

**Environmental Impact Assessment Report**  
**for**  
**Proposed Common Bio-Medical Waste Treatment Facility (CBWTF)**

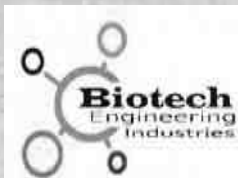
At Survey No: 17/7, Pisanathur Village, Gandarvakkottai taluk,  
Pudukkottai District, Tamil Nadu

by

**M/s. Biotech Engineering Industries**

**Activity:** 7(da) Biomedical waste treatment Facility-Category B1  
**TOR Identification No.** TO24B3301TN5162069N dt. 22.10.2024  
**Baseline Study Period:** 13<sup>th</sup> January 2025 to 03<sup>rd</sup> April 2025

**Project Proponent**



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**(Draft Report for Public Hearing)**

**NABET – Accredited EIA Consultant**



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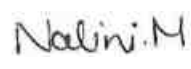
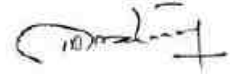


### **DECLARATION OF EXPERTS**

This is to confirm that the EIA Report for the project “Proposed Common Bio-Medical Waste Treatment Facility” located at SF. No17/7, Pisanathur Village, Gandharvakottai Taluk, Pudukkottai District has been prepared by **Stanislaus Charles Rodriguez** in the capacity of EIA Coordinator.

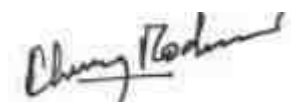
SEIAA-TN issued the Terms of Reference under Identification No. TO24B3301TN5162069N dated 22.10.2024 with public hearing and have been complied with in preparing the EIA Report.

We also confirm that the EIA prepared is based on factual data and all due diligence has been followed in preparing the same.

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**DECLARATION BY THE HEAD OF THE ACCREDITED  
CONSULTANT ORGANIZATION**

I, Syed Kassali.A, hereby confirmed that the above-mentioned experts prepared the EIA for M/s. Biotech Engineering Industries located at **Survey No: 17/7, Pisanathur Village, Gandarvakkottai taluk, Pudukkottai District, TamilNadu**. I also confirm that Olympia Eco Solutions shall be fully accountable for any misleading information mentioned in this Report.

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| 23                  | TOPO Survey by CIT                                                |
| 24                  | NOC from Tahsildar                                                |
| 25                  | NOC from Block Development Officer                                |

### **LIST OF ABBREVIATIONS**

|                 |                                                                                     |
|-----------------|-------------------------------------------------------------------------------------|
| °C              | Degree Celsius                                                                      |
| AAQ             | Ambient Air Quality                                                                 |
| AERMOD          | American Meteorological Society/Environmental Protection Agency<br>Regulatory Model |
| APCD            | Air Pollution Control Device                                                        |
| APHA            | American Public Health Association                                                  |
| AQI             | Air Quality Index                                                                   |
| BDL             | Below Detection Limit                                                               |
| BMWM Rules      | Biomedical Waste Management Rules, 2016                                             |
| BOD             | Biochemical Oxygen Demand                                                           |
| CBWTF           | Common Biomedical Waste Treatment and Disposal Facility                             |
| CEMS            | Continuous Emission Monitoring System                                               |
| CER             | Corporate Environmental Responsibility                                              |
| CGWB            | Central Ground Water Board                                                          |
| CO              | Carbon Monoxide                                                                     |
| CO <sub>2</sub> | Carbon Dioxide                                                                      |
| COD             | Chemical Oxygen Demand                                                              |
| CPCB            | Central Pollution Control Board                                                     |
| dB              | Decibels                                                                            |
| DG              | Diesel Generator                                                                    |
| DMP             | Disaster Management Plan                                                            |
| EAC             | Expert Appraisal Committee                                                          |
| EC              | Environmental Clearance                                                             |
| EIA             | Environment Impact Assessment                                                       |
| EMP             | Environmental Management Plan                                                       |
| EPA             | Environmental Protection Agency                                                     |
| EPP             | Emergency Preparedness Plan                                                         |
| ETP             | Effluent Treatment Plant                                                            |
| FAE             | Functional Area Expert                                                              |
| GIS             | Geographic Information System                                                       |



---

|                   |                                                           |
|-------------------|-----------------------------------------------------------|
| GLC               | Ground Level Concentration                                |
| GOI               | Government of India                                       |
| GPS               | Global Positioning System                                 |
| GW                | Ground Water                                              |
| GWTP              | Grey Water Treatment Plant                                |
| Ha                | Hectare                                                   |
| HC                | Hydrocarbon                                               |
| HCE               | Health Care Establishments                                |
| HCFs              | Health Care Facilities                                    |
| HCl               | Hydrochloric Acid                                         |
| Hg                | Mercury                                                   |
| IMD               | Indian Meteorological Department                          |
| ISO               | International Organization for Standardization            |
| IUCN              | International Union for Conservation of Nature            |
| KLD               | Kilo Litres per Day                                       |
| Km                | Kilo meter                                                |
| KW                | Kilowatt                                                  |
| MoEF & CC         | Ministry of Environment, Forest & Climate Change          |
| MoU               | Memorandum of Understanding                               |
| MSL               | Mean Sea Level                                            |
| NABL              | National Accreditation Board for Testing and Laboratories |
| NOC               | Non-Objection Certificate                                 |
| NOx               | Oxides of Nitrogen                                        |
| O <sub>2</sub>    | Oxygen                                                    |
| OHC               | Occupational Health Centre                                |
| OM                | Office Memorandum                                         |
| PCU               | Passenger Car Unit                                        |
| PFR               | Pre -Feasibility Report                                   |
| PH                | Public Hearing                                            |
| PM                | Particulate matter                                        |
| PM <sub>10</sub>  | Particulate matter 10                                     |
| PM <sub>2.5</sub> | Particulate matter 2.5                                    |

|       |                                                    |
|-------|----------------------------------------------------|
| PPE   | Personal Protective Equipment                      |
| RF    | Reserved Forest                                    |
| RTO   | Regional Transport Office or Road Transport Office |
| SEAC  | State Expert Appraisal Committee                   |
| SEIAA | State Environment Impact Assessment Authority      |
| SOI   | Survey of India                                    |
| SOP   | Standard Operating Procedure                       |
| SOx   | Oxides of Sulphur                                  |
| SPCB  | State Pollution Control Board                      |
| Sq.m  | Square Meter                                       |
| STP   | Sewage Treatment Plant                             |
| TNPCB | Tamil Nadu Pollution Control Board                 |
| TSDF  | Treatment Storage and Disposal Facility            |

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Introduction**

M/s. Biotech Engineering Industries has proposed to set up a Common Bio-Medical Waste Treatment Facility (CBWTF) at Survey No: 17/7, Pisanathur Village, Gandarvakottai taluk, Pudukkottai District, TamilNadu. The bio-medical wastes generated from healthcare units including veterinary institutions, animal house, pathological Laboratory, Blood Bank etc. from parts of in and around Pudukkottai, Tiruchirappalli, Thanjavur, Sivagangai, Nagapattinam, Thiruvarur, Perambalur district will be suitably collected & treated to reduce the possible adverse effects.

#### **1.2 Purpose of the Report**

A Common Bio-medical Waste Treatment & Disposal Facility (CBWTF) is proposed for safe collection, treatment and disposal of biomedical waste generated from a number of Health Care Units located in and around Pudukkottai, Tiruchirappalli, Perambalur, Thanjavur, Sivagangai, Nagapattinam, Thiruvarur district.

Also, the Biomedical Waste Management Rule 2016 restricts occupier for establishment of onsite or captive biomedical waste treatment and disposal facility if Common Biomedical Waste Treatment Facility is available in 75 Km radius of a Healthcare Facility.

The proposed establishment of common bio-medical waste treatment and disposal facility is covered under activity 7 [d (a)] and Category B1 of “Bio-medical Waste Treatment Facilities” as per the EIA Notification dated 14th September, 2006 and amendment no. S.O 1142 (E) dated 17th April 201. The proposed project requires prior Environmental Clearance from SEIAA, Tamil Nadu.

Application seeking ToR was made with Form 1 & Pre-feasibility report to SEIAA, Tamil Nadu vide proposal no. SIA/TN/INFRA2/494961/2024 and File no.11227. SEAC in its 501<sup>th</sup> meeting held on 27th September 2024 appraised the project. The Terms of Reference (ToR) for the study and preparation of EIA report, with identification no. TO24B3301TN5162069N was issued on 22.10.2024 by the SEIAA-TN with Public Hearing.

This EIA report has been prepared accordingly to assess the environmental impacts during construction and operation phase of proposed facility.

### **1.3 Identification of Project & Project Proponent**

M/s. Biotech Engineering Industries is a proprietary concern and was established in 2022 in Thanjavur district. It is proposed to establish a CBWTF at Survey No. 17/7, Pisanathur Village, Gandarvakkottai Taluk, Pudukkottai District, Tamil Nadu.

### **1.4 Nature and Size of Project**

The nature of the proposed project is establishment of Common Bio-medical Waste Treatment and Disposal Facility of capacity 10 Tons/day. BMW from health care establishments from in and around Pudukkottai, Tiruchirappalli, Thanjavur, Sivagangai, Perambalur, Nagapattinam, Thiruvarur district are collected, stored, treated and securely disposed by this facility using Incinerator, Autoclave, Shredder, etc. The incinerated ash will be disposed to TSDF. The proposed establishment mission is to treat and dispose bio-medical waste generated from about 3600 Health care units with a total bed strength of more than 10,000 beds.

### **1.5 Location of the Project**

The proposed project site is located at Pisanathur Village, Gandarvakottai taluk, Pudukkottai district, Tamil Nadu. The land of extent 1.55 acres (6250 Sq.m) is owned by M/s Biotech Engineering Industries. The land use of the site is given as non-agricultural dry land as per revenue record. At present, the proposed project site is barren except few shrubs. The sale deed and land use classification certificate are given in the **Annexure-1 & Annexure-2**.

#### **1.5.1 Location Criteria**

As per the guidelines published by CPCB for common Bio-Medical Waste published by Central Pollution Control Board during 2016, the project facility meets the location guidelines. As per guidelines, the facility will ensure the following;

1. The location of the proposed CBWTF is situated near the HCEs in parts of Pudukkottai, Tiruchirappalli, Thanjavur, Sivagangai, Perambalur, Nagapattinam, Thiruvarur district, all within a 75 km radius. Therefore, the waste can be collected, transported to the site, and disposed of within 48 hours.
2. No potential spread of infection and odour from storing of bio-medical waste on-site as the waste will be treated within 48 hours upon its arrival to the facility.
3. The emissions from incinerators will be controlled by air pollution control equipment.
4. The wastewater generated on-site will be directed to ETP for its treatment & recycle and sewage to septic tank and soak pit.
5. For employees working will be provided with PPEs for their safety and the facility has let 33% of its total plot area for greenbelt development.

6. The residues such as incinerated ash and ETP sludge will be securely disposed to TSDF.

7. No potential risk for noise pollution and odour production as the facility will be cleaned regularly using hypo solution & chlorine and the facility has 33% of its total plot area for greenbelt development which acts as barrier for emission and noise pollution.

8. The residues such as incinerated ash and ETP sludge will be securely disposed to TSDF.

The HCEs located in districts of Pudukkottai, Tiruchirappalli, Ariyalur, Perambalur, Nagapattinam, Thiruvavur, Thanjavur, and Sivagangai districts in the radius of 75 Km from the proposed CBWTF therefore the waste can be collected and brought to the site and disposed within 48 Hrs.

The proposed site is outside the residential area; it has buffer of 650 m from the nearest village Salient features of the project are given in **Table 1.1**. The general location of the project site in State and District map is as shown in **Figure 1.1**.

**Table 1.1-Salient Features of the Project Site**

| Sl. No. | Parameters              | Description                                                                                  |
|---------|-------------------------|----------------------------------------------------------------------------------------------|
| 1.      | Project Proponent       | M/s. Biotech Engineering Industries.                                                         |
| 2.      | Location                | Survey No. 17/7, Pisanathur Village, Gandarvakottai Taluk, Pudukkottai District, Tamil Nadu. |
| 3.      | Project or Activity     | Proposed Common Bio-medical Waste Treatment & disposal Facility (CBWTF).                     |
| 4.      | Category & Schedule No. | B1 Category project – 7[d (a)] – CBWTF                                                       |
| 5.      | Proposed plant capacity | 10.0 Tons / Day                                                                              |
| 6.      | Total Plot Area         | 6250 Sq.m (1.55 Acres)                                                                       |
| 7.      | Geo coordinates         | 10° 35' 28.64" N 79° 02' 08.45" E                                                            |
| 8.      | SOI Top sheet           | <b>C44H2</b>                                                                                 |
| 9.      | Total Built up area     | 1148.10 Sq.M                                                                                 |
| 10.     | Total Project Cost      | Rs. 2.83 Crore                                                                               |

### 1.5.2 Land requirement

Sufficient land shall be allocated to the CBWTF to provide all requisite systems which include dedicated space for storage of waste (both treated and untreated), waste treatment equipment, vehicle washing bay, vehicle parking space, ETP, incineration ash storage provision, administrative room, space for DG Set etc., (a) Preferably, a CBWTF shall be set up on a plot size of not less than one acre in all the areas. However, a CBWTF can be developed in adjacent plots but cannot be set up in two or more different plots located in different areas. Separate plots can be permitted only for vehicle parking if located in the close

vicinity of the proposed CBWTFs or the existing CBWTFs. (b) In case of upcoming or new CBWTFs (both in municipal limits with population more than 25 lakhs or in rural areas), the land area requirement may be relaxed (but in any case not less than 0.5 acre) by the SPCB/PCC, with additional control measures such as zero liquid discharge, increase in stack height, stringent emission norms, odour control measures or any other measures felt necessary by the prescribed authority on case-to-case basis, only in consultation with CPCB.

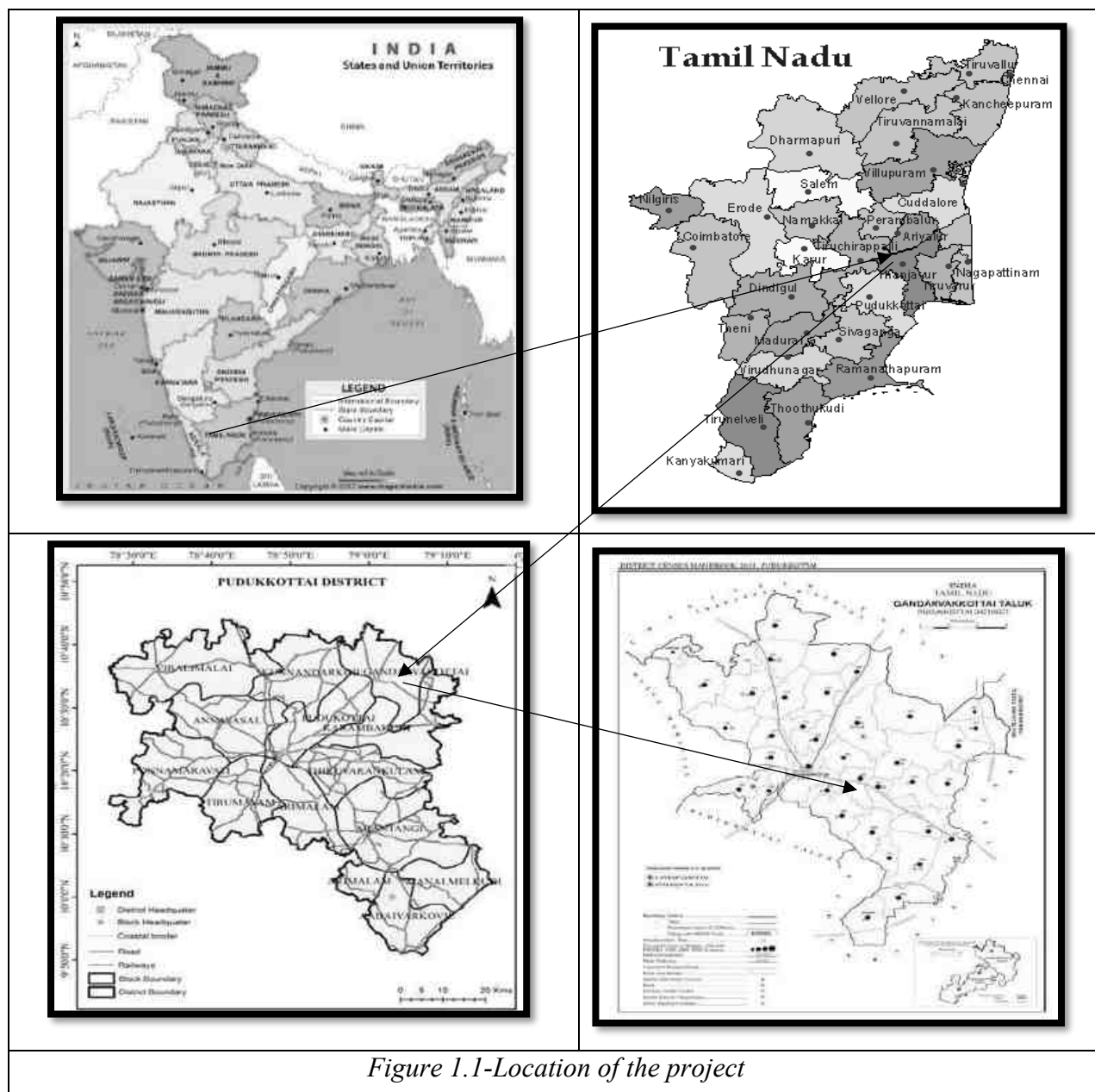


*Figure 1.1-Location of the project*

### **1.5.3 Project Importance to the Country and Region**

Bio-medical waste generated from Health Care Establishments should be handled without causing any adverse impact on human health and environment. These wastes require proper treatment and disposal by providing captive facility or through common treatment and disposal facility. The major objective of bio-medical waste management is to prevent transmission of diseases through handling of bio-medical waste and also scientifically treat and disposed.

The Tamil Nadu Pollution Control Board, had published an advertisement on 11.11.2018 in the “The Hindu” inviting “applications from project proponents to identify suitable land and to establish a CBWTF in the state of Tamil Nadu. The paper cutting of the TNPCB advertisement has been given as **Annexure 3**.

There are 11 Common Bio-Medical Waste treatment and Disposal facilities located in Kanchipuram (2 number), Coimbatore (2), Thanjavur, Vellore, Virudhunagar, Salem, Tirunelveli, Nilgiris and Ramanathapuram districts. The list of CBWTFs is detailed in Table 1.2 below; In addition, three common facilities are under establishment in Tiruvallur, Cuddalore and Tiruppur Districts.

As per the Biomedical Waste Management Rules 2016, The biomedical waste generated from Hospitals, nursing homes, clinics, dispensaries, veterinary institution’s, animal houses, pathological laboratories, blood banks, ayush hospitals, clinical establishments, research and educational institutions, health camps, medical or surgical camps, vaccinations camps, blood donations camps, first aid rooms of schools, forensic laboratories and research labs should be handled safely, treated and disposed properly as per the said rules.

As the generation of the biomedical waste is increasing and need to be treated, there is necessity for establishment of more number of Common Biomedical Waste Treatment and Disposal facilities in Tamil Nadu as per Rule 6 of the Biomedical Waste Management Rules 2016, State pollutions Control Board is responsible to monitor the proper management of Biomedical waste.

**Table 1.2-Coverage Area of Common Bio-medical Waste Treatment Facilities**

| Sl. No. | Bio-medical Waste Treatment Facility                                                                         | Areas Covered                                                                                                        | Total No of Health Care Facilities Being Covered | Total No of Beds Covered | Total Quantity Bio-medical waste Collected in (Kg/day) | Capacity of treatment equipment and Handling Capacity |                                   |
|---------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------------------------|--------------------------------------------------------|-------------------------------------------------------|-----------------------------------|
|         |                                                                                                              |                                                                                                                      |                                                  |                          |                                                        | Equipment                                             | Total Installed Capacity (Kg/day) |
| 1.      | <b>M/s. G.J. Multiclave (India) Pvt. Ltd.,</b> Thenmelpakkam, Chengalpattu Taluk, Kancheepuram District.     | Chengalpattu District, Parts of Chennai District, Parts of Kancheepuram District                                     | 5049                                             | 24882                    | 18800                                                  | <b>Incinerator</b>                                    | 10800                             |
|         |                                                                                                              |                                                                                                                      |                                                  |                          |                                                        | <b>Autoclave</b>                                      | 8000                              |
|         |                                                                                                              |                                                                                                                      |                                                  |                          |                                                        | <b>Shredder</b>                                       | 6000                              |
| 2.      | <b>M/s. Tamilnadu Waste Management Ltd.,</b> No:29/2,3 K.K.Pudur Road, Kinar Village, Chengalpattu District. | Parts of Kancheepuram District, Thiruvallur District Maduranthagam Taluk of Chengalpattu district Parts of Cuddalore | 4149                                             | 18962                    | 5610                                                   | <b>Incinerator</b>                                    | 4500                              |
|         |                                                                                                              |                                                                                                                      |                                                  |                          |                                                        | <b>Autoclave</b>                                      | 3000                              |
|         |                                                                                                              |                                                                                                                      |                                                  |                          |                                                        | <b>Shredder</b>                                       | 80                                |
| 3.      | <b>M/s. Ken Bio Links Private Limited,</b> Kandipedu, Katpadi Taluk, Vellore District.                       | <b>Districts of</b> Vellore, Ranipet, Thiruvannamalai And Tirupathur                                                 | 848                                              | 9025                     | 7722.869                                               | <b>Incinerator</b>                                    | 5500                              |
|         |                                                                                                              |                                                                                                                      |                                                  |                          |                                                        | <b>Autoclave</b>                                      | 2240                              |
|         |                                                                                                              |                                                                                                                      |                                                  |                          |                                                        | <b>Shredder</b>                                       | 2200-3300                         |



| Sl. No. | Bio-medical Waste Treatment Facility                                              | Areas Covered                                                                                              | Total No of Health Care Facilities Being Covered | Total No of Beds Covered | Total Quantity Bio-medical waste Collected in (Kg/day) | Capacity of treatment equipment and Handling Capacity |                                   |
|---------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------------------------|--------------------------------------------------------|-------------------------------------------------------|-----------------------------------|
|         |                                                                                   |                                                                                                            |                                                  |                          |                                                        | Equipment                                             | Total Installed Capacity (Kg/day) |
| 4.      | M/s. Medicare Enviro Systems, Sengipatti, Thanjavur Taluk, Thanjavur District.    | Districts of Thanjavur, Thiruvarur, Trichy, Nagapattinam, Pudukottai, Perambalur, Ariyalur and Sivagangai. | 4357                                             | 31153                    | 6536                                                   | Incinerator                                           | 3300                              |
|         |                                                                                   |                                                                                                            |                                                  |                          |                                                        | Autoclave                                             | 2000                              |
|         |                                                                                   |                                                                                                            |                                                  |                          |                                                        | Shredder                                              | 1100                              |
| 5.      | M/s. Ramky Energy and Environmental Ltd., Undurmikidakulam, Virudhunagar District | Districts of Madurai, Virudhunagar, Dindigal, Theni and Ramanathapuram.                                    | 2961                                             | 26810                    | 3747.84                                                | Incinerator                                           | 3300                              |
|         |                                                                                   |                                                                                                            |                                                  |                          |                                                        | Autoclave                                             | 1600                              |
|         |                                                                                   |                                                                                                            |                                                  |                          |                                                        | Shredder                                              | 2200 & 1650                       |
| 6.      | M/s. Aseptic System Bio-medical Waste Management                                  |                                                                                                            | 3316                                             | 23459                    | 4161                                                   | Incinerator                                           | 4400                              |
|         |                                                                                   |                                                                                                            |                                                  |                          |                                                        | Autoclave                                             | 2400                              |



| Sl. No. | Bio-medical Waste Treatment Facility                                                                       | Areas Covered                                                    | Total No of Health Care Facilities Being Covered | Total No of Beds Covered | Total Quantity Bio-medical waste Collected in (Kg/day) | Capacity of treatment equipment and Handling Capacity |                                   |
|---------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------|--------------------------|--------------------------------------------------------|-------------------------------------------------------|-----------------------------------|
|         |                                                                                                            |                                                                  |                                                  |                          |                                                        | Equipment                                             | Total Installed Capacity (Kg/day) |
|         | Co.,Pappankulam, Tirunelveli District.                                                                     | Districts of Tirunelveli, Thoothukudi, Kanyakumari and Thenkasi. |                                                  |                          |                                                        | Shredder                                              | 4400                              |
| 7.      | M/s.Teknotherm Industries, 183/1A Orattukupal Village, Chettipalayam Village, Podanur, Coimbatore District | Districts of Coimbatore and Tiruppur.                            | 1115                                             | 24345                    | 10313                                                  | Incinerator                                           | 5500                              |
|         |                                                                                                            |                                                                  |                                                  |                          |                                                        | Autoclave                                             | 4000                              |
|         |                                                                                                            |                                                                  |                                                  |                          |                                                        | Shredder                                              | 2200                              |
| 8.      | M/s. Ramky Energy and Environment Ltd., Thangayur, Salem District                                          | Districts of Salem, Namakkal, Erode and Karur.                   | 3127                                             | 25810                    | 2093                                                   | Incinerator                                           | 3300                              |
|         |                                                                                                            |                                                                  |                                                  |                          |                                                        | Autoclave                                             | 2600                              |
|         |                                                                                                            |                                                                  |                                                  |                          |                                                        | Shredder                                              | 1100 & 2200                       |

| Sl. No. | Bio-medical Waste Treatment Facility                                                | Areas Covered                                                             | Total No of Health Care Facilities Being Covered | Total No of Beds Covered | Total Quantity Bio-medical waste Collected in (Kg/day) | Capacity of treatment equipment and Handling Capacity |                                   |
|---------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------|--------------------------|--------------------------------------------------------|-------------------------------------------------------|-----------------------------------|
|         |                                                                                     |                                                                           |                                                  |                          |                                                        | Equipment                                             | Total Installed Capacity (Kg/day) |
| 9.      | M/s. Kovai Bio Waste Management Pvt. Ltd.,<br>Orattukuppai,<br>Coimbatore District. | Districts of Coimbatore, Tirupur, And Nilgiris.                           | 2329                                             | 3624                     | 1301                                                   | Incinerator                                           | 5500                              |
|         |                                                                                     |                                                                           |                                                  |                          |                                                        | Autoclave                                             | 4400                              |
|         |                                                                                     |                                                                           |                                                  |                          |                                                        | Shredder                                              | 2200                              |
| 10.     | M/s Pondicherry Solid Waste Management                                              | Districts of Cuddalore, Villupuram, Kallakuruchi, Ariyalur and Perambalur | 922                                              | 5047                     | 1632                                                   | Incinerator                                           | 10000                             |
|         |                                                                                     |                                                                           |                                                  |                          |                                                        | Autoclave                                             | 2560                              |
|         |                                                                                     |                                                                           |                                                  |                          |                                                        | Shredder                                              | 5500                              |
| 11.     |                                                                                     | Districts of                                                              |                                                  |                          | 862                                                    | Incinerator                                           | 5500                              |



| Sl. No. | Bio-medical Waste Treatment Facility                                                                                                                                      | Areas Covered                 | Total No of Health Care Facilities Being Covered | Total No of Beds Covered | Total Quantity Bio-medical waste Collected in (Kg/day) | Capacity of treatment equipment and Handling Capacity |                                   |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------------|--------------------------|--------------------------------------------------------|-------------------------------------------------------|-----------------------------------|
|         |                                                                                                                                                                           |                               |                                                  |                          |                                                        | Equipment                                             | Total Installed Capacity (Kg/day) |
|         | <b>M/s. Tamilnadu Waste Management Ltd.,</b><br>Unit 3 S.F No Plot No 141 A,142 &143/S.F No 726(Part),<br>Balethottam Village,<br>Pochampalli Taluk and<br>Krishnagiri Dt | Dharmapuri and<br>Krishnagiri | 1299                                             | 7855                     |                                                        | Autoclave                                             | 5100                              |
|         |                                                                                                                                                                           |                               |                                                  |                          |                                                        | Shredder                                              | 5500                              |

**(Source : TNPCB Bio-Medical Waste Annual Report - 2023)**

At present, near the proposed project site, there exists only one CBWTF at Thanjavur. However, the number of hospitals, clinics, medical colleges and diagnostic laboratories have almost double times in past 2 decades. Also due to Covid-19 spread, the number of beds has been increased in hospitals. Hence there exists demand supply gap in the generation of biomedical waste and establishment of CBWTF.

**Table 1.3-Existing facilities nearby proposed project site.**

| S.no          | Name of the existing CBMWTF                                                                                                                    | No of HCU | Installed treatment and disposal capacity by CBMWTF (Kg/Day) * | Quantity of BMW treated or disposal by CBMWTF (Kg/Day) |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------|--------------------------------------------------------|
| 1             | M/s.Medicare Enviro Systems<br>S.R.No. 208/1234, 209/3, 62/2 Part,<br>Ayothipatti Road, Sengipatti Village,<br>Budalur Tk,<br>Thanjavur-613402 | 4102      | Incinerator - 3300<br>Autoclave - 2000                         | 6200.75                                                |
| *Source TNPCB |                                                                                                                                                |           |                                                                |                                                        |

The project was identified due to increase in HCF, Clinics, lab, blood bank etc., in and around Pudukkottai, Tiruchirappalli, Thanjavur, Sivagangai, Thiruvavur, Nagapattinam, Ariyalur, Perambalur District. Also new medical colleges & hospitals were established, some are under establishment and existing are also increasing their bed strength.

Thus, **M/s. Biotech Engineering Industries** is proposed to set up a Common Bio-Medical Waste Treatment Facility (CBWTF) at Survey No: 17/7, Pisanathur Village, Gandarvakottai Taluk, Pudukkottai District, Tamil Nadu.

## 1.6 Policy and Legal Framework

The project proponent will ensure that it conforms to all National legislations, regulations and conventions from time to time relating to various aspects of CBWTF activities in India.

### 1.6.1 Regulatory control of the project:

The list of applicable Acts and Rules as set by MoEF, CPCB and TNPCB are as follows:

- ❖ Environmental Protection Act 1986 and its amendments thereon
- ❖ EIA notification 2006 and its amendments thereafter
- ❖ Air (Prevention and Control of pollution) Act, 1981
- ❖ Water (Prevention and Control of pollution) Act, 1974
- ❖ Water (Prevention & Control of Pollution) Cess Act, 1977.

- ❖ Noise Pollution (Regulation and Control), 2000
- ❖ Municipal Solid waste (Management & Handling) Rules, 2000
- ❖ Bio-Medical Waste Management Rules 2016
- ❖ Hazardous Waste (Management Handling & Transboundary Movement), 2008.
- ❖ The Forest (Conservation) Act, 1980.
- ❖ The Factories Act, 1948.
- ❖ The Wildlife (Protection) Act, 1972.
- ❖ Battery (Management & Handling) Rules, 2000
- ❖ Guidelines for Management of Health Care Waste as per BMW Rules 2016 published by Central Pollution Control Board.

### 1.7 Structure of EIA report

The purpose of this report is to carry out Environment Impact Assessment study for the proposed M/s. Biotech Engineering Industries has proposed to set up a Common Bio-Medical Waste Treatment Facility (CBWTF) at Survey No: 17/7, Pisanathur Village, Gandarvakottai taluk, Pudukkottai District, TamilNadu. Generic Structure of the Environmental Impact Assessment (EIA) Report as per the EIA notification of the MoEF, GoI dated 14th September 2006 and its subsequent amendments is detailed below. The report is divided into twelve chapters, the details of which are summarized below:

- **Chapter 1: Introduction** - The present chapter gives brief outline of the project and its proponent, brief description of the nature, size, and location of the project and its importance, and extent of the EIA study, including the scope of the study.
- **Chapter 2: Project Description** - This chapter deals with the details of the CBWTF process details and other utilities of the plant and also the facilities to monitor and treat the pollutants. The various features of the proposed project are described in this chapter.
- **Chapter 3: Description of Environment** - This chapter presents the baseline data of existing situation of air, water, noise, soil, flora and fauna and socio-economic environment. Various sections of the chapter discuss the site profile, land form and existing land use and drainage pattern, climate and meteorological parameters. Both primary and secondary data collected for the study are depicted in this chapter.
- **Chapter 4: Impact Assessment & Mitigation Measures** - This chapter describes the anticipated impact on the environment and mitigation measures. The method of assessment of impact including studies carried out and modelling techniques adopted to assess the impact where pertinent have been elaborated in this chapter. The details of the impact on the baseline parameters, both during the

construction and operational phases and the mitigation measures to be implemented by the proponent have been suggested.

- **Chapter 5: Analysis of Alternatives (Technology & Site)** - This chapter gives details of various alternatives both in respect of location of site and technologies to be deployed. Alternatives have been compared in terms of their potential environmental impacts, suitability under local conditions, and institutional training and monitoring requirements.
- **Chapter 6: Environment Monitoring Plan** - This chapter covers the planned Environmental Monitoring Program. It also includes the technical aspects of monitoring the effectiveness of mitigation measures.
- **Chapter 7: Additional Studies** - This chapter covers the details of the additional studies required in addition to those specified in the ToR and which are necessary to cater to more specific issues applicable to the project.
- **Chapter 8: Project Benefits** - This chapter highlights the benefits accruing to the locality, neighborhood, region and nation as a whole. It brings out details of benefits by way of improvements in the physical infrastructure, social infrastructure, employment potential and other tangible benefits.
- **Chapter 9: Environmental Cost Benefit Analysis**- Environmental cost benefit analysis for the proposed project
- **Chapter 10: Environmental Management Plan** - This chapter comprehensively presents the Environmental Management Plan (EMP), which includes the administrative and technical setup, summary matrix of EMP, the cost involved to implement the EMP during both phase of construction and operation.
- **Chapter 11: Summary & Conclusions** – This chapter deals with the overall summary of the project giving details of project i.e. salient features, baseline monitoring of various attributes of environment their mitigation measures, project benefits etc. which have discussed in the above chapters
- **Chapter 12: Disclosure of the Consultant** - This chapter presents in brief about the consultant engaged along with the key experts as per QCI/ NABET accreditation scheme.

## 1.8 Scope of Study

The purpose of EIA/EMP is to critically analyse the environmental impacts due to the establishment of CBWTF and to suggest mitigation measures to reduce the pollution and to delineate an Environmental Management Plan along with recommendations and suggestions. The Terms of Reference issued by SEIAA, Tamil Nadu is in **Annexure 4**.

The scope of study includes detailed baseline study of existing status of environment in the study area of 10 Km radius for various environmental components viz. air, noise, water, land, biological and socio-economic and other parameters of interest. The envisaged scope of EIA is as follows:

- To assess the present status of air, noise, water, land, biological and socio-economic components of environment
- Collect primary and secondary data preparing to EIA Report
- Identification and quantification of significant impacts from the proposed project operations on various components of environment
- Suggest ways and means to mitigate or/and minimize the impacts to meet the regulatory norms
- To prepare an Environmental Monitoring Program to strengthen the regulatory compliance vis-à-vis sustainable development
- Risk assessment and Disaster Management Plan studies
- Preparation of a sound Environmental Management Plan (EMP) outlining mitigation measures to address the impacts identified.
- Propose Corporate Environmental responsibility

The proposal seeking ToR was placed in the SEAC meeting held on 27.09.2024. The proposal was considered as recommended by SEAC in 501<sup>th</sup> SEIAA meeting held on 27.09.2024 and after detailed discussion, the authority issued ToR with public consultation subject to standard ToR for preparation of EIA report along with additional ToR.

Baseline environmental data and the other data collection for the project has been undertaken by NABL accredited lab- M/s. Femo Labs Pvt Ltd., for the study period 13 January 2025 to 3 April 2025.

Draft EIA report for the proposed CBWTF at Pudukkottai dt has been prepared in conformity with the conditions laid down in ToR.

This draft EIA report will be presented during the public consultation, as per rules and procedures in this respect, as per EIA notification 2006. The topics discussed in public by the public and other stake holders connected, will be taken into consideration and compliance report thereon will be submitted to SEIAA, Tamil Nadu in the final EIA report.

### **1.9 Methodology of EIA report**

The methodology adopted for carrying out the EIA study is based on the guidelines and Standard TOR issued by the SEIAA. The EIA report is based on data collected from primary and secondary sources that included;



- Collection of information on existing baseline conditions.
- Ambient air, water and soil quality and noise level monitoring.
- Identification of environmentally sensitive locations (if any) in the impacted area.
- Assess the adverse impacts on the environment and to avoid the impacts, suggest cost effective mitigation and management measures to mitigate the negative impacts.
- Preparation of Environmental Management Plan, which will include associated costs for execution of mitigation and enhancement, works; development of an environmental monitoring program.
- Addressing the derived issues involving occupational health and safety, and emergency/disaster management to limit/contain the adverse effects.

Any developmental activity in general is expected to cause impacts on surrounding environment during its implementation and operation phases, which can be either positive or negative. The nature and intensity of impacts on different components of environment would depend on the type of project activities and geographical conditions of the study area.

The impacts of the project activities on environmental components are quantified through Environmental Impact Assessment Studies within the impact zone of the project activities.

The detailed studies for various environmental components like air, noise, water, land, biological and socio-economic environment were carried out during January to April 2025. The study area for the present EIA study is 10 km radius from the project site.

Study was carried out by reconnaissance survey, fixing the monitoring locations for baseline studies, interview of people residing in the study area, sample survey, collection of secondary data etc., compilation of the baseline data and analysis.

### EIA PROCESS FLOWCHART:

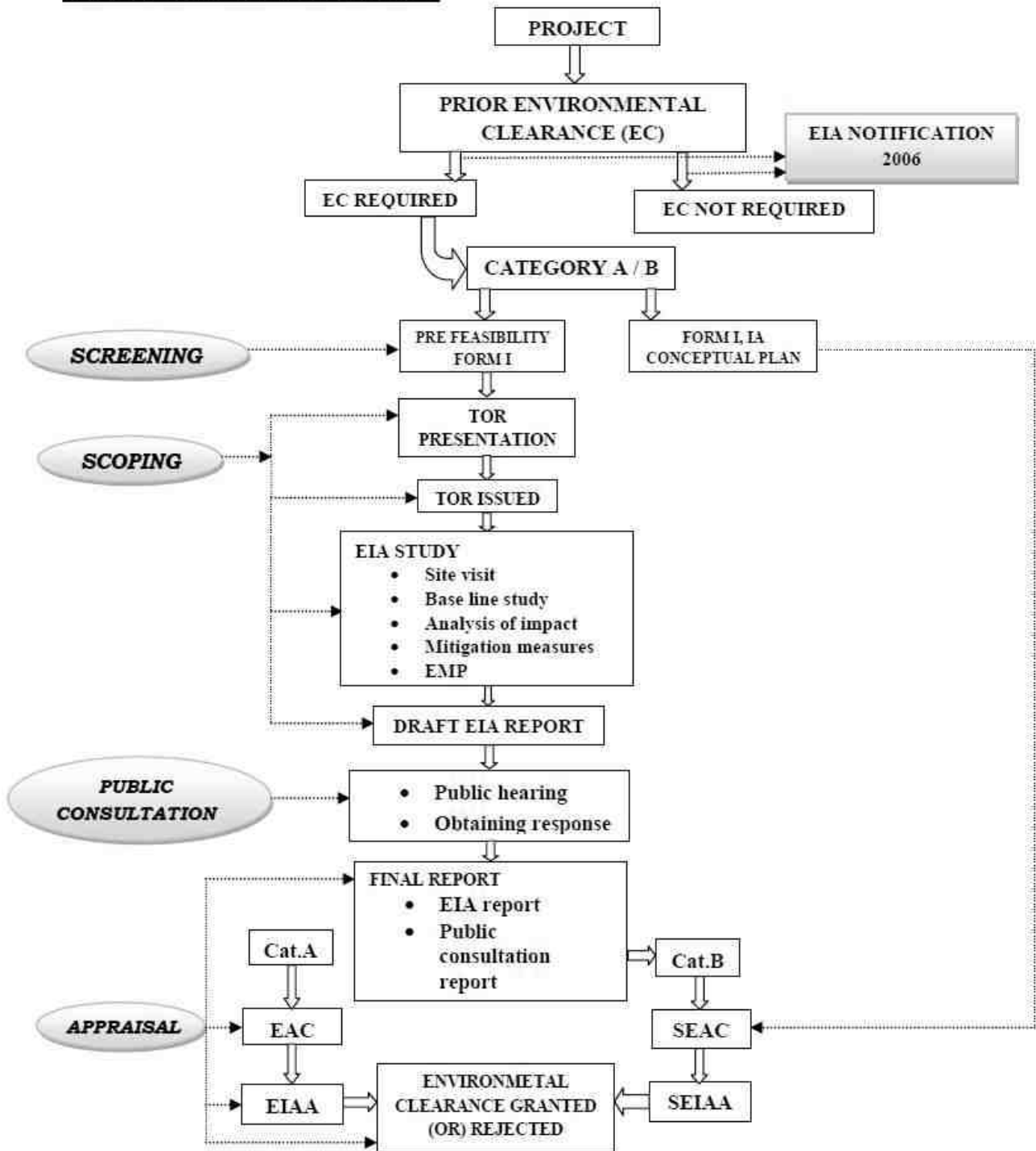


Figure 1.2-Methodology of EIA Study

### 1.10 Compliance to Terms of Reference

SEIAA- TN has issued the ToR with Identification TO24B3301TN5162069N was issued on 22.10.2024.

