient Air Quality**

Ambient air quality monitoring is carried out regularly at mines to know the status of the ambient air quality. Ambient air quality is monitored for 24 hours at following locations Near Temple, Near Haulage Road, Crusher site, loading point, Devapur Village, Forest area, Maddimadugu village, Gatlarapalli village, for the estimation of PM10, PM2.5, $SO_2$ NO2 and CO. Estimated average values for the parameters monitored is represented in below table & the analyzed values for PM10, PM2.5, $SO_2$, NOx are within limits prescribed by TSPCB.

Average values of Ambient air quality data for the year 2020 – 2021 Core Zone

| Direction | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Particulate Matter – PM10 Concentration (ug/m$^3$) | 68.00 | 67.82 | 65.82 | 63.4 |
| Particulate Matter – Concentration PM 2.5 (ug/m3) | 22.36 | 23.09 | 22.55 | 20.5 |
| Sulfur dioxide Concentration (ug/m$^3$) | 10.09 | 11.27 | 9.18 | 10.9 |
| Nitrogen dioxide Concentration (ug/m$^3$) | 21.27 | 22.09 | 19.55 | 21.4 |
| Lead (Pb) | 0.10 | 0.12 | 0.11 | 0.1 |
| Carbon monoxide (Co) | BDL | BDL | BDL | BDL |
| Ammonia (NH3) | BDL | BDL | BDL | BDL |
| Ozone (O3) | 7.00 | 10.09 | 7.82 | 7.55 |
| Benzene (C6 H6) | <0.02 | <0.02 | <0.02 | <0.02 |
| Arsenic (As) | ND | ND | ND | ND |
| Nickel (Ni) | ND | ND | ND | ND |
| Benzo pyrene (Bap) | ND | ND | ND | ND |

1. Near Loading Area
2. Near Unloading Area
3. Near Drilling Area
4. Near Haulage Road

Note: All the values are expressed as (µg/m$^3$

Average values of Ambient air quality data for the year 2020 – 2021 Buffer Zone

| Direction | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Particulate Matter – PM10 Concentration (ug/m$^3$) | 58.18 | 47.55 | 48.18 | 55.00 |
| Particulate Matter – Concentration PM 2.5 (ug/m3) | 20.55 | 16.18 | 17.18 | 19.55 |
| Sulfur dioxide Concentration (ug/m$^3$) | 10.82 | 9.64 | 9.55 | 13.45 |
| Nitrogen dioxide Concentration (ug/m$^3$) | 21.27 | 18.91 | 18.64 | 20.55 |
| Lead (Pb) | 0.07 | 0.04 | 0.05 | 0.09 |
| Carbon monoxide (Co) | BDL | BDL | BDL | BDL |
| Ammonia (NH3) | BDL | BDL | BDL | BDL |
| Ozone (O3) | 7.73 | 3.36 | 3.55 | 7.64 |
| Benzene (C6 H6) | <0.03 | <0.03 | <0.02 | <0.02 |
| Arsenic (As) | ND | ND | ND | ND |
| Nickel (Ni) | ND | ND | ND | ND |
| Benzo pyrene (Bap) | ND | ND | ND | ND |

5. Near Devapur Village
6. Near Forest Area
7. Near Gatralpalli Village
8. Near Maddiamadugu

Note: All the values are expressed as (µg/m$^3$

### 5.3 Waste water Sources and Monitoring

Waste water is generated from cleaning of HEMM.

### 5.4 Noise Pollution

Noise pollution control measures are adopted at various stages of operation. Noise Levels are measured at various places in the mines by using a sound level meter the results furnished below table.

**Noise Levels 2020-2021**

| Stn Code | Location | Noise Levels dB(A) | |
|---|---|---|---|
| | | Day Equiv | Night Equiv |
| 1 | Devapur Village | 62.68 | 57.35 |
| 2 | Devapur Forest Area | 52.53 | 47.75 |
| 3 | Gatlarapalli Village | 56.53 | 51.55 |
| 4 | Maddimadugu Check post | 65.85 | 60.68 |
| 5 | Township (Om Store) | 62.20 | 57.40 |
| 6 | Core Zone (Near Temple) | 67.75 | 62.55 |

## 6. GREENBELT DEVELOPMENT

Greenery/plantation recharges oxygen into environment. Greenbelt development may have the following benefits.

a. Mitigation of fugitive emissions
b. Noise pollution control
c. Improving the local eco-system
d. Arresting the soil erosion
e. Improving the landscape of the area
f. Aesthetics beauty

## 7. CONCLUSIONS

There are no effluents like mine drainage etc. from the mine area. The water samples collected in and around mine area are meeting the standards as per IS: 10500 – 1991.

Ambient air quality data generated in core zone i.e., mining area and immediate surroundings are observed to be varying between the limits with mining operations i.e., 6 am to 10 pm in a day.

These concentrations are remarkably low during night time i.e., 10 pm to 6 am. $SO_2$ and Nox concentrations are consistent during the whole day hence the $SO_2$ and NOx emissions due to mining operations are negligible in the area.

Ambient air quality data generated in buffer zone i.e., nearby areas with habitations around the mining area showed consistently very less concentrations for all the parameters analyzed hence there is no impact in the buffer zone due to the mining operations carried out. In a nutshell the mine operation is meeting the overall standards of the statutory authorities.

**Signature:**

For, **Devapur Limestone Mine of M/s. TSMDC Ltd.,**

**MINES MANAGER**