List of ToR conditions and its compliance are given in **Table 1.4 & Table 1.5**

#### **DELIBERATIONS BY THE SEIAA**

Based on the presentation made by the proponent, SEAC recommended to grant of Terms of Reference (TOR) with Public Hearing, subject to the following TORs, in addition to the standard terms of reference for EIA study for the Proposed Common Bio-Medical Waste Treatment Facility (CBMWTF) and details issued by the MOEF & CC to be included in EIA/EMP Report

**Table 1.4-SEAC Conditions-Site Specific**

| Sl.No | Description                                                                                                                                                                                                                                                                                                                                           | Details Provided                                                                                                                                                                                                                  |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | The PP shall discuss the alternative sites to the proposed site. Preferably, alternative site should be away from the residential area, water body and may be selected in discussion with PCB. The details of the same shall be included in the EIA report. Also, the Site Suitability report for the proposed site shall be obtained from the TNPCB. | The details are given in Chapter 5 – section 5.1, Page No: 174. Site suitability letter has been obtained from Member Secretary, TNPCB Lr.No. T6//TNPCB/F.019201/BMW/2025, Dated:09.05.2025 and is enclosed as <b>Annexure 5.</b> |
| 2     | The PP shall furnish the gap-analysis studies undertaken by the concerned SPCBs duly highlighting the difference in the BMW generated vis-à-vis the treatment capacity available.                                                                                                                                                                     | The details are given in Chapter 2 – section 2.2, Page No:37. Gap analysis study has been obtained from MS Member Secretary, TNPCB Lr.No. T6//TNPCB/F.019201/BMW/2025, Dated:09.05.2025 and is enclosed as <b>Annexure 5.</b>     |
| 3     | Enumerate the details of habitations/residential area, sensitive area up to 2Km radius and the implication of the proposal with particular reference to wind direction, both monsoon seasons shall be included in the EIA report. The CBMWTF                                                                                                          | In chapter – 2, Table 2.5 Page No:43 the details of habitations/residential area, sensitive area up to 2Km radius are given. The details of wind direction, both monsoon seasons are given in chapter – 3, section 3.3.2.1,       |

| Sl.No | Description                                                                                                                                                                                                                                                                                              | Details Provided                                                                                                                                                                                                                                                                                 |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | should have a buffer distance of preferably 500 m so that it shall have minimal impact on these areas.                                                                                                                                                                                                   | Page No:94 There are no habitations near the proposed project site within 500m.                                                                                                                                                                                                                  |
| 4     | Enumerate the details of nearby water bodies i.e., tank & reservoir, water table upto 2km radius and the implication of the proposal shall be included in the EIA report. Also, Implication of the proposal on the Pisanathur lake located at 650m shall be included.                                    | The details are given in chapter – 2, Table 2.5, Page No:43.                                                                                                                                                                                                                                     |
| 5     | Enumerate the details of agriculture, type of crops, harvesting period and the implication of the proposal shall be included in the EIA report. Also, the implication on flora & fauna shall be included in the EIA report.                                                                              | The details are given in chapter – 3, Section 3.3.8, Page No:135. The implication on flora & fauna is given in chapter-3 Table 3.18 & 3.19, Page No:135&136.                                                                                                                                     |
| 6     | The proponent shall furnish the details on Vehicle-wise route chart for collection, transportation of bio-medical waste from the member HCFs, No. of vehicles and feature of vehicles etc., Also, details of the existing access road(s)/walkways to the designed operations in the site and its layout. | The details are given in Chapter 3 Figure 3.21 and Figure 3.22, Page No:153&154. The details of vehicle are given in Chapter 2 Section 2.13, Page No:70. The details of the existing access roads/walkways to the designed operations in the site and its layout is given as <b>Annexure 6</b> . |
| 7     | The PP shall furnish an affidavit stating that he will not extract the ground water for the proposed activity and shall obtain commitment letter for commitment letter for connection for fresh water supply and disposal of excess treated water from the local body/ TWAD.                             | The commitment letter for connection for fresh water supply is applied in TWAD board and acknowledgement for application was obtained from TWAD Board Pudukkottai dated: 13.05.2025 is attached as <b>Annexure 7</b> .                                                                           |
| 8     | Details of the treatment equipment's capacity and detailed design specification of the proposed                                                                                                                                                                                                          | The detailed design specification of the proposed Incinerator, Autoclave,                                                                                                                                                                                                                        |

| Sl.No | Description                                                                                                                                                                                                                                                                                                                                             | Details Provided                                                                                                                                                      |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | incinerator, Autoclave, Shredders etc., shall be included.                                                                                                                                                                                                                                                                                              | Shredders are given in Chapter 2 Section 2.10.4 – Pg.No:56 and Table 2.10,2.11,2.13&2.14                                                                              |
| 9     | Details of various state of art of technology available for this field and justification for selection of a particular technology.                                                                                                                                                                                                                      | The details are given in chapter 5 section 5.3, Page No:177.                                                                                                          |
| 10    | Details of the incineration system – a statement on the compliance to CPCB guidelines for common bio medical waste incinerators in respect of waste feed cut-offs, operating parameters of combustion chambers, flue gas cleaning, ash handling, etc.                                                                                                   | The details are given in chapter 2 Section 2.10.4.1, Page No:56                                                                                                       |
| 11    | Details on fuel requirement for incineration                                                                                                                                                                                                                                                                                                            | The details are given in chapter 2 Section 2.12 and Table 2.16 in Page No:70.                                                                                         |
| 12    | Details on flue gas emissions discharge through stack and proposed pollution control technologies.                                                                                                                                                                                                                                                      | Details on flue gas emissions discharge through stack and proposed pollution control technologies are given in Chapter 2 Section 2.10.4.1 – Table 2.12 Page No:56&61. |
| 13    | Land requirement for facility including its breakup for various purposes, its availability and optimization.                                                                                                                                                                                                                                            | The details are given in chapter 2, Table 2.7, Page No:47                                                                                                             |
| 14    | Details of proposed layout clearly demarcating various activities such as security, Waste Storage Rooms, Waste Treatment Equipment Rooms/Areas, Treated Waste Storage Room, Pollution Control Devices like APCS and ETP, ash storage/disposal area, vehicle washing areas and others such as admin area, worker's room, health centers, greenbelt, etc. | The details are given in chapter 2, Section 2.9, Page No:48 and also the proposed layout has been enclosed as <b>Annexure 8</b> .                                     |

| Sl.No | Description                                                                                                                                                                                                                                                                                                                   | Details Provided                                                                                                                                                                            |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15    | Details of waste storage facilities/rooms.                                                                                                                                                                                                                                                                                    | The details are given in chapter 2, section 2.10.3- Page No:55.                                                                                                                             |
| 16    | Details on residue/ash generation and management.                                                                                                                                                                                                                                                                             | The details are given in chapter 2, section 2.15.7 – Page No:77                                                                                                                             |
| 17    | Details of waste heat utilisation, if any.                                                                                                                                                                                                                                                                                    | NA                                                                                                                                                                                          |
| 18    | Details of the proposed overall safety and health protection measures.                                                                                                                                                                                                                                                        | The details are given in chapter 7, Section 7.6 – Page No:198                                                                                                                               |
| 19    | Land use map based on satellite imagery including location specific sensitivities such as national parks/ wildlife sanctuary, villages, industries etc.                                                                                                                                                                       | There is no sensitivities areas such as national parks/ wildlife sanctuary, around the project site within 10 Km radius The details are given in section 3.3.1.7 – Figure:3.2 Page No:90&92 |
| 20    | Topography details.                                                                                                                                                                                                                                                                                                           | The details are given in Chapter 2 Table – 2.5, Page No:43                                                                                                                                  |
| 21    | Surface water quality of nearby water bodies.                                                                                                                                                                                                                                                                                 | The details are given in chapter 3 Section 3.3.6 – Page No:127.                                                                                                                             |
| 22    | Details on proposed groundwater monitoring wells, locations, frequency of monitoring, parameters, etc.                                                                                                                                                                                                                        | There are no proposed ground water monitoring wells.                                                                                                                                        |
| 23    | Action plan for the greenbelt development in accordance to CPCB guidelines.                                                                                                                                                                                                                                                   | The details are given in chapter 6 section 6.5 – Page No:187.                                                                                                                               |
| 24    | Details on pollution control technologies and online monitoring equipment.                                                                                                                                                                                                                                                    | The details are given in chapter 2 Section 2.10.4.4 and 2.10.4.5 – Page No:66                                                                                                               |
| 25    | Details of monitoring of pollutants at source – performance of the incinerator, including operating hours, fuel consumption, operating parameters (Combustion chamber – temperature, pressure, stack temperature, total particulate matter, HCl, NO <sub>x</sub> as per Bio Medical Waste (Management & Handling) Rules,1998. | The details are given in chapter 2, Section 2.10.4.1 – Page No:56.                                                                                                                          |

| Sl.No | Description                                                                                                                                                                                                             | Details Provided                                                                                                                                                                                                                                                 |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 26    | Stack and fugitive emissions may be monitored for SPM, HCl & NO <sub>2</sub> as per Bio Medical Waste (Management & Handling) Rules, 2016                                                                               | Stack and fugitive emissions will be monitored for SPM, HCl and NO <sub>2</sub> in accordance with the Bio-Medical Waste Management Rules, 2016. Compliance with these monitoring requirements will be ensured post-installation and commissioning of the CBWTF. |
| 27    | Specific programme to monitor safety and health protection of workers.                                                                                                                                                  | The details are given in chapter 7, Section 7.6 – Page No:198.                                                                                                                                                                                                   |
| 28    | Details of administrative and technical organizational structure.                                                                                                                                                       | The details are given in chapter 10, Section 10.2 – Page No:217.                                                                                                                                                                                                 |
| 29    | Details of emergency preparedness plan and on-site & off-site disaster management plan. Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural and man-made disaster. | The details are given in chapter 7, Section 7.7 – Page No:199.                                                                                                                                                                                                   |
| 30    | The EIA/EMP shall conform to the ‘Revised Guidelines for Common Bio-medical Waste Treatment and Disposal Facilities’ issued by the Central Pollution Control Board.                                                     | Yes, the prepared report of EIA/EMP is being complied with the ‘Revised Guidelines for Common Bio-medical Waste Treatment and Disposal Facilities’ issued by the Central Pollution Control Board.                                                                |
| 31    | PP shall strive to generate a minimum of 50% of energy consumption by way of solar energy.                                                                                                                              | The details are given in chapter 10, Section 10.11 – Page No:239                                                                                                                                                                                                 |
| 32    | Details of litigation pending against the project, if any, with direction/ order passed by any Court of Law against the project will be given.                                                                          | No litigation pending against the project.                                                                                                                                                                                                                       |

| Sl.No | Description                                                                                                                            | Details Provided                                                 |
|-------|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| 33    | The cost of the project (capital cost and recurring cost) as well as the cost towards implementation of EMP will be clearly spelt out. | The details are given in chapter 10, Section 10.4 – Page No:230. |

**Table 1.5-SEIAA Specific Conditions**

| Sl.No | Description                                                                                                                                                                                                                                                                    | Details Provided                                                                                                 |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| 1     | As per the MoEF & CC office memorandum F.No. 22-65/2017-IA, III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.              |                                                                                                                  |
| 2     | The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities. | The details are given in Chapter 4, section 4.10 – Page No:170.                                                  |
| 3     | The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.                                                                              | The details are given in Chapter 3, Section 3.3.8 – Page No:134                                                  |
| 4     | The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components                                                                                                                          | The details are given in Chapter 3, Section 3.3.7 – Page No:134.                                                 |
| 5     | The Environmental Impact Assessment should study impact on standing trees and the trees should be numbered.                                                                                                                                                                    | A total of 20 trees are present at the project site, and there will be no adverse impact on them, as the project |



| Sl.No | Description                                                                                                                                                                      | Details Provided                                                                                                                          |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
|       |                                                                                                                                                                                  | has been planned in such a way that all existing trees will be retained.                                                                  |
| 6     | The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and hydrological cycles.                                                       | The details are given in Chapter 3, Section 3.3.3.3 – Fig:3.11 Page No:105.                                                               |
| 7     | The Environmental Impact Assessment should study impact on climate change, GHG emissions, temperature rise, pollution and above soil & below soil carbon stock.                  | The details are given in Chapter 4, Section 4.10 – Page No:170.                                                                           |
| 8     | The Environmental Impact Assessment shall include study of impact of the proposed activity on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways. | There is no protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways around 10 Km radius of the project site.    |
| 9     | The project proponent shall furnish the details of trees in the project site with all trees numbered and protected.                                                              | All the trees within the project site have been identified, numbered, and protected. The total number of trees present at the site is 20. |
| 10    | The project proponent shall furnish a detailed study on the impact of proposed activity with mitigation measures on the nearby environmental fragile areas.                      | There are no environmentally fragile area around the project site and the details are given in Chapter 4, section 4.8 – Page No:166       |
| 11    | The project proponent shall furnish the detailed study on health with regard to respiratory distress due to allergens on workers and nearby villagers.                           | The details are given in Chapter 4, section 4.11 – Page No:172                                                                            |
| 12    | The project proponent shall furnish the impact on dust pollution on the nearby habitation and livelihoods.                                                                       | The details are given in Chapter 4, section 4.5 – Page No:157                                                                             |
| 13    | The project proponent shall furnish the Risk assessment plan, EMP and Disaster management                                                                                        | The details are given in Chapter 7                                                                                                        |

| Sl.No | Description                                                                                                                                                          | Details Provided                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | plan which should be prepared after thorough study.                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 14    | The GPS co-ordinates for the boundaries at the green belt proposed & proposed project site shall be furnished separately.                                            | The GPS co-ordinates for the boundaries at the green belt proposed & proposed project is enclosed as <b>Annexure 9.</b>                                                                                                                                                                                                                                                                                                                                                                                   |
| 15    | Air quality modelling study shall be conducted for the CPCB primary air pollutants specified by considering the impact on the proposed plant to the nearby villages. | The details are given in Chapter 4, section 4.5.4 – Page No:158                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 16    | The details of quantity of steam to be generated, fuel and equipment to be used shall be furnished.                                                                  | The details are given in the Chapter 2, equipment's used is given in Table 2.10 Page No:56 and Fuel requirement is in Table 2.16 Page No:70.                                                                                                                                                                                                                                                                                                                                                              |
| 17    | The proponent shall ensure that the activities do not cause any damage to water environment, air quality and are carbon neutral.                                     | Air pollution is effectively controlled through the implementation of Air Pollution Control Devices (APCDs), while an Effluent Treatment Plant (ETP) is utilized for the treatment of industrial wastewater. The treated water is recycled and reused within the industrial process, thereby ensuring zero discharge. As a result, the project does not pose any adverse impact on air quality or the water environment and aligns with carbon neutrality principles. The details are given in Chapter 2. |

| Sl.No | Description                                                                                                                                                                                                                                           | Details Provided                                                                                                                                                                                                                                                                                     |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18    | The proponent shall ensure that the activities undertaken do not result in carbon emission and temperature rise in the area.                                                                                                                          | The details are given in Chapter 4, Section 4.10 – Page No:170                                                                                                                                                                                                                                       |
| 19    | The activities shall not in any no way cause emissions and build-up of Green House Gases. Action plan shall be furnished for eco-friendly actions that support sustainable management of the natural resources within and outside the plant premises. | A green belt covering 33.85 % of the total plot area is being developed around the project site. This green belt serves as an effective carbon sink, contributing to the sequestration of carbon dioxide and other greenhouse gases. The details are given in Chapter 4, Section 4.10 – Page No:170. |
| 20    | Details regarding the implementation of 4R(Recycle/reduce/reuse/recover) principle in the plant shall be furnished.                                                                                                                                   | The details regarding implementation of 4R principle in the plant is given in Chapter 10, section 10.9 – Page No:237.                                                                                                                                                                                |
| 21    | The Proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna.                                                             | The details are given in Chapter 3, Section 3.3 – Page No:85.                                                                                                                                                                                                                                        |
| 22    | Measures proposed for prevention of odour emanating from solid waste processing plant and STP.                                                                                                                                                        | There is no solid waste processing plant and STP inside the premises hence there is no generation of odour.                                                                                                                                                                                          |
| 23    | The Environmental Impact Assessment shall include Study on the energy conservation measures conforming to energy conservation norms prescribed by the Bureau of Energy Efficiency.                                                                    | The details are given in Chapter 10, Section 10.10 – Page No:238.                                                                                                                                                                                                                                    |
| 24    | Impact of the proposed activity on soil, water and air envisaged shall be studied and mitigation measures proposed shall be detailed.                                                                                                                 | The impact and mitigation measures for soil, water and air is given in Chapter 4, Sections 4.5, 4.6 & 4.7 – Page No: 157                                                                                                                                                                             |

**Table1.6-Standard Terms of Reference for Bio- Medical Treatment Facilities**

**1. Project Details**

| Sl.No | Description                                                                                                                                                                                                                                                                                                                                                                                                                                             | Details Provided                                                                                                                                                                                                                                                                                                                        |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1   | Importance and benefits of the project.                                                                                                                                                                                                                                                                                                                                                                                                                 | The details are given in Chapter 8 – Page No:210                                                                                                                                                                                                                                                                                        |
| 1.2   | Reasons for selecting the site with details of alternate sites examined/rejected/selected on merit with comparative statement and reason/basis for selection. The examination should justify site suitability in terms of environmental damages, resources sustainability associated with selected site as compared to rejected sites. The analysis should include parameters considered along with weightage criteria for short-listing selected site. | The details are given in Chapter 5, Section 5.1 – Page No:174                                                                                                                                                                                                                                                                           |
| 1.3   | The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.                                                                                                                                                                                                                                                                                                                | The details are given in Chapter 10, Table 10.2 – Page No:230                                                                                                                                                                                                                                                                           |
| 1.4   | Details of various waste management units with capacities for the proposed project. Details of utilities indicating size and capacity to be provided.                                                                                                                                                                                                                                                                                                   | The details are given in Chapter 2, Table:2.10 – Page No:56.                                                                                                                                                                                                                                                                            |
| 1.5   | List of waste to be handled and their characteristics. Details of temporary storage facility for storage of Biomedical waste at project site.                                                                                                                                                                                                                                                                                                           | Biomedical waste is categorized as per Biomedical Waste Management Rules, 2016 and the List of waste to be handled and their characteristics is given in Chapter 2, Figure:2.10 – Page No:50 Details of temporary storage facility for storage of Biomedical waste at project site are given in Chapter 2, Section 2.10.3 – Page No:55. |

| SL.No | Description                                                                                                                                                                                                  | Details Provided                                                                                                                                                                                                                                                   |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.6   | Other chemicals and materials required with quantities and storage capacities.                                                                                                                               | The chemicals used in the facility will be mainly for ETP. The chemicals to be used are lime, polyelectrolytes, alum etc. The diesel fuel is used for initial startup of incinerator.                                                                              |
| 1.7   | Detailed design of pre-treatment and waste stabilization facility of Biomedical waste.                                                                                                                       | Detailed design of pre-treatment and waste stabilization facility of Biomedical waste are given in Chapter 2.                                                                                                                                                      |
| 1.8   | Project proponents would also submit a write up on how their project proposal conform to the stipulations made in the Bio-Medical Waste Management Rules, 2016, notified by the MoEF&CC on 28th March, 2016. | The compliance on applicable rules and guidelines for CBWTF as per “Bio-Medical Waste Management Rules, 2016” notified by the MoEF&CC on 28th March 2016 and Revised guidelines for CBWTF by CPCB on 21st Dec 2016 is given in Chapter 2, Table 2.22 – Page No:79. |
| 1.9   | Process description along with major equipment and machineries, process flow sheet (quantitative) from Bio-Medical waste material to disposal to be provided.                                                | The details are given in Chapter 2, Figure:2.11 – Page No:51.                                                                                                                                                                                                      |
| 1.10  | Details of man-power requirement (regular and contract).                                                                                                                                                     | The details are given in Chapter 2, Section 2.11 – Page No:69                                                                                                                                                                                                      |

| Sl.No | Description                                                                  | Details Provided                                                         |
|-------|------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 1.11  | A detailed layout of the project site indicating all the project components. | A detailed layout of the project site is enclosed as <b>Annexure 8</b> . |

## 2. Road and Traffic

| Sl.No | Description                                                                                            | Details Provided                                                                       |
|-------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 2.1   | Submit the details of the road/rail connectivity along with the likely impacts and mitigative measures | The details are given in Chapter 3, Section:3.3.10, Figure: 3.21 & 3.22 – Page No: 151 |
| 2.2   | Examine the details of transportation of Bio-Medical wastes, and its safety in handling.               | The details are given in Chapter 2, Section 2.13 – Page No:70                          |

## 3. Land Environment

| Sl.No | Description                                                                                                                                                                                                 | Details Provided                                                                                                                                                     |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.1   | Detailed soil analysis of the site including its permeability, water holding capacity be included.                                                                                                          | The details are given in Chapter 3, Section 3.3.7 – Page No:127                                                                                                      |
| 3.2   | Submit the present land use and permission required for any conversion such as forest, agriculture etc.                                                                                                     | There is no conversion of forest and agricultural land. The Land use certificate is given as <b>Annexure 2</b> .                                                     |
| 3.3   | Specify the land area and space allotted for each activity proposed within the facility. The area requirements for each activity shall be calculated as per the CPCB guidelines for the specified activity. | The details are given in Chapter 2 Section 2.6 Table: 2.7 – Page No:47                                                                                               |
| 3.4   | Status of the land purchases in terms of land acquisition Act. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.                       | The proposed project site is located on land that has been directly purchased through private negotiation. No land has been acquired under the Land Acquisition Act. |

| Sl.No | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Details Provided                                                                                                                    |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 3.5   | The EIA would address to the conformity of site to the stipulations as made in the Bio-Medical Waste Management Rules, 2016 and Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016 and will have a complete chapter indicating conformity to the said rules. NOC shall be obtained from State Pollution Control Board/Committee (SPCB/SPCC) regarding site suitability for establishment of Bio-Medical Waste Treatment Facilities. | We obtained site suitability letter from the Member Secretary, TNPCB vide Letter. No. T6/TNPCB/F.019201/BMW/2025, dated 09.05.2025. |
| 3.6   | Post project reclamation management program with financial allocation.                                                                                                                                                                                                                                                                                                                                                                                           | No land fill is proposed within the site, as post project reclamation is not envisaged.                                             |

#### 4. Environmental Monitoring and Management

| Sl.No | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Details Provided                                                                                                                                                                                                                                                                                                                                               |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.1   | Examine and submit the details of online pollutant monitoring.                                                                                                                                                                                                                                                                                                                                                                                                  | The details are given in Chapter 2 Section 2.10.4.5 – Page No:68.                                                                                                                                                                                                                                                                                              |
| 4.2   | Project proponent must ensure Good Combustion Practice (GCP) to reduce the possibilities of formation of ‘Total dioxins and furans. In addition, GCP must be coupled with appropriate End-of-the-pipe treatment at low temperature to reduce the emission of ‘Total dioxins and furans’ below the standards. Further, the project proponent must provide detailed Standard operating procedure (SOPs) for sampling and monitoring of ‘Total dioxins and furans. | As per Bio-Medical Waste Management Rules, 2016 and amendments, Health Care Establishments (HCEs) must phase out chlorinated plastic items like bags, gloves, and blood bags. The facility will use only non-chlorinated colored plastic bags.<br><br>To ensure Good Combustion Practice (GCP), an air-to-fuel ratio of ~1:1.5 will be maintained to reduce CO |

| Sl.No | Description                                                                                                                                                                                     | Details Provided                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |                                                                                                                                                                                                 | <p>emissions. Flue gas temperature will be quickly lowered from 1100°C to 150°C using gas cooling and neutralization to prevent dioxins and furans. Dry scrubbing will further remove harmful gases.</p> <p>The incinerator will meet standards for dioxins/furans. Waste will not be chemically treated with chlorinated disinfectants. Annual monitoring of dioxins/furans will be done by an authorized third party, in PCB presence if needed.</p> |
| 4.3   | Environmental Management Plan should be accompanied with Environmental Monitoring Plan and environmental cost and benefit assessment. Regular monitoring shall be carried out for odour control | The details are given in Chapter 10, Table:10.2 – Page No:230 and for odour control the details are given in chapter 2, Section 2.15.5 – Page No:76                                                                                                                                                                                                                                                                                                    |
| 4.4   | Water quality around the landfill site shall be monitored regularly to examine the impact on the ground water.                                                                                  | There is no Landfill in proposed CBWTF.                                                                                                                                                                                                                                                                                                                                                                                                                |
| 4.5   | A detailed draft EIA/EMP report should be prepared in accordance with the above additional TOR and should be submitted to the Ministry in accordance with the Notification.                     | Yes, the detailed draft EIA/EMP report was prepared in accordance with the above additional TOR and the same will be submitted to the Ministry in accordance with the Notification.                                                                                                                                                                                                                                                                    |



| Sl.No | Description                                                                                                                                            | Details Provided                                                            |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 4.6   | Air Quality Index shall be calculated for base level air quality.                                                                                      | The details are given in Chapter 3, Section 3.3.4 – Table:3.10 Page No:111. |
| 4.7   | Baseline data on Ground water quality is required.                                                                                                     | The details are given in Chapter 3, Section 3.3.6 – Page No:127.            |
| 4.8   | Possible carbon footprint contribution from each activities and mitigation measures proposed shall be included as part of Environment Management Plan. | The details are given Chapter 4, Section 4.10 – Page No:170                 |

## 5. Waste Management

| Sl.No | Description                                                                                                                                                                                                                | Details Provided                                                                                                                                                                                                                                                                                                           |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5.1   | Examine and submit details of the proposed odour control measures.                                                                                                                                                         | The details are given in Chapter 2, Section 2.15.5 – Page No:76                                                                                                                                                                                                                                                            |
| 5.2   | The storage and handling of Bio-Medical wastes shall be as per the Bio-Medical Waste Management Rules, 2016.                                                                                                               | Yes, we will comply                                                                                                                                                                                                                                                                                                        |
| 5.3   | Details of storage and disposal of pre-processing and post-processing rejects/inerts and products. List of proposed end receivers for the rejects/inerts/products should be provided. MoUs to be submitted in this regard. | Pre-processing and post-processing rejects/inerts such as incinerator ash, ETP sludge, will be collected, stored in a designated covered area with impermeable flooring, and disposed to TSDF in accordance with CPCB guidelines. Recyclable waste (like disinfected plastics/glass) will be sent to authorized recyclers. |

|     |                                                                   |                                                                     |
|-----|-------------------------------------------------------------------|---------------------------------------------------------------------|
|     |                                                                   | Since it is a proposed CBWTF the MoUs will be submitted during CTO. |
| 5.4 | Details of hazardous/solid waste generation and their management. | The details are given in Chapter 2, Section 2.15.7 – Page No:77.    |

## 6. Water Environment

| Sl.No | Description                                                                                                                                                                                                                                                                                                                                                    | Details Provided                                                                                                                                                                                                                                |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.1   | Detailed hydro-geological studies and possible impact if any accidental contamination occurs shall be included.                                                                                                                                                                                                                                                | Details are given in Chapter 3, Section 3.3.3.3 – Page No:103                                                                                                                                                                                   |
| 6.2   | Examine and submit details of monitoring of water quality around the landfill site.                                                                                                                                                                                                                                                                            | There is no landfill in site.                                                                                                                                                                                                                   |
| 6.3   | Examine and submit details of impact on water body and mitigative measures during rainy season.                                                                                                                                                                                                                                                                | The details are given in Chapter 4, Section 4.7 – Page No:164.                                                                                                                                                                                  |
| 6.4   | Details of Drainage of the project up to 5 km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. | Letter for seeking details of the drainage, flood level from PWD is submitted to PWD, Pudukkottai and Acknowledgement for the letter was obtained from Public Work Department Pudukkottai dated: 05.05.2025 is attached as <b>Annexure 10</b> . |

## 7. Water Management

| Sl.No | Description                                          | Details Provided                                                |
|-------|------------------------------------------------------|-----------------------------------------------------------------|
| 7.1   | Details of effluent treatment and recycling process. | The details are given in Chapter 2, Section 2.15.3 – Page No:74 |

|     |                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                            |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7.2 | A certificate from the local body supplying water, specifying the total annual water availability with the local authority, the quantity of water already committed, the quantity of water allotted to the project under consideration and the balance water available. | The commitment letter for fresh water supply from TWAD board was applied and the acknowledgement obtained from TWAD Board Pudukkottai for application dated: 13.05.2025 is attached as <b>Annexure 7</b> . |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 8. Energy Management

| Sl.No | Description                                                                                                                              | Details Provided                                                                                                                                                                                                          |
|-------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8.1   | A certificate of adequacy of available power from the agency supplying power to the project along with the load allowed for the project. | The power requirement of the plant will be 120 KW is sourced from the Tamil Nadu State Electricity Generation and Distribution Company Limited (TANGEDCO). D.G. set of 120 kVA capacity will be provided as power backup. |

## 9. Disaster Management Plan

| Sl.No | Description                                                                                                                     | Details Provided                                                |
|-------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| 9.1   | Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural and man-made disaster. | The details are given in Chapter 7, Section 7.7 – Page No:199   |
| 9.2   | Hazard identification and proposed mitigation measures.                                                                         | The details are given in Chapter 7, Section 7.2. – Page No:193. |

## 10. Green Belt

| Sl.No | Description                                 | Details Provided                                                 |
|-------|---------------------------------------------|------------------------------------------------------------------|
| 10.1  | A detailed Plan for green belt development. | The details are given in Chapter 10, Section 10.5 – Page No:231. |

## 11. Socioeconomic Environment

| Sl.No | Description                                                                                                                                                                                                                                                                                                                                                                                      | Details Provided                              |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| 11.1  | Public hearing to be conducted for the project in accordance with provisions of Environmental Impact Assessment Notification, 2006 and the issues raised by the public should be addressed in the Environmental Management Plan. The Public Hearing should be conducted based on the ToR letter issued by the Ministry and not on the basis of Minutes of the Meeting available on the web-site. | <b>Shall be complied after public hearing</b> |
| 11.2  | The project proponents shall satisfactorily address all the complaints/suggestions that have been received against the project till the date of submission of proposals for Appraisal.                                                                                                                                                                                                           | <b>Shall be complied after public hearing</b> |

## 12. Court Cases

| Sl.No | Description                                                                                                                                      | Details Provided |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| 12.1  | Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given. | NA               |

### 13. Miscellaneous

| Sl.No | Description                                                                                                                                                                                                                                                                                               | Details Provided       |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 13.1  | Any further clarification on carrying out the above studies including anticipated impacts due to the project and mitigative measure, project proponent can refer to the model ToR available on Ministry website <a href="http://moef.nic.in/Manual/Incinerator">http://moef.nic.in/Manual/Incinerator</a> | Noted and shall comply |

## CHAPTER 2

### PROJECT DESCRIPTION

#### 2.1 TYPE OF THE PROJECT

Proposed project Biotech Engineering Industries is a setting up of Common Bio Medical Waste Treatment Facility (CBWTF) with a capacity of 10 TPD at Survey No: 17/7, Pisanathur Village, Gandarvakottai Taluk, Pudukkottai district Tamil Nadu. Proposed CBWTF of capacity 10 Tons per day includes Incinerator, Autoclave, Shredder, Effluent Treatment Facility, Air pollution control devices, Computer facility for recording the operation of facilities, online monitoring etc. The salient features of the proposed project are given in the **Table 2.1**.

**Table 2.1-Salient Features of the project**

|                                 |                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------|
| <b>Project Name</b>             | Proposed Common Bio Medical Waste Treatment Facility                                        |
| <b>Capacity</b>                 | 10 TPD                                                                                      |
| <b>Project Site</b>             | Survey No: 17/7, Pisanathur Village, Gandarvakottai Taluk, Pudukkottai District, Tamil Nadu |
| <b>Proposal Number</b>          | SIA/TN/INFRA2/494961/2024 (from Parivesh Portal)                                            |
| <b>Geo Co-ordinates of site</b> | 10° 35' 28.64" N 79° 02' 08.45" E                                                           |
| <b>Project Land Area</b>        | Total plot area –1.55 acres (6250 Sq.m)                                                     |
| <b>Project Cost</b>             | Rs.2.83 Crores                                                                              |

The proposed activity falls under Category “B1” - Schedule 7[d (a)] as per EIA notification of Ministry of Environment Forest & Climate Change (MoEF & CC) dated 14<sup>th</sup> September 2006 and as per EIA notification S.O1142(E) dated 17<sup>th</sup> April 2015, all projects of Bio-Medical Waste Treatment Facilities fall under Category B1.

Bio-medical Waste segregated in colour coded containers as per Biomedical Waste Management and Handling Rules, 2016. The BMW will be collected from Health Care Facilities located within 75 Km radius from the project site. The facility will have four dedicated covered vehicles for collecting BMW from HCUs. CBWTF will be provided with Incinerator, Autoclave, Shredder, Effluent Treatment Facility and Air Pollution Control Devices with online monitoring of emissions from the incinerator and the operation will be connected and monitored.

The objective of this project is to provide an environmentally sound solution for the collection, transportation, treatment, and disposal of bio-medical waste. It aims to ensure the maximum collection of bio-medical waste at the right time to minimize environmental and health impacts. Additionally, the project seeks to prevent the transmission of diseases from patient to patient, as well as from patients to health workers and support service workers who handle bio-medical waste.

## 2.2 NEED AND OBJECTIVES OF THE PROJECT

### 2.2.1 Need of the project

Ministry of Environment, Forest & Climate Change (MoEF&CC), Govt. of India has notified the bio-medical waste (Management & Handling) Rules, 2016. In accordance to the Rule, every occupier of a Health Care Unit (HCU) shall either establish requisite bio-medical waste treatment facilities on site or ensure requisite treatment of the bio-medical waste at an approved Common Bio-medical Waste Treatment facility. No untreated bio-medical waste shall be kept stored beyond a period of 48 hours. As per the below advertisement shown in **Figure 2.1**, by TNPCB has invited application from project proponents to identify suitable land and to establish common bio medical waste treatment and disposal facility.

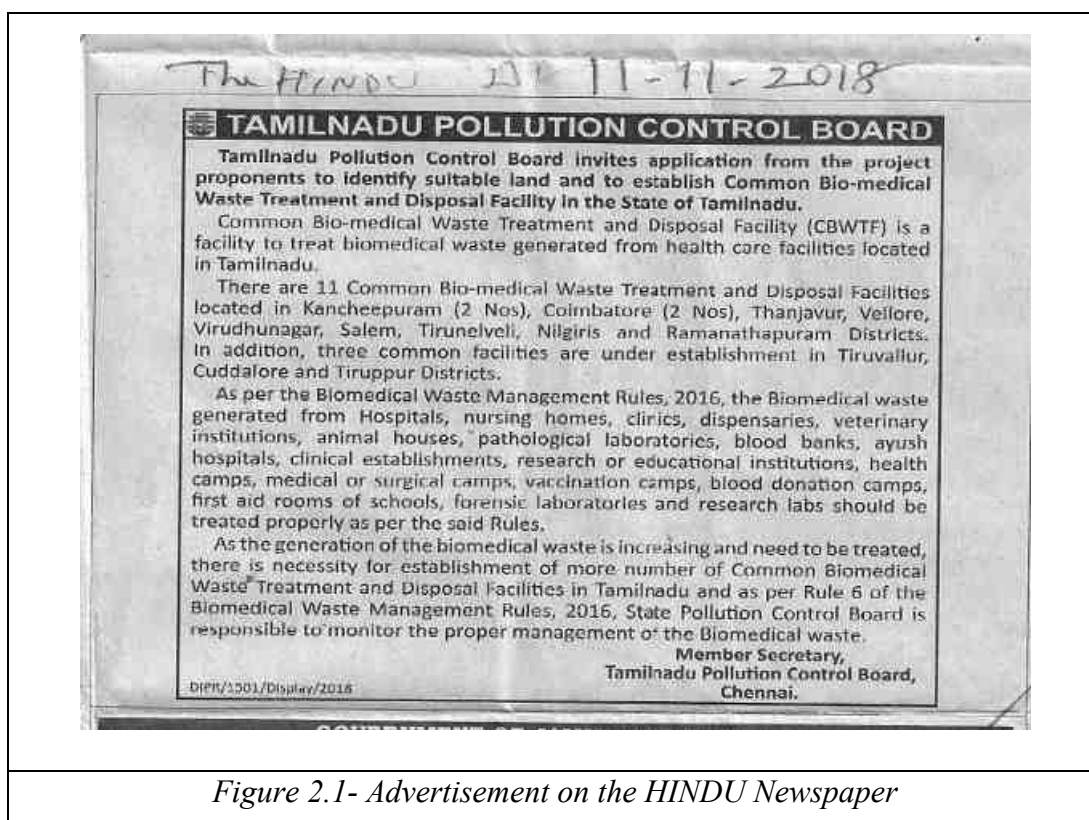


Figure 2.1- Advertisement on the HINDU Newspaper

In Pudukkottai district as per records there are about 3391 HCU of various types, detail is given below.

**Table 2.2-Types of HCU**

| S.no      | Health Care unit             | No of units |
|-----------|------------------------------|-------------|
| 1         | Primary health care unit     | 197         |
| 2         | Research centre              | 59          |
| 3         | Veterinary hospitals         | 153         |
| 4         | Nursing home                 | 389         |
| 5         | Multi-specialty hospitals    | 33          |
| 6         | Laboratories                 | 221         |
| 7         | Blood bank                   | 13          |
| 8         | Women and Children specialty | 65          |
| 9         | Ayush                        | 4           |
| 10        | Single specialty hospital    | 98          |
| 11        | Dispensaries                 | 247         |
| 12        | Eye care units               | 84          |
| 13        | Medical foundations          | 18          |
| 14        | Medical centre               | 127         |
| 15        | Clinic                       | 662         |
| 16        | Scan centres                 | 46          |
| 17        | Dental care units            | 159         |
| 18        | Educational colleges         | 11          |
| 19        | Hospitals                    | 805         |
| Total HCU |                              | 3391        |

### 2.2.2 Objectives of the project

- ❖ To provide environmentally sound solution for collection, transportation, treatment and disposal of bio-medical waste.
- ❖ To ensure maximum collection of bio-medical waste on right time to reduce environmental and health impacts.
- ❖ To prevent transmission of diseases from patient to patient, from patient to health worker and workers in support services while handling bio-medical waste.



## 2.3 LOCATION OF THE PROJECT

- ❖ Proposed project site is situated in the Survey No: 17/7, Pisanathur Village, Gandarvakkottai Taluk, Pudukkottai District, Tamil Nadu. At present, the land is barren, with few trees and shrubs.
- ❖ Pisanathur is a small Village/hamlet in Gandarvakkottai Taluk in Pudukkottai District of Tamil Nadu State, India.
- ❖ It is located 36 Km towards North East from centre of the Pudukkottai District. 380 Km from State capital Chennai. Gandarvakkottai is surrounded by Thanjavur Block towards North, Trichy Block towards North West, Pattukottai Block towards South East.

The detail on the location of proposed project site is shown in **Table 2.3**.

**Table 2.3-Location of the Proposed Project**

| Title           | Description                       |
|-----------------|-----------------------------------|
| Survey No.      | 17/7                              |
| Village Name    | Pisanathur                        |
| Taluk           | Gandarvakottai                    |
| District        | Pudukkottai                       |
| Geo coordinates | 10° 35' 28.64" N 79° 02' 08.45" E |
| SOI Toposheet   | <b>C44H2</b>                      |

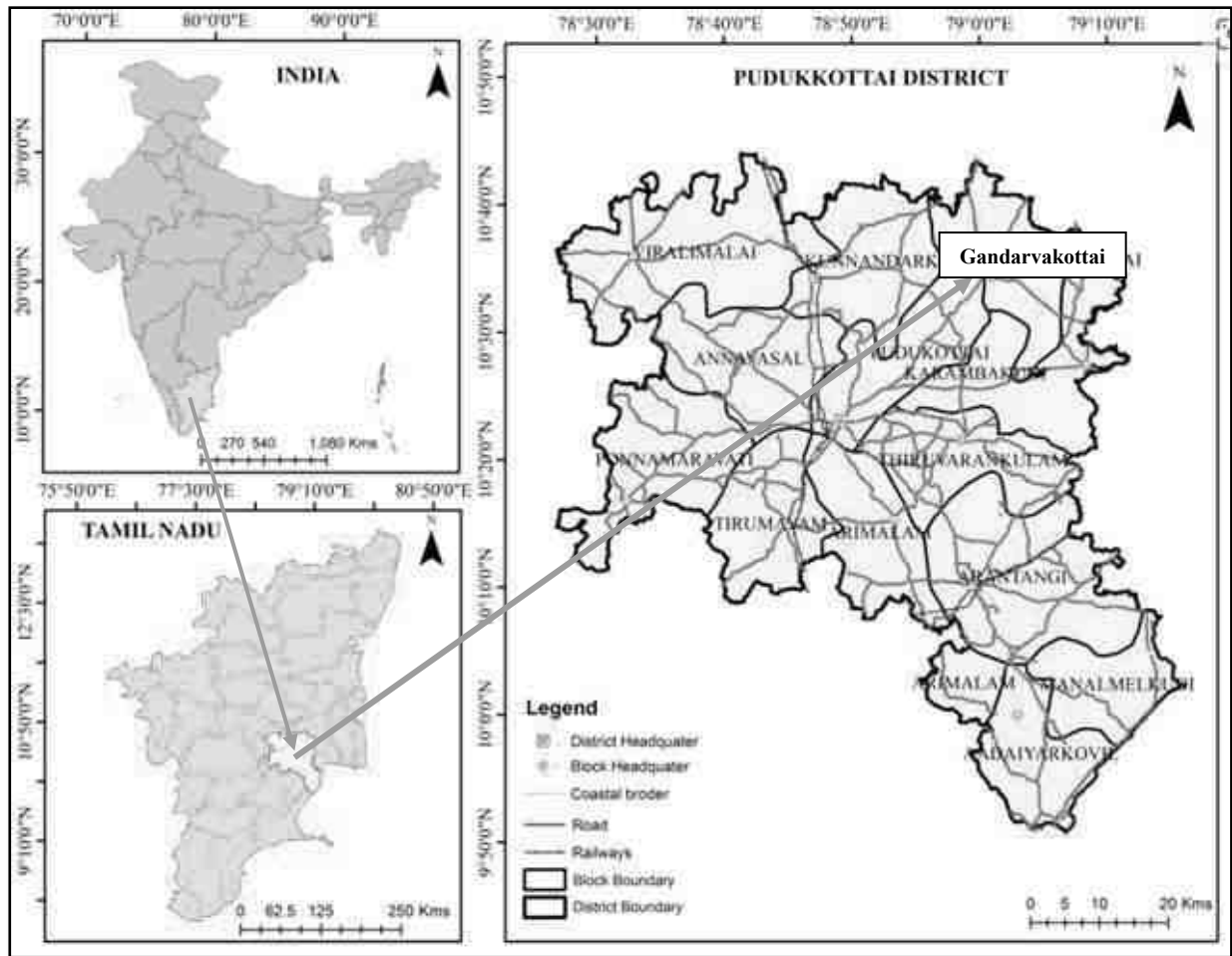


Figure 2.2-Location of the project site

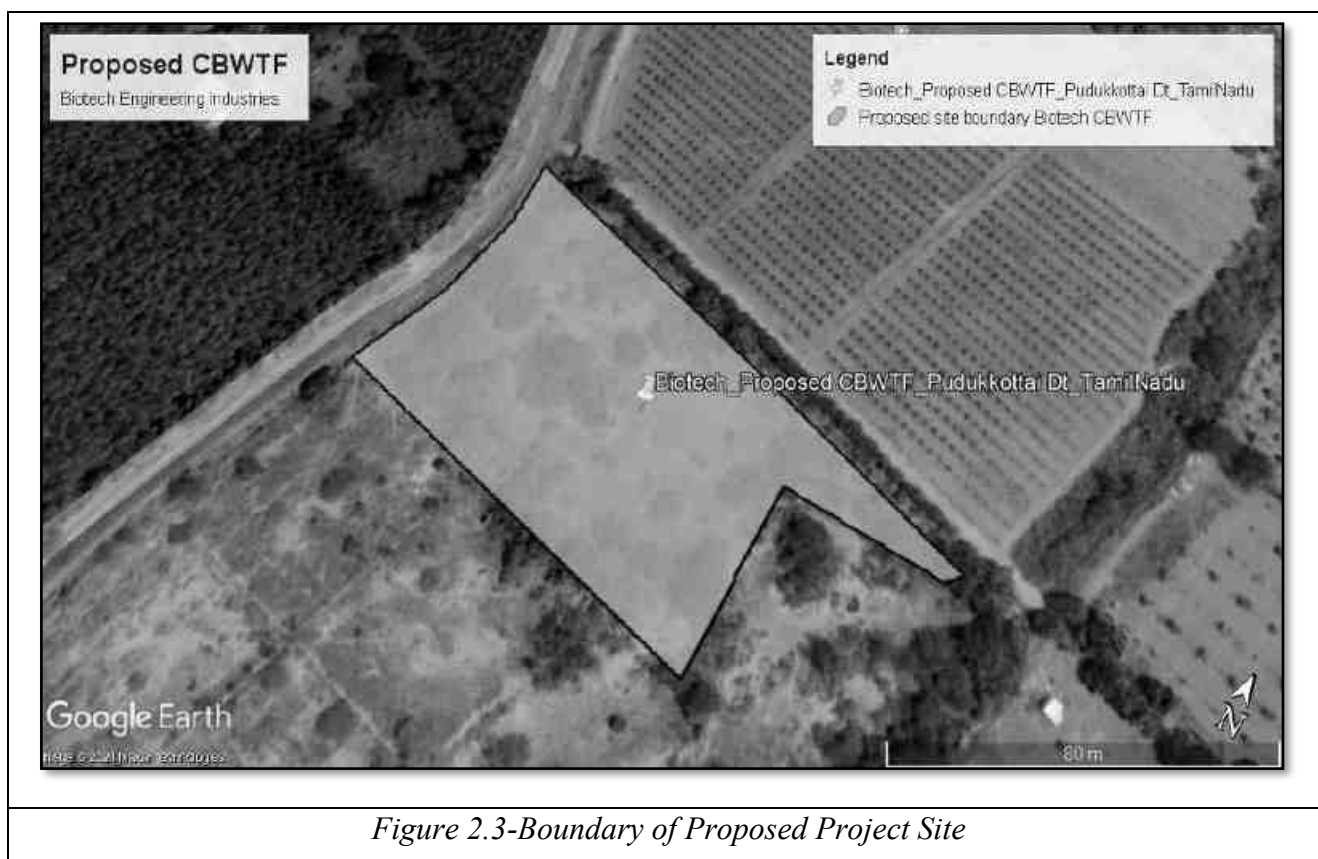


Figure 2.3-Boundary of Proposed Project Site

Table 2.4- Geo Co-ordinates of project site

| S.No | Location Number | Latitude & Longitude (DMS)       | Latitude & Longitude (Decimal Degree) |
|------|-----------------|----------------------------------|---------------------------------------|
| 1    | L1              | 10°35'30.2" N, 79°02'6.5" E      | 10.591722°, 79.035139°                |
| 2    | L2              | 10°35'28.7" N, 79°02'11.1" E     | 10.591306°, 79.036417°                |
| 3    | L3              | 10°35'28.6" N, 79°02'11.0" E     | 10.591278°, 79.036389°                |
| 4    | L4              | 10°35'28.7" N, 79°02'9.7" E      | 10.591306°, 79.036028°                |
| 5    | L5              | 10°35'27.1" N, 79°02'9.7" E      | 10.590861°, 79.036028°                |
| 6    | L6              | 10°35'27.9" N, 79°02'6.2" E      | 10.591083°, 79.035056°                |
| 7    | L7              | 10° 35' 28.45" N, 79° 2' 6.44" E | 10.591235°, 79.035123°                |
| 8    | L8              | 10° 35' 30.01" N, 79° 2' 8.39" E | 10.591668°, 79.035296°                |
| 9    | L9              | 10° 35' 29.12" N, 79° 2' 9.55" E | 10.591424°, 79.035987°                |
| 10   | L10             | 10° 35' 27.39" N, 79° 2' 8.88" E | 10.590942°, 79.035800°                |
| 11   | L11             | 10° 35' 28.17" N, 79° 2' 6.66" E | 10.591158°, 79.035184°                |
| 12   | L12             | 10° 35' 28.40" N, 79° 2' 6.44" E | 10.591223°, 79.035122°                |

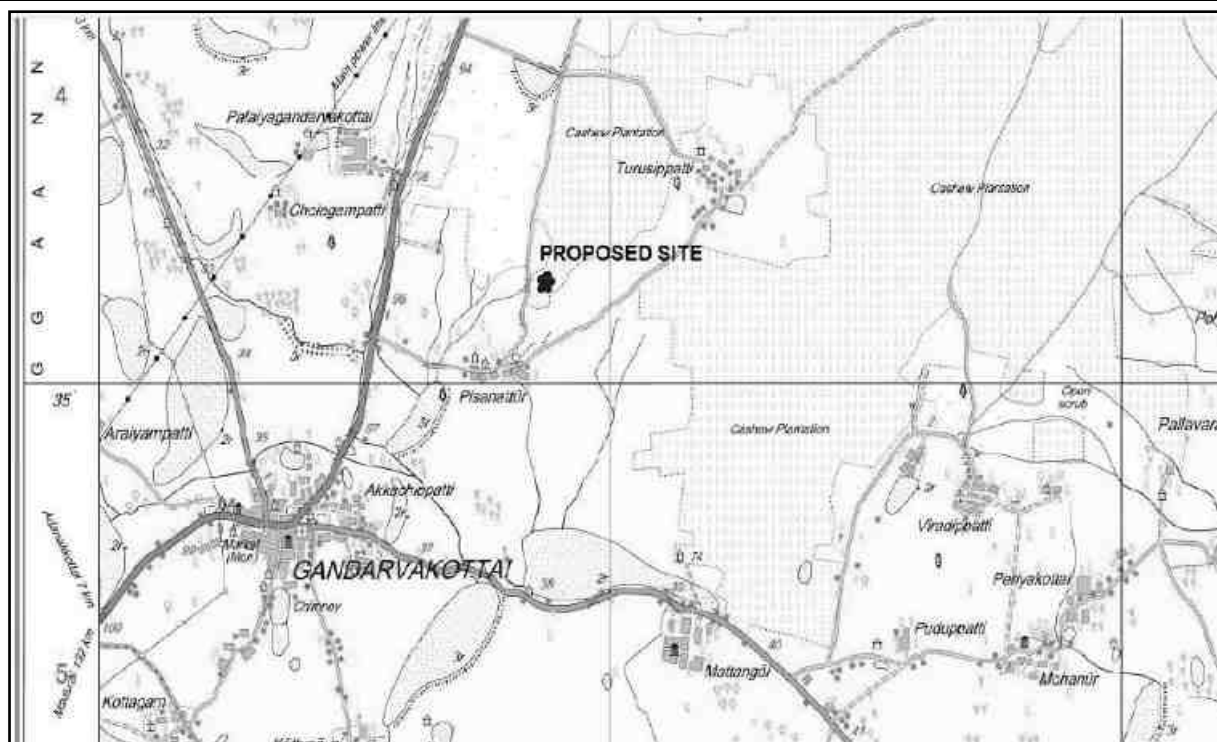
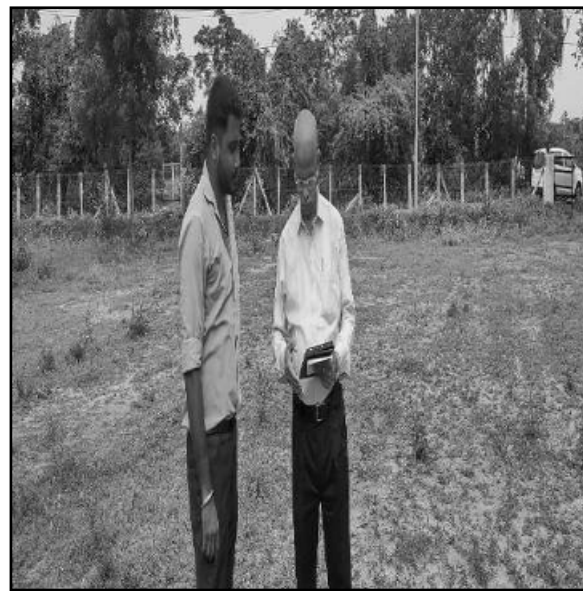


Figure 2.4-Topo map of area 2 km radius from the project site



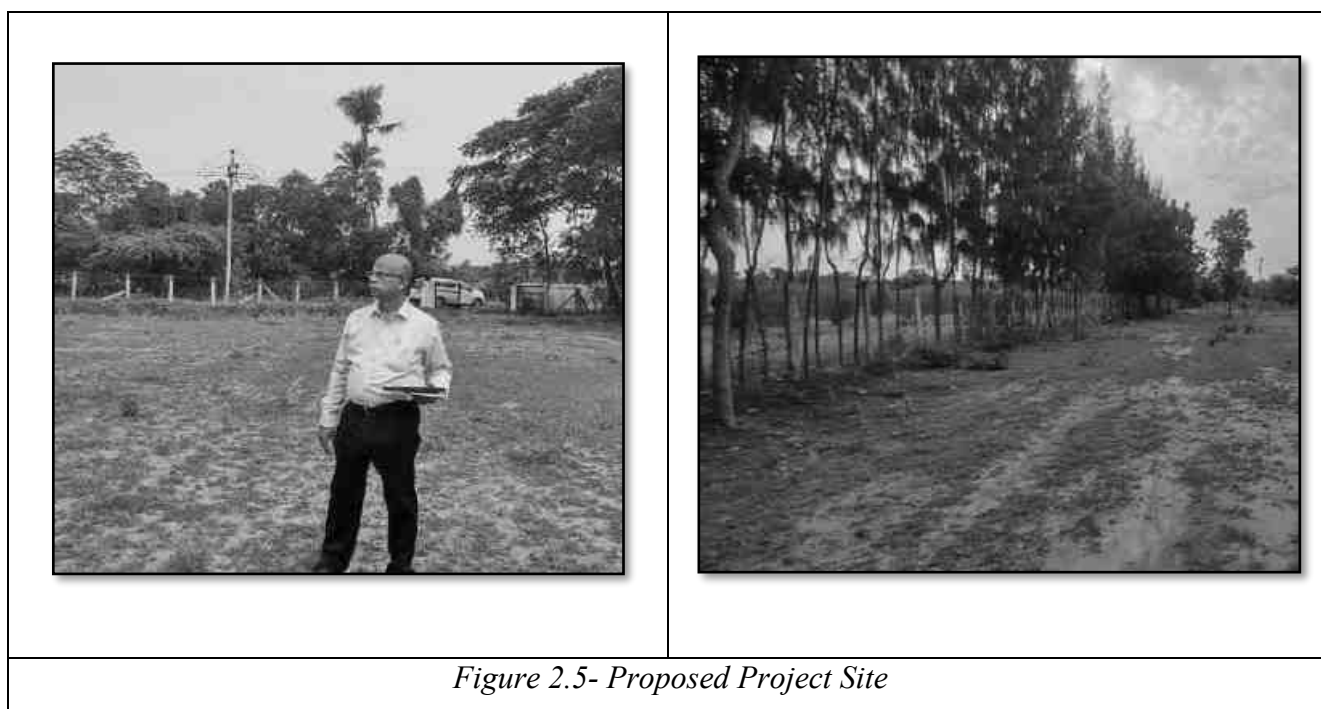


Figure 2.5- Proposed Project Site

## 2.4 ENVIRONMENTAL SETTING OF THE PROPOSED PROJECT

The project study area is considered as 0.5 Km to 10 Km radius from proposed project site. The Google Earth Satellite imagery showing 0.5 Km, 5 Km & 10 Km radius from proposed site is shown as Figure 2.6, 2.7 & 2.8 respectively. The environmental setting of the proposed project is given in **Table 2.5** below.

**Table 2.5-Environmental setting**

| Feature                                   | Details                                                                     |         |    |
|-------------------------------------------|-----------------------------------------------------------------------------|---------|----|
| <b>Village, Tehsil, District, State</b>   | Pisanathur Village, Gandarvakkottai Taluk, Pudukkottai District, Tamil Nadu |         |    |
| <b>District head quarters</b>             | Pudukkottai                                                                 | 30.3 Km | SW |
| <b>IMD STATION</b>                        | Tiruchirappalli International Airport - IMD                                 |         |    |
| <b>Max./Min Temp</b>                      | 39.70°C / 17.80°C                                                           |         |    |
| <b>Relative Humidity</b>                  | 59-85%                                                                      |         |    |
| <b>Annual rainfall</b>                    | 857.80 mm                                                                   |         |    |
| <b>Topography/ Soil Type</b>              | Ferruginous Lateritic soil                                                  |         |    |
| <b>Terrain, level with respect to MSL</b> | Flat terrain and lies at an altitude of 100 m MSL                           |         |    |
| <b>Nearest Habitation</b>                 | Pisanathur                                                                  | 0.77 Km | S  |

| Feature                        | Details                                                 |         |    |
|--------------------------------|---------------------------------------------------------|---------|----|
|                                | Pudunagar                                               | 2.76 Km | N  |
|                                | Veeradipatti                                            | 4.14 Km | SE |
|                                | Palaya Gandarvakottai                                   | 1.34 Km | W  |
| Nearest Major City             | Thanjavur                                               | 20 km   | NE |
| Nearest Air port               | Tiruchirappalli International Airport                   | 58.7 Km | NW |
| Nearest Sea port               | V. O. Chidambaranar Port                                | 223 Km  | S  |
| Nearest Railway                | Thanjavur Railway station                               | 24 Km   | NW |
| Nearest Highway                | (SH - 99) Thurukattupalli - Sengipatti-Pattukottai Road | 2.45 Km | S  |
|                                | (NH- 36) Pudukkottai-Tanjore Road                       | 1.28 Km | N  |
| Nearest Water Bodies           | Pisanathur Village Pond                                 | 0.65 Km | S  |
|                                | Sivan Koil Kulam                                        | 2.53 Km | SW |
|                                | Veeradipatti Vadaku Kulam                               | 4.00 Km | E  |
|                                | Pudunagar Pond                                          | 2.50 Km | N  |
|                                | Mattangal pond                                          | 2.00 Km | S  |
|                                | Kovilur Pond                                            | 2.57 Km | S  |
|                                | Gandarvakottai Lake                                     | 2.85 Km | W  |
| Nearest Forest                 | Nil                                                     |         |    |
| Historical places              | None within 10 km radius                                |         |    |
| Interstate boundary            | Nil                                                     |         |    |
| Source: *DCHB Pudukkottai 2011 |                                                         |         |    |



Figure 2.6-Map showing features within 500 m boundary from project site

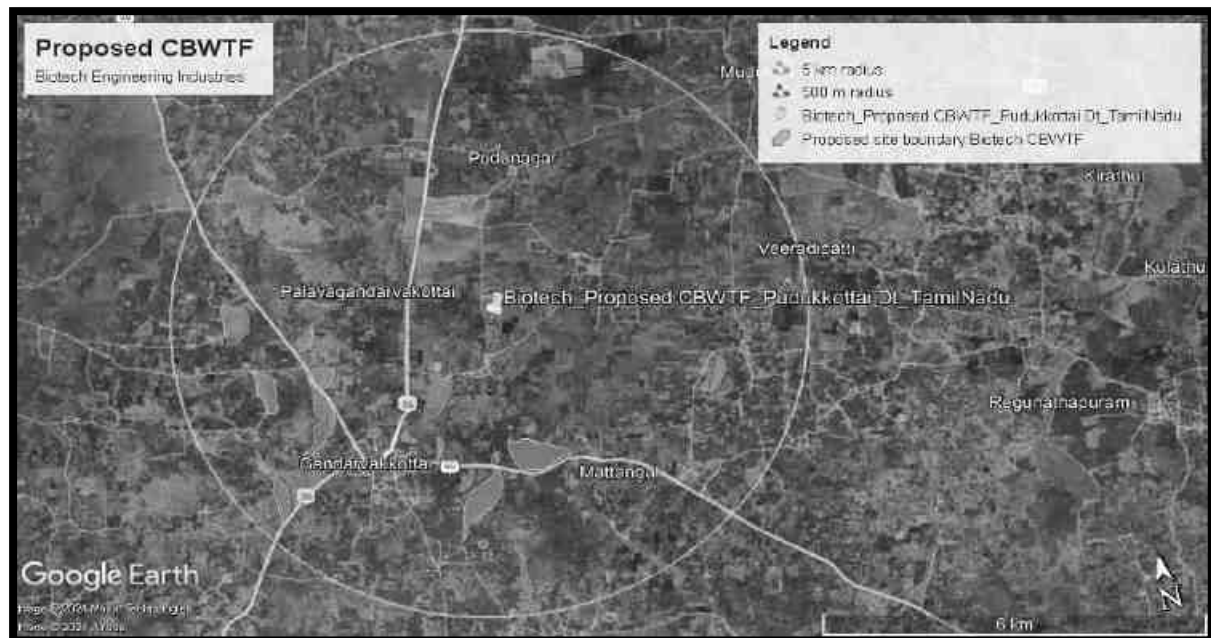


Figure 2.7-Map showing features within 5km boundary from project site

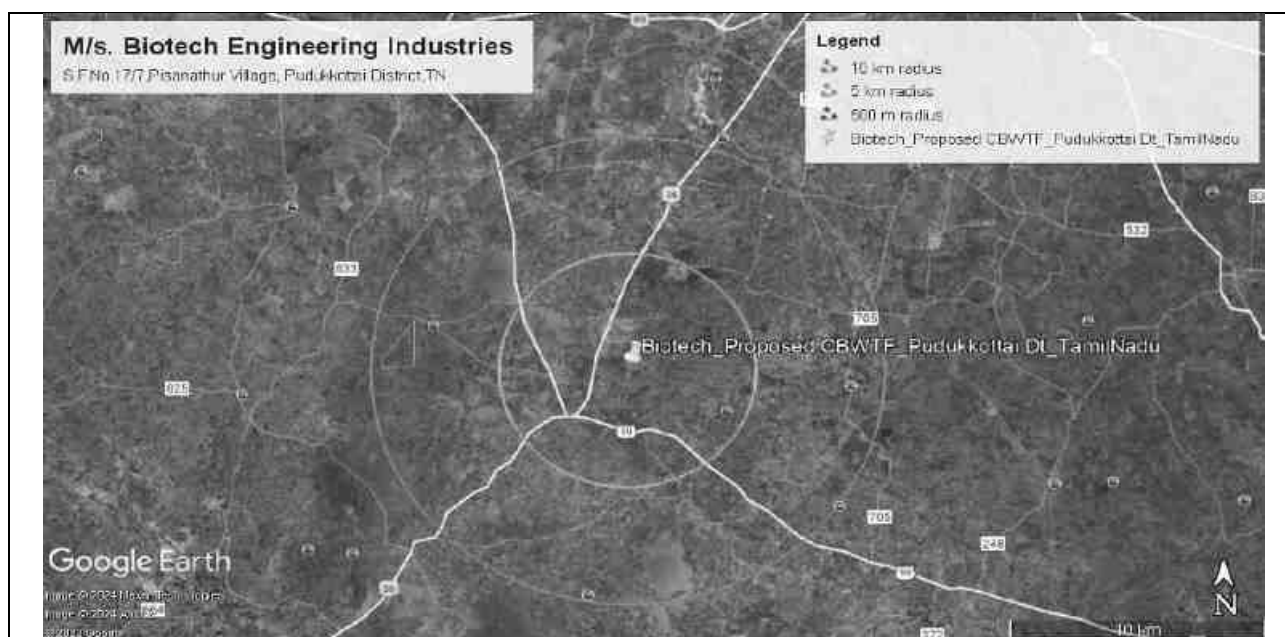


Figure 2.8-Map showing features within 10 km boundary from project site

## 2.5 SIZE OR MAGNITUDE OF OPERATION

- I. **Size** - M/s. Biotech Engineering Industries is proposed to establish 10 TPD Common Bio-Medical Waste Treatment Facility (CBWTF) to treat BMW generated from HCUs.
- II. **Plot size of the project** - M/s. Biotech Engineering Industries is a small-scale unit with 1.55 Acres (6250 Sq.M) land at Pisanathur Village Pudukkottai District
- III. **Capital Cost**- The proposed investment for the project is Rs. 2.83 Crores. The project cost break-up details are given **Table 2.6**. The Gross Fixed Asset of the proposed project is enclosed as **Annexure 11**.

**Table 2.6-Proposed Project Cost**

| S. No                   | Asset Type          | Value of Gross Fixed Asset |
|-------------------------|---------------------|----------------------------|
| 1.                      | Land                | Rs.16 Lakhs                |
| 2.                      | Building            | Rs.20 Lakhs                |
| 3.                      | Plant and machinery | Rs.175 Lakhs               |
| 4.                      | ETP & APC           | Rs.40 Lakhs                |
| 5.                      | Other Asset         | Rs.32 Lakhs                |
| <b>Total Investment</b> |                     | <b>Rs.283 Lakhs</b>        |



## 2.6 LAND DETAILS

The total land area of the project site is 1.55 Acres (6250 Sq. m) owned by Project Proponent.

The project land is a dry land, not suitable for agriculture. At present, the land is barren with few trees.

The soil is Ferrogenous Lateritic soil.

**Table 2.7-Land area Breakup**

| S.No            | Project area use  | Area (Sq.m) | % of total plot area |
|-----------------|-------------------|-------------|----------------------|
| 1               | Building coverage | 1148.10     | 18.56                |
| 2               | Green belt        | 2115.44     | 33.85                |
| 3               | Road coverage     | 650.66      | 10.41                |
| 4               | Parking area      | 112.90      | 1.81                 |
| 5               | Vacant area       | 2222.90     | 35.37                |
| Total Plot Area |                   | 6250        | 100%                 |

## 2.7 PROPOSED TIME SCHEDULE FOR APPROVAL AND IMPLEMENTATION OF THE PROJECT

On receipt of the EC from SEIAA, Tamil Nadu, Consent to Establishment (CTE) from TNPCB will be sought and take-up the construction work. The probable date of commissioning of project after obtaining CTO is scheduled for July 2026. Time schedule for project implementation is given in **Table 2.8** below

**Table 2.8-Time schedule for project implementation**

| Sl. No. | Activity                                            | Estimated completion time |
|---------|-----------------------------------------------------|---------------------------|
| 1       | Application for EC to SEIAA, TN                     | 15.07.2024                |
| 2       | Receipt of Terms of Reference from SEIAA, TN        | 22.10.2024                |
| 3       | Baseline Monitoring Period                          | Jan- April 2025           |
| 4       | Submission of draft EIA report to TNPCB, Tamil Nadu | June 2025                 |
| 5       | Public Hearing date by TNPCB                        | July 2025                 |
| 6       | Public Hearing proceeding by TNPCB                  | July 2025                 |
| 7       | Submission of EIA report to SEIAA, TN               | September 2025            |
| 8       | Probable time of EC approval                        | October 2025              |
| 9       | Application to TNPCB for CTE                        | November 2025             |
| 10      | Expected time of CTE from TNPCB                     | January 2026              |
| 11      | Civil works completion                              | April 2026                |
| 12      | Commissioning after obtaining CTO                   | July 2026                 |

## 2.8 PROJECT DESCRIPTION INCLUDING DRAWINGS SHOWING PROJECT LAYOUT, COMPONENTS OF PROJECT

The proposed project is establishment of a Common Bio-medical Waste Treatment Facility (CBWTF) for treatment and disposal of bio-medical waste. The project site is situated in Pisanathur village, Pudukkottai district.

## 2.9 PROPOSED INFRASTRUCTURE

The proposed Common Bio-Medical Waste Treatment Facility (CBWTF) will be equipped with comprehensive infrastructure to support safe, efficient, and compliant operations. The facility is designed to meet CPCB guidelines and ensure the health, safety, and welfare of workers and the environment.

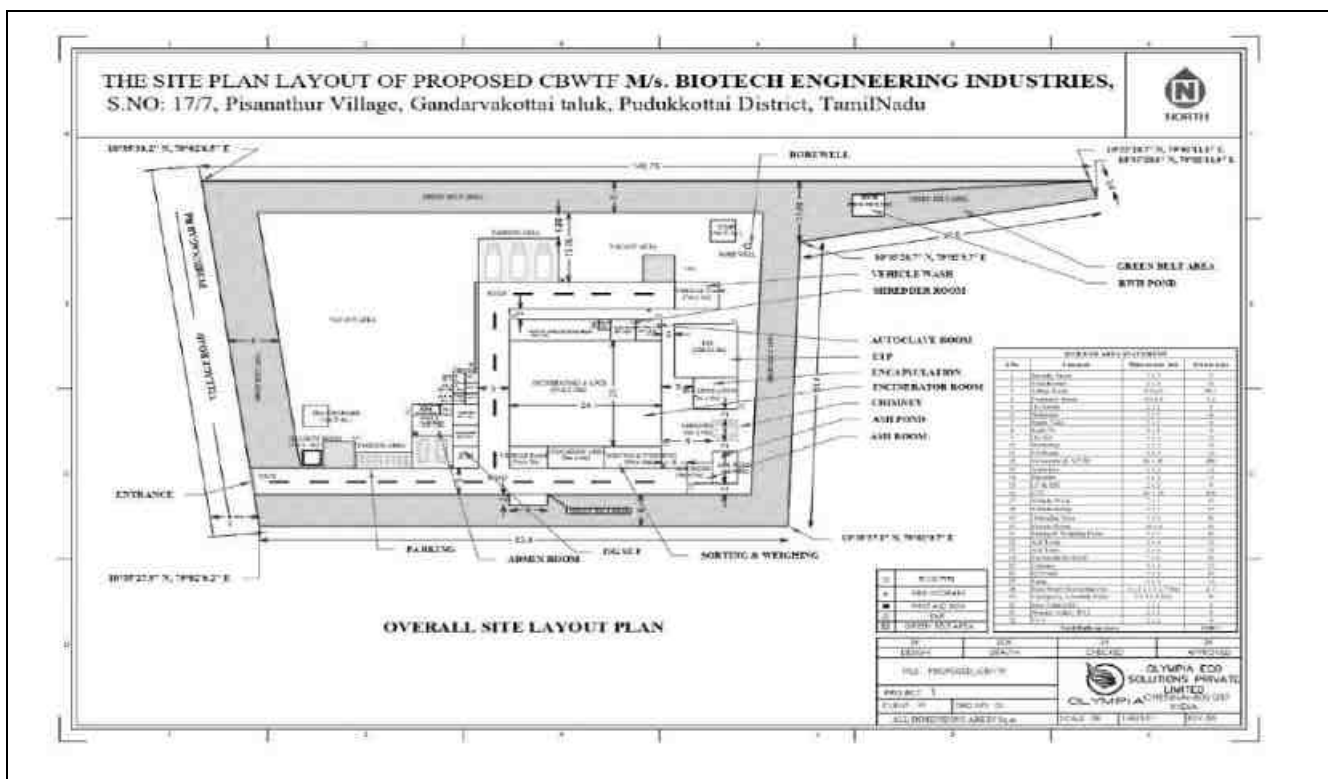


Figure 2.9-Overall Site Layout Plan

The Overall site plan layout of the proposed site is enclosed as **annexure 8**.

### Main Facility Components

- Administration Building
- Workshop
- Unloading & Segregation Room
- Process Area, including:
  - ✓ Incineration Shed

- ✓ Autoclave Unit
- ✓ Shredder Unit
- ✓ Encapsulation Room/Pit
- Ash Storage Area
- Mercury Waste Storage Room
- Effluent Treatment Plant (ETP)
- Vehicle Washing Area
- Electrical Room & DG Sets
- Security Room
- Transformer Area
- Rainwater Harvesting Pits
- Parking Area
- Workers rest Area
- Canteen

### **Supporting Facilities**

- **Washing Room**

A separate washing room will be provided for workers, equipped with eye wash units, hand washing stations, and bathing facilities to maintain hygiene and safety.

- **Site Security**

The facility will be enclosed with high boundary walls, fencing, and guarded entry/exit gates to prevent unauthorized access by individuals or animals.

- **Fire Safety Measures**

Fire protection measures will include:

- Fire extinguishers and sand buckets at strategic locations (incinerator area, diesel storage, etc.)
- Fire alarm systems for early warning
- First aid kits and basic training for all staff in fire response and first aid procedures

- **Display and Signage**

- Facility name and operator details
- Address and contact numbers
- Prescribed authority's contact details
- Operational hours and emergency contacts

- Authorization validity and waste handling capacity
- Internal signboards will be placed in all critical zones, including:
  - Waste storage (treated and untreated)
  - Treatment equipment areas (incinerator, autoclave, shredder)
  - ETP and safety equipment locations

## 2.10 TECHNOLOGY AND PROCESS DESCRIPTION

The facility is for treatment and disposal of bio-medical waste defined under Bio-medical waste Management Rules 2016. There is no risk of technological failure as the facility will be designed and operated as per the guidelines published by CPCB. Technology and process description of the proposed project is detailed in subsequent sections.

### 2.10.1 Types of wastes handled in CBWTF

The types of wastes that are going to be handled in the facility, its source, quantity and mode of treatment & disposal are given in **Figure 2.10**. The facility will have the capacity to handle 10 Ton/Day.

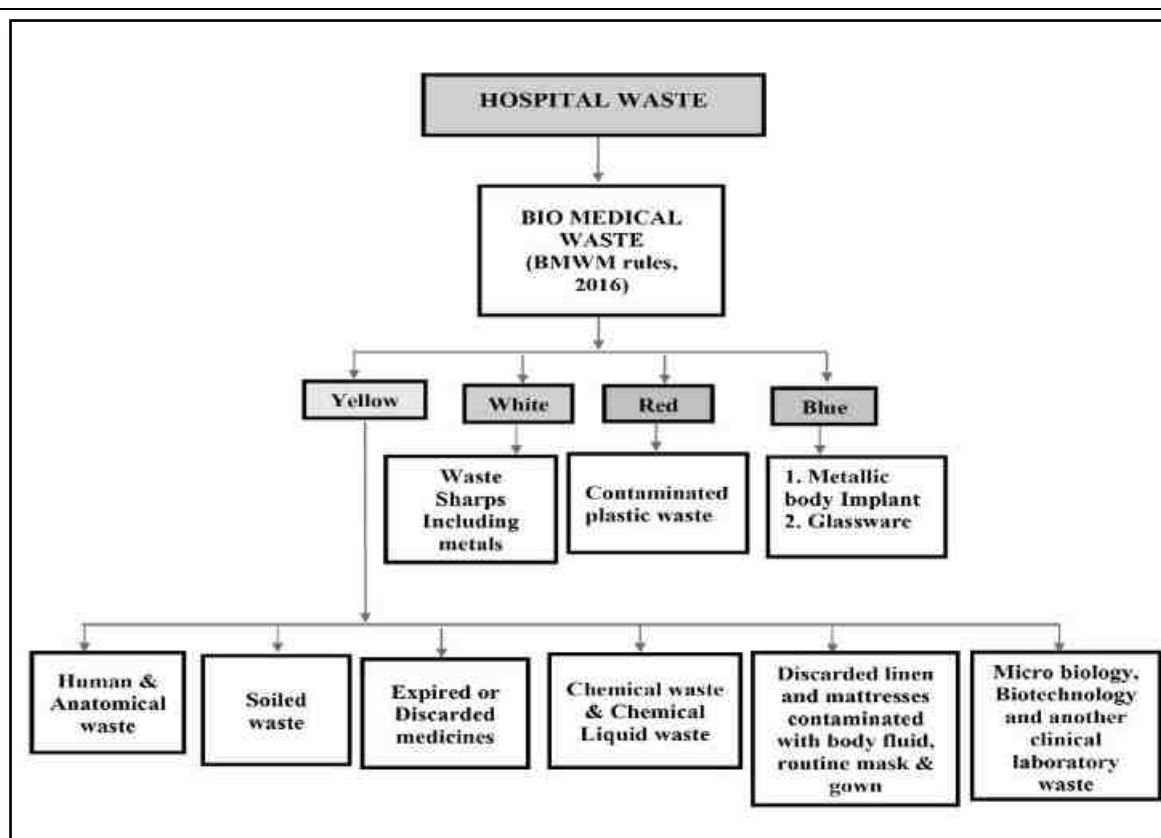


Figure 2.10 Categories of waste

**Note** -The wastes listed above will be transported through designated closed vehicles of treatment facility from HCEs to CBWTF.

### 2.10.2 Process Flow of Treatment and Disposal of Bio-Medical Waste

The **Figure 2.11** shows the process flow of common bio-medical waste treatment facility followed by M/s. Biotech Engineering Industries.

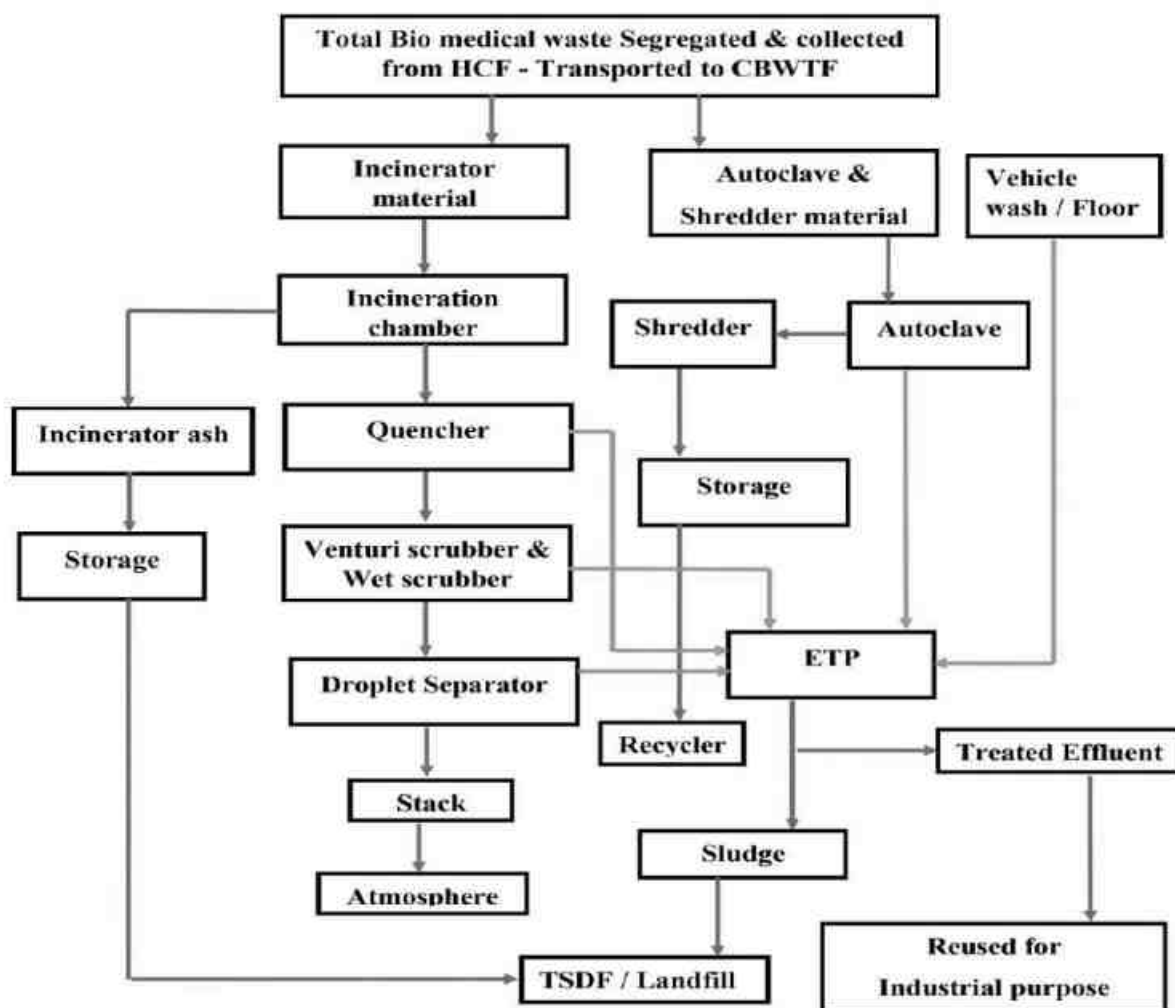


Figure 2.11– Schematic representation showing the process followed for waste treatment and disposal by CBWTF

### 2.10.3 Components of the Proposed CBWTF

The various components of the CBWTF have been designed to meet the requirements of Guidelines for Common Bio-medical Waste Treatment and Disposal Facilities, 2016.

**1) Segregation of BMW at source:** It is the responsibility of Health Care Establishment (HCE) to

segregate the waste at source and to contain them in color-coded containers/plastic bags as stipulated in BMW (Management & Handling) Rules, 2016. The color coding as prescribed in the 'Biomedical waste management and handling Rules' is indicated in **Table 2.9**. The segregated waste is stored in the temporary waste storage unit at the HCEs.

**2) Packaging and Labelling:** The coloured bags handed over by the healthcare units shall be collected by CBWTF in similar coloured containers with proper cover. Each bag shall be labelled as per Schedule IV, as well as with bar coding system.

- All the bags/ containers/ bins used for collection and storage of bio-medical waste, must be labelled with the Symbol of Bio Hazard or Cytotoxic Hazard as the case may be as per the type of waste in accordance with the BMW Rules, 2016.
- BMW plastic bags segregated from HCEs are required to provide with bar code labels/ QR code labels in accordance with the CPCB guidelines for "Guidelines for barcode System for Effective Management of Biomedical Waste" April, 2018. The purpose of bar coding/ QR coding is to maintain the tracking of source of generation of BMW and final destination of disposal and treatment.
- The bar code label should be paste on the centre or near the centre of the plastic bags/ containers
- A color mark or text is required on bar code label for easy identification of the bar code (by the workers handling bio-medical waste) with designated color-coded bag or container. The color mark or Text shall be placed at the top left corner of the bar code label.
- Unique Number of the HCU and its specification: the bar code label contains unique code number which is developed and provided by SPCB to each HCUs
  - a) The name of the HCFs shall be indicated by first 5 letters
  - b) The name of the place where HCF is located is indicated by 6-digit postal pin code
  - c) The name of the state/UT shall be indicated in the form of two-digit alphabets.
  - d) The type of HCF should be indicated by two-digit alphabetical number (first two letters of a type of HCF/first letter in two words of an HCF)
  - e) The last five-digit number is the indication of numerical number of the HCF which is provided by SPCB
- Details like date of waste generation, type of waste category, quantity of waste generated, generator's details, contact details of responsible person in case of any emergency, receiver's details etc., should also be labelled on the BMW plastic bags and containers apart from bar coding/ QR coding labels.

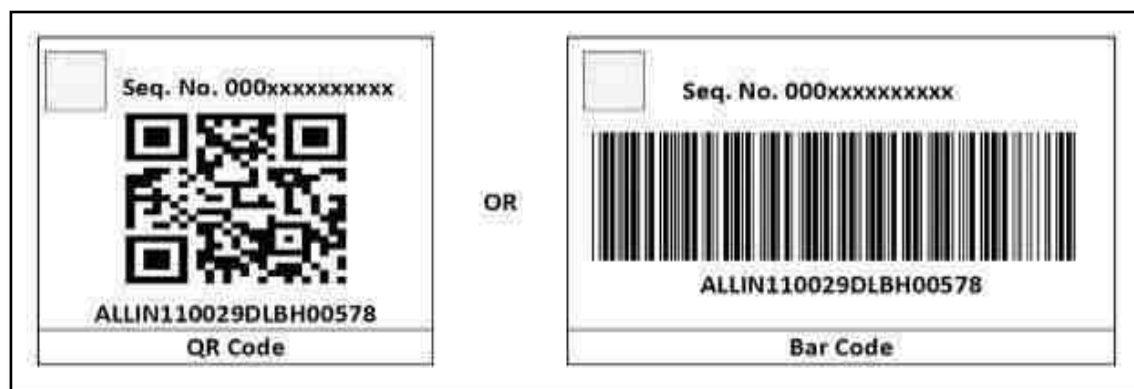


Figure 2.12– Typical Bar code / QR code Label

(Source: “Guidelines for barcode System for Effective Management of Biomedical Waste” April, 2018)

Table 2.9-Colour coded Containers/plastic bags stipulated by BMW Rules, 2016

| Category      | Type of Bag/ Container Used                           | Type of Waste                                                                                                                                                                                    | Treatment/ Disposal Options                          |
|---------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| <b>Yellow</b> | Non- chlorinated plastic bags                         | <b>a. Human Anatomical Waste</b><br><b>b. Animal Anatomical Waste</b><br><b>c. Soiled Waste</b><br><b>d. Expired/ Discarded Medicines</b><br><b>e. Micro, Bio-T and other clinical lab Waste</b> | Incineration.                                        |
| <b>Red</b>    | Non- chlorinated plastic bags or containers           | <u><b>Contaminated Waste (Recyclable)</b></u><br>tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles) and gloves                                       | Autoclave sterilization and then sent for recycling. |
| <b>White</b>  | Puncture, Leak, Tamper proof containers (Translucent) | <b>Waste sharps including metals</b>                                                                                                                                                             | Autoclave sterilization followed by shredding.       |

| Category | Type of Bag/ Container Used              | Type of Waste | Treatment/ Disposal Options                          |
|----------|------------------------------------------|---------------|------------------------------------------------------|
| Blue     | Cardboard boxes with blue colour marking | Glassware     | Autoclave sterilization and then sent for recycling. |

### 3.) Collection and Transportation of Bio-Medical Waste

Biomedical Waste (BMW) generated from various Health Care Facilities (HCFs) located within a 75 km radius will be collected by the Common Bio-Medical Waste Treatment Facility (CBWTF) using fully covered transportation vehicles.

The personnel assigned for waste collection will carry a register to systematically record the following details:

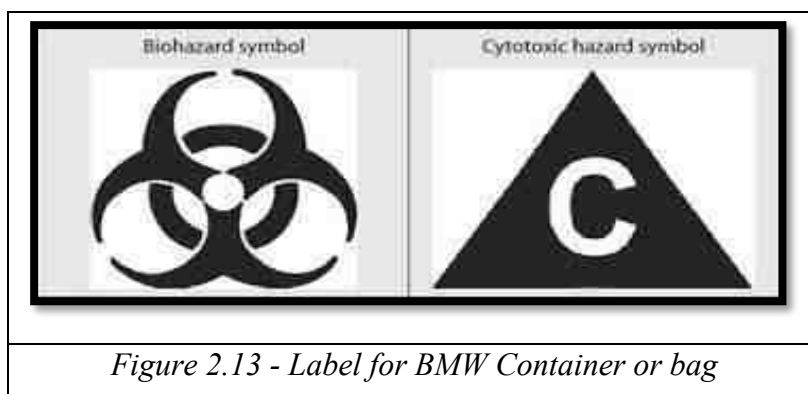
- Name of the healthcare facility
- Type and quantity of waste received
- Time of collection from the facility
- Signature of the authorized representative of the HCF

Transportation will be carried out using specially designed, covered vehicles that display a clear label indicating that biomedical waste is being transported. Each vehicle will prominently feature the biohazard symbol, as prescribed in Schedule IV of the Biomedical Waste Management Rules, 2016.

Initially, four dedicated vehicles will be deployed for waste collection and transportation. These vehicles will adhere to the following standards and specifications

- Separate compartments for the driver/staff and for biomedical waste storage.
- Leak-proof base in the waste compartment to facilitate easy cleaning and disinfection.
- Proper labeling with the Biohazard symbol and display of the company's name, address, and contact number.
- Mobile phones provided to drivers to ensure continuous communication and effective supervision.
- Installation of GPS tracking systems in compliance with Tamil Nadu Pollution Control Board (TNPCB) requirements.
- Smooth inner surfaces in the waste compartment to minimize water retention and facilitate maintenance.
- Adequate rear openings for convenient loading and unloading of biomedical waste.
- Provision of First Aid Kits in each vehicle to handle any emergency situations during transport.





#### 4. Waste Storage room

The waste collected from HCEs are brought in by the vehicles to the facility is stored in a designated storage area in the facility. The bags labelled with bar codes are scanned for identifying the details of source of waste generated and for maintaining records. The storage area consisting of the following;

Separate space will be provided to store the wastes collected from HCE's and treated in different treatment units in the facility. The wastes will be stored in separate group as per the disposal options. Other provisions in the room will be similar to the main storage room. Waste such as incineration ash generated in the process of incineration will be stored safely in a separate area under the shed so as to avoid entry of rain water during the monsoon and for easy collection. Incineration ash is found to be hazardous waste in nature & it will be disposed to authorized TSDF operator, following the manifest as per Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016. The details of storage facility are as under

- A high roof storage shed with impervious flooring to prevent seepage of liquid waste into the soil and Ground water
- The shed is given provision for natural ventilation to control odour
- Storage area is designed to withstand the load of waste stocked and ensuring no probable impact from bio-medical waste spillage
- The shed is provided with proper slopes which acts as secondary containment as well as the floor level is at least 150 mm above the maximum flood level
- In case of spills/leak from the stored waste, cotton will be used to mop the leachate from the floor and incinerated
- Smoking is prohibited in and around the storage area
- Proper housekeeping and maintenance of the storage area
- Only person authorized and trained will have access to the bio-medical waste storage area.

- It is to be ensured that central storage area is under lock and guarded by a designated person.
- To ensure protection from the animals in the facility premises, cattle traps at the entrance of the facility will be installed.
- To ensure protection against the pest, the pest control agency will be engaged to take control measures on regular basis.
- Proper record of BMW received at site will be maintained as per the protocol in the guidelines.
- Recyclable waste such as plastic and glass, after disinfection through autoclave and shredding/chemical disinfection are collected separately and stored in closed shed. These materials are disposed to authorized recyclers.

#### 2.10.4 Treatment Process components

The components in the Common Bio-medical Waste Treatment Facility include incinerators, Autoclave, Shredder, Effluent Treatment Plant, Air pollution control devices with computerization. The following are the proposed equipment to be installed in the plant as shown in **Table 2.10**.

**Table 2.10-List of Equipment**

| Sl.No. | Equipment                                                                                                           | Installed Capacity  | Numbers |
|--------|---------------------------------------------------------------------------------------------------------------------|---------------------|---------|
| 1      | Static Incinerator                                                                                                  | 200 Kg Per Hour     | 1       |
| 2      | Static Incinerator                                                                                                  | 100 Kg Per Hour     | 1       |
| 3      | Autoclave                                                                                                           | 1220 litre Per Hour | 1       |
| 4      | Shredder                                                                                                            | 200 Kg Per Hour     | 1       |
| 5      | Effluent Treatment Plant                                                                                            | 25 KLD              | 1       |
| 6      | Air Pollution Control Devices – Quencher (Spray cooler), Venturi Scrubber, Flue Gas Wet Scrubber, Droplet Separator |                     |         |
| 7      | Continuous Emission Monitoring System (CEMS)                                                                        |                     |         |

##### 2.10.4.1 Incinerator

Incineration is the controlled combustion process where the waste is completely oxidized and converts into inert material and gases. Incinerators can be oil fired, gas fired, electrically powered or a combination of gas and oil. The incinerator will have Primary and secondary combustion chambers raising temperature to 800+50 °C and 1050+50 °C respectively.

The incinerator shell is lined with high temperature resistant refractory bricks. In incinerators, solid phase combustion takes place in the primary chamber whereas the secondary chamber is for gas phase combustion. Additional burners are used to raise the temperature in secondary chambers.

The waste is incinerated in two stages i.e. the primary combustion chamber and the secondary combustion chamber which are placed next to each other.

The Primary Combustion chamber operates at 800+50 °C where the wastes are oxidized and harmful microorganisms present in it are destroyed and all volatiles are released. The remaining substrate gets converted into sterile ash.

The volatiles released from the primary combustion chamber are then completely burnt in the secondary combustion chamber under high temperature and excess air. The flue gases are treated through the high pressure drop Venturi Scrubber, Wet Scrubber, droplet separator and are let out to atmosphere via ID fan and 30 m high chimney.

Light Diesel Oil is used as fuel for the incineration process. The daily requirement of diesel is met by daily procurement in 250 litre capacity barrels. The Technical specification of the proposed Incinerator is enclosed as **Annexure 12**.

### ***Incineration Process Description***

Incineration system contains basic elements such as feed system, combustion chambers (primary and secondary), exhaust system and residue disposal system. The incinerator equipment includes material feeding system at front end of the incinerator in to the primary combustion chamber and air pollution control devices at the back end of the incinerator.

The incineration plant is divided into following sections:

- a. Waste Receiving and Storing Area
- b. Feeding Section
- c. Incineration Section/Combustion chamber – primary and secondary
- d. Pollution Control devices

#### **a. Waste Receiving and Storing Area**

The BMW generated from HCEs are collected within 24 hours of generation. The wastes will be stored in separate group as per the colour of containers and disposal options. The BMW collected will be stored in the facility (waste storage area) in a secured manner. The waste is quantified and inventory is maintained.

#### **b. Feeding Section**

The BMW stored in the storage area is carried through trolleys to incineration section. The solid waste will be fed through Belt Conveyor directly to the Combustion chamber.

Feed rate of waste materials charging is 50-60 Kg in every 15 mins for 200 Kg/hr. incinerator system and 20-30 Kg in every 15 mins for 100 Kg/hr. incinerator system.

### c. Incineration Section

#### Incinerator Operating Standards

- The facility is designed to achieve a minimum temperature of 800<sup>0</sup>C+50<sup>0</sup>C in the primary combustion chamber and 1050<sup>0</sup>C ± 50<sup>0</sup>C in secondary combustion chamber and the gas retention time in secondary combustion chamber should be at least 2 seconds.
- Diesel is used as a fuel in incineration process and fuel consumption for 200 Kg/hr incineration system is 35-37 Lt/hr and 100 Lt/hr incineration System is 25-27 Lt/hr.
- Incinerator will be operated in such temperature, retention time and turbulence so as to achieve total organic carbon (TOC) content in the slag and bottom ashes is less than 3% or their loss on ignition is less than 5% dry weight of the material.
  - Combustion efficiency (CE) will be at least 99.99%
  - The combustion efficiency is computed as follows:

$$C.E. = \frac{\%CO_2}{\%CO_2 + \%CO} \times 100$$

CO<sub>2</sub> - dry volume stack concentration of CO<sub>2</sub> in ppm

CO - dry volume stack concentration of CO in ppm

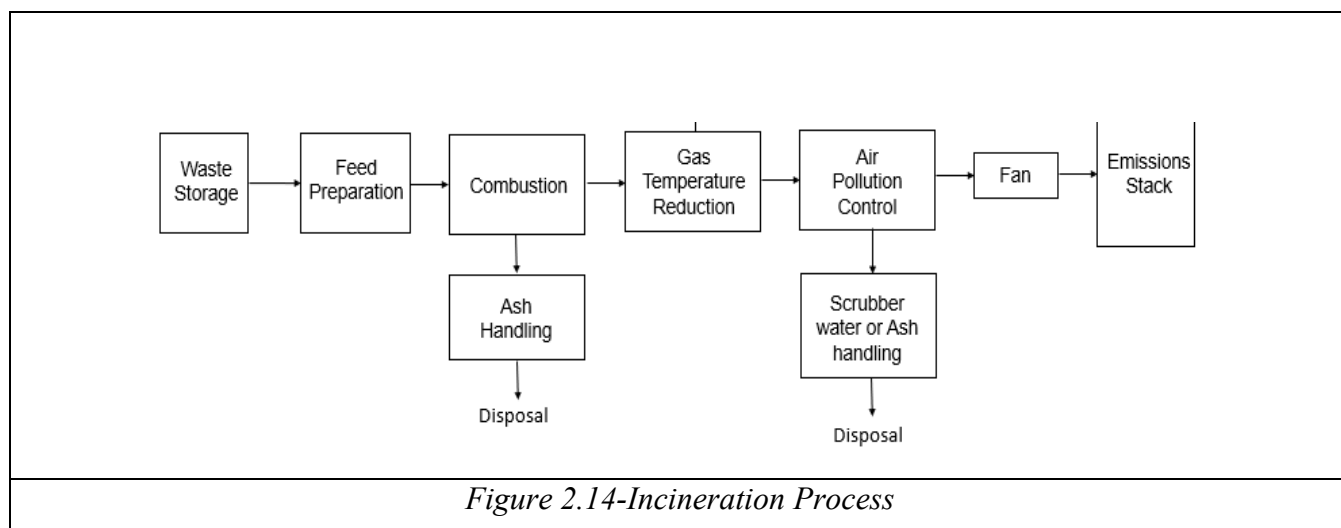


Figure 2.14-Incineration Process

The plant will have structurally stiffened incineration chambers duly lined with environment compatible high alumina hot face and insulated with refractory bricks line, with openings for flue gases, instruments and burners. Technical specification of Incinerator is given in **Table 2.11**.

**Table 2.11– Technical specification of Incinerator**

| S.No | Components                   | Description and Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Primary Combustion Chamber   | The first phase of the incineration is combustion without air, comparable to gasification. This combustion in a reduced atmosphere produces some combustion gas rich in CO and not in CO <sub>2</sub> . This is a considerable advantage for the post-combustion of gases-CO is combustible. The process runs in a complete self-combustion and doesn't need any other combustible, except for the preheating or the starting, if waste has a calorific power superior to 2000 kcal/kg.                                                                                                                                                                   |
|      |                              | <ul style="list-style-type: none"> <li>➤ It will be Static Solid Hearth type.</li> <li>➤ Construction material will be Mild Steel.</li> <li>➤ Design temperature will be 1400°C.</li> <li>➤ Waste charging will be automatic through DFDV System</li> <li>➤ Manual ash removal.</li> <li>➤ Combustion Fan provided.</li> <li>➤ Burner provided.</li> <li>➤ Ash amount for Static – (5-8%)</li> </ul>                                                                                                                                                                                                                                                      |
| 2    | Secondary Combustion Chamber | <p>The second phase is post combustion (secondary chamber) at high temperature of the gases produced by the rotary furnace. The high content of CO in these gasses' permits are-lighting by simple air injection without using any other combustible. This process is therefore especially well adapted for a treatment on the site.</p> <ul style="list-style-type: none"> <li>➤ It will be Static Solid Hearth type.</li> <li>➤ Construction material will be Mild Steel.</li> <li>➤ Design temperature will be 1400°C.</li> <li>➤ Residence time for flue gas is 2 seconds.</li> <li>➤ Combustion Fan provided.</li> <li>➤ Burner provided.</li> </ul> |

| S.No | Components                                               | Description and Specification                                                                                                                                                                                                                                                                         |
|------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3    | Venturi Scrubber                                         | <ul style="list-style-type: none"> <li>➤ It will be high pressure jet type.</li> <li>➤ Gas outlet temperature - (78-80°C).</li> <li>➤ Scrubbing media will be water with 5% caustic.</li> <li>➤ Centrifugal pump provided for water re-circulation.</li> </ul>                                        |
| 4    | Air Pollution Control Device - Quencher                  | <ul style="list-style-type: none"> <li>➤ Provided to reduce flue gas temperature before venturi scrubber</li> </ul>                                                                                                                                                                                   |
| 5    | Venturi Scrubber                                         | <ul style="list-style-type: none"> <li>➤ It will be high pressure jet type.</li> <li>➤ Gas outlet temperature - (78-80°C).</li> <li>➤ Scrubbing media will be water with 5% caustic.</li> <li>➤ Centrifugal pump provided for water re-circulation.</li> </ul>                                        |
| 6    | Droplet Separator & Water Re-Circulation Tank (Integral) | <ul style="list-style-type: none"> <li>➤ It will be cyclonic type.</li> <li>➤ It helps to separate water droplets for the flue gases.</li> </ul>                                                                                                                                                      |
| 7    | Packed Bed Scrubber                                      | <ul style="list-style-type: none"> <li>➤ Packing media will be PP saddles.</li> <li>➤ Centrifugal pump provided for water re-circulation</li> </ul>                                                                                                                                                   |
| 8    | Mist Eliminator                                          | <ul style="list-style-type: none"> <li>➤ To remove the water droplet from the gases</li> <li>➤ Provided for internal protection</li> </ul>                                                                                                                                                            |
| 9    | Control Panel                                            | <ul style="list-style-type: none"> <li>➤ It will be PLC (Programmable Logic Control) based.</li> <li>➤ It will be PLC (Programmable Logic Control) based.</li> <li>➤ HMI provided for display of plant operations and temperature controls.</li> <li>➤ Audio-visual alarm system provided.</li> </ul> |
| 10   | Chimney Of 30 metres Height                              | <ul style="list-style-type: none"> <li>➤ Chimney will be self-supporting.</li> <li>➤ Chimney will be made of mild steel.</li> <li>➤ Height of the chimney from the ground level is 30 mtrs.</li> <li>➤ Chimney will be provided with ladder till the top</li> </ul>                                   |

#### d. Air Pollution Control Devices

The wastes incinerate by the incinerators during combustion process produces gaseous pollutants and flue gases such as oxides of nitrogen and Sulphur, Dioxins, HCl and some other heavy metals which are harmful to the environment. To reduce the pollutants from flue gases Air pollution Control Devices (APCD) are used in the incineration process.

APCD devices such as Quencher, Venturi Scrubber, Wet Scrubber, Droplet separator are used for the reduction of pollutants in flue gases within emission standards.

#### *Emission standards for the flue gas*

The emission from the incineration stack will meet the emission standards stipulated in the BMW Rules 2016. The standards are shown in **Table 2.12** below

**Table 2.12 - Emissions Standards for Incinerator**

| Sl. No | Parameter                                                           | Standards                                          |                                                                  |
|--------|---------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------------|
|        |                                                                     | Con. in mg/Nm <sup>3</sup> unless stated           | Sampling Duration in minutes, unless stated                      |
| 1      | Particulate matter                                                  | 50                                                 | 30 mins or 1 NM <sup>3</sup> of sample volume, whichever is more |
| 2      | Nitrogen Oxides NO and NO <sub>2</sub> expressed as NO <sub>2</sub> | 400                                                | 30 mins for online sampling or grab sample                       |
| 3      | Sulphur di Oxide SO <sub>2</sub>                                    | 200                                                | 30 mins for online sampling or grab sample                       |
| 4      | HCl                                                                 | 50                                                 | 30 mins or 1 NM <sup>3</sup> of sample volume, whichever is more |
| 5      | Total Dioxins and Furans                                            | 0.1ng TEQ/Nm <sup>3</sup> (at 11% O <sub>2</sub> ) | 8 hours or 5 NM <sup>3</sup> of sample volume, whichever is more |
| 6      | Hg and its compounds                                                | 0.05                                               | 2 hours or 1 NM <sup>3</sup> of sample volume, whichever is more |

#### 2.10.4.2 Autoclave

An autoclave is a device that uses steam under pressure for decontamination of waste (culture media, surgical instruments, laboratory equipment, glassware and biomedical waste including sharps) operating at 121°C temperature under 1.2 kg/cm<sup>2</sup> pressure for a period of 1 hour in a chamber, with the aim of disinfecting and sterilizing the contents of the chamber. The technical specification of proposed Autoclave is enclosed as **Annexure 13**.

Disinfection is the reduction of biological contamination such as bacteria, virus, harmful microorganisms and pathogens to a level where it is no longer a hazard to the people and environment & sterilization is the process that kills/ removes biological contamination.

### **Standards for autoclaving of bio-medical waste**

The autoclave should be dedicated for the purposes of disinfecting and treating bio-medical waste.

1. When operating a vacuum autoclave, medical waste shall be subjected to a minimum of three pre-vacuum pulses to purge the autoclave of all air. The air removed during the pre-vacuum, cycle should be decontaminated by means of HEPA and activated carbon filtration, steam treatment, or any other method to prevent release of pathogen.
2. Temperature of not less than 121°C and pressure of 15 psi per an autoclave residence time of not less than 45 minutes; or
3. Temperature of not less than 135°C and a pressure of 31 psi for an autoclave residence time of not less than 30 minutes;
4. Medical waste shall not be considered as properly treated unless the time, temperature and pressure indicators indicate that the required time, temperature and pressure were reached during the autoclave process. If for any reasons, time temperature or pressure indicator indicates that the required temperature, pressure or residence time was not reached, the entire load of medical waste must be autoclaved again until the proper temperature, pressure and residence time were achieved.
5. Recording of operational parameters: Each autoclave shall have graphic or computer recording devices which will automatically and continuously monitor and record dates, time of day, load identification number and operating parameters throughout the entire length of the autoclave cycle.
6. Validation test for autoclave: The validation test shall use four biological indicator strips, one shall be used as a control and left at room temperature, and three shall be placed in the approximate center of three containers with the waste. Personal protective equipment. (Gloves, face mask and coveralls) shall be used when opening containers for the purpose of placing the biological indicators. At least one of the containers with a biological indicator should be placed in the most difficult location for steam to penetrate, generally the bottom center of the waste pile. The occupier or operator shall conduct this test three consecutive times to define the minimum operating conditions. The temperature, pressure and residence time at which all biological indicator vials or strips for three consecutive tests show complete inactivation of the



spores shall define the minimum operating conditions for the autoclave. After determining the minimum temperature, pressure and residence time, the occupier or operator of a common biomedical waste treatment facility shall conduct this test once in here months and records in this regard shall be maintained.

7. Routine Test: A chemical indicator strips or tape that changes colour when a certain temperature is reached can be used to verify that a specific temperature has been achieved. It may be necessary to use more than one strip over the waste package at different locations to ensure that the inner content of the package has been adequately autoclaved. Common bio-medical waste treatment facility shall conduct this test during autoclaving of each batch and records in this regard shall be maintained.
8. Spore testing: The autoclave should completely and consistently kill the approved biological indicator at the maximum design capacity of each autoclave unit. Biological indicator for autoclave shall be *Geobacillus stearothermophilus* spores using vials or spore Strips; with at least  $10^6$  spores. Under no circumstances will an autoclave have minimum operating parameters less than a residence time of 30 minutes, a temperature less than  $121^{\circ}\text{C}$  or a pressure less than 15 psi. The occupier or operator of a common bio-medical waste treatment and disposal facility shall conduct this test at least once in every week and records in this regard shall be maintained.

**Table 2.13 Technical Specifications of Autoclave**

| Sl. No. | PARAMETER                  | REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1     | Type                       | Direct steam type                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1.2     | Door                       | Single door with radial locking system for automatic locking during operation as a safety measure. Triple Walled construction to be fabricated from polished S.S. – 316 plates. Sealing by means of Single Piece molded Silicone gasket. The Door is made of SS 316 with 12mm thickness, radial locking mechanism, Hinge and Stand are made of epoxy painted Mild Steel. Door will not open unless the pressure in the chamber is reduced fully. |
| 1.3     | Chamber Dimensions (WxDxH) | 900 x1500 x 900 mm                                                                                                                                                                                                                                                                                                                                                                                                                               |

| Sl. No. | PARAMETER                | REQUIREMENT                                                                                                                                 |                                              |          |
|---------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------|
| 1.4     | Operating pressure       | 1.2 bar – inner chamber<br>2.0 bar – outer jacket                                                                                           |                                              |          |
| 1.5     | Working Temperature      | 121 <sup>0</sup> C                                                                                                                          |                                              |          |
| 1.6     | Material of construction | 1.6.1                                                                                                                                       | Inner chamber                                | S.S.316  |
|         |                          | 1.6.2                                                                                                                                       | Thickness (inner chamber)                    | 6 mm     |
|         |                          | 1.6.3                                                                                                                                       | Outer chamber                                | S.S. 304 |
|         |                          | 1.6.4                                                                                                                                       | Thickness (outer chamber)                    | 6 mm     |
| 1.7     | Insulation & Polishing   | All outer surfaces except the door shall be insulated with mineral wool and polished S.S. cladding. All the exposed parts will be polished. |                                              |          |
| 1.8     | Nozzles and ports        | 1.8.1                                                                                                                                       | Steam inlet to chamber from jacket           |          |
|         |                          | 1.8.2                                                                                                                                       | Safety valves for inner and outer chambers   |          |
|         |                          | 1.8.3                                                                                                                                       | Steam inlet to jacket                        |          |
|         |                          | 1.8.4                                                                                                                                       | Chamber drain out                            |          |
|         |                          | 1.8.5                                                                                                                                       | Jacket drain out                             |          |
|         |                          | 1.8.6                                                                                                                                       | Vacuum Drier port                            |          |
|         |                          | 1.8.7                                                                                                                                       | Common drain with check valve and Steam trap |          |
| 1.9     | Fittings and gauges      | Dial pressure gauge, Dial pressure-vacuum gauge, Pneumatic valves for Automatic control.                                                    |                                              |          |
| 2.0     | Carriage                 | SS carriage – 1no, and MS Trolley - 1no.                                                                                                    |                                              |          |
| 2.1     | Mounting                 | The autoclave shall be mounted on Epoxy painted Mild Steel tubular stand structure with height adjustable legs.                             |                                              |          |

| Sl. No. | PARAMETER       | REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                      |
|---------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.2     | Steam Generator | Integrated Steam generator made of 6mm thick SS 304 sheet with 18kw heater in 3 phase power supply. Steam Generator has in-built critical water level cut off using Float sensor in the basic system. Automatic Water feed using feed pump with gauge glass indication as well as digital low water level indication present in the steam generator. Heavy Duty ISI Mark heating coils are used. |
| 2.3     | Hydro Testing   | Testing of Jacket, inner chamber and Steam Generator are done at 1.5times of the operating pressure, necessary test certificates will be submitting along with the machine.                                                                                                                                                                                                                      |
| 2.4     | Piping work     | All pipelines and pipefitting, integral with the Autoclave unit shall be of stainless steel. Critical joining shall be of Flanges / Quick release type couplings and where necessary, welding shall be of Argon arc process.                                                                                                                                                                     |
| 2.5     | Control System  | Semi-Automatic Control system with Mild Steel powder coated control panel which houses the microprocessor controller with necessary contactors, relays etc. for operation of the Sterilizing unit. Microprocessor based PID Temperature controller with in-built timer up to 999mins.                                                                                                            |
| 2.6     | Power Supply    | 415V, 50Hz, Three Phase, 19KW load.                                                                                                                                                                                                                                                                                                                                                              |

#### 2.10.4.3 Shredder

- a) **Sorting:** After decontaminating the Biomedical Waste Bags from autoclave, the wastes are sent for the manual sorting process. During this process the glass containers, vials are sorted and collected in a separate container. Syringes without needles, plastic tubes, intravenous tubes, plastic bottles, gloves, urine bags and catheters are sorted and send to shredders.
- b) **Shredding:** Shredding is the process by which waste is de-shaped or cut in to smaller pieces so as to make the waste unrecognizable. Shredder has non-corrosive sharp blades capable for shredding of plastic waste, sharps, bottles, needles, tubing and other general waste. The low speed two shaft systems are effective for shredding hard and solid waste. The shredded waste is then sent to recyclers.
- c) **Recycling:** Recycling is a process by which non- infectious recyclable waste such as plastic and

glass after disinfection through autoclave and shredding or chemical disinfection are collected separately and stored in closed shed. These materials are disposed to authorized recyclers.

The Technical specification of Shredder is given as **Annexure 14**.

**Table 2.14-Technical specification of Shredder**

| S. No | Description           | Parameter                   |
|-------|-----------------------|-----------------------------|
| 1.    | Type                  | Bio-Medical Waste Shredder  |
| 2.    | Load Capacity         | 100 Kg/hr                   |
| 3.    | MOC                   | M.S.Powder Coated           |
| 4.    | Hopper                | M.S. Powder Coated          |
| 5.    | Cutting Blade         | NO Corrosive Hardened Steel |
| 6.    | In feed Opening       | 345 X 545                   |
| 7.    | Shaft                 | Hexagonal 2 Nos             |
| 8.    | Motor                 | 15 HP 3 Phase               |
| 9.    | Reduction Gear Box    | Planetary Type              |
| 10.   | Waste Collection Tray | Provided                    |
| 11.   | Control Panel         | PLC / VFD                   |
| 12.   | Auto Reverse System   | Provided                    |

#### 2.10.4.4 Air Pollution Control Devices

##### 1. Quencher (Spray Cooler)

Spray towers or spray chambers consist of empty cylindrical vessels made of steel or plastic and nozzles that spray liquid into the vessels. The inlet gas stream usually enters the bottom of the tower and moves upward, while liquid is sprayed downward from one or more levels. It sprays raw water for quenching the temperature of the outlet flue gas from Secondary Combustion Chamber.

##### 2. Venturi scrubber

In this device there is a minimum pressure drop of 350mm. The scrubber is fabricated out of stainless steel 316 grade. In the venture scrubber, the flue gases are in acidic condition is forced in through the divergent column along with 5% caustic solution of scrubbing liquid. The SO<sub>2</sub> gas, HCl gas etc. present in the flue gases are get neutralized due to high pressure drop across the venture.

All scrubbing/neutralization take place in the venture throat. At divergent, the effluent is collected at the bottom, treated and re-circulated. The neutralized gases with traces of ashes if any will be taken to wet scrubber for further treatment purification of flue gas. It is estimated that the scrubbing media is circulated at 2-2.5 lit/m<sup>3</sup>/min by using separate pump and piping made of stainless steel 316 grade.

### **3. Wet Scrubber**

It is a packed tower column made of mild steel and rubber lined from inside. The scrubber is packed with ceramic rings and with mist eliminator at the top of the tower for further purification of flue gases. The scrubber has inner connecting piping with water recirculation pump with motor.

### **4. Droplet Separator**

A droplet separator is a drum type equipment made of MS/SS with number of partitions. The water droplets present in the flue gases are removed in moist separator before being vent to chimney through ID fan. The separator is FRP lining inside. Dusting -All interconnecting dusting are provided with castable lining. Inter connecting piping -All inter connecting water piping between venture scrubber to droplet separator and re-circulation tank is provided.

### **5. Chimney**

The chimney is provided for the final out let of flue gas into the atmosphere. This chimney is fabricated with mild steel with 10 mm lining 30-meter height with ladder and platform. Stack drain, aviation lamp, lightening arrestor and other accessories.

### **6. Miscellaneous items**

Apart from the above, some miscellaneous items are to be added to the incinerator, they are

- a. Thermo couple
- b. Thermo stud
- c. Water circulation with ETP TANKS
- d. Trolley-5
- e. ID Fan

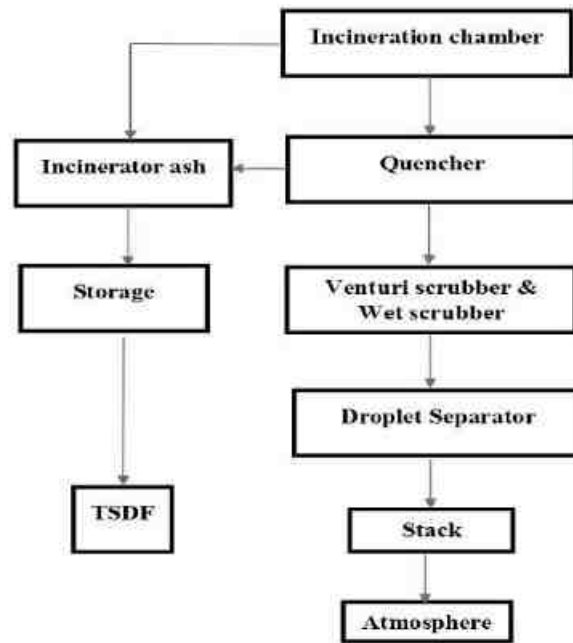


Figure 2.15- Flow diagram of steps followed in Air Pollution Control Devices

#### 2.10.4.5 Continuous Emission Monitoring System (CEMS)

In compliance with the Revised Guidelines for Continuous Emission Monitoring System, 2018 and the Bio-Medical Waste Management Rules, 2016, a Continuous Emission Monitoring System (CEMS) will be installed to monitor gaseous emissions from the incinerator stack on a real-time basis.

CEMS comprises the complete set of equipment required to determine gas or particulate concentrations and emission rates. It includes pollutant analysers, data acquisition systems, and conversion tools (such as equations, graphs, or software) to calculate emission values in units consistent with regulatory standards.

#### Key Features of the CEMS at CBWTF:

- Each incinerator will be equipped with graphic or computer-based recording devices to continuously and automatically log
  - Date and time
  - Batch number
  - Operating temperatures in the primary and secondary combustion chambers
  - Stack exit gas parameters

- The system will continuously monitor and record the following flue gas components such as CO, CO<sub>2</sub>, PM, NO<sub>x</sub>, O<sub>2</sub>, HCl, HF

### System Operation and Design:

- An online stack gas analyzer will be used for continuous monitoring. The process involves:
  - Drawing flue gas samples through a sample probe and hose.
  - Passing the sample through a water catch pot to remove residual moisture.
  - Further filtering the sample using a 0.1-micron particulate filter to eliminate fine dust and mist.
  - Directing the clean gas sample to sensor manifolds for parameter detection.
- Performance Characteristics:
  - Response time: Approximately 45 seconds
  - Sample flow rate: Between 3–5 LPM
  - Sensor maintenance:
- Sensors are purged with ambient air during start-up/shutdown to protect integrity.
- Automatic calibration with ambient air is conducted during system startup for accuracy.
- Data Reporting:
  - Emission data will be continuously recorded and uploaded in real-time to the regulatory authority, such as the State Pollution Control Board (SPCB), for compliance verification and transparency.

### 2.11 MANPOWER REQUIREMENT

Manpower required during construction phase of the unit, 50 Nos of labours and workers will be hired from nearby villages. During the operation phase of the unit, 30 number of persons required is shown in the **Table 2.15**.

**Table 2.15 – Man Power Requirement**

| Manpower              | Person | No. of Shift | Total             |
|-----------------------|--------|--------------|-------------------|
| Incineration operator | 4      | 3            | 12                |
| Autoclave/shredder    | 3      | 3            | 9                 |
| Driver & cleaner      | 4      | 1            | 4                 |
| Manager & Other staff | 5      | 1            | 5                 |
| <b>Total</b>          |        |              | <b>30 persons</b> |

## 2.12 POWER REQUIREMENT AND FUEL REQUIREMENT

The power requirement of the plant will be 120 KW is sourced from the Tamil Nadu State Electricity Generation and Distribution Company Limited (TANGEDCO). D.G. set of 120 kVA capacity will be provided as power backup.

**Table 2.16– Fuel Requirement of the plant in operation phase**

| Sl.No. | Components              | Fuel Required |
|--------|-------------------------|---------------|
| 1      | Incinerator- 200 kg/hr  | 35-37 lt/hr   |
| 2      | Incinerator – 100 kg/hr | 25-27 lt/hr   |
| 3      | DG set – 120 KVA        | 16 lt/hr      |

## 2.13 TRANSPORTATION OF WASTE TO THE FACILITY

Care will be taken to ensure that the segregated bio-medical waste handed over by the healthcare units reach CBWTF in fully covered vehicles without any damage, spillage or unauthorized access by public, animals etc. The bio-medical waste collected in designated coloured containers will be transported to the CBWTF in a fully covered vehicle. Such vehicle shall be dedicated for transportation of bio-medical waste only. Number of vehicles used will be 4 nos depending upon waste generation. Transportation vehicle shall be fitted with GPS to track the movement of the vehicle.

Each vehicle will:

- Be labelled with the bio-hazard symbol as per Schedule IV of the BMW Rules.
- Display the name, address, and contact numbers of the CBWTF.
- Carry valid vehicle registration issued by the transport authority.
- Operate on optimized routes based on the location of HCFs to ensure efficiency and minimize travel time.
- Preferably operate during non-peak traffic hours to avoid delays.

Real-time GPS tracking and monitoring will be implemented, with online access provided to the State Pollution Control Board (SPCB) for route verification and compliance checks. It will be ensured that the total time from waste generation to treatment does not exceed 48 hours, including collection and transportation, treatment & disposal.



## 2.14 MITIGATION MEASURES INCORPORATED INTO THE PROJECT TO MEET

### ENVIRONMENTAL STANDARDS, ENVIRONMENTAL OPERATING CONDITIONS

Mitigation measures incorporated into the project for compliance with the Revised Common Bio-Medical Waste Treatment and Disposal Facility guidelines by CPCB (2016) focus on ensuring safe, scientific, and environmentally sound management of bio-medical waste.

- Key measures include segregation of waste at the point of generation using colour-coded and barcoded containers to prevent cross mixing with general waste. The CBWTF facility will implement a barcode tracking system to ensure traceability of waste from generation to disposal.
- Waste will be transported to the CBWTF using dedicated, GPS-tracked vehicles, compliant with CPCB's specifications. The transportation system will ensure minimum handling, spillage prevention, and route optimization for timely and safe delivery.
- The facility will use autoclaving, shredding, and incineration as approved treatment technologies. Incineration ash, a byproduct of the treatment process, will be classified as hazardous waste and disposed to TSDF.
- The facility will include an optimal water usage and Effluent Treatment Plant (ETP) for managing wastewater generated from treatment processes and vehicle washing areas. Treated effluent will meet discharge standards prescribed by CPCB and Tamil Nadu Pollution Control Board (TNPCB) before reuse or disposal.
- The mitigation measures also place strong emphasis on occupational health and safety for workers engaged in the handling and treatment of bio-medical waste. Workers' safety is ensured through the use of PPEs, regular health check-ups, vaccinations, and training on safe waste handling.

## 2.15 WATER DEMAND AND WASTEWATER/EFFLUENT DISCHARGE

### 2.15.1 Source of water supply

Water will be out sourced through tankers during construction phase and sourced from local body during operation phase. The commitment letter from TWAD board for fresh water supply is given as **Annexure 7**

### 2.15.2 Water demand and wastewater discharge during construction phase

- **During construction phase** - Water requirement of about 5 KLD will be met by water tankers from external source and sourced from local body during operation face.
- **During operation phase** - The total water requirement during operation is calculated to be 19 KLD which is sourced from local body (panchayat union).
- The water balance chart for the proposed project is enclosed as **Annexure 15**.

**Table 2.17 Water Consumption Details**

| Sl. No.      | Source Consumption                        | Quantity (KLD) |
|--------------|-------------------------------------------|----------------|
| 1            | Industrial Use Auto Clave & APCD          | 15             |
| 2            | Vehicle wash , Floor wash & Fire fighting | 0.7            |
| 3            | Domestic                                  | 1.5            |
| 4            | Gardening                                 | 1.8            |
| <b>Total</b> |                                           | <b>19</b>      |

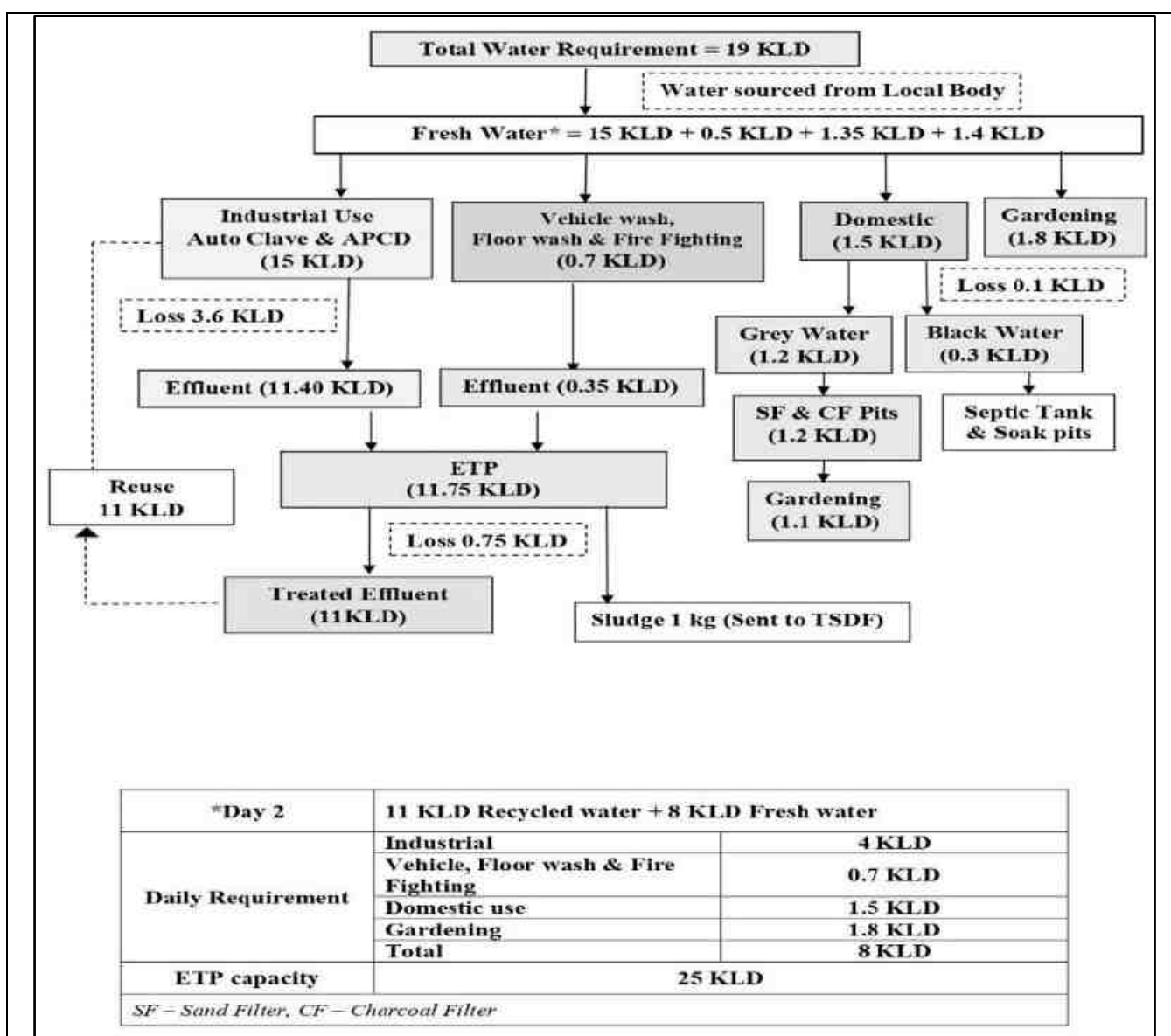


*Figure 2.16– Water Balance Chart*

The total water requirement for the proposed facility is estimated to be 19 KLD, distributed across various uses. Approximately 15 KLD will be utilized for industrial purposes, including operations of the Autoclave and Air Pollution Control Devices (APCDs). Around 0.7 KLD is allocated for vehicle washing, floor washing, and fire-fighting needs, ensuring hygiene and safety within the premises. Domestic usage is expected to require 1.5 KLD, catering to the daily needs of personnel. Additionally, 1.8 KLD will be used for gardening, supporting green belt development and maintaining landscape aesthetics. The details of wastewater generation and treatment is given in **Table 2.18 & Table 2.19**.

**Table 2.18 Domestic use of water and wastewater generation**

| Domestic Use                                      | Water quantity (KLD)        | Treatment                                        |
|---------------------------------------------------|-----------------------------|--------------------------------------------------|
| Total water required<br>(30 employees + Visitors) | 1.5 KLD                     | -                                                |
| Waste water generation<br>(80% of water consumed) | Sewage generated<br>1.2 KLD | Treated by CF & SF & Used for Gardening.         |
| Waste water generation<br>(20% of water consumed) | Sewage generated<br>0.3 KLD | Sewage will be Sent to Septic tank and soak pit. |

For industrial autoclave and APCD operations, water is required for processes such as scrubber operation and steam generation in the autoclave. Water is also lost through evaporation from both the scrubber and autoclave, and steam condensate from the autoclave is typically reused for cleaning floors and equipment. The wastewater generated from these operations is treated in an effluent treatment plant and subsequently reused.

**Table 2.19-Water Requirement for process activity**

| Sl. No | Items                             | Water Requirement (KLD) | Evaporator loss (KLD) | Wastewater in KLD |
|--------|-----------------------------------|-------------------------|-----------------------|-------------------|
| 1.     | Industrial use, Auto clave & APCD | 15                      | 3.6                   | 11.4              |
| 2.     | Vehicle & floor wash              | 0.7                     | 0.15                  | 0.35              |
|        | <b>Total</b>                      | <b>15.07</b>            | <b>3.75</b>           | <b>11.75</b>      |

### 2.15.3 Wastewater treatment and disposal details

In domestic water of 1.35 KLD, the sewage generated will be collected and grey water of 1.08 KLD is sent to SF & CF from there 1.08 KLD water treated and it is used for gardening.

The process water of quantity 15 KLD with evaporation loss of 3.75 KLD and makeup of 11 KLD recycled throughout the treatment process will be treated in Effluent Treatment Plant (ETP). The flow diagram for the ETP process is shown in the **Figure 2.18**.

The specifications of the Effluent Treatment Plant are given in **Table 2.20 & as Annexure 16**.

- The effluent from the various sources is pumped through the bar screens before the collection sump where large debris entering in to the system will be protected with a screen.
- The effluent water collected from the screen chamber is let out in to the collection sump and is aerated for even mixing of the effluent water.
- The effluent is then pumped to the flash mixer. Here alum and poly is added which enhances Suspended Solids (SS) to settle and pH dose is added for the neutralization.
- The overflow from the flash mixer unit is send to settling tank where the suspended particles gets settled and gets reduced to a maximum extend.
- The effluent from intermediate tank shall be sent to the Secondary Aeration Tank for removal of BOD, COD and to maintain the Turbidity the BIOAERATION tank shall be equipped with the fine Bubble Diffusers, Air Blowers, Air feed Lines & RAS Lines
- Hypo is dosed before filtration for disinfection.
- The overflow from the settling tank is pumped in to the filter feed tank where further many types of impurities gets filtered.
- The water from the filter feed tank is fed to Pressure Activated Filter and Activated Carbon Filter which is used as final polishing for the removal of suspended solids and removal of colour & odour respectively.
- The filtrate from the PSF and ACF is collected in the treated water tank.
- The treated effluent will be recycled for scrubbing activity.
- The sludge obtained from ETP will be collected in the bag & securely stored in waste storage area until final disposal to TSDF.

**Table 2.20 - ETP Components**

| Sl. No. | Tank Details    | Specification               |
|---------|-----------------|-----------------------------|
| 1.      | Collection Tank | 2.5 x 2.5 x 2.5 M SWD + 0.3 |

| Sl. No. | Tank Details            | Specification                    |
|---------|-------------------------|----------------------------------|
| 2.      | Flash Mixer             | 0.5 m x 0.5 m 1.0 m              |
| 3.      | Primary Settling Tank   | 2.5 m X 2.5 x 2.75 m SWD         |
| 4.      | Bio Aeration Tank       | 4.0 m x 2.5 m x 3.0 m SWD        |
| 5.      | Secondary Settling Tank | 2.5 m x 2.5 x 2.75 m SWD         |
| 6.      | Sand Filter             | 18 dia x 65 ht (inches)          |
| 7.      | Carbon Filter           | 18 dia x 65 ht (inches)          |
| 8.      | Treated Water Tank      | 2.0 m x 2.0 m x 2.0 m SWD +0.25m |

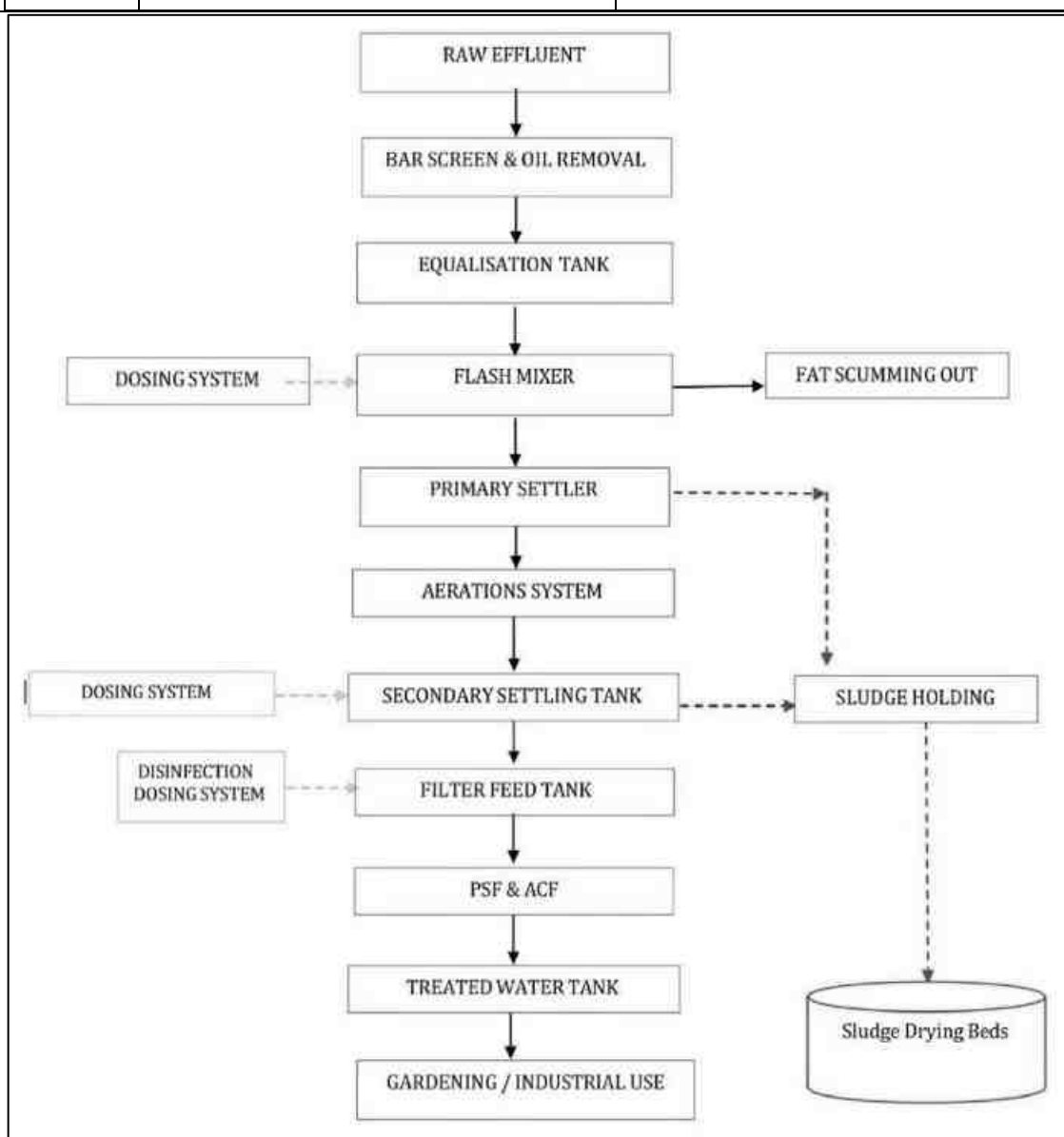


Figure 2.17- Process Flow Diagram of ETP 25 KLD

#### 2.15.4 Air Pollution Sources and Management

The main sources of air emissions at the proposed CBWTF are incinerators and DG sets. Pollution control systems will be installed to meet environmental standards.

##### Incinerator Emission Control

- Secondary Chamber: Flue gases from the primary chamber are further burned at  $1050 \pm 50^{\circ}\text{C}$  to destroy harmful pollutants like dioxins and furans.
- Scrubber System:
  - o Hot gases are cooled using a water quenching system.
  - o Gases pass through a Venturi scrubber and then a wet scrubber to remove dust and acid gases.
  - o an alkaline (NaOH) solution is used in the scrubber to neutralize gases like HCl and SO<sub>x</sub>.
- Clean Emissions: After treatment, clean gases (free from PM, HCl, NO<sub>x</sub>, dioxins, and mercury) are safely released into the air.

##### DG Set Emissions

- Emissions from DG sets are controlled by providing the required stack height as per CPCB rules.
- DG sets will be used only during power cuts and will be regularly maintained for efficient operation and lower emissions.

#### 2.15.5 Odour Generation and Management

- Odour emission is a significant concern in Common Biomedical Waste Treatment Facilities (CBWTFs) in Tamil Nadu due to the decomposition of organic medical waste, chemical reactions, and incineration processes. The release of foul-smelling gases, such as ammonia, hydrogen sulfide, and volatile organic compounds (VOCs), can cause discomfort to nearby communities and pose potential health risks.
- Effective odour management strategies include proper waste segregation, timely treatment, and the use of advanced technologies such as biofilters, activated carbon adsorption, and chemical scrubbers. Regular maintenance of incinerators, autoclaves, and effluent treatment plants is crucial to minimize odour generation. Additionally, maintaining a negative air pressure system in waste storage areas and using odour-neutralizing agents can help control unpleasant smells. Compliance with the Tamil Nadu Pollution Control Board (TNPCB) guidelines and regular monitoring of air quality are essential to ensuring that CBWTFs operate in an environmentally responsible manner while minimizing odour-related issues.

### 2.15.6 Noise Generation and Management

Noise pollution sources from the proposed project are from operating of equipment's like incinerators and DG set. Incinerators will be housed/covered completely by acoustic enclosures. DG sets will be provided with prebuilt acoustic enclosures. Greenbelt area all around the facility will further acts as noise barrier. The project site is located at Pisanathur village Pudukkottai District and there are no habitats within 500 m from the proposed project site. Employees working in high noise zone i.e., incinerator are provided with ear plugs and personnel protective equipment.

### 2.15.7 Solid Waste and Hazardous Waste Generation and Management

The solid waste generation during wastewater treatment & treatment of common bio-medical waste will be disposed to TSDF for beneficial use. The generation of waste is estimated to be 60% of incinerable waste and 40% of the sterilization waste (including autoclave and sharps/metallic body in plants). In order to meet the above requirement for disposal of waste, incinerator capacity required is 200 kg/hr & 100 kg/hr, autoclave capacity is 1220 litre/hr and shredder to the capacity of 200 kg/hr.

Incineration per day = 6000 kg/day

Autoclave per day = 4000 kg/day

Total = 10,000 kg /day (10 TPD)

It is sufficient to handle the daily estimated waste without accumulation. The incinerator will be operated with LDO. If gas is available in future the provision will be made to establish gas burner.

Autoclave/shredded waste are collected and stored in bags and kept in earmarked area. Once its set 10 T or more will be send to authorized plastic /metal scrap units which are located nearby to the unit.

### 2.15.8 Waste generated during operation

- The incinerator will be operated with fuel temperature with reference to time and turbulence so as to achieve total organic carbon content in the slag and bottom ashes less than 3% or their loss on ignition will be less than 5% of dry weight.
- It is estimated that total waste to be incinerated per day is 6000 kg.
- Ash @ 5%=300 kg/day
- The above ash will be collected in every 3 hours interval of time during the operation from the bottom portion of primary chamber using scrapper in bags/containers and stored in waste storage HDPE lined pit area in a specially earmarked area within site. The material collected is then disposed to TSDF, sent once in a month.
- Solid waste generated during the biomedical waste treatment process and waste water treatment process is mainly ash and STP/ETP sludge. The sludge collected from the ETP will be dried in

sludge drying beds which is collected and disposed to TSDF, sent once in a month.

- The disinfected plastic waste will be sent for recycling to registered recycler. The floor/vehicle will be cleaned by mobbing the floors hence reduces the quantity of wastewater generation.
- The used oil generated from the DG set will be collected in a separate container and send to TSDF.

**Table 2.21- Details of waste generated and mode of disposal**

| SI. No. | Description                            | Quantity Generated | Mode of Disposal                                      |
|---------|----------------------------------------|--------------------|-------------------------------------------------------|
| 1       | Incinerator Ash                        | 300 kg/day         | Send to TSDF                                          |
| 2       | Sludge from ETP                        | 1 kg/day           |                                                       |
| 3       | Waste oil from DG Set                  | 0.5 TPA            |                                                       |
| 4       | Disinfected Glasses and Shredded Waste | 4 TPA              | Send to authorised recycler for recycling             |
| 5       | Sterilized Needles                     | 0.5TPA             | Stored in encapsulation pit within the site premises. |

## 2.16 RESPONSIBILITY OF COMMON BIO-MEDICAL WASTE FACILITY

Duties of the operator of a common bio-medical waste treatment and disposal facility as defined in the Bio-Medical Waste Management Rules, 2016 is as under and the same will be incorporated in the Bio-Medical Waste Management

To take all necessary steps to ensure that the bio-medical waste collected from the occupier is transported, handled, stored, treated and disposed of, without any adverse effect to the human health and the environment, in accordance with the BMW Rules and guidelines issued by the Central Government or, as the case may be, the central pollution control board from time to time

- a. Ensure timely collection of bio-medical waste from the occupier as prescribed under the BMW Rules.
- b. Establish bar coding and global positioning system for handling of bio- medical waste.
- c. Inform the prescribed authority immediately regarding the occupiers which are not handing over the segregated bio-medical waste in accordance with the BMW Rules.
- d. Provide training for all its workers involved in handling of bio-medical waste at the time of induction and at least once a year thereafter.
- e. Assist in training conducted by them for bio-medical waste management.
- f. Undertake appropriate medical examination at the time of induction and at least once in a year and immunize all its workers involved in handling of bio-medical waste for protection against diseases,



including Hepatitis B and Tetanus, that are likely to be transmitted while handling bio-medical waste and maintain the records for the same.

- g. Ensure occupational safety of all its workers involved in handling of bio-medical waste by providing appropriate and adequate personal protective equipment
- h. Report major accidents including accidents caused by fire hazards, blasts during handling of biomedical waste and the remedial action taken and the records relevant thereto, (including nil report) in Form I to the prescribed authority and also along with the annual report
- i. Maintain a log book for each of its treatment equipment according to weight of batch; categories of waste treated; time, date and duration of treatment cycle and total hours of operation
- j. To allow occupiers of HCE's, who are giving waste for treatment to see whether the treatment is carried out as per the rules
- k. Shall display details of authorization, treatment, annual report etc. on its web-site.
- l. After ensuring treatment by autoclaving or microwaving followed by mutilation or shredding, whichever is applicable, the recyclables from the treated bio-medical wastes such as plastics and glass, shall be given to recyclers having valid consent or authorization or registration from the respective State Pollution Control Board or Pollution Control Committee.
- m. Supply non-chlorinated plastic colored bags to the occupier on chargeable basis, if required
- n. Common bio-medical waste treatment facility shall ensure collection of biomedical waste on holidays also
- o. Maintain all record for operation of incineration, autoclaving for a period of five years.

**Table 2.22 Compliance on applicable rules and guidelines for CBWTF**

| Sl. No.                                         | Criteria                                                                                                                                                                                                  | Details                                                                                                                                                                                                                        | Remark             |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>Bio-medical Waste Management Rules, 2016</b> |                                                                                                                                                                                                           |                                                                                                                                                                                                                                |                    |
| 1.                                              | The selection of site for setting up of such facility shall be made in consultation with the prescribed authority, other stakeholders and in accordance with guidelines published by the MoEF&CC and CPCB | The land is complying to the siting criteria specified by CPCB. Further as per the ToR condition, we Biotech Engineering Industries has obtained the site suitability letter from the Member Secretary, TNPCB vide Letter. No. | Noted and Complied |

| Sl. No.                                                       | Criteria                                                                                                                                                                                                                                                                                                                     | Details                                                                                                                                                                                                                                                                                                                                                                           | Remark                      |
|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
|                                                               |                                                                                                                                                                                                                                                                                                                              | T6/TNPCB/F.019201/BMW/2025,<br>dated 09.05.2025 for the<br>land to establish the Proposed CBWTF.                                                                                                                                                                                                                                                                                  |                             |
| <b>Revised Guidelines for CBWTF by CPCB on 21st Dec. 2016</b> |                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                   |                             |
| 1.                                                            | A CBWTF shall preferably be developed in a notified industrial area without any requirement of buffer zone (or) CBWTF can be located at a place reasonably far away from notified residential and sensitive areas and should have a buffer distance of preferably 500 m so that it shall have minimal impact on these areas. | The Proposed Project site does not have any residential and sensitive area in a buffer distance of 500 m                                                                                                                                                                                                                                                                          | Noted and shall be Complied |
| 2.                                                            | Adoption of best available technologies (BAT) by the proponent of CBWTF                                                                                                                                                                                                                                                      | The proposal includes all advance treatment facility like dual fired chamber incinerator with Air Pollution Controlling Equipment and adequate height of Stack. Shredder, Autoclave has also provided for disinfection of not incinerable waste. ETP has been provided with good utilization of treated wastewater so that no wastewater will be discharged outside the facility. | Noted and shall be Complied |
| 3.                                                            | The CBWTF can also be developed as an integral part of the Hazardous Waste Treatment Storage and Disposal Facility (TSDF) subject to obtaining of                                                                                                                                                                            | The proposed CBWTF is a standalone facility to be constructed at 1.55 acres of the at survey no: 17/7 Pisanathur village Gandarvakottai taluk                                                                                                                                                                                                                                     | Complied                    |

| Sl. No. | Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Details                                                                                                                                                                                                                                                                            | Remark            |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
|         | necessary approvals from the authorities concerned including 'Environmental Clearance' as per Environmental Impact Assessment Notification 2006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Pudukkottai district. The facility shall be established after obtaining necessary Environmental Clearance, Consent to Establish and Consent to Operate from the respective authorities                                                                                             |                   |
| 4.      | <p>Preferably, a CBWTF shall be set up on a plot size of not less than one Acre in all the areas. However, a CBWTF can be developed in adjacent plots but cannot be set up in two or more different plots located in different areas. Separate plots can be permitted only for vehicle parking if located in the close vicinity of the proposed CBWTFs or the existing CBWTFs.</p> <p>In case of upcoming or new CBWTFs (both in municipal limits with population more than 25 lakhs or in rural areas), the land area requirement may be relaxed (but in any case, not less than 0.5 Acre) by the SPCB/PCC, with additional control measures such as ZLD, increase in stack height, stringent emission norms, odour control measures or any other measures felt necessary by</p> | <p>The CBWTF is proposed on 1.55 acres of land at survey no: 17/7 Pisanathur village Gandarvakottai taluk Pudukkottai district</p> <p>Necessary steps such as ETP, 30m stack height, odour control measures etc., as shall be prescribed by the authorities shall be followed.</p> | Shall be Complied |

| Sl. No. | Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Details                                                                                                            | Remark                      |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------------|
|         | the prescribed authority on case-to-case basis, only in consultation with CPCB                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                    |                             |
| 5.      | A CBWTF located within the respective State/UT shall be allowed to cater healthcare units situated at a radial distance of 75 km. However, in a coverage area where 10,000 beds are not available within a radial distance of 75 km, existing CBWTF in the locality (located within the respective State/UT) may be allowed to cater the healthcare units situated up to 150 km radius w.r.t. its location provided the Biomedical waste generated is collected, treated and disposed of within 48 hours as stipulated under the BMW Rules 2016. | M/s Medicare Enviro System is located in an aerial distance of 15 km in North West direction of the proposed CBWTF | Noted and Shall be Complied |

## CHAPTER 3

### **DESCRIPTION OF THE ENVIRONMENT**

#### **3.1 Introduction**

This chapter illustrates the description of the existing environmental status of the study area with reference to the prominent environmental attributes. The baseline environmental values of various environmental components like ambient air quality, noise levels, surface and ground water quality, soil, flora and fauna and socio-economic condition are studied. The data was collected from both primary and secondary sources. Primary source data are collected by environmental monitoring and survey of the study area. Secondary data was collected from State / Central Government and semi-Government Organizations publications.

From reconnaissance survey, the sampling locations were identified based on:

- Existing topography and meteorological conditions
- Locations of water bodies
- Location of human habitation and other sensitive area present in the vicinity of the proposed project site
- Wind-rose diagrams
- Representative areas for baseline conditions
- Accessibility for sampling Soil quality
- Drainage pattern
- Cultural and social status of the people in the study area etc.

The impacts from CBWTF project on its surrounding environment could be attributed to the nature of pollutants arising out of the process of treatment process, its characteristics/concentration, quantity discharged to the environment, existing environmental quality, assimilative capacity of the surrounding environment and topography.

The data so collected are computed the impacts that are likely to arise due to establishment of Proposed Common Bio Medical Waste Facility.

Study Area, Period, Components & Methodology

#### **3.2 Study Area, Period, Components and Methodology**

##### **3.2.1 Study Area and Baseline Period**

For studying the present baseline Environmental Status, area falling within 10.0 km radius from the source is considered as the study area. The study area is predominantly rural, urban and industrial area. Proposed CBWTF is situated at the intersection of 10° 35' 28.64" N Latitude 79° 02' 08.45" E Longitude

The proposed project site is bounded by the nearest habitations such as Viralipatti on East, Pisanathur on South, Palaya Gandarvakottai on west Pudunagar on north. Nearest habitation is Pisanathur Village at 0.77 km in South direction & Pudunagar village at 2.76Km in North.

Baseline study in this Environmental Impact Assessment report was conducted for a period of three months viz., from January 2025 to April 2025 for the proposed establishment of bio-medical waste facility.

### **3.2.2 Environmental Components**

The following environmental attributes related to the study area is considered for environmental study to ascertain the baseline status. Using the baseline status, the impact due to project and plan for mitigation is arrived.

- a) Meteorology
- b) Air Environment
- c) Noise Environment
- d) Water Environment
- e) Land Environment
- f) Socio-economic Environment
- g) Ecology and bio-diversity

### **3.2.3 Methodology**

The methodology adopted for the baseline environmental study involved a combination of primary data collection and secondary data review to establish an accurate environmental profile of the study area. The process followed is outlined below:

### **3.2.4 Primary Data Collection**

Field surveys and environmental monitoring were conducted to collect real-time data on various environmental parameters within the 10 km radius study area. The following activities were carried out:

- Ambient air quality monitoring at identified locations
- Noise level measurements in residential, industrial, and sensitive zones
- Collection and analysis of surface water and groundwater samples
- Soil sample collection for assessing land quality
- Ecological survey to document flora and fauna
- Socio-economic survey through field visits and interaction with local communities

### **3.2.5 Secondary Data Collection**

Relevant secondary information was collected from various government departments, published reports, official records, and other credible sources. These included:

- Meteorological data from the nearest weather station
- Census data and socio-economic statistics
- Land use and drainage pattern maps
- Environmental quality reports from authorized agencies

### **3.2.6 Sampling Location Selection**

Sampling locations were selected based on

- Proximity to the project site
- Presence of human habitations, sensitive areas, and ecological features
- Direction of predominant wind flow
- Accessibility and representativeness of the area
- Existing land use and topographical features

### **3.2.7 Data Analysis and Interpretation**

The data collected through field monitoring and secondary sources were systematically analysed. The findings were used to:

- Establish the existing environmental conditions
- Identify environmental sensitivities and constraints
- Assess the potential impacts of the proposed CBWTF project
- Propose appropriate environmental management and mitigation measures

This structured methodology ensured a comprehensive understanding of the baseline environmental scenario and its relevance to the proposed project activities.

## **3.3 Establishment of baseline for valued environmental components, as identified in the scope**

To understand the existing environmental conditions for the proposed Common Bio-Medical Waste Treatment Facility (CBWTF) at Pisanathur Village, Pudukkottai District a detailed baseline study was conducted. This study helps in assessing how the project might impact the surroundings and in planning mitigation measures accordingly.

The study covered a 10 km radius around the project site, analysing key environmental aspects such as land use, micrometeorology, air, water, soil, noise, biodiversity, and the socio-economic environment. The data was collected through field monitoring, laboratory analysis, and secondary sources.

The baseline environmental data for Ambient Air, Noise, Water, and Soil has been systematically collected through M/s. Femo Labs Private Limited, an NABL-accredited laboratory. A copy of the NABL accreditation certificate is provided in **Annexure 17**.

To ensure the accuracy and reliability of the data, only calibrated samplers, instruments, and equipment were used during the sampling and analysis process. The monitoring methodology and frequency for this baseline study are detailed in **Table 3.1**.

Strict measures were followed to keep the samples safe and accurate, ensuring proper preservation and transportation as per standard guidelines.

**Table 3.1-Environmental attributes and frequency of monitoring**

| S. No | Environmental Attribute | Sampling Locations                                 | Parameters                                                                                              | Frequency                               | Purpose                                                            |
|-------|-------------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------------|
| 1     | Meteorology             | 1 (IMD data)                                       | Wind speed, wind direction, temperature, relative humidity, rainfall                                    | Hourly, daily (Jan – Mar 2025)          | Understanding weather patterns affecting pollutant dispersion      |
| 2     | Ambient Air Quality     | 8                                                  | As per NAAQS 2009 (PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> , NO <sub>x</sub> , CO, etc.) | 12 weeks, twice a week (Jan - Mar 2025) | Monitoring air quality to assess impact from emissions             |
| 3     | Water Quality           | GW –Bore wells & open wells<br>SW –Lake &Reservoir | As per IS:10500 (Indian drinking water standards) and IS 2296-1982                                      | Once during study period                | Assessing potential contamination of groundwater and surface water |
| 4     | Soil Quality            | 8                                                  | As per Methods Manual – Soil Testing in India (Ministry of Agriculture, GOI)                            | Once during study period                | Evaluating soil fertility and contamination risks                  |
| 5     | Noise Quality           | 8                                                  | L day, L night, L dn, L eq (as per CPCB norms)                                                          | Once during study period                | Monitoring noise levels from DG sets and vehicular activity        |



| S. No | Environmental Attribute           | Sampling Locations | Parameters                                                        | Frequency                | Purpose                                                          |
|-------|-----------------------------------|--------------------|-------------------------------------------------------------------|--------------------------|------------------------------------------------------------------|
| 6     | Ecology (Terrestrial & Aquatic)   | Study area         | Flora and fauna                                                   | Once during study period | Documenting biodiversity and assessing potential project impact  |
| 7     | Land Use                          | Study area         | Satellite imagery and secondary data                              | Once during study period | Evaluating land use changes due to project development           |
| 8     | Geology & Hydrogeology            | Study area         | Based on secondary & primary hydro geological data                | Once during study period | Assessing groundwater conditions and potential project impact    |
| 9     | Demography & Socio-Economic Study | Study area         | Based on DCHB (District Census Handbook) 2011 & secondary sources | Once during study period | Analysing socio-economic profile and project benefits for locals |

### 3.3.1 Land Use and Land Classification

To demarcate different land use classes using the remote sensing data such as satellite imagery and application of GIS techniques for assessing the areal extent of the different classes that is interpreted, for the 10 km radius from the proposed project site.

The study area has been divided into Core zone and Buffer zone which is about 10 km radius from the boundary of the proposed project site area. The current land use has to be assessed as it forms the basis for any developmental planning

#### 3.3.1.1 Objectives of Land Use / Land Cover map

Land Use / Land Cover - Land Use refers to man's activity and the various uses, which are carried on land. Land Cover refers to natural vegetation, water bodies, rock/soil, artificial cover and others, resulting due to land transformation. The present Land Use/Land Classification map is developed with following

objectives. The main objective of the study is to classify the different land use within 10 km from the project boundary

### 3.3.1.2 Methodology

Information of land use and land cover is important for many planning and management activities concerning the surface of the earth (Agarwal and Garg, 2000). Land use refers to man's activities on land, which are directly related to land (Anderson et al., 1976). The land use and the land cover determine the infiltration capacity. Barren surfaces are poor retainers of water as compared to grasslands and forests, which not only hold water for longer periods on the surface, but at the same time allow it to percolate down.

The terms 'land use' and 'land cover' (LULC) are often used to describe maps that provide information about the types of features found on the earth's surface (land cover) and the human activity that is associated with them (land use). Satellite remote sensing is being used for determining different types of land use classes as it provides a means of assessing a large area with limited time and resources. However, satellite images do not record land cover details directly and they are measured based on the solar energy reflected from each area on the land. The methodology of land use map preparation is detailed below.

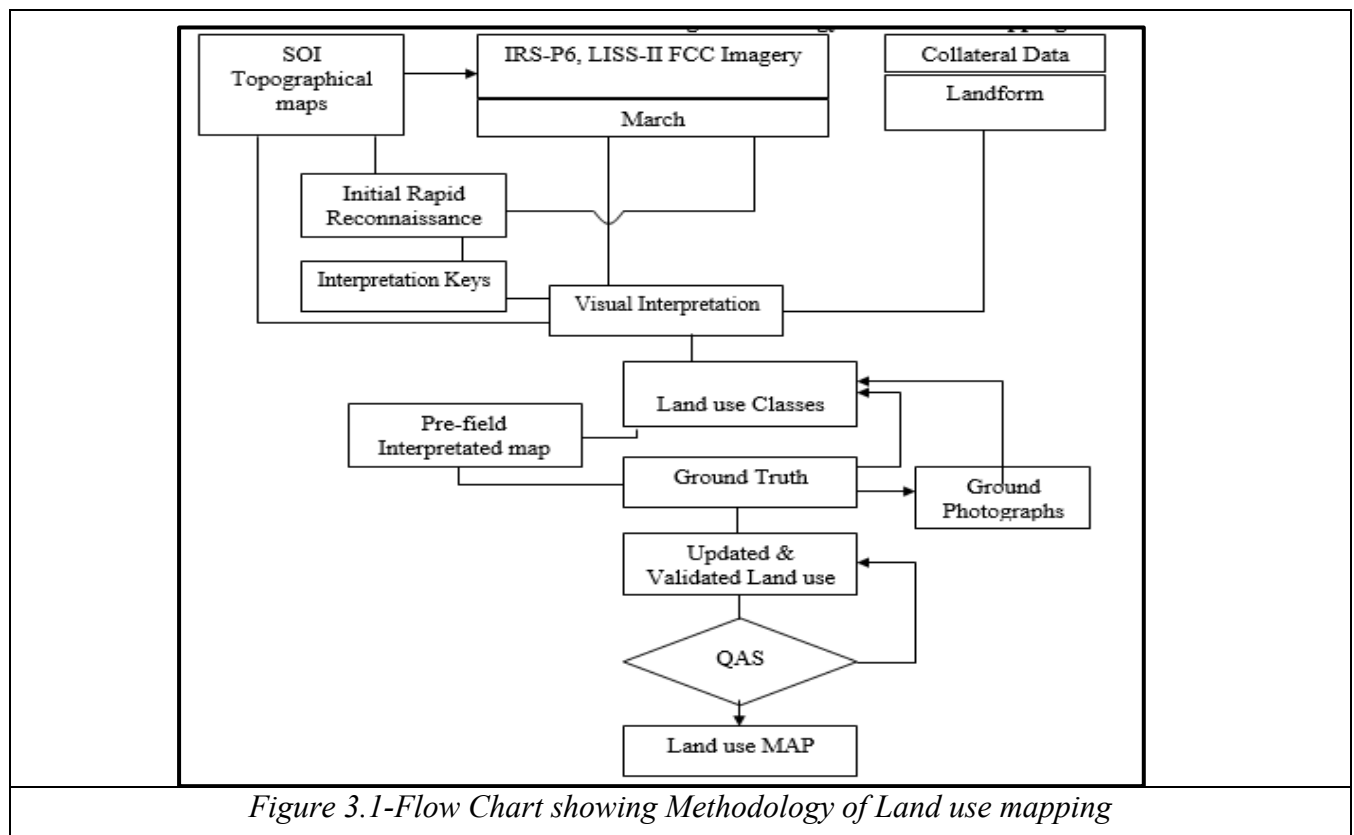


Figure 3.1-Flow Chart showing Methodology of Land use mapping

The amount of multi spectral energy in multi wavelengths depends on the type of material at the earth's surface and the objective is to associate particular land cover with each of these reflected energies, which

is achieved using either visual or digital interpretation. In the present study the task is to study in detail the land use and land cover in and around the project site. The study envisages different LULC around the proposed project area and the procedure adopted is as above.

### **3.3.1.3 Satellite Data**

IRS Resourcesat-2 LISS-III multispectral satellite data of was utilized for the present study. Details of satellite data is given below. The rectification of imagery was carried out on to bring the digital data on the earth coordinate system by means of ground control point (GCP) assignments/SOI toposheets.

### **3.3.1.4 Scale of mapping**

Considering the user defined scale of mapping, 1:50000 IRS-P6, LISS-III data on 1:50000 Scale was used for Land use / Land cover mapping of 10 km radius for proposed site. The description of the land use categories for 10 km radius and the statistics are given for 10 km radius.

### **3.3.1.5 Interpretation Technique**

Standard on screen visual interpretation procedure was followed. The various Land use / Land cover classes interpreted along with the SOI topographical maps during the initial rapid reconnaissance of the study area. The physiognomic expressions conceived by image elements of color, tone, texture, size, shape, pattern, shadow, location and associated features are used to interpret the FCC imagery. Image interpretation keys were developed for each of the LU/LC classes in terms of image elements.

FCC imagery (Digital data) of the study area was interpreted for the relevant land use classes. On screen visual interpretation coupled with supervised image classification techniques are used to prepare the land use classification.

- Digitisation of the study area (10 km radius from the proposed site) from the topo maps
- In the present study the IRS –P6 satellite image and SOI topo sheets of the project site have been procured and interpreted using the ERDAS imaging and ARC-GIS software adopting the necessary interpretation techniques.
- Satellite data interpretation and vectorisation of the resulting units
- Adopting the available guidelines from manual of LULC mapping using Satellite imagery (NRSA, 1989)
- Field checking and ground truth validation
- Composition of final LULC map

The LULC Classification has been done at three levels where level -1 being the broad classification about the land covers that is Built-up land, agriculture land, waste land, wet lands, and water bodies. These are

followed by level –II where built-up land is divided into towns/cities as well villages. The agriculture land is divided into different classes such as cropland, Fallow, Plantation, while wastelands are broadly divided into, Land with scrub and without Scrub and Mining and Industrial wasteland. The wetlands are classified into inland wetlands, coastal wetlands and islands. The water bodies are classified further into River/stream, Canal, Tanks and bay. In the present study level II classification has been undertaken. The SOI Topo map is presented in Plate. and Satellite imagery of 10 km radius from the project site is presented – Plate.

### 3.3.1.6 Field Verification

Field verification involved collection, verification and record of the different surface features that create specific spectral signatures / image expressions on FCC. In the study area, doubtful areas identified in course of interpretation of imagery is systematically listed and transferred on to the corresponding SOI topographical maps for ground verification. In addition to these, traverse routes were planned with reference to SOI topographical maps to verify interpreted LU/LC classes in such a manner that all the different classes are covered by at least 5 sampling areas, evenly distributed in the area. Ground truth details involving LU/LC classes and other ancillary information about crop growth stage, exposed soils, landform, nature and type of land degradation are recorded and the different land use classes are taken.

### 3.3.1.7 Description of the Land Use / land cover classes

It is defined as an area of human settlements composed of houses, commercial complex, transport, communication lines, utilities, services, places of worships, recreational areas, industries etc. Depending upon the nature and type of utilities and size of habitations, residential areas can be aggregated into villages, towns and cities. All the man-made construction covering land belongs to this category. The built- up in 10 km radius from the proposed project site is as follows. The built-up land occupies 1.82 % The built-up Land is 6.12 Sq.km.

#### ❖ Agricultural land -Crop land

This category includes the land utilized for crops, vegetables, fodder and fruits. Existing cropland and current fallows are included in this category.

It is described as an area under agricultural tree crops, planted adopting certain agricultural management techniques. The Agricultural land in 10 km radius from the proposed project site is as follows.

**Table 3.2-Agricultural land details**

| S.No | Land use   | Area in Sq. Km | Percentage |
|------|------------|----------------|------------|
| 1    | Crop Land  | 184.12         | 54.80      |
| 2    | Plantation | 16.12          | 4.80       |

|              |             |               |             |
|--------------|-------------|---------------|-------------|
| 3            | Fallow Land | 14.12         | 4.2         |
| <b>Total</b> |             | <b>214.36</b> | <b>63.8</b> |

Of all the agricultural lands, Crop land occupies maximum of 54.8 % area within 10 km radius.

#### ❖ Forest Land

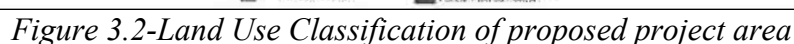
These are the areas bearing an association predominantly of trees and other vegetation types (within the notified forest boundaries) capable of producing timber and other forest produce. The study area of 10 km buffer comprises of Forest plantation, forest blanks and Scrub Forest.

**Table 3.3-Forest Land Classification**

| S. No        | Land use           | Area in Sq. Km | Percentage   |
|--------------|--------------------|----------------|--------------|
| 1            | Forest Plantation  | 60.13          | 17.9         |
| 2            | Forest scrub       | 60.13          | 17.9         |
| 3            | Land with scrub    | 14.29          | 4.25         |
| 4            | Land without scrub | 20.72          | 6.17         |
| 5            | Mines              | 3.14           | 0.93         |
| <b>Total</b> |                    | <b>158.41</b>  | <b>47.15</b> |

#### ❖ Water bodies

The category comprises area of surface water, either impounded in the form of ponds, reservoirs or flowing as streams, rivers and canals. River caters channel is inland waterways used for irrigation and for flood control. Water Bodies like Tank, River, Canal covers an area of 6.12 Sq.m of 1.82%.



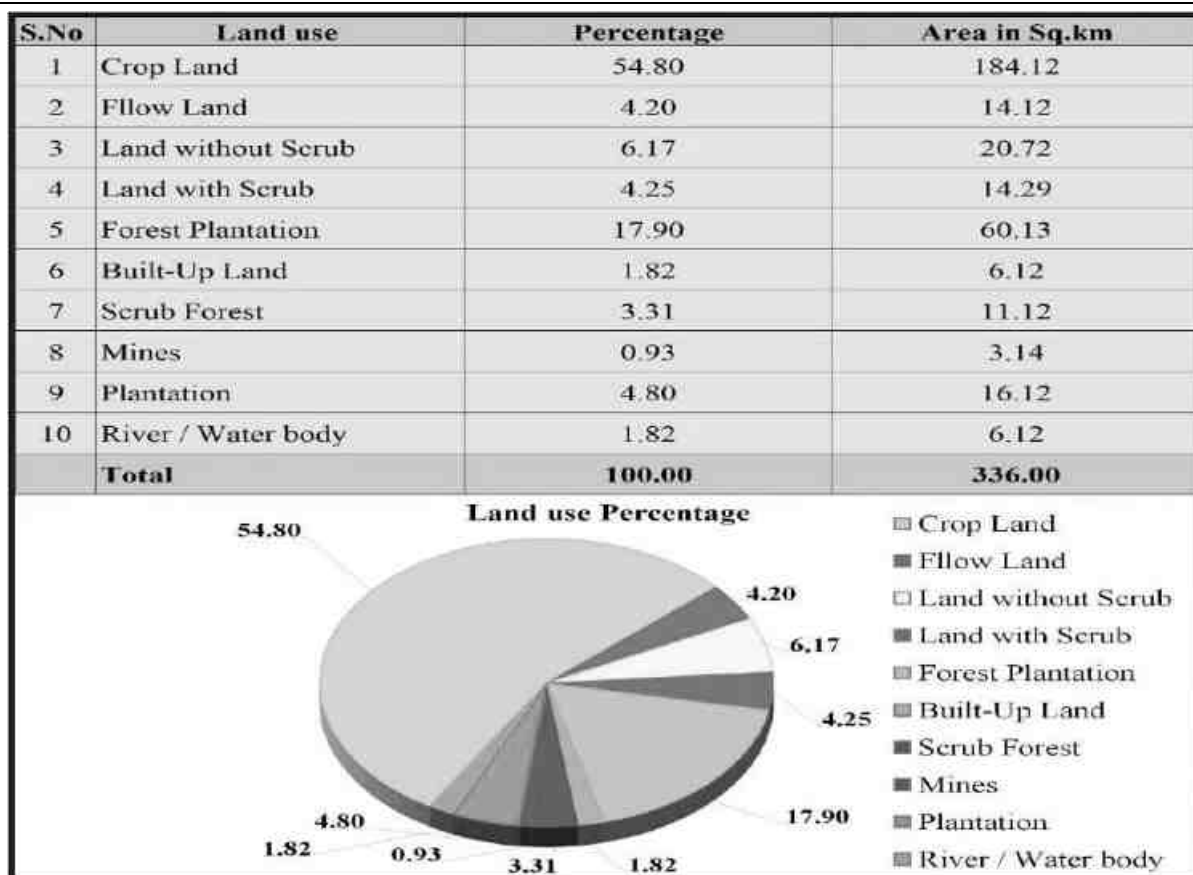


Figure 3.3-Different Land use classes around 10 km radius from the project site

The study reveals that the following major land use in the study area of 10 km radius from the project boundary

- Built-up area occupies only 1.82% of total area
- In the agricultural land crop land occupies majority of the area 54.80%
- The Project site is located in the crop land area.

### 3.3.2 Micrometeorology

For the period January to April, a detailed analysis of meteorological conditions was conducted to understand local climate patterns and their impact on environmental factors like air dispersion and humidity. The key parameters monitored during this period include wind speed and direction, temperature, humidity, rainfall Ground water and Drainage and waterbodies. The necessary micro-meteorological data were obtained from Climatological Section, Regional Meteorological Centre, Indian Meteorological Department (IMD) for the study period of Jan 2025 – April 2025

#### 3.3.2.1 Wind Pattern and Speed

Wind data is crucial for predicting the dispersion of air pollutants and ensuring effective air quality management.

- The predominant wind direction in the study area during January to April was from the East north East ENE, East (E) and South-East (SE).
- Wind speeds 8kts, with occasional fluctuations due to local weather disturbances.

#### 3.3.2.2 Temperature

- The average minimum temperature ranged between 23°C to 27°C during early mornings and nights.
- The maximum daytime temperature ranged between 28°C to 33°C, gradually increasing towards the end of April.

#### 3.3.2.3 Relative Humidity

Humidity levels indicate moisture content in the air, affecting evaporation rates and cloud formation.

- Morning relative humidity levels were around 70% to 85%, with higher values recorded in January due to winter conditions.
- By noon, humidity levels dropped to 50% to 65%, with March showing lower humidity levels due to increasing temperature.

#### 3.3.2.4 Rainfall

The 22 years, annual rainfall data for the Pudukkottai District has been collected from District Statistical Handbook 2022-23. The normal annual rainfall in the district is around 857.80mm. The area receives good amount of rainfall during Northeast monsoon. The normal yearly rainfall for the Pudukkottai district is as shown below as **Figure 3.4**



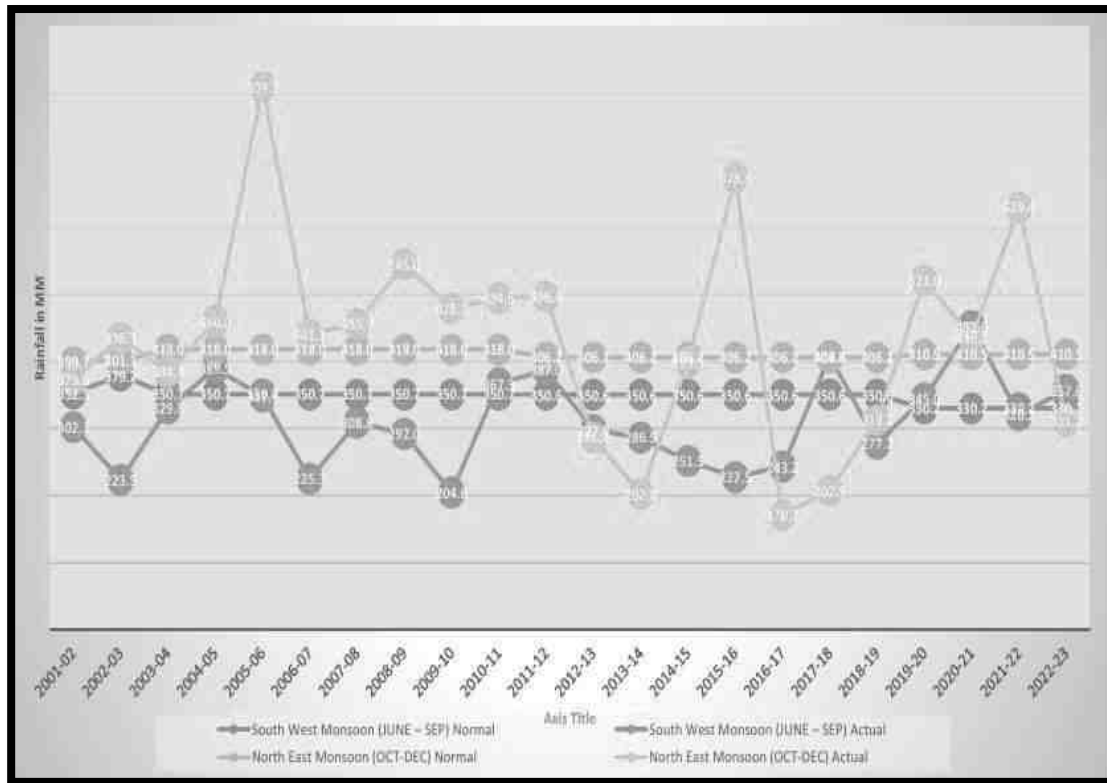


Figure 3.4-Average annual Season wise rainfall of Pudukkottai District

### 3.3.2.5 Drainage and water bodies

Surface water plays major role in irrigation when compared to the ground water source. The water drainage map sourced from Bhuvan website showing the 5 km buffer aerial distance from the proposed study area is shown in **Figure 3.2**.

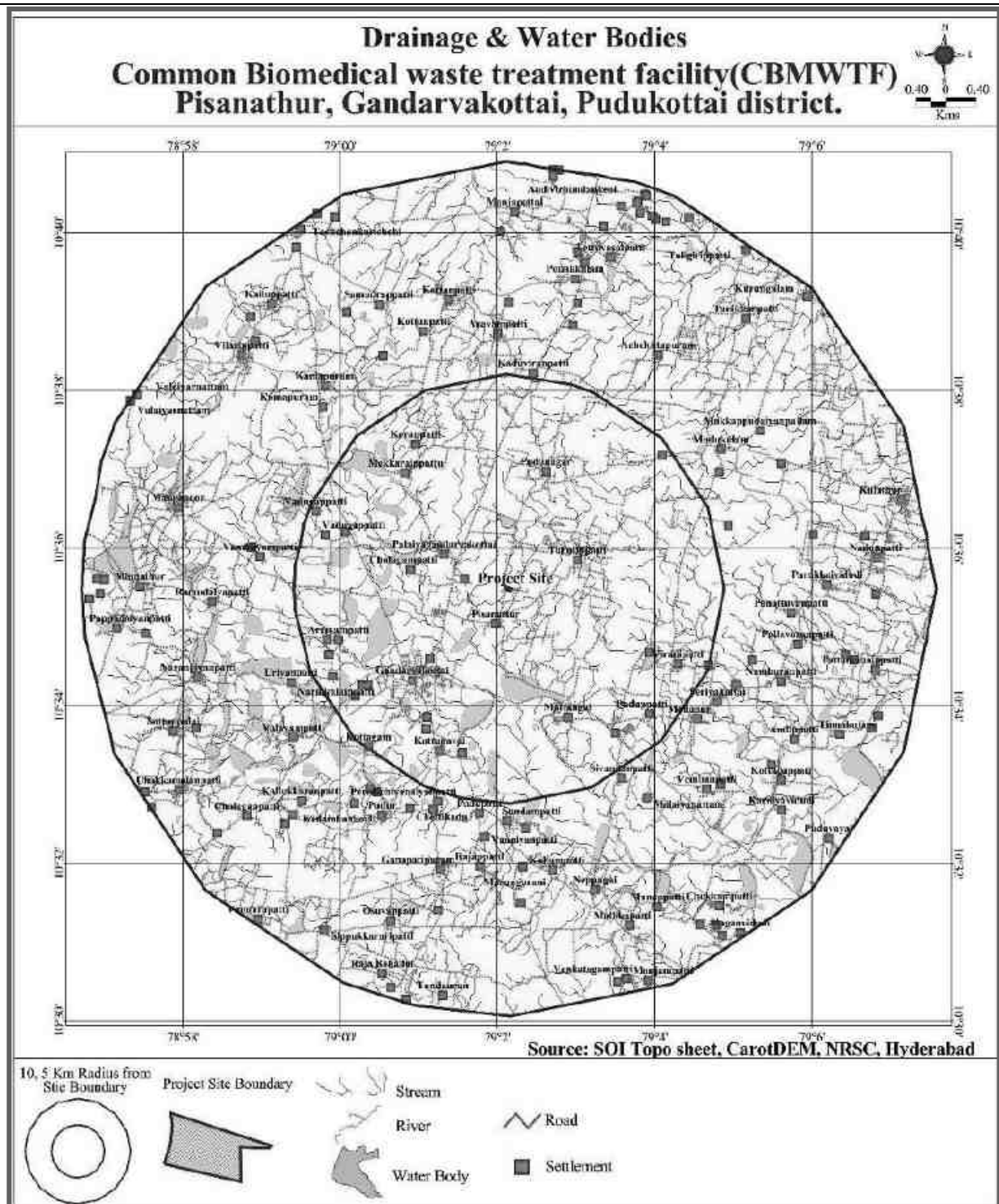


Figure 3.5-Water Drainage Map of the Project Site

### 3.3.2.6 Ground water

Ground water level data of monitoring well collected in the district since 1991 during pre-monsoon and post monsoon. The minimum and maximum water level in pre monsoon is 6.9m and 21.7m and in post monsoon is 3.3m and 12.3m.

### ❖ Occurrence of Ground water

Groundwater occurs in the area under unconfined to semi-confined conditions and under confined conditions in depth. The occurrence and movement of groundwater is through secondary porosity developed through weathering, fracturing and tectonic formation under gone by the rocks. The main source recharge to the aquifers is by precipitation and also by applied irrigation. In the soft rock formations occurrence and movement of ground water if through the primary porosity of bedding plans, granular arrangement of the formations. Though the porosity of the clay content formations is high permeability is very low and sandstone as well as limestone formations acts as good conduits and permeability is comparatively high.

The occurrence of ground water in the study area (10 km radius) has been studied in detail by collecting the water level from 13 wells (borewells/Openwells). The depth of the well's ranges from 12 m to 180 m. The ground water levels are collected from the bore wells and open wells. At the time of the collection of ground water level the yield of the wells have been recorded by oral enquiry. The ground water levels vary between 21 to 53 m bgl and yield of the wells varies between 40 to 120 liters / minutes. At the time of field visit during the pre-monsoon, the local people were enquired about the water level fluctuation in the observed wells during the post monsoon period. Based on the details collected Ground water level/table contours have been constructed. The location, ground water level and depth collected from the 10 m radius is given the table and photos.

**Table 3.4-Details of Observation wells in the project area**

| Observation wells in the project area |                 |           |            |                |                      |     |                          |
|---------------------------------------|-----------------|-----------|------------|----------------|----------------------|-----|--------------------------|
| S. No                                 | Location        | Latitude  | Longitude  | Type of Source | water level in m bgl | MSL | Reduced water level in m |
| 1                                     | Pisanathur      | 10.584301 | 79.031187  | BW             | 49                   | 97  | 48                       |
| 2                                     | Sundampatti     | 10.542654 | 79.033319  | BW             | 39                   | 91  | 52                       |
| 3                                     | Gandarvakottai  | 10.584608 | 79.032734  | BW             | 48                   | 98  | 50                       |
| 4                                     | Turusupatti     | 10.602134 | 79.0047529 | BW             | 26                   | 108 | 82                       |
| 5                                     | Kallukaranpatti | 10.532087 | 79.006881  | BW             | 28                   | 116 | 88                       |
| 6                                     | kallupatti      | 10.650085 | 78.9875    | BW             | 26                   | 130 | 104                      |
| 7                                     | Project site    | 10.591937 | 79.036022  | BW             | 53                   | 101 | 48                       |
| 8                                     | Nadupatti       | 10.596933 | 79.115482  | BW             | 34                   | 78  | 44                       |

**Observation wells in the project area**

| S. No | Location   | Latitude  | Longitude | Type of Source | water level in m bgl | MSL | Reduced water level in m |
|-------|------------|-----------|-----------|----------------|----------------------|-----|--------------------------|
| 9     | Mattangal  | 10.567349 | 79.047026 | OW             | 21                   | 91  | 70                       |
| 10    | Pudunagar  | 10.617562 | 79.042633 | OW             | 31                   | 115 | 84                       |
| 11    | Karungulam | 10.672868 | 79.080853 | BW             | 21.5                 | 93  | 71.5                     |
| 12    | Minnathur  | 10.59278  | 78.95606  | BW             | 18.6                 | 125 | 106.4                    |





Figure 3.6 Ground water level observation photos

#### ❖ Movement of Ground water

The movement of ground water is controlled by the hydraulic conductivity of the aquifer and hydraulic gradient. In study area the hydraulic conductivity is mainly based on the primary porosity. The homogeneity of the soft rock formation plays a vital role in the movement of the ground water. In the study area the formations are soft rock of near homogenous in nature. Sand and sandstone acts as ground water conduit. Sand stone is the principal aquifer in the study area apart from the other rock aquifers.

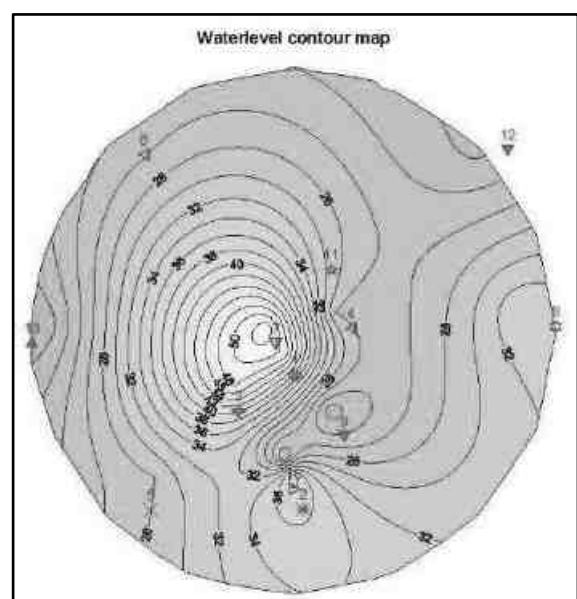
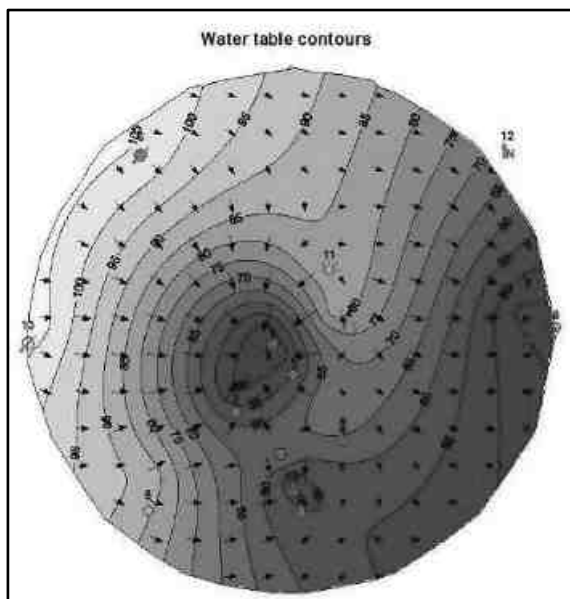


Figure 3.6-Water Table Contours around the project area

Based on the water level data the ground water table contours and water level contours have been constructed by using SURFER. The water table contours depict mixed response in movement of ground water. The general ground water movement is from west to east and in the project site area Ground water trough shows deep water level. Steep gradient of contours near the ground water table trough shows low permeability and, in the north and south of the project area the contours show moderate to high permeability. The inhomogeneity of the contours is due to the recharge conditions from the river system and the local ponds and lakes. Geology of the area with presence of permeable (sandy alluvium) and impermeable formations (laterite) also play a vital role in the variation.

The water level contour constructed by using the actual water level below ground level is shown in the plate above. The contours show a ground water trough near the project area due to deep water level in the borewell. This also coincides with the water table contours.

Ground water estimation for the year 2020 for Gandarvakottai block is given in the **Table 3.5**

**Table 3.5-Ground water estimation for the year 2020 for Gandarvakottai block**

| Gandarvakottai Firka – Categorization (Million Cubic Meter) |                                                  |                                                                          |                                                      |                                                           |                       |
|-------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|-----------------------|
| Net Annual Ground Water Availability                        | Existing Gross Ground Water Draft for Irrigation | Existing Gross Ground Water Draft for domestic & industrial water supply | Existing Gross Ground Water Draft for All uses (4+5) | Stage of Ground Water Development<br>$\{(6/3) * 100\} \%$ | Category of the Firka |
| MCM                                                         | MCM                                              | MCM                                                                      | MCM                                                  |                                                           |                       |
| 21.91                                                       | 5.18                                             | 0.426                                                                    | 5.60                                                 | 26                                                        | SAFE                  |

The estimation results clearly states that Gandarvakottai Firka is in ‘SAFE’ category. The stage of ground water development is 26%.

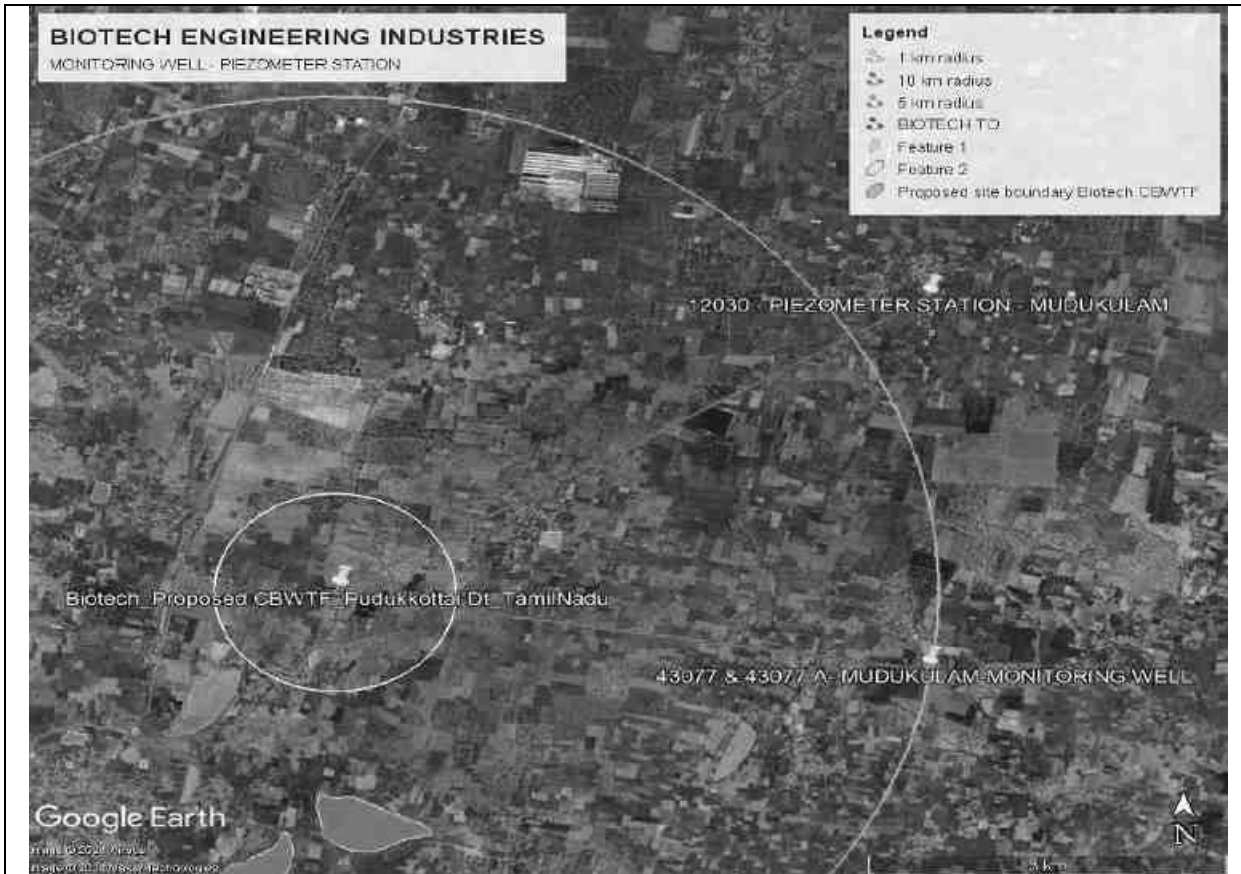


Figure 3.7-Ground water Level-Pudukkottai District

### 3.3.2.7 Groundwater Availability in Gandarvakottai

As per the latest categorization by the Tamil Nadu Water Supply and Drainage (TWAD) Board, Gandarvakottai falls under the '**Safe**' category for groundwater extraction. This categorization, based on the extraction status as of 2020, indicates that the groundwater extraction levels in Gandarvakottai are well within sustainable limits, being less than 70% of the available recharge.

This designation highlights that Gandarvakottai, along with other areas categorized under the 'Safe' zone, maintains a balanced groundwater level, ensuring the long-term availability of this vital resource. As such, Gandarvakottai is recognized as a region where groundwater can be drawn without significant risk of over-exploitation, making it a secure and reliable source for water needs in both the present and the future. The Commitment Letter from TWAD for the project is attached herewith as **Annexure 7**.

Ref: <https://twadboard.tn.gov.in/content/pudukkottai>

| Categorisation Based On Extraction (As On 2020) | No. Of Firkas | Firkas                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Over Exploited (>100%)                          | 0             |                                                                                                                                                                                                                                                                                                                                                                                    |
| Critical (90%-100%)                             | 0             |                                                                                                                                                                                                                                                                                                                                                                                    |
| Semi Critical (70%-90%)                         | 10            | Arasamalai, Arasarkulam, Karaiyur, Keeramangalam, Kodumbalur, Kottur, Narthamalai, Ponnamaravathy, Vennavalkudi, Viralimalai                                                                                                                                                                                                                                                       |
| Safe (<70%)                                     | 32            | Alangudi, Aranthangi, Athani, Avudaiyarkoil, Embal, Gandarvakottai, Illuppur, Kallakkottai, Karambakudi, Keelanilai, Keeranur, Killukkottai, Kudumiyamalai, Kunnandarkoil, Malaiyur, Manamelkudi, Mathoor, Mimisal, Nagudi, Neerpalani, Ponpette, Poovathakudi, Pudukkottai, Pudunagar, Sengeerai, Silattur, Sithanavasal, Thirumayam, Vallanadu, Varappur, Veerapatty, Virachilai |
| Others (Poor & Saline)                          | 3             | Kottaipattinam, Perumaruthur, Sinkavanam                                                                                                                                                                                                                                                                                                                                           |
| <b>Total</b>                                    | <b>45</b>     |                                                                                                                                                                                                                                                                                                                                                                                    |

Figure 3.8-Ground water extraction zone TWAD

### 3.3.3 Geology

Geologically the entire district can be broadly classified into hard rock and sedimentary regions.

#### 3.3.3.1 Hard rock regions

Around 45% of this district is underlain by hard massive formations of Archaean age. Granitic gneiss, hornblende biotite gneiss, Charnockites, pegmatites and quartzites are the various types of rocks encountered in the hard rock region.

#### 3.3.3.2 Sedimentary regions

The area occupied by sedimentary formations belonging to

##### 1. Cretaceous

##### 2. Tertiary

Recent ages fall on the eastern half of the district. The total extent occupied by sedimentary formations amounts to 55% of the total geographical area of the district. Tertiary deposits of Pudukkottai district consists of laterite, arenaceous and argillaceous sand stone and clay.

Cretaceous deposits consist of clay, limestone, sand stone and clayey sand stone. The coastal alluvial deposits consist of unconsolidated sands, gravels and clay. Aranthangi, major parts of Gandarvakottai, Alangudi, Avudaiyarkoil and half of Manamelkudi and Pudukkottai taluks are occupied by tertiary



deposits. Minor parts of Gandarvakottai, Thirumayam and half of Pudukkottai taluks are occupied by cretaceous deposits. Half of Manamalkudi and minor parts of Avudaiyarkoil taluks are occupied by Quarternary deposits.

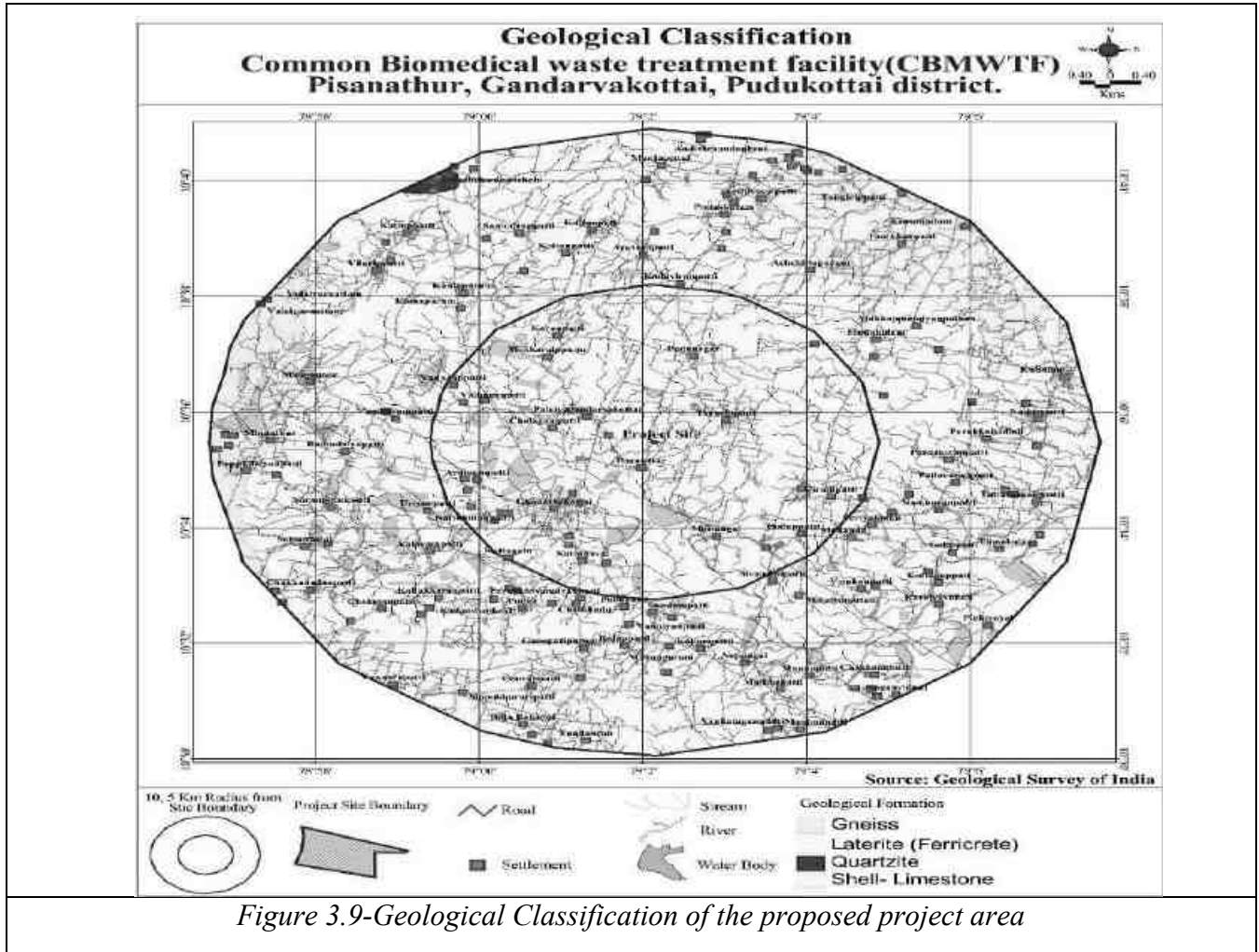


Figure 3.9-Geological Classification of the proposed project area

### 3.3.3.3 Hydrogeology

The occurrence and movement of groundwater in hard rock formations are restricted to the porous zones of weathered formations and the open systems of fractures, fissures and joints. Generally, in hard rock regions, occurrence of weathered thickness is discontinuous both in space and depth. Hence recharge of groundwater in hard rock formations is influenced by the intensity and depth of weathering. The subsurface lithological condition and the aquifer characters are ascertained by drilling exploratory boreholes and conducting pumping tests by State and central organisations.

### 3.3.3.4 Aquifer parameter

#### a) Hard rock formations

The thickness of aquifer in varies between 12 m to 45 m below ground level

The intensity and degree of weathering and fracture development in the crystalline formations play a vital role in the development of intergranular porosity. Whenever gneissic formations occur deep and very high intensity of weathering is observed. While in Charnockites area weathering is moderate. The aquifer parameter in hard rock region of the district is observed to be as follows:

**Table 3.6-Aquifer Parameter in hard rock region**

| S. No | Parameters                             | Range                    |
|-------|----------------------------------------|--------------------------|
| 1     | Well yield in LPM                      | 1-2 lpm                  |
| 2     | Transmissivity (T) m <sup>2</sup> /day | 5-25 m <sup>2</sup> /day |
| 3     | Permeability (K) m/day                 | 3-16 m/day               |

#### b) Sedimentary formations - Cretaceous formations

The project site falls in the cretaceous formation. The cretaceous formations are the oldest among the sedimentary formations occurring in the area. cropping out along a narrow belt of 6-8 kms width adjoining the archaean complex. These formations consist mainly of coarse grained sand, clay, clayey sand stone associated with kankar and gravel. The aquifer parameter values of the cretaceous formations are given below.

**Table 3.7-Aquifer parameter in cretaceous formations**

| S. No | Parameters                             | Range      |
|-------|----------------------------------------|------------|
| 1     | Well yield in LPM                      | 30-100     |
| 2     | Transmissivity (T) m <sup>2</sup> /day | 9 - 47     |
| 3     | Permeability (K) m/day                 | 0.5 - 2.80 |

#### 3.3.3.5 Geomorphology and Structure

The land forms / geomorphic units and structures such as fractures, fissures and faults have been interpreted from the recent satellite image. All the landform / geomorphic units and structures occurring in the study area are mapped. The geomorphology and structures of the area plays the vital role in identifying the ground water potential zones.

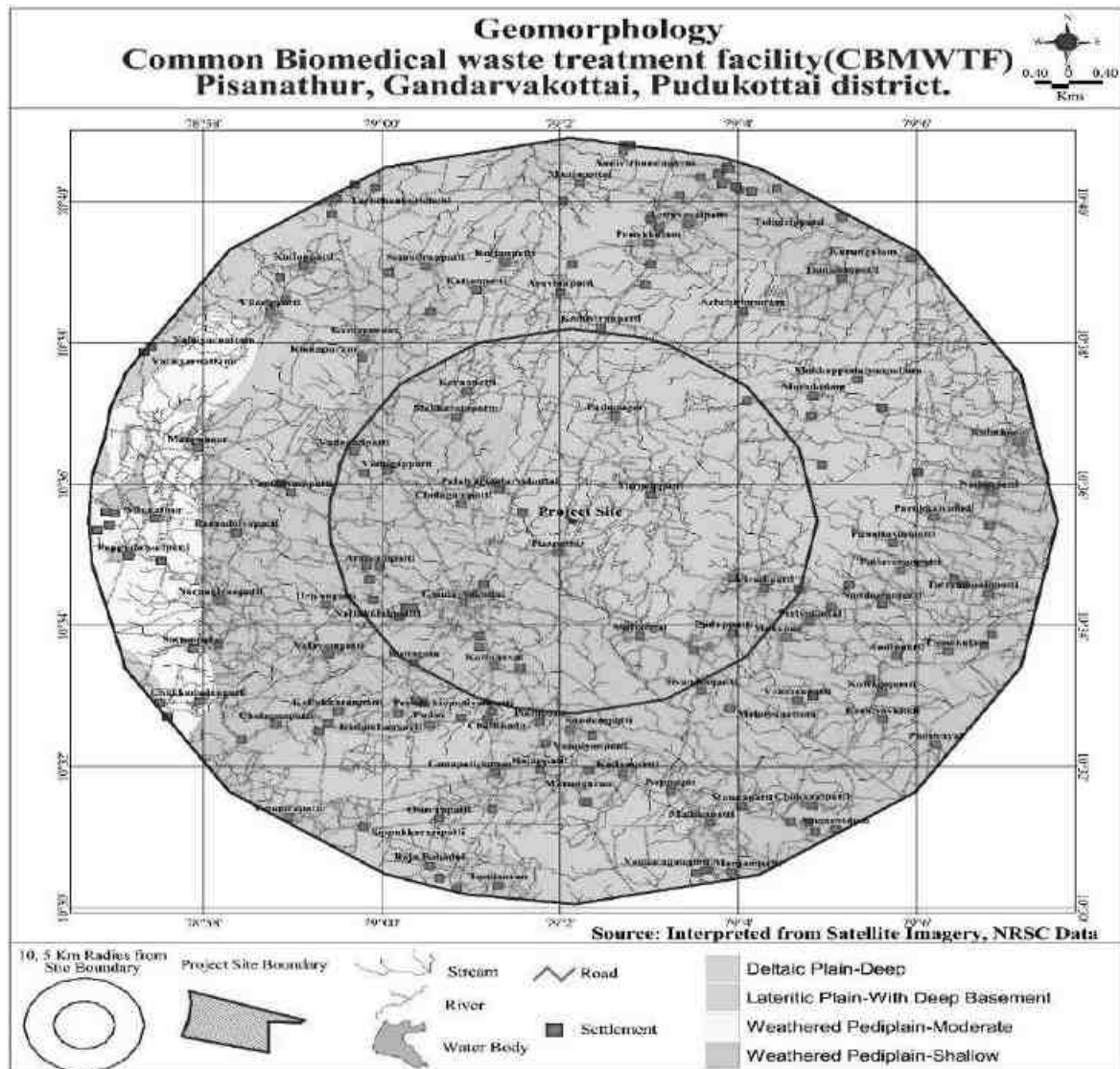


Figure 3.11 Geomorphology of proposed project area

The following geomorphic units have been interpreted using the satellite images within 10 km radius of the project site boundary.

1. Deltaic Plain - deep
2. Lateritic plain with deep basement
3. Weathered Pediplain – Shallow
4. Weathered Pediplain – Moderate

Weathered pediplain shallow and moderate, are good in ground water occurrence and movement. The Project site is located in lateritic plain.

### 3.3.4 Ambient Air Quality

Ambient Air Quality (AAQ) monitoring will be conducted at eight strategic locations within a 10 km radius of the project site, covering both core and buffer zones. The selection of monitoring locations is based on prevailing wind patterns, including both upwind and downwind directions during the study period.

The AAQ monitoring will be performed twice a week at each location for a duration of 12 weeks. The key air quality parameters to be measured and analysed include Particulate Matter (PM<sub>10</sub> & PM<sub>2.5</sub>), Sulphur Di Oxide (SO<sub>2</sub>), Nitrogen Di Oxide (NO<sub>x</sub>), Carbon Monoxide (CO), and Ozone (O<sub>3</sub>). The selected monitoring locations are detailed in the table below.

The AAQM locations in study area with respect to the proposed project site are shown in **Figure 3.12**

The details of these Ambient Air sample locations are presented in **Table 3.8**. Standard analytical procedures were used for collection of samples, analysis and quantification of air quality parameters. The summary of AAQ results is listed in **Table 3.9**.

At each monitoring location **High Volume Samplers (HVS)** and **Fine Particulate Samplers (FPS)** are installed to continuously collect air samples, measuring PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO, and O<sub>3</sub> at **8-hour intervals**. The chemical analysis of collected samples was carried out in in-house laboratory.

**Table 3.8-Details of sampling location**

| No.   | Location        | Direction from the site | Distance from the site (Km) | Geographical coordinates |           |
|-------|-----------------|-------------------------|-----------------------------|--------------------------|-----------|
|       |                 |                         |                             | Latitude                 | Longitude |
| AAQ 1 | Project Site    | -                       | -                           | 10.591316                | 79.035469 |
| AAQ 2 | Pisanathur      | 0.8                     | SW                          | 10.584583                | 79.032694 |
| AAQ 3 | Turusupatti     | 1.7                     | NE                          | 10.602202                | 79.047231 |
| AAQ 4 | Gandarvakottai  | 2.8                     | SW                          | 10.573678                | 79.017201 |
| AAQ 5 | Pudunagar       | 1.7                     | N                           | 10.607024                | 79.037918 |
| AAQ 6 | Sundampatti     | 5.4                     | S                           | 10.542028                | 79.036155 |
| AAQ 7 | Viralippatti    | 9.3                     | NW                          | 10.641506                | 78.96685  |
| AAQ 8 | Kallukaranpatti | 7.2                     | SW                          | 10.532081                | 79.006858 |

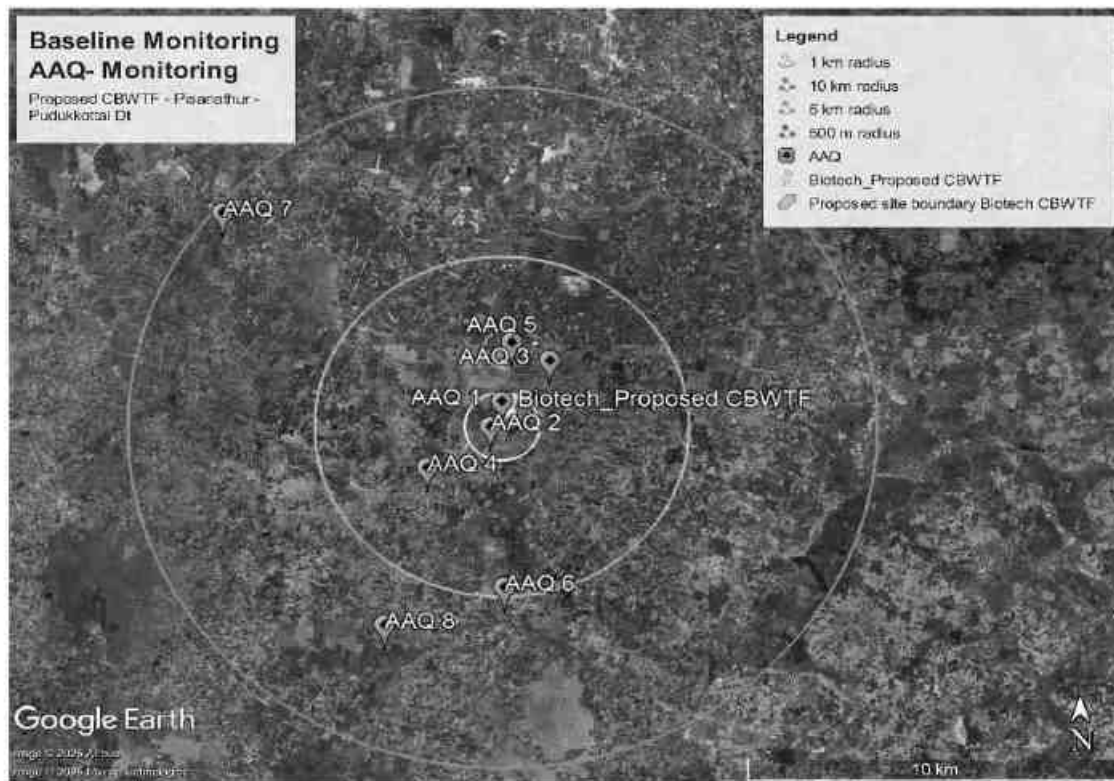


Figure 3.12 Proposed CBWTF - Baseline Monitoring - Air Sampling – Pudukkottai

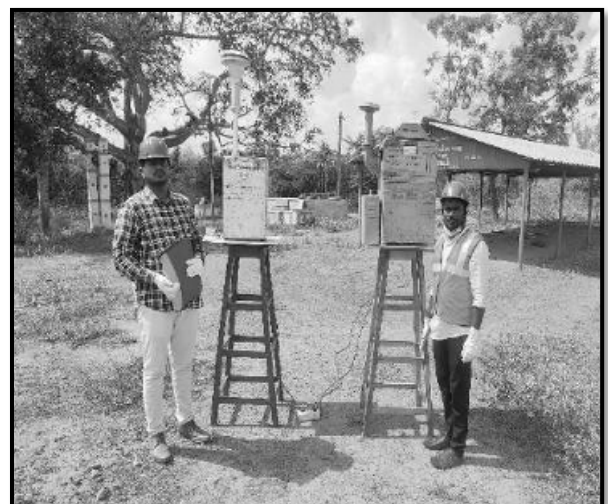




*Figure 3.10-AAQ Monitoring photos*

**Table 3.9-Summary of Ambient Air Quality Results (As per NAAQS ,2009)**

| Monitoring Period - Jan 2025 to April 2025 |      |               |                    |                      |                  |                   |                     |                     |                          |       |
|--------------------------------------------|------|---------------|--------------------|----------------------|------------------|-------------------|---------------------|---------------------|--------------------------|-------|
| PARAMETERS                                 |      | L1            | L2                 | L3                   | L4               | L5                | L6                  | L7                  | L8                       | NAAQS |
|                                            |      | Proposed Site | Pisanathur Village | Thurusupatti village | Gandarva-kkottai | Pudunagar Village | Sundampatti Village | Viralipatti village | Kallukaran-patti village |       |
| PM10, $\mu\text{g}/\text{m}^3$             | Min  | 45.47         | 45.77              | 45.77                | 50.40            | 42.73             | 40.85               | 42.05               | 44.60                    | 100   |
|                                            | Max  | 53.22         | 52.85              | 52.50                | 56.55            | 52.60             | 52.52               | 50.46               | 50.22                    |       |
|                                            | Mean | 49.09         | 48.48              | 49.24                | 54.06            | 47.65             | 47.14               | 47.05               | 47.58                    |       |
|                                            | 98%  | 53.14         | 51.74              | 52.19                | 56.49            | 52.37             | 52.29               | 50.46               | 50.22                    |       |
| PM2.5, $\mu\text{g}/\text{m}^3$            | Min  | 23.70         | 22.70              | 23.20                | 27.07            | 22.21             | 21.46               | 23.45               | 21.33                    | 60    |
|                                            | Max  | 52.53         | 48.60              | 50.95                | 56.55            | 46.99             | 49.43               | 47.20               | 46.65                    |       |
|                                            | Mean | 26.96         | 26.04              | 27.81                | 33.12            | 25.27             | 26.51               | 26.25               | 25.32                    |       |
|                                            | 98%  | 42.03         | 39.27              | 44.10                | 47.81            | 37.48             | 40.29               | 39.15               | 37.58                    |       |
| SO <sub>2</sub> , $\mu\text{g}/\text{m}^3$ | Min  | 0.00          | 0.00               | 0.00                 | 2.14             | 0.00              | 0.00                | 0.00                | 0.00                     | 80    |
|                                            | Max  | 0.00          | 0.00               | 0.00                 | 14.97            | 0.00              | 0.00                | 0.00                | 0.00                     |       |
|                                            | Mean | 0.00          | 0.00               | 0.00                 | 7.31             | 0.00              | 0.00                | 0.00                | 0.00                     |       |
|                                            | 98%  | 0.00          | 0.00               | 0.00                 | 13.99            | 0.00              | 0.00                | 0.00                | 0.00                     |       |



| Monitoring Period - Jan 2025 to April 2025 |      |               |                    |                      |                  |                   |                     |                     |                          |                            |
|--------------------------------------------|------|---------------|--------------------|----------------------|------------------|-------------------|---------------------|---------------------|--------------------------|----------------------------|
| PARAMETERS                                 |      | L1            | L2                 | L3                   | L4               | L5                | L6                  | L7                  | L8                       | NAAQS                      |
|                                            |      | Proposed Site | Pisanathur Village | Thurusupatti village | Gandarva-kkottai | Pudunagar Village | Sundampatti Village | Viralipatti village | Kallukaran-patti village |                            |
| NO <sub>2</sub> ,<br>µg/m <sup>3</sup>     | Min  | 3.93          | 4.37               | 4.37                 | 5.68             | 3.50              | 4.37                | 3.93                | 3.93                     | 80                         |
|                                            | Max  | 8.31          | 8.31               | 7.87                 | 16.17            | 7.43              | 7.87                | 7.43                | 7.43                     |                            |
|                                            | Mean | 5.92          | 6.21               | 6.14                 | 10.84            | 5.43              | 6.03                | 5.81                | 5.68                     |                            |
|                                            | 98%  | 8.10          | 8.10               | 7.87                 | 15.37            | 7.23              | 7.87                | 7.43                | 7.43                     |                            |
| O <sub>3</sub> ,<br>µg/m <sup>3</sup>      | Min  | 0.00          | 0.00               | 0.00                 | 0.00             | 0.00              | 0.00                | 0.00                | 0.00                     | 1hr:4mg<br>/m <sup>3</sup> |
|                                            | Max  | 0.00          | 0.00               | 0.00                 | 0.00             | 0.00              | 0.00                | 0.00                | 0.00                     |                            |
|                                            | Mean | 0.00          | 0.00               | 0.00                 | 0.00             | 0.00              | 0.00                | 0.00                | 0.00                     |                            |
|                                            | 98%  | 0.00          | 0.00               | 0.00                 | 0.00             | 0.00              | 0.00                | 0.00                | 0.00                     |                            |
| CO,<br>mg/m <sup>3</sup>                   | Min  | -0.99         | -0.99              | -0.99                | 0.00             | 0.00              | 0.00                | 0.00                | 0.00                     | 1hr : 180                  |
|                                            | Max  | -0.99         | -0.99              | -0.99                | 0.00             | 0.00              | 0.00                | 0.00                | 0.00                     |                            |
|                                            | Mean | -0.99         | -0.99              | -0.99                | 0.00             | 0.00              | 0.00                | 0.00                | 0.00                     |                            |
|                                            | 98%  | -0.99         | -0.99              | -0.99                | 0.00             | 0.00              | 0.00                | 0.00                | 0.00                     |                            |



## Interpretation

The average concentration of air pollutants recorded during the monitoring period is as follows:

- **PM<sub>10</sub>**: Ranged between 40.85 – 56.55  $\mu\text{g}/\text{m}^3$
- **PM<sub>2.5</sub>**: Ranged between 21.33 – 56.55  $\mu\text{g}/\text{m}^3$
- **SO<sub>2</sub>**: Ranged between 0.00 – 14.97  $\mu\text{g}/\text{m}^3$
- **NO<sub>2</sub>**: Ranged between 3.50 – 16.17  $\mu\text{g}/\text{m}^3$

**Table 3.10-Air Quality index**

| Location                     | Location Name           | AQI                                                                                    |                     |
|------------------------------|-------------------------|----------------------------------------------------------------------------------------|---------------------|
| L1                           | Proposed Site           | 49                                                                                     | <b>Good</b>         |
| L2                           | Pisanathur Village      | 48                                                                                     | <b>Good</b>         |
| L3                           | Thurusupatti village    | 49                                                                                     | <b>Good</b>         |
| L4                           | Gandarvakkottai         | 55                                                                                     | <b>Satisfactory</b> |
| L5                           | Pudunagar Village       | 48                                                                                     | <b>Good</b>         |
| L6                           | Sundampatti Village     | 47                                                                                     | <b>Good</b>         |
| L7                           | Veralipatti village     | 47                                                                                     | <b>Good</b>         |
| L8                           | Kallukaranpatti village | 48                                                                                     | <b>Good</b>         |
|                              |                         |                                                                                        |                     |
| <b>Good (0–50)</b>           |                         | Minimal Impact                                                                         |                     |
| <b>Satisfactory (51–100)</b> |                         | Minor breathing discomfort to sensitive people                                         |                     |
| <b>Moderate (101–200)</b>    |                         | Breathing discomfort to the people with lung, heart disease, children and older adults |                     |
| <b>Poor (201–300)</b>        |                         | Breathing discomfort to people on prolonged exposure                                   |                     |
| <b>Very Poor (301–400)</b>   |                         | Respiratory illness to the people on prolonged exposure                                |                     |
| <b>Severe (&gt;401)</b>      |                         | Respiratory effects even on healthy people                                             |                     |

All recorded values are within the permissible limits set by the Central Pollution Control Board (CPCB) under the National Ambient Air Quality Standards (NAAQS), 2009. This indicates that air quality in the study area remains within acceptable environmental standards.

### 3.3.5 Ambient Noise

Noise is defined as any unwanted or disruptive sound that interferes with communication, affects hearing, or causes discomfort. Various sources contribute to noise pollution, with potential risks depending on the intensity and duration of exposure. Common sources include transportation systems, construction activities, industrial operations, and household appliances.

In the study area, vehicular traffic on roads has been identified as the primary source of noise pollution. The locations for noise level monitoring are detailed in **Table 3.11**.

Noise Level Monitoring will be conducted at eight locations within a 10 km radius of the project site, using a noise measurement device. To assess the existing noise conditions, readings will be taken at different locations during the study period.

The selection of monitoring locations is based on land use patterns and potential noise-sensitive areas. The noise monitoring will be carried out in accordance with CPCB guidelines, assessing noise levels during both daytime and night time to evaluate variations in ambient noise conditions. The selected monitoring locations are listed in the table below.

**Table 3.11-Details of Ambient Noise Sampling Locations**

| No.   | Location        | Direction from the site | Distance from the site (Km) | Geographical coordinates |           |
|-------|-----------------|-------------------------|-----------------------------|--------------------------|-----------|
|       |                 |                         |                             | Latitude                 | Longitude |
| ANL 1 | Project Site    | -                       | -                           | 10.591316                | 79.035469 |
| ANL 2 | Pisanathur      | 0.8                     | SW                          | 10.584583                | 79.032694 |
| ANL 3 | Turusupatti     | 1.7                     | NE                          | 10.602202                | 79.047231 |
| ANL 4 | Gandarvakottai  | 2.8                     | SW                          | 10.573678                | 79.017201 |
| ANL 5 | Pudunagar       | 1.7                     | N                           | 10.607024                | 79.037918 |
| ANL 6 | Sundampatti     | 5.4                     | S                           | 10.542028                | 79.036155 |
| ANL 7 | Viralippatti    | 9.3                     | NW                          | 10.641506                | 78.96685  |
| ANL 8 | Kallukaranpatti | 7.2                     | SW                          | 10.532081                | 79.006858 |

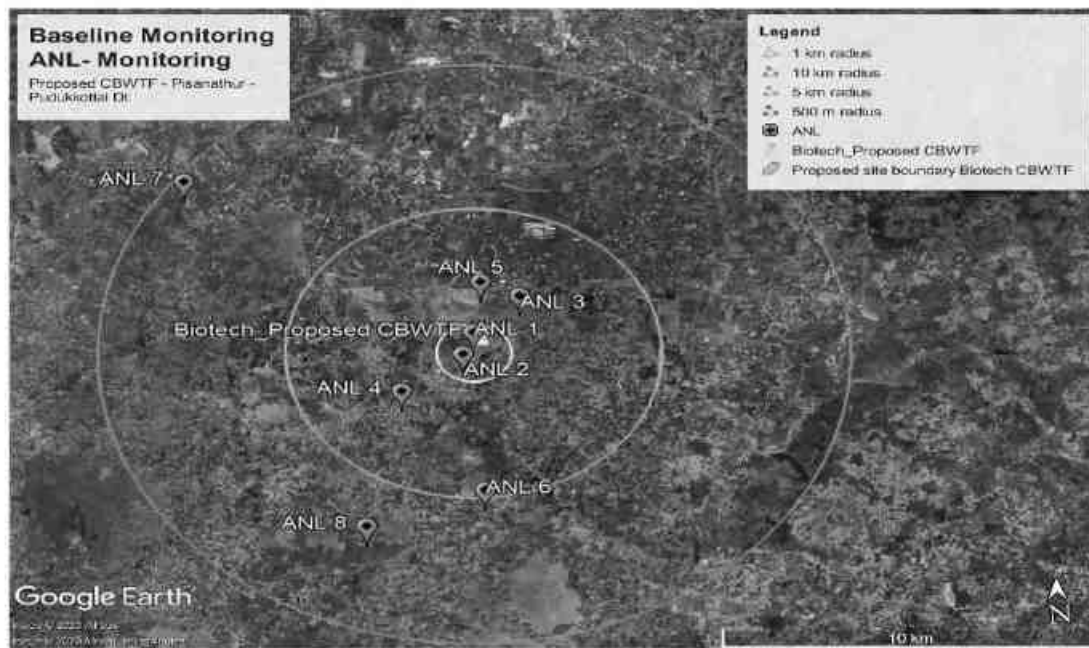


Figure 3.11-Proposed CBWTF - Baseline Monitoring - Noise Sampling



Figure 3.12- Noise Monitoring Photos

Standard analytical procedures were used for collection of samples, analysis and quantification of noise parameters summary of Noise study results are listed in **Table 3.12**.

**Table 3.12-Test Report of Ambient Noise Sampling Locations**

| Locations | Test Method  | Day Time<br>Results<br>db(A) Leq | Night Time<br>Results<br>db(A) Leq | Limits                                                         |
|-----------|--------------|----------------------------------|------------------------------------|----------------------------------------------------------------|
| ANL 1     | IS:9989-1981 | 56.3                             | 45.8                               | 75 db(A) as per<br>CPCB Day Time<br>(6.00 am to 10.00<br>pm)   |
| ANL 2     | IS:9989-1981 | 48.9                             | 44.5                               |                                                                |
| ANL 3     | IS:9989-1981 | 52.6                             | 46.2                               |                                                                |
| ANL 4     | IS:9989-1981 | 49.0                             | 42.3                               |                                                                |
| ANL 5     | IS:9989-1981 | 49.5                             | 45.7                               | 70 db(A) as per<br>CPCB Night Time<br>(10.00 pm to 6.00<br>am) |
| ANL 6     | IS:9989-1981 | 48.1                             | 48.8                               |                                                                |
| ANL 7     | IS:9989-1981 | 48.9                             | 45.1                               |                                                                |
| ANL 8     | IS:9989-1981 | 45.8                             | 40.6                               |                                                                |

#### Interpretation

In the study area, noise levels during the daytime ranged from 45.8 dB(A) to 56.3 dB(A), while night time levels varied between 40.6 dB(A) and 48.8 dB(A). These measurements are well within the permissible limits prescribed by the Central Pollution Control Board (CPCB), which are 55 dB(A) for daytime and 45 dB(A) for night time in residential areas, and 75 dB(A) for daytime and 70 dB(A) for night time in industrial areas. Additionally, the hourly equivalent continuous noise levels (Leq) recorded at various monitoring locations across the study area complied with the applicable CPCB standards for both time periods and land use categories.

#### 3.3.6 Water Environment

The water environment of the study area is broadly categorized into the following two components:

**(a) Ground Water** – This includes subsurface water present in aquifers, wells, and boreholes, which serves as a source for drinking, irrigation, and industrial use.

**(b) Surface Water** – This comprises water bodies such as rivers, lakes, ponds, canals, and reservoirs.

Water quality assessment will be conducted at two surface water and eight groundwater sampling locations within a 10 km radius of the study area. Sampling sites have been selected based on their relevance to potential environmental impacts and proximity to the project site.

Water samples will be analysed as per IS 10500: 2012, IS 2296:1982 &CPCB standards and parameters, covering key physicochemical and biological characteristics to assess overall water quality. The selected sampling locations for surface and groundwater monitoring are detailed in the table below.

**Table 3.13-Details of Water Sampling Location**

| Table S-15- Details of Water Sampling Location |                     |                                          |                                              |                  |           |
|------------------------------------------------|---------------------|------------------------------------------|----------------------------------------------|------------------|-----------|
| Sl. No                                         | Location            | Direction<br>from<br>project<br>boundary | Distance<br>from Project<br>Boundary<br>(Km) | Geo Co-ordinates |           |
|                                                |                     |                                          |                                              | Latitude         | Longitude |
| Ground Water                                   |                     |                                          |                                              |                  |           |
| GW-1                                           | Pisanathur          | 0.9                                      | SW                                           | 10.584103        | 79.031187 |
| GW-2                                           | Sundampatti         | 3.4                                      | NW                                           | 10.54.2654       | 79.033319 |
| GW-3                                           | Gandarvakottai      | 0.8                                      | SW                                           | 10.584608        | 79.032734 |
| GW-4                                           | Turusupatti         | 1.7                                      | NE                                           | 10.602134        | 79.047529 |
| GW-5                                           | Kallukaranpatti     | 7.2                                      | SW                                           | 10.532087        | 79.006881 |
| Surface Water                                  |                     |                                          |                                              |                  |           |
| SW-1                                           | Pisanathur Pond     | 0.7                                      | S                                            | 10.584817        | 79.033835 |
| SW-2                                           | Sundampati          | 5.4                                      | S                                            | 10.542028        | 79.036155 |
| SW-3                                           | Viralippatti        | 9.3                                      | NW                                           | 10.641506        | 78.96685  |
| SW-4                                           | Pudunagar Pond      | 2.5                                      | NE                                           | 10.613001        | 79.043009 |
| SW-5                                           | Gandarvakottai Lake | 2.9                                      | SW                                           | 10.582611        | 79.010605 |

The locations and photos of water sampling are shown in **Figure 3.13 & 3.14** respectively.

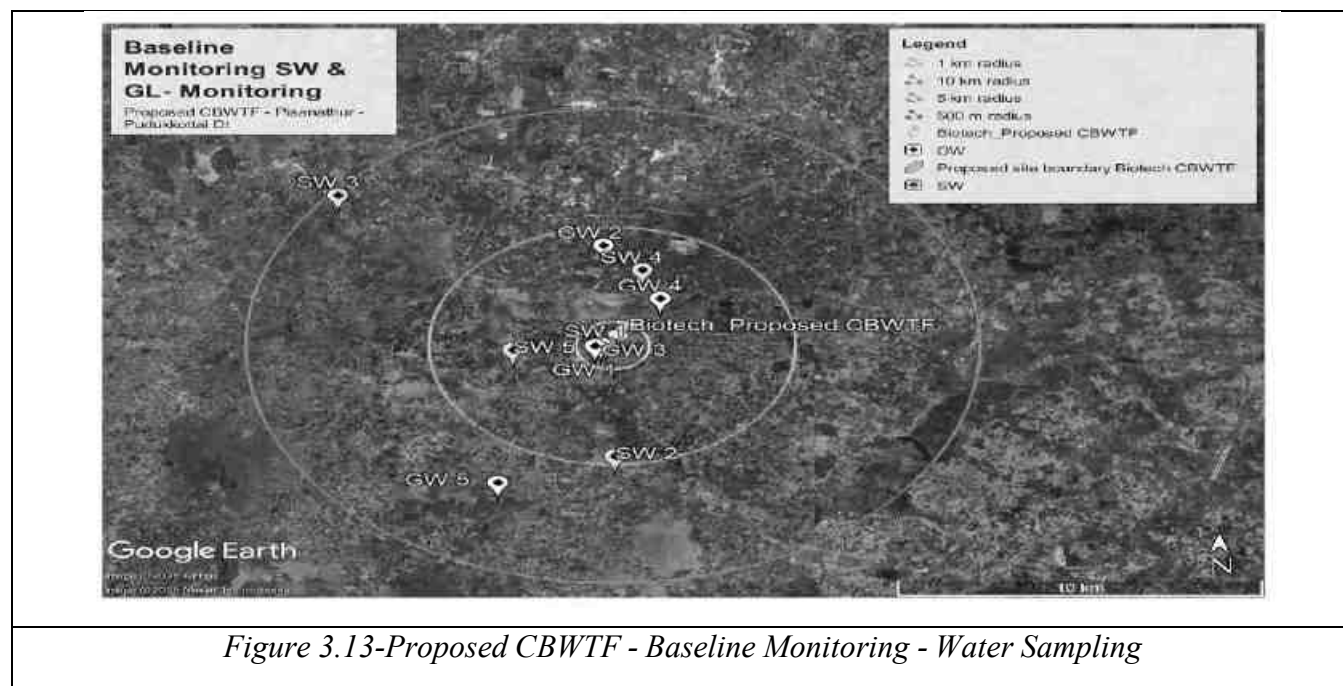


**Figure 3.13-Proposed CBWTF - Baseline Monitoring - Water Sampling**

### Ground Water Sampling Photos



### Surface Water Sampling Photos



Figure 3.14-Water Sampling Photos

The summary of ground water and surface water quality analysis results is given in **Table 3.14** and **Table 3.15** respectively.

**Table 3.14-Test Report of Ground Water Quality**

| Parameter                                   | Unit         | Test Method                             | GW-1<br>Pisanathur | GW-2<br>Sundampatti | GW-3<br>Gandarvakottai | GW-4<br>Turusupatti | GW-5<br>Kallukaranpatti | Permissible<br>Limits AS<br>PER<br>IS 10500-<br>2012 |
|---------------------------------------------|--------------|-----------------------------------------|--------------------|---------------------|------------------------|---------------------|-------------------------|------------------------------------------------------|
| <b>Colour</b>                               | Hazen        | IS 3025-Part<br>4-1983<br>(Reaff 2012)  | <1.0               | <1.0                | <1.0                   | <1.0                | <1.0                    | <b>15</b>                                            |
| <b>Odour</b>                                | --           | IS 3025-Part<br>5-1983<br>(Reaff 2012)  | Agreeable          | Agreeable           | Agreeable              | Agreeable           | Agreeable               | <b>Agreeable</b>                                     |
| <b>pH @ 250C</b>                            | --           | IS 3025-Part<br>11-1983<br>(Reaff 2012) | 7.14               | 6.70                | 7.05                   | 7.05                | 6.59                    | <b>6.5-8.5</b>                                       |
| <b>Electrical<br/>Conductivity</b>          | µmhos<br>/Cm | IS 3025-Part<br>14-1984<br>(Reaff 2013) | 885                | 606                 | 721                    | 721                 | 286                     | --                                                   |
| <b>Turbidity</b>                            | NTU          | IS 3025-Part<br>10-1984<br>(Reaff 2012) | BDL<br>(DL1.0)     | BDL<br>(DL0.5)      | BDL<br>(DL0.5)         | BDL<br>(DL0.5)      | 64                      | <b>5.0</b>                                           |
| <b>Total<br/>Suspended<br/>Solids (TSS)</b> | mg/l         | IS 3025-Part<br>17-1983<br>(Reaff 2012) | BDL<br>(DL1.0)     | BDL<br>(DL1.0)      | 2.0                    | 2.0                 | 46                      | --                                                   |



| Parameter                                             | Unit | Test Method                             | GW-1<br>Pisanathur | GW-2<br>Sundampatti | GW-3<br>Gandarvakottai | GW-4<br>Turusupatti | GW-5<br>Kallukaranpatti | Permissible<br>Limits AS<br>PER<br>IS 10500-<br>2012 |
|-------------------------------------------------------|------|-----------------------------------------|--------------------|---------------------|------------------------|---------------------|-------------------------|------------------------------------------------------|
| <b>Total<br/>Dissolved<br/>Solids (TDS)</b>           | mg/l | IS 3025-Part<br>16-1983<br>(Reaff 2006) | 530                | 364                 | 432                    | 432                 | 172                     | <b>2000</b>                                          |
| <b>Total<br/>Hardness as<br/>CaCO<sub>3</sub></b>     | mg/l | APHA 23rd<br>Edn 2017-<br>2340 C        | 220                | 152                 | 44                     | 44                  | 26                      | <b>600</b>                                           |
| <b>Calcium<br/>Hardness as<br/>CaCO<sub>3</sub></b>   | mg/l | APHA 23rd<br>Edn 2017-<br>2340 Ca B     | 116                | 78                  | 22                     | 22                  | 16                      | <b>Not<br/>Specified</b>                             |
| <b>Magnesium<br/>Hardness as<br/>CaCO<sub>3</sub></b> | mg/l | APHA 23rd<br>Edn 2017-<br>2340 Mg B     | 104                | 74                  | 22                     | 22                  | 10                      | <b>Not<br/>Specified</b>                             |
| <b>Calcium as Ca</b>                                  | mg/l | APHA 23rd<br>Edn 2017-<br>2340 Ca B     | 46.5               | 31.2                | 8.8                    | 17.6                | 6.41                    | <b>200</b>                                           |
| <b>Magnesium as<br/>Mg</b>                            | mg/l | APHA 23rd<br>Edn 2017-<br>2340 Mg B     | 25.2               | 17.9                | 5.3                    | 5.3                 | 2.4                     | <b>100</b>                                           |
| <b>P-Alkalinity<br/>as CaCO<sub>3</sub></b>           | mg/l | IS 3025-Part<br>23-1986<br>(Reaff 2009) | NIL                | NIL                 | NIL                    | NIL                 | NIL                     | <b>Not<br/>Specified</b>                             |



| Parameter                                   | Unit | Test Method                       | GW-1<br>Pisanathur | GW-2<br>Sundampatti | GW-3<br>Gandarvakottai | GW-4<br>Turusupatti | GW-5<br>Kallukaranpatti | Permissible<br>Limits AS<br>PER<br>IS 10500-<br>2012 |
|---------------------------------------------|------|-----------------------------------|--------------------|---------------------|------------------------|---------------------|-------------------------|------------------------------------------------------|
| Total Alkalinity as CaCO <sub>3</sub>       | mg/l | IS 3025-Part 23-1986 (Reaff 2009) | 40                 | 12.4                | 28                     | 20                  | 6.0                     | 600                                                  |
| Carbonate Hardness as CaCO <sub>3</sub>     | mg/l | APHA 23rd Edn 2017 - 2340 A       | 40                 | 124                 | 28                     | 20                  | 6.0                     | Not Specified                                        |
| Non carbonate Hardness as CaCO <sub>3</sub> | mg/l | APHA 23rd Edn 2017 - 2340 A       | 40                 | 28                  | 16                     | 24                  | 20                      | Not Specified                                        |
| Free Residual Chlorine as Cl <sub>2</sub>   | mg/l | IS 3025-Part 26-1986 (Reaff 2003) | 180                | BDL (DL2.0)         | BDL (DL0.2)            | BDL (DL0.2)         | BDL (DL0.2)             | 1.0                                                  |
| Chemical Oxygen Demand (COD)                | mg/l | APHA 23rd Edn 2017- 5220 B        | 4.94               | 2.9                 | 2.9                    | 2.9                 | BDL (DL0.2)             | 250                                                  |
| BOD -3 days @ 27°C                          | mg/l | APHA 23rd Edn 2017- 5210 B        | BDL (DL0.2)        | BDL (DL2.0)         | BDL (DL2.0)            | BDL (DL0.2)         | BDL (DL0.2)             | 30                                                   |
| Chloride as Cl                              | mg/l | IS 3025-Part 32-1988 (Reaff 2009) | 104.9              | 75.2                | 54.9                   | 160                 | 40                      | 1000                                                 |

| Parameter                   | Unit       | Test Method                               | GW-1<br>Pisanathur | GW-2<br>Sundampatti | GW-3<br>Gandarvakottai | GW-4<br>Turusupatti | GW-5<br>Kallukaranpatti | Permissible<br>Limits AS<br>PER<br>IS 10500-<br>2012 |
|-----------------------------|------------|-------------------------------------------|--------------------|---------------------|------------------------|---------------------|-------------------------|------------------------------------------------------|
| Sulphate as SO <sub>4</sub> | mg/l       | APHA 23rd Edn 2017-4500 SO <sub>4</sub> E | 34.5               | 9.09                | 6.05                   | 62                  | 62                      | 400                                                  |
| Fluoride as F               | mg/l       | APHA 23rd Edn 2017-4500 F, D              | 1.04               | 0.12                | BDL<br>(DL0.2)         | BDL<br>(DL0.2)      | BDL<br>(DL0.2)          | 1.5                                                  |
| Sodium as Na                | mg/l       | IS 3025-Part 45-1993                      | 52                 | 28.0                | 48                     | 78                  | 20                      | Not Specified                                        |
| Potassium as K              | mg/l       | IS 3025-Part 45-1993                      | 18                 | 172                 | 12                     | 16                  | 3.0                     | Not Specified                                        |
| Iron as Fe                  | mg/l       | IS 3025-Part 53-2003 (Reaff 2009)         | 0.22               | 0.18                | 2.1                    | 2.1                 | 13.82                   | 1.0                                                  |
| Nitrate as NO <sub>3</sub>  | mg/l       | APHA 23rd Edn 2017-4500 NO <sub>3</sub> B | 8.63               | 12.2                | 5.26                   | 6.82                | 3.5                     | 45                                                   |
| Total Coliforms             | Per 100 ml | IS 15185:2016 (RA 2021)                   | Absent             | Absent              | Absent                 | Absent              | Absent                  | Shall not be detectable in any 100ml sample          |
| Escherichia Coil            | Per 100 ml | IS 15185:2016 (RA 2021)                   | Absent             | Absent              | Absent                 | Absent              | Absent                  | Shall not be detectable in                           |

| Parameter | Unit | Test Method | GW-1<br>Pisanathur | GW-2<br>Sundampatti | GW-3<br>Gandarvakottai | GW-4<br>Turusupatti | GW-5<br>Kallukaranpatti | Permissible<br>Limits AS<br>PER<br>IS 10500-<br>2012 |
|-----------|------|-------------|--------------------|---------------------|------------------------|---------------------|-------------------------|------------------------------------------------------|
|           |      |             |                    |                     |                        |                     |                         | any 100ml<br>sample                                  |

**Table 3.15-Test Report of Surface Water Quality**

| Parameter        | Unit  | Test Method                             | SW-1<br>Pissanathur | SW-2<br>Sundampatti | SW-3<br>Viralipatti | SW-4<br>Pudunagar | SW-5<br>Gandarvakottai | Permissible<br>Limits AS<br>PER<br>IS 10500-2012 |
|------------------|-------|-----------------------------------------|---------------------|---------------------|---------------------|-------------------|------------------------|--------------------------------------------------|
| <b>Colour</b>    | Hazen | IS 3025-Part<br>4-1983<br>(Reaff 2012)  | <1.0                | <1.0                | <1.0                | <1.0              | <1.0                   | <b>15</b>                                        |
| <b>Odour</b>     | --    | IS 3025-Part<br>5-1983<br>(Reaff 2012)  | Agreeable           | Agreeable           | Agreeable           | Agreeable         | Agreeable              | <b>Agreeable</b>                                 |
| <b>pH @ 250C</b> | --    | IS 3025-Part<br>11-1983<br>(Reaff 2012) | 8.5                 | 6.70                | 6.25                | 8.22              | 7.31                   | <b>6.5-8.5</b>                                   |

| Parameter                           | Unit      | Test Method                       | SW-1<br>Pissanathur | SW-2<br>Sundampatti | SW-3<br>Viralipatti | SW-4<br>Pudunagar | SW-5<br>Gandarvakottai | Permissible<br>Limits AS<br>PER<br>IS 10500-2012 |
|-------------------------------------|-----------|-----------------------------------|---------------------|---------------------|---------------------|-------------------|------------------------|--------------------------------------------------|
| Electrical Conductivity             | µmhos /Cm | IS 3025-Part 14-1984 (Reaff 2013) | 312                 | 606                 | 230                 | 431               | 150                    | --                                               |
| Turbidity                           | NTU       | IS 3025-Part 10-1984 (Reaff 2012) | 5.2                 | BDL (0.5)           | BDL                 | 19.8              | 1.2                    | 5.0                                              |
| Total Suspended Solids (TSS)        | mg/l      | IS 3025-Part 17-1983 (Reaff 2012) | 8.0                 | BDL (1.0)           | BDL                 | 26                | 3.0                    | --                                               |
| Total Dissolved Solids (TDS)        | mg/l      | IS 3025-Part 16-1983 (Reaff 2006) | 188                 | 364                 | 138                 | 258               | 90                     | 2000                                             |
| Total Hardness as CaCO <sub>3</sub> | mg/l      | APHA 23rd Edn 2017-2340 C         | 78                  | 152                 | 46                  | 210               | 56                     | 600                                              |



| Parameter                                     | Unit | Test Method                       | SW-1<br>Pissanathur | SW-2<br>Sundampatti | SW-3<br>Viralipatti | SW-4<br>Pudunagar | SW-5<br>Gandarvakottai | Permissible<br>Limits AS<br>PER<br>IS 10500-2012 |
|-----------------------------------------------|------|-----------------------------------|---------------------|---------------------|---------------------|-------------------|------------------------|--------------------------------------------------|
| <b>Calcium Hardness as CaCO<sub>3</sub></b>   | mg/l | APHA 23rd Edn 2017-2340 Ca B      | 40                  | 78                  | 24                  | 108               | 30                     | <b>Not Specified</b>                             |
| <b>Magnesium Hardness as CaCO<sub>3</sub></b> | mg/l | APHA 23rd Edn 2017-2340 Mg B      | 38                  | 74                  | 22                  | 102               | 26                     | <b>Not Specified</b>                             |
| <b>Calcium as Ca</b>                          | mg/l | APHA 23rd Edn 2017-2340 Ca B      | 31.2                | 31.2                | 9.6                 | 43.2              | 12                     | <b>200</b>                                       |
| <b>Magnesium as Mg</b>                        | mg/l | APHA 23rd Edn 2017-2340 Mg B      | 9.2                 | 17.9                | 5.3                 | 24.7              | 6.3                    | <b>100</b>                                       |
| <b>P-Alkalinity as CaCO<sub>3</sub></b>       | mg/l | IS 3025-Part 23-1986 (Reaff 2009) | 8.0                 | NIL                 | NIL                 | 3.0               | NIL                    | <b>Not Specified</b>                             |

| Parameter                                         | Unit | Test Method                       | SW-1<br>Pissanathur | SW-2<br>Sundampatti | SW-3<br>Viralipatti | SW-4<br>Pudunagar | SW-5<br>Gandarvakottai | Permissible<br>Limits AS<br>PER<br>IS 10500-2012 |
|---------------------------------------------------|------|-----------------------------------|---------------------|---------------------|---------------------|-------------------|------------------------|--------------------------------------------------|
| <b>Total Alkalinity as CaCO<sub>3</sub></b>       | mg/l | IS 3025-Part 23-1986 (Reaff 2009) | 36                  | 12.4                | 50                  | 34                | 10                     | <b>600</b>                                       |
| <b>Carbonate Hardness as CaCO<sub>3</sub></b>     | mg/l | APHA 23rd Edn 2017 - 2340 A       | 36                  | 124                 | 46                  | 34                | 10                     | <b>Not Specified</b>                             |
| <b>Non carbonate Hardness as CaCO<sub>3</sub></b> | mg/l | APHA 23rd Edn 2017 - 2340 A       | 42                  | 28                  | NIL                 | 176               | 46                     | <b>Not Specified</b>                             |
| <b>Free Residual Chlorine as Cl<sub>2</sub></b>   | mg/l | IS 3025-Part 26-1986 (Reaff 2003) | BDL<br>(DL0.2)      | BDL<br>(0.2)        | BDL<br>(0.2)        | BDL<br>(0.2)      | BDL<br>(0.2)           | <b>1.0</b>                                       |
| <b>Chemical Oxygen</b>                            | mg/l | APHA 23rd Edn 2017- 5220 B        | 6.9                 | 2.9                 | BDL<br>(2.0)        | 3.9               | BDL<br>(2.0)           | <b>250</b>                                       |



| Parameter                             | Unit | Test Method                                      | SW-1<br>Pissanathur | SW-2<br>Sundampatti | SW-3<br>Viralipatti | SW-4<br>Pudunagar | SW-5<br>Gandarvakottai | Permissible<br>Limits AS<br>PER<br>IS 10500-2012 |
|---------------------------------------|------|--------------------------------------------------|---------------------|---------------------|---------------------|-------------------|------------------------|--------------------------------------------------|
| <b>Demand<br/>(COD)</b>               |      |                                                  |                     |                     |                     |                   |                        |                                                  |
| <b>BOD -3 days<br/>@ 27°C</b>         | mg/l | APHA 23rd<br>Edn 2017-<br>5210 B                 | BDL<br>(DL2.0)      | BDL<br>(2.0)        | BDL<br>(2.0)        | BDL<br>(2.0)      | BDL<br>(2.0)           | <b>30</b>                                        |
| <b>Chloride as<br/>Cl</b>             | mg/l | IS 3025-Part<br>32-1988<br>(Reaff 2009)          | 54.9                | 75.2                | 21.2                | 72                | 35                     | <b>1000</b>                                      |
| <b>Sulphate as<br/>SO<sub>4</sub></b> | mg/l | APHA 23rd<br>Edn 2017-<br>4500 SO <sub>4</sub> E | 25.6                | 9.09                | 8.47                | 42.9              | 20                     | <b>400</b>                                       |
| <b>Fluoride as F</b>                  | mg/l | APHA 23rd<br>Edn 2017-<br>4500 F, D              | BDL<br>(DL)         | 0.12                | BDL                 | 0.57              | 0.13                   | <b>1.5</b>                                       |
| <b>Sodium as Na</b>                   | mg/l | IS 3025-Part<br>45-1993                          | 32                  | 28                  | 22                  | 44                | 12                     | <b>Not Specified</b>                             |

| Parameter                  | Unit       | Test Method                       | SW-1<br>Pissanathur | SW-2<br>Sundampatti | SW-3<br>Viralipatti | SW-4<br>Pudunagar | SW-5<br>Gandarvakottai | Permissible Limits AS PER IS 10500-2012     |
|----------------------------|------------|-----------------------------------|---------------------|---------------------|---------------------|-------------------|------------------------|---------------------------------------------|
| Potassium as K             | mg/l       | IS 3025-Part 45-1993              | 4.0                 | 172                 | 12                  | 8.0               | 2.0                    | Not Specified                               |
| Iron as Fe                 | mg/l       | IS 3025-Part 53-2003 (Reaff 2009) | 0.9                 | 0.18                | BDL                 | 0.28              | 1.76                   | 1.0                                         |
| Nitrate as NO <sub>3</sub> | mg/l       | APHA 23rd Edn 2017-4500 NO3 B     | 5.2                 | 12.2                | 4.97                | 3.87              | 2.32                   | 45                                          |
| Total Coliforms            | Per 100 ml | IS 15185:2016 (RA 2021)           | Absent              | Absent              | Absent              | Absent            | Absent                 | Shall not be detectable in any 100ml sample |
| Escherichia Coil           | Per 100 ml | IS 15185:2016 (RA 2021)           | Absent              | Absent              | Absent              | Absent            | Absent                 | Shall not be detectable in any 100ml sample |



### Interpretation

The analysis of **ground water samples** collected from various locations within the study area indicates that the **pH values** are within the acceptable range specified by CPCB guidelines. **Total hardness** was observed to range between **26 mg/L – 220 mg/L**, while the concentration of **Total Dissolved Solids (TDS)** varied from **172 mg/L - 530 mg/L**. The levels of **Chlorides** and **Nitrates** were found to be in the range of **21.2mg/L-75.2mg/L** and **3.5 mg/L – 12.2 mg/L** respectively. **Magnesium** concentrations ranged from **2.4 mg/L – 25.2 mg/L**, and **Potassium** levels were observed between **3.0 mg/L – 172 mg/L**.

The **surface water samples** collected from selected locations within the study area were analyzed for various physico-chemical and biological parameters. The **pH values** of the samples were found to be within the acceptable range as per CPCB guidelines, indicating a neutral to slightly alkaline nature. **Total hardness** was observed to range between **56mg/L-210mg/L**, and **Total Dissolved Solids (TDS)** levels varied from **90mg/L-364mg/L**, reflecting moderate mineral content. The concentrations of **Chlorides** and **Nitrates** were found in the range of **40mg/L-104.9mg/L** and **2.32mg/L-12.2mg/L**, respectively. **Magnesium** and **Potassium** levels were recorded in the range of **22mg/L-102mg/L** and **2.0mg/L-172mg/L**.

In conclusion, all tested parameters of the surface water sample and ground water samples were found to be within the permissible limits set by the **Central Pollution Control Board (CPCB)**, indicating that the water in the area is of good quality and suitable for various uses.

### 3.3.7 Soil Environment

Soil sampling will be conducted at eight locations within a 10 km radius of the study area to assess soil characteristics and potential environmental impacts. Sampling sites have been selected based on land use patterns, including agricultural, industrial, and residential areas.

Soil samples will be collected following CPCB guidelines, using the composite sampling method. At each location, soil will be sampled from the topsoil (0–15 cm depth) and subsoil (15–30 cm depth) using a soil auger. The collected samples will be air-dried, sieved, and analysed for key parameters such as texture, pH, organic matter, and nutrients to evaluate soil quality and fertility. The selected soil sampling locations are listed in the **Table 3.16**

Testing of soil samples was carried out as per the guidelines of “Methods manual” for Soil testing in India. The manual has been published by the Department of Agriculture and Co-operation, Ministry of Agriculture, Government of India (January 2011). The summary of the Soil quality analysis report is shown in **Table 3.17**.

**Table 3.16-Details of Soil Sampling Locations**

| Locations | Station name    | Distance from the site | Direction from the site | Geographical coordinates |             |
|-----------|-----------------|------------------------|-------------------------|--------------------------|-------------|
|           |                 |                        |                         | Latitude N               | Longitude E |
| SSL 1     | Project Site    | -                      | -                       | 10.591316                | 79.035469   |
| SSL 2     | Pisanathur      | 0.8                    | SW                      | 10.584583                | 79.032694   |
| SSL 3     | Turusupatti     | 1.7                    | NE                      | 10.602202                | 79.047231   |
| SSL 4     | Gandarvakottai  | 2.8                    | SW                      | 10.573678                | 79.017201   |
| SSL 5     | Pudunagar       | 1.7                    | N                       | 10.607024                | 79.037918   |
| SSL 6     | Sundampatti     | 5.4                    | S                       | 10.542028                | 79.036155   |
| SSL 7     | Viralipatti     | 9.3                    | NW                      | 10.641506                | 78.96685    |
| SSL 8     | Kallukaranpatti | 7.2                    | SW                      | 10.532081                | 79.006858   |

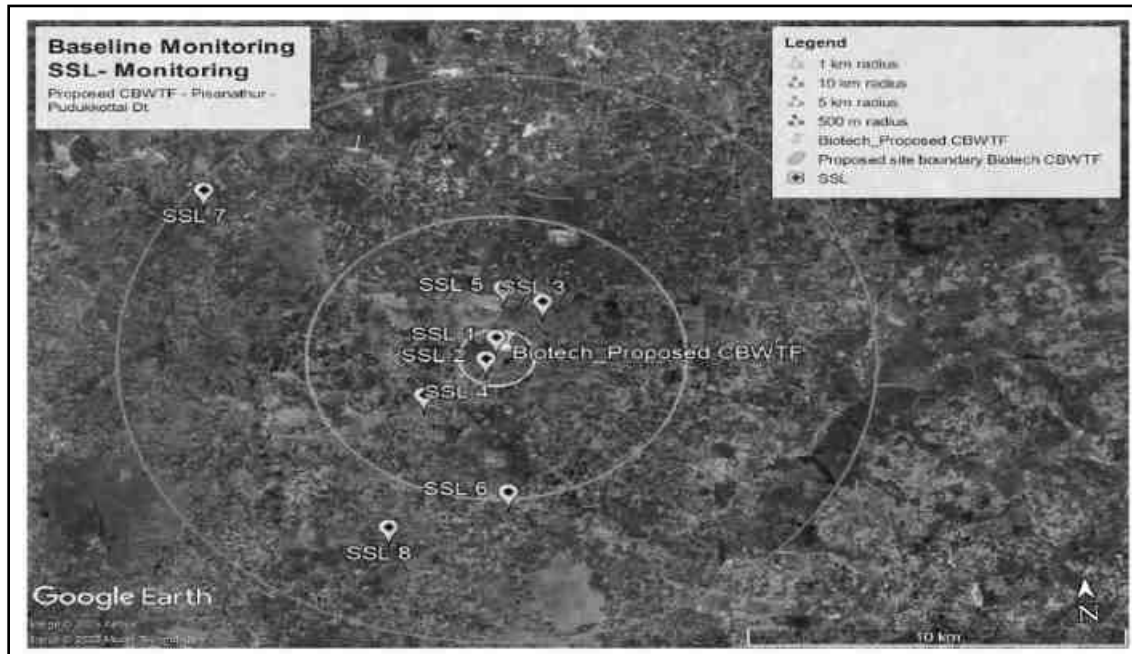


*Figure 3.15-Proposed CBWTF - Baseline Monitoring - Soil Sampling*



*Figure 3.16-Soil sampling photos*

**Table 3.17-Test Results of Sampled soils**

| Parameter                           | Unit  | TEST METHOD                     | SSL 1<br>Project Site | SSL 2<br>Pisanathur | SSL 3<br>Turusupatti | SSL 4<br>Gandarva<br>kkottai | SSL 5<br>Pudu<br>nagar | SSL 6<br>Sundam<br>patti | SSL 7<br>Viralip<br>patti | SSL 8<br>Kallukaran<br>patti |
|-------------------------------------|-------|---------------------------------|-----------------------|---------------------|----------------------|------------------------------|------------------------|--------------------------|---------------------------|------------------------------|
| pH (1:10)                           | --    | IS 2720 Part 26<br>(Reaff 2002) | 6.0                   | 4.36                | 4.96                 | 4.86                         | 5.09                   | 6.80                     | 5.90                      | 4.57                         |
| Electrical<br>conductivity<br>(1:5) | µc/cm | IS 14767-2000                   | 30                    | 37                  | 40                   | 210                          | 20                     | 250                      | 780                       | 30                           |
| Texture                             | -     | FEMO/SOIL/S-<br>012-2019        | Silt Loam             | Silt Loam           | Sandy<br>Loam        | Sandy<br>Loam                | Silt<br>Loam           | Sandy<br>Clay<br>Loam    | Red<br>Loam               | Silt Loam                    |
| Soil Texture<br>(Sand)              | %     | FEMO/SOIL/S-<br>012-2019        | 22                    | 22                  | 70                   | 60                           | 25                     | 50                       | 50                        | 20                           |
| Soil Texture<br>(Silt)              | %     | FEMO/SOIL/S-<br>012-2019        | 68                    | 68                  | 20                   | 25                           | 65                     | 30                       | 35                        | 65                           |
| Soil Texture<br>(Clay)              | %     | FEMO/SOIL/S-<br>012-2019        | 10                    | 10                  | 10                   | 15                           | 10                     | 20                       | 15                        | 15                           |
| Bulk Density                        | g/cc  | FEMO/SOIL/S-<br>013-2019        | 1.79                  | 1.24                | 1.30                 | 1.48                         | 1.36                   | 1.52                     | 1.66                      | 1.32                         |

| Parameter              | Unit  | TEST METHOD                                                   | SSL 1<br>Project Site | SSL 2<br>Pisanathur | SSL 3<br>Turusupatti | SSL 4<br>Gandarva<br>kkottai | SSL 5<br>Pudu<br>nagar | SSL 6<br>Sundam<br>patti | SSL 7<br>Viralip<br>patti | SSL 8<br>Kallukaran<br>patti |
|------------------------|-------|---------------------------------------------------------------|-----------------------|---------------------|----------------------|------------------------------|------------------------|--------------------------|---------------------------|------------------------------|
| <b>Calcium as Ca</b>   | mg/Kg | Methods of Soil Testing in India by Department of Agriculture | 440.7                 | 460                 | 448                  | 480.8                        | 440                    | 510.8                    | 520.9                     | 448                          |
| <b>Magnesium as Mg</b> | mg/Kg | Methods of Soil Testing in India by Department of Agriculture | 255                   | 279                 | 269                  | 267.2                        | 264                    | 273.2                    | 291.5                     | 262                          |
| <b>Potassium as K</b>  | mg/Kg | Methods of Soil Testing in India by Department of Agriculture | 280                   | 380                 | 378                  | 310                          | 418                    | 300                      | 330                       | 426                          |
| <b>Sodium as Na</b>    | mg/Kg | Methods of Soil Testing in India by Department of Agriculture | 300                   | 330                 | 336                  | 260                          | 340                    | 275                      | 265                       | 356                          |

| Parameter                       | Unit       | TEST METHOD                                                   | SSL 1<br>Project Site | SSL 2<br>Pisanathur | SSL 3<br>Turusupatti | SSL 4<br>Gandarva<br>kkottai | SSL 5<br>Pudu<br>nagar | SSL 6<br>Sundam<br>patti | SSL 7<br>Viralip<br>patti | SSL 8<br>Kallukaran<br>patti |
|---------------------------------|------------|---------------------------------------------------------------|-----------------------|---------------------|----------------------|------------------------------|------------------------|--------------------------|---------------------------|------------------------------|
| <b>Total Nitrogen</b>           | Kg/ha      | IS 14684-2014                                                 | 201.5                 | 134                 | 142                  | 257.5                        | 168                    | 291.1                    | 352.7                     | 173                          |
| <b>Sodium Absorbption Ratio</b> | Meq/<br>Kg | FEMO/SOIL/S-014-2019                                          | 0.69                  | 0.74                | 0.77                 | 0.58                         | 0.78                   | 0.6                      | 0.57                      | 0.82                         |
| <b>Total Organic Matter</b>     | %          | Methods of Soil Testing in India by Department of Agriculture | 0.12                  | 0.83                | 0.90                 | 0.59                         | 0.93                   | 0.93                     | 1.0                       | 0.97                         |
| <b>Total Organic Corbon</b>     | %          | Methods of Soil Testing in India by Department of Agriculture | 0.07                  | 0.48                | 0.52                 | 0.34                         | 0.54                   | 0.54                     | 0.58                      | 0.56                         |
| <b>Chloride</b>                 | mg/K<br>g  | IS 6925-2013                                                  | 117.3                 | 165                 | 172                  | 156.2                        | 173                    | 195.6                    | 234.6                     | 168                          |



| Parameter                 | Unit      | TEST METHOD                                                            | SSL 1<br>Project<br>Site | SSL 2<br>Pisanathur | SSL 3<br>Turusupatti | SSL 4<br>Gandarva<br>kkottai | SSL 5<br>Pudu<br>nagar | SSL 6<br>Sundam<br>patti | SSL 7<br>Viralip<br>patti | SSL 8<br>Kallukaran<br>patti |
|---------------------------|-----------|------------------------------------------------------------------------|--------------------------|---------------------|----------------------|------------------------------|------------------------|--------------------------|---------------------------|------------------------------|
| <b>Sulphate</b>           | mg/K<br>g | IS 2720 Part 27<br>(Reaff 2015)                                        | 31.7                     | 28                  | 26                   | 57                           | 29                     | 41.2                     | 72.2                      | 32                           |
| <b>Phosphorus</b>         | Kg/ha     | Methods of Soil<br>Testing in India by<br>Department<br>of Agriculture | 10.4                     | 14.5                | 13.44                | 21.7                         | 12.5                   | 26.5                     | 28.1                      | 14.5                         |
| <b>Available<br/>Iron</b> | mg/K<br>g | FEMO/SOIL/S-<br>018-2019                                               | 3.7                      | 16.47               | 21.71                | 5.2                          | 18.40                  | 5.7                      | 8.5                       | 21.60                        |
| <b>Zinc as Zn</b>         | mg/K<br>g | FEMO/SOIL/S-<br>018-2019                                               | 1.62                     | 1.64                | 1.60                 | 2.0                          | 1.52                   | 2.4                      | 3.6                       | 1.59                         |
| <b>Moisture</b>           | %         | IS 2720 Part 2-<br>2015                                                | 1.85                     | 6.83                | 9.72                 | 2.05                         | 3.8                    | 1.04                     | 1.58                      | 4.18                         |

## Interpretation

Soil samples collected from various locations within the study area were analyzed to assess their physical and chemical characteristics. From the analysis reports it has been observed that

- **pH** of the soil samples ranged from 4.36 to 6.80
- **Electrical Conductivity (EC)** was found to range between 20 and 780  $\mu\text{S}/\text{cm}$ , suggesting moderate/minimal salinity levels.
- **Organic Matter Content** varied between 0.12% and 1.0%, indicating the fertility status of the soil.
- **Total Nitrogen, Phosphorus (P), and Potassium (K)** contents were observed in the range of 134 Kg/ha – 352.7 Kg/ha, 10.4 Kg/ha – 28.1 Kg/ha, and 280 mg/kg- 426 mg/Kg respectively, showing the nutrient availability for plant growth.
- **Heavy metals** such as lead, cadmium, chromium, and arsenic were either absent or detected below permissible limits, indicating minimal contamination risk.
- The **Soil texture** analysis for the study area has been given as red soil.

The nutrient levels and pH are within acceptable limits for agricultural and no significant presence of hazardous element elements was observed.

### 3.3.8 Ecological Environment

The study of biological environment in the study area near the projects site of the proposed CBWTF in Pisanathur Village was conducted in compliance to ToR. The data of the flora and fauna in the study area is collected by conducting field survey in the area, examination of floral and faunal records in published reports in Government websites, standard books, research publications etc.

The data was analyzed to comprehend the probable impact of the establishment of the proposed facility in the surrounding environment with specific reference to ecology.

In Pudukkottai District, four major rivers namely, Vellar, Agniyar, Pambar and Kundar are flowing. Pudukkottai District is predominantly an agricultural district. Paddy, groundnut, sugarcane, maize and cashewnuts are the major crops grown in this district. Gandarvakottai taluk in the Pudukkottai district primarily has red ferruginous lateritic soils. The soil is mostly fertile and has soil seed banks. The soil microflora is generally, bacteria, fungi, algae, protozoa and the soil micro fauna are nematodes and protozoa from the soil organic matter.

There a diverse range of plant species, including those found in vegetable fields. Fauna diversity includes a variety of insect species, ants, and other invertebrates, along with birds, reptiles, and mammals.



The principal crops of Pudukkottai district are Paddy (Rice), Cholan (Jowar), Maize, Black gram, Gingelly, Groundnut, Coconut, Sugarcane, Mango, Banana, Cashewnut etc (pudukkottai.nic.in)

In Pudukkottai district the agricultural cultivation includes Cereals such Rice Cholan Varagu Ragi Maize Cumbu; Pulses such as Red Gram, Cow Pea, Horse gram, Black gram and Green gram; Oil seeds such as Ground nut, Coconut, Gingelly, Soya bean; Condiments such as Chillies, Tamarind; Sugars include Sugarcane and Palmyra and Fibres Cotton

In the study area of 10 km radius, there are no reported rare or endangered species of birds and animals have been reported from the industry area and Also, there are no National Parks, Wildlife Sanctuary etc. found within 10 km radius of the project site.

To assess the baseline biological environment in the study are, a flora and fauna observation were conducted to assess the existing flora and fauna of the area.

The study of the existing flora types (herbs, shrubs, trees etc) in the core and buffer zones has been done using observation and published data. For the survey of fauna both direct and indirect observation methods were used.

Fauna Mammals: Bonnet macaque - *Macaca radiata*, Jungle cat - *Felis chaus*, Jackal - *Canis aureus*, 9 Small Indian civets - *Viverricula indica*, Mongoose - *Herpestes edwardsii*, Black naped hare - *Lepus nigricollis*) Reptiles: Green whip snake - *Ahaetulla nasutus*, Cobra - *Naja naja*, Indian Krait - *Bungarus caeruleus*, Russel's viper - *Vipera russelli*;

**Table 3.18-Flora in the study area**

| S. No. | Botanical name               | Common name        | Type /Habit       |
|--------|------------------------------|--------------------|-------------------|
| 1.     | <i>Acalypha indica</i>       | Kuppaimeni         | Herb              |
| 2.     | <i>Cassia italica</i>        | Nilavahai          | Herb              |
| 3.     | <i>Catharanthus roseus</i>   | Nithyakalyani      | Herb              |
| 4.     | <i>Euphorbia hirta</i>       | Amampatchaiarisi   | Herb              |
| 5.     | <i>Nymphaea rubra</i>        | Sivappu Alli,      | Herb              |
| 6.     | <i>Oryza sativa</i> L.       | Nell               | Herb              |
| 7.     | <i>Datura metel</i>          | Oomathai           | Herb              |
| 8.     | <i>Leucas aspera</i>         | Thumbai            | Herb              |
| 9.     | <i>Portulaca quadrifida</i>  | Siru pasalai keera | Herb              |
| 10.    | <i>Pamburus missionis</i>    | Kaattu Narinji     | Small Thorny Tree |
| 11.    | <i>Jatropha glandulifera</i> | Kaatu-amanakku     | Shrub             |

| S. No. | Botanical name        | Common name   | Type /Habit |
|--------|-----------------------|---------------|-------------|
| 12.    | Calotropis gigantea   | Erukku        | Shrub       |
| 13.    | Carissa carandes      | kalakaai      | shrub       |
| 14.    | Citrus aurantifolia   | elumichai     | Shrub       |
| 15.    | Opuntia stricta       | Sappathikalli | Shrub       |
| 16.    | Tephrosia purpurea    | Kolingi       | Shrub       |
| 17.    | Acacia nilotica       | Karuvelamaram | Tree        |
| 18.    | Azadirachta indica    | Veppamaram    | Tree        |
| 19.    | Borassus flabellifer  | Panaimaram    | Tree        |
| 20.    | Casuarina litorea     | Chavuku       | Tree        |
| 21.    | Ficus religiosa       | Arasu         | Tree        |
| 22.    | Ficus benghalensis    | Aal           | Tree        |
| 23.    | Soathadea companulata | Tulip         | Tree        |
| 24.    | Tamarindus indica     | Puliyamaram   | Tree        |
| 25.    | Tectona grandis       | Teak          | Tree        |
| 26.    | Mangifera indica      | Maanga        | Tree        |
| 27.    | Psidium guajava       | Koyya         | Tree        |
| 28.    | Terminalia cuneata    | Marutu        | Tree        |
| 29.    | Terminaliacatappa     | Badam,        | Tree        |
| 30.    | Ziziphus mauritiana   | Ilandhai      | Tree        |
| 31.    | Cocos nucifera        | Thennaimaram  | Tree        |
| 32.    | Prosopis juliflora    | Veelikkaruvai | Tree        |

**Table 3.19-Fauna in the Study area**

| S. No. | Scientific name       | Common name          |
|--------|-----------------------|----------------------|
| 1.     | Bufo melanostictus    | Toad                 |
| 2.     | Rana hexadactyla      | Tree frog            |
| 3.     | Bandicota bengalensis | Rice Rat             |
| 4.     | Herpestes edwardii    | Indian Grey Mongoose |
| 5.     | Rattus norvegicus     | Field mouse          |
| 6.     | Calotes ellioti       | Forest Lizard        |

| S. No. | Scientific name      | Common name             |
|--------|----------------------|-------------------------|
| 7.     | Funambulus palmaram  | Squirrel Anil           |
| 8.     | Rattus rattus        | House rat               |
| 9.     | Chameleo zeylanicus  | Indian chameleon        |
| 10.    | Eutropis carinata    | skink                   |
| 11.    | Graphium agamemnos   | Tailed jay butterfly    |
| 12.    | Alcedo atthis        | Common Kingfisher       |
| 13.    | Ardia intermedia     | Mediem egret            |
| 14.    | Anas poecilorhyncha  | Indian spot billed duck |
| 15.    | Acridotheres tristis | Common myna             |
| 16.    | Corvus splendens     | House crow              |
| 17.    | Cuculus varus        | Cuckoo Kuyil            |
| 18.    | Columba livia        | Rock pigeon             |
| 19.    | Hierococcyx varius   | Common hawk             |
| 20.    | Orthotomus sutorius  | Common tailor bird      |
| 21.    | Ploceus phillippinus | Chitukuruvi             |
| 22.    | Psittacula krameri   | Rose ringed parakeet    |

As per MoEF&CC guidelines, 10 Km radius from the project site is considered as study area for evaluating environmental sensitivity. In the study area ecological sensitive areas are not present. Wild animals and endangered or vulnerable fauna were not observed.

#### ❖ AGRICULTURE

Pudukkottai District is situated within the Cauvery Delta Zone and Southern Agro-Climatic Zone. The region receives an average annual rainfall of approximately **857.80 mm**, which generally supports **single cropping under rain fed conditions**. However, in areas with assured irrigation, it is feasible to cultivate **two to three crops per year**.

The main cropping pattern is rice followed by rice, especially in irrigated lands. In garden lands, groundnut followed by pulses is commonly grown. Vegetables and oilseeds are also part of the farming system in the district.

In some parts of Pudukkottai, farmers are increasingly shifting to banana and sugarcane mono-cropping. This change is due to the growth of sugar industries and the high-income farmers earn from banana cultivation. (Source: [tnau.ac.in](http://tnau.ac.in))

**Table 3.20-Soil Type of Pudukkottai District**

| Sl. No | Type of Soil                  | Blocks (Places in the District)                                                                   |
|--------|-------------------------------|---------------------------------------------------------------------------------------------------|
| 1      | Red Loam                      | Annavaasal, Pudukkottai, Gandaravakottai, Thirumayam, Ponnamaravathy, Thiruvarangulam, Aranthangi |
| 2      | Black Soil                    | Karambakudi, Viralimalai, Annavaasal, Kunnandarkoil                                               |
| 3      | Sandy Coastal / Alluvial Soil | Avudaiyarkoil, Manamelkudi                                                                        |
| 4      | Red Sandy Soil                | Viralimalai, Pudukkottai, Arimalam, Thiruvarangulam, Aranthangi                                   |

**Table 3.21-Major Crops cultivated in Pudukkottai district**

| S.No        | Crop Category | Crop           | Area (ha) |
|-------------|---------------|----------------|-----------|
| 1.          | Cereals       | Paddy          | 75,162    |
|             |               | Maize          | 3,204     |
| 2.          | Millets       | Cumbu          | 6         |
|             |               | Ragi           | 21        |
|             |               | Cholam         | 189       |
| 3.          | Pulses        | Blackgram      | 3,842     |
|             |               | Redgram        | 299       |
|             |               | Cowpea         | 262       |
| 4.          | Oilseeds      | Groundnut      | 10,402    |
|             |               | Gingelly       | 1,211     |
| 5.          | Cash Crops    | Sugarcane      | 3,207     |
|             |               | Coconut        | 10,147    |
| 6.          | Fruits        | Banana         | 3,426     |
|             |               | Mango          | 3,316     |
|             |               | Jack           | 213       |
| 7.          | Vegetables    | Brinjal        | 876       |
|             |               | Bhendi         | 820       |
|             |               | Chillies (dry) | 976       |
|             |               | Tapioca        | 56        |
| 8.          | Flower Crops  | Jasmine        | 294       |
|             |               | Tuberose       | 48        |
|             |               | Rose           | 92        |
| Grand Total |               |                | 132,343   |

### **3.3.9 Socio Economic Environment**

The assessment of socio-economic environment forms an integral part of an EIA study. Socio-Economic status of the population is an indicator for the development of the region. Any developmental project of any magnitude will have a bearing on the living conditions and on the economic base of population in particular and the region as a whole. Similarly, the proposed project site will have its share of socio-economic influence in the study area. The section delineates the overall appraisal of society relevant attributes. The data collection for evaluation of impact of proposed project site on socio-economic aspects in the study area has been done through primary household survey and through the analysis of secondary data available for study area.

#### **3.3.9.1 Methodology**

The methodology adopted in assessment of socio-economic condition is as given below;

- ❖ To assess socio-economic conditions of the Population.
- ❖ Analysis of the identified social attributes like population distribution, availability of public utilities etc., through Census of India 2011.
- ❖ Primary household survey to assess the present status of population of the study area.

#### **3.3.9.2 Sources of Information**

As per the scope of this study, the information on socio-economic aspects has been gathered and compiled from several secondary sources. These include Taluk Office, Collectorate, Agriculture Department, Irrigation Department, Central Ground Water Board, Directorate of Census Operation, Tamil Nadu etc. The demographic data has mainly been compiled from the Census of India 2011.

The socio-economic details are briefly described in following sections. This section includes the present status of the socio-economic environment in the study area. To determine the baseline socio-economic pattern, at and around the project site, the required data have been obtained from the published data. Socio-economic base line data were collected for the following indicators:

- ❖ Demographic Structure
- ❖ Economic Structure
- ❖ Availability of Basic Amenities

The major demographic and economic structure of the study area are classified into population, literacy rate and workers details.

#### **3.3.9.3 Socio-Economic Profile**

##### **1. Population & Demographics (2011 Census):**

- **Total Population:** 1,618,345

- **Rural Population:** ~80% (~1.3 million)
- **Urban Population:** ~20% (~316,000)
- **Sex Ratio:** 1,015 females per 1,000 males
- **Literacy Rate:** ~73.6%
- **SC/ST Population:** SC – 17.6%, ST – 0.08%

## 2. Economy:

- **Primary Sector (Agriculture):** Main crops Paddy, groundnut, sugarcane, millets, pulses
  - Irrigation via tanks, wells, and canal systems (mainly from Cauvery basin)
- **Secondary Sector (Industry):**
  - Small-scale industries: Rice mills, textile weaving, wood carving, metal works
  - Granite mining is significant in some parts of the district.
- **Tertiary Sector (Services):**
  - Growing due to educational institutions, trade, transport, and banking services

## 3. Employment:

- **Major Occupation:** Agriculture and allied activities
- MGNREGA provides rural employment and infrastructure development
- Migration to urban centres for work is common due to seasonal agricultural employment

## 4. Health & Education:

- **Health:** Government hospitals, Primary Health Centres (PHCs), and sub-centres serve rural areas
- **Education:** Government and aided schools, plus a few arts, science, and engineering colleges

## Economic Profile:

- **Agriculture:** Agriculture is the backbone of Pudukkottai's economy, with a significant portion of the workforce engaged in farming. The district is notable for being a leading cultivator of Eucalyptus in Tamil Nadu. It ranks third in cashew nut cultivation area, fifth in jackfruit, and seventh in lemon production.
- **Industrial Development:** Despite its agricultural prominence, Pudukkottai is categorized as economically backward. The district's industrial sector is underdeveloped, with small-scale industries primarily involved in food processing, textiles, and handicrafts.
- **Employment:** The workforce distribution includes 192,462 cultivators and 234,344 main agricultural labourers. Other sectors employ 213,442 individuals, indicating limited diversification in employment opportunities.

## Developmental Challenges:

Pudukkottai faces several socio-economic challenges:

- **Economic Backwardness:** The district's economy is predominantly agrarian with minimal industrialization, leading to limited employment opportunities outside agriculture.
- **Literacy and Education:** With a literacy rate below the national average, enhancing educational infrastructure and promoting literacy, especially among women, is crucial.
- **Urbanization:** Low urbanization levels suggest a need for developing urban centres to stimulate economic growth and provide better amenities.

### 3.3.9.4 Introduction to Infrastructure

Pisanathur, also known as Pisanathur, is a village situated in the Gandarvakkottai Taluka of Pudukkottai District in Tamil Nadu, India. It lies approximately 3 kilometres from the sub-district headquarters in Kovilur and about 33 kilometres from the district headquarters in Pudukkottai.

#### Infrastructure Overview:

- **Governance:** Pisanathur functions as a Gram Panchayat and is divided into six wards, each represented by elected members responsible for local governance and development initiatives.
- **Education:** The village hosts five schools, providing educational facilities to the local population.
- **Population and Area:** Covering a geographical area of 754.73 hectares, Pisanathur has a population of 958 individuals, comprising 480 males and 478 females, resulting in a sex ratio of approximately 995 females per 1,000 males.

Pisanathur, a village in the Gandarvakkottai taluka of Pudukkottai district, Tamil Nadu, has a modest transport infrastructure that connects it to nearby towns and facilitates local commuting.

#### Road Connectivity:

- **Public Bus Services:** The village is served by public bus services, providing residents with access to nearby towns and essential services.
- **Private Bus Services:** Within a 5 km radius, private bus services are available, offering additional transportation options for the villagers.

#### Rail Connectivity:

- **Nearest Railway Station:** The closest railway station is located more than 10 km from Pisanathur, necessitating alternative transportation to access rail services.

#### Proximity to Towns:

- **Vallam:** Approximately 33 km from Pisanathur, Vallam serves as the nearest town for major economic activities and access to broader services.

The transport system in Pisanathur primarily relies on road connectivity, with public and private bus services playing a crucial role in facilitating movement to and from the village. While rail services are not in immediate proximity, the existing road network supports the daily commuting and economic needs of the residents.

### **3.3.9.5 Demographic details of Villages**

#### **1.Pisannathur Population - Pudukkottai, Tamil Nadu**

Pisanathur is a medium size village located in Gandarvakottai Taluka of Pudukkottai district, Tamil Nadu with total 232 families residing. The Pisanathur village has population of 958 of which 480 are males while 478 are females as per Population Census 2011. In Pisanathur village population of children with age 0-6 is 95 which makes up 9.92 % of total population of village. Average Sex Ratio of Pisanathur village is 996 which is equal than Tamil Nadu state average of 996. Child Sex Ratio for the Pisanathur as per census is 1159, higher than Tamil Nadu average of 943. Pisanathur village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Pisanathur village was 77.75 % compared to 80.09 % of Tamil Nadu. In Pisanathur Male literacy stands at 85.78 % while female literacy rate was 69.56 %.

#### **2.Regunathapuram Population - Pudukkottai, Tamil Nadu**

Regunathapuram is a large village located in Karambakudi Taluka of Pudukkottai district, Tamil Nadu with total 463 families residing. The Regunathapuram village has population of 2023 of which 1024 are males while 999 are females as per Population Census 2011. In Regunathapuram village population of children with age 0-6 is 216 which makes up 10.68 % of total population of village. Average Sex Ratio of Regunathapuram village is 976 which is lower than Tamil Nadu state average of 996. Child Sex Ratio for the Regunathapuram as per census is 895, lower than Tamil Nadu average of 943. Regunathapuram village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Regunathapuram village was 68.07 % compared to 80.09 % of Tamil Nadu. In Regunathapuram Male literacy stands at 75.05 % while female literacy rate was 60.98 %.

#### **3.Namburampatti Population - Pudukkottai, Tamil Nadu**

Namburampatti is a medium size village located in Gandarvakottai Taluka of Pudukkottai district, Tamil Nadu with total 337 families residing. The Namburampatti village has population of 1431 of which 710 are males while 721 are females as per Population Census 2011. In Namburampatti village population of children with age 0-6 is 182 which makes up 12.72 % of total population of village. Average Sex Ratio of Namburampatti village is 1015 which is higher than Tamil Nadu state average of 996. Child Sex Ratio for the Namburampatti as per census is 936, lower than Tamil Nadu average of 943. Namburampatti village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of



Namburampatti village was 61.41 % compared to 80.09 % of Tamil Nadu. In Namburampatti Male literacy stands at 72.40 % while female literacy rate was 50.71 %.

#### **4.Veeradipatti Population - Pudukkottai, Tamil Nadu**

Veeradipatti is a large village located in Gandarvakottai Taluka of Pudukkottai district, Tamil Nadu with total 824 families residing. The Veeradipatti village has population of 3542 of which 1812 are males while 1730 are females as per Population Census 2011. In Veeradipatti village population of children with age 0-6 is 375 which makes up 10.59 % of total population of village. Average Sex Ratio of Veeradipatti village is 955 which is lower than Tamil Nadu state average of 996. Child Sex Ratio for the Veeradipatti as per census is 933, lower than Tamil Nadu average of 943. Veeradipatti village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Veeradipatti village was 74.96 % compared to 80.09 % of Tamil Nadu. In Veeradipatti Male literacy stands at 85.35 % while female literacy rate was 64.11 %.

#### **5. Kattunaval Population - Pudukkottai, Tamil Nadu**

Kattunaval is a large village located in Gandarvakottai Taluka of Pudukkottai district, Tamil Nadu with total 755 families residing. The Kattunaval village has population of 3070 of which 1613 are males while 1457 are females as per Population Census 2011. In Kattunaval village population of children with age 0-6 is 326 which makes up 10.62 % of total population of village. Average Sex Ratio of Kattunaval village is 903 which is lower than Tamil Nadu state average of 996. Child Sex Ratio for the Kattunaval as per census is 884, lower than Tamil Nadu average of 943. Kattunaval village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Kattunaval village was 76.46 % compared to 80.09 % of Tamil Nadu. In Kattunaval Male literacy stands at 85.00 % while female literacy rate was 67.02 %.

#### **6.Periakottai Population - Pudukkottai, Tamil Nadu**

Periakottai is a large village located in Gandarvakottai Taluka of Pudukkottai district, Tamil Nadu with total 672 families residing. The Periakottai village has population of 3002 of which 1495 are males while 1507 are females as per Population Census 2011. In Periakottai village population of children with age 0-6 is 342 which makes up 11.39 % of total population of village. Average Sex Ratio of Periakottai village is 1008 which is higher than Tamil Nadu state average of 996. Child Sex Ratio for the Periakottai as per census is 1000, higher than Tamil Nadu average of 943. Periakottai village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Periakottai village was 68.42 % compared to 80.09 % of Tamil Nadu. In Periakottai Male literacy stands at 79.91 % while female literacy rate was 57.04 %.

#### **7.Vellalaviduthy Population - Pudukkottai, Tamil Nadu**

Vellalaviduthy is a large village located in Gandarvakottai Taluka of Pudukkottai district, Tamil Nadu with total 649 families residing. The Vellalaviduthy village has population of 2977 of which 1512 are

males while 1465 are females as per Population Census 2011. In Vellalaviduthy village population of children with age 0-6 is 331 which makes up 11.12 % of total population of village. Average Sex Ratio of Vellalaviduthy village is 969 which is lower than Tamil Nadu state average of 996. Child Sex Ratio for the Vellalaviduthy as per census is 860, lower than Tamil Nadu average of 943. Vellalaviduthy village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Vellalaviduthy village was 67.50 % compared to 80.09 % of Tamil Nadu. In Vellalaviduthy Male literacy stands at 75.86 % while female literacy rate was 58.99 %.

#### **8.Nappugai Population - Pudukkottai, Tamil Nadu**

Nappugai is a large village located in Gandarvakkottai Taluka of Pudukkottai district, Tamil Nadu with total 655 families residing. The Nappugai village has population of 2810 of which 1431 are males while 1379 are females as per Population Census 2011. In Nappugai village population of children with age 0-6 is 353 which makes up 12.56 % of total population of village. Average Sex Ratio of Nappugai village is 964 which is lower than Tamil Nadu state average of 996. Child Sex Ratio for the Nappugai as per census is 994, higher than Tamil Nadu average of 943. Nappugai village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Nappugai village was 66.42 % compared to 80.09 % of Tamil Nadu. In Nappugai Male literacy stands at 75.68 % while female literacy rate was 56.77 %.

#### **9. Sengamviduthy Population - Pudukkottai, Tamil Nadu**

Sengamviduthy is a large village located in Gandarvakkottai Taluka of Pudukkottai district, Tamil Nadu with total 556 families residing. The Sengamviduthy village has population of 2559 of which 1276 are males while 1283 are females as per Population Census 2011. Children with age 0-6 is 258 which makes up 10.08 % of total population of village. Average Sex Ratio of Sengamviduthy village is 1005 which is higher than Tamil Nadu state average of 996. Child Sex Ratio for the Sengamviduthy as per census is 1016, higher than Tamil Nadu average of 943. Sengamviduthy village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Sengamviduthy village was 61.45 % compared to 80.09 % of Tamil Nadu. In Sengamviduthy Male literacy stands at 70.56 % while female literacy rate was 52.39 %.

#### **10.Mattangal Population - Pudukkottai, Tamil Nadu**

Matangal is a large village located in Gandarvakkottai Taluka of Pudukkottai district, Tamil Nadu with total 590 families residing. The Mattangal village has population of 2378 of which 1151 are males while 1227 are females as per Population Census 2011. In Mattangal village population of children with age 0-6 is 267 which makes up 11.23 % of total population of village. Average Sex Ratio of Mattangal village is 1066 which is higher than Tamil Nadu state average of 996. Child Sex Ratio for the Mattangal as per census is 1023, higher than Tamil Nadu average of 943. Mattangal village has lower literacy rate compared

to Tamil Nadu. In 2011, literacy rate of Mattangal village was 73.09 % compared to 80.09 % of Tamil Nadu. In Mattangal Male literacy stands at 86.16 % while female literacy rate was 60.90 %.

### 11. Mudukulam Population - Pudukkottai, Tamil Nadu

Mudukulam is a large village located in Gandarvakottai Taluka of Pudukkottai district, Tamil Nadu with total 489 families residing. The Mudukulam village has population of 2114 of which 1097 are males while 1017 are females as per Population Census 2011. In Mudukulam village population of children with age 0-6 is 269 which makes up 12.72 % of total population of village. Average Sex Ratio of Mudukulam village is 927 which is lower than Tamil Nadu state average of 996. Child Sex Ratio for the Mudukulam as per census is 818, lower than Tamil Nadu average of 943. Mudukulam village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Mudukulam village was 76.69 % compared to 80.09 % of Tamil Nadu. In Mudukulam Male literacy stands at 85.56 % while female literacy rate was 67.30 %.

**Table 3.22-List of Survey Villages around the project Site**

| Sl.No. | Survey Villages | Distance (KM) | Direction |
|--------|-----------------|---------------|-----------|
| 1      | Pisannathur     | 7.7           | SE        |
| 2      | Regunathpuram   | 9.9           | W         |
| 3      | namburampatti   | 7.2           | E         |
| 4      | Veeradipatti    | 4.4           | NE        |
| 5      | kattunaval      | 5.3           | W         |
| 6      | Periakottai     | 5.3           | E         |
| 7      | Vellalaviduthy  | 10            | S         |
| 8      | Nappugai        | 9.7           | S         |
| 9      | Sengamviduthy   | 8.7           | SE        |
| 10     | Matangal        | 1.8           | W         |
| 11     | Mudukulam       | 7.8           | NE        |

### Inference of Study Area:

The quality of life is best described in relation to the public amenities available to resident population. The villages/towns within the 10 km from the project site shows public amenities like presence of Govt. Primary School, Telephone/mobile, Self Help Groups and regular power supply are present in almost 100% of villages. Further, presence of Anganwadi centre and Metal Road are present in 90-95% of the villages. While mode of public and private transportation is restricted among 85% of the villages, treated water piped supply is restricted in 70% of the villages and Total Sanitation Campaign is witnessed among

60% of the villages. The presence of river and canal is restricted in only 15% of the villages. The other public amenities like Govt. PHC/SC, presence of community centre, commercial bank and Agricultural Credit Society are only among 5% of the villages. Technical training centres like ITI is totally absent in the study area. The study area requires immediate mobile health services that can be linked with CSR funds while industrial training institutions must be initiated through local industries to cater the needs of the existing industries in the project area.

### **Social Profile:**

Pisanathur is a village located in the Gandarvakottai Block of Pudukkottai District in Tamil Nadu, approximately 38 kilometres east of the district headquarters, Pudukkottai. Pisanathur village hosts several institutions contributing to the community's development.

#### **3.3.9.6 Educational Institutions:**

- **Panchayat Union Primary School (PUPS), Pisanathur:** Established in 1954 and managed by the local body, this primary school offers education from grades 1 to 5, with Tamil as the medium of instruction.
- **Panchayat Union Middle School, S. Solagampatti:** Located in P. Gandarvakkottai, this middle school was established in 2003 and is managed by the local body.
- **Government Boys Higher Secondary School, Gandarvakottai:** Situated in the nearby town of Gandarvakottai, this higher secondary school offers education beyond the primary level.

### **Higher Education Institutions in Pudukkottai District:**

For higher education, residents of Pisanathur can access institutions in the broader Pudukkottai District, such as:

- **Mother Terasa College of Engineering and Technology:** Located in Mettusalai, Illuppur, this engineering college offers various undergraduate and postgraduate programs in engineering and technology.
- **Mount Zion College of Engineering and Technology:** Situated in Pulivalam, Thirumayam Taluk, this institution provides engineering education with a focus on technological advancements.

**Energy Infrastructure:** In October 2024, a 7-megawatt solar power plant was commissioned in Pisanathur and the neighbouring Pudunagar Village by Select Energy Systems. This facility contributes to the region's renewable energy capacity.

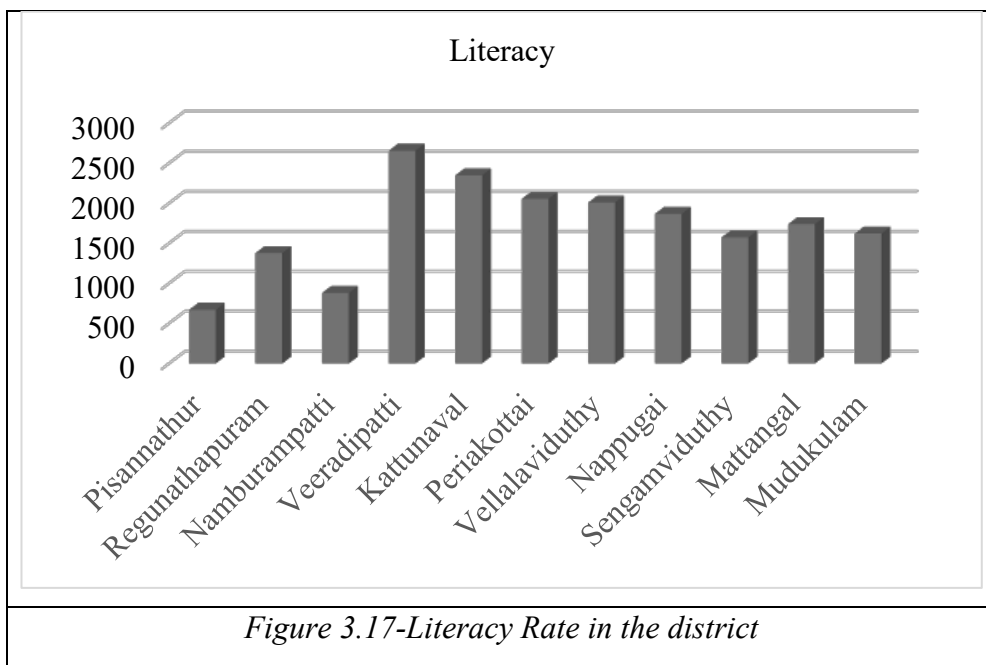
**Administrative Structure:** Pisanathur functions as a Gram Panchayat within the Gandarvakottai Panchayat Samiti, comprising six wards and an equal number of elected members. The Gram Panchayat oversees local governance and development initiatives.

**Development Initiatives:** The Tamil Nadu government has implemented schemes like THAI-II to enhance essential infrastructure in rural areas, including villages like Pisanathur. While specific details on other infrastructure elements such as healthcare facilities, banking services, and transportation are limited, the presence of educational institutions and renewable energy projects indicates ongoing development efforts in Pisanathur.

**Table 3.23-Demographic Profile of Study Area**

|                    | <b>Pisanathur Village</b> | <b>Regunatha puram</b> | <b>Namburam pati</b> | <b>Veeradi patti</b> | <b>Kattunaval</b> | <b>Periya kottai</b> | <b>Vellala viduthy</b> | <b>Napuggai</b> | <b>Sengam viduthy</b> | <b>Mattangal</b> | <b>Mudukulam</b> | <b>Total</b> |
|--------------------|---------------------------|------------------------|----------------------|----------------------|-------------------|----------------------|------------------------|-----------------|-----------------------|------------------|------------------|--------------|
| Total No of Houses | 232                       | 463                    | 337                  | 824                  | 755               | 672                  | 649                    | 655             | 556                   | 590              | 489              | 6222         |
| Population         | 858                       | 2023                   | 1431                 | 3542                 | 3070              | 3002                 | 2977                   | 2810            | 2559                  | 2378             | 2114             | 26764        |
| Child 0-6          | 95                        | 216                    | 182                  | 375                  | 326               | 342                  | 331                    | 353             | 258                   | 267              | 269              | 3014         |
| Schedule Caste     | 400                       | 699                    | 704                  | 847                  | 1301              | 1128                 | 653                    | 159             | 691                   | 1104             | 576              | 8262         |
| Schedule Tribe     | 0                         | 0                      | 1                    | 0                    | 0                 | 2                    | 0                      | 0               | 0                     | 0                | 0                | 3            |
| Literacy           | 667                       | 1377                   | 879                  | 2655                 | 2347              | 2054                 | 2009                   | 1866            | 1573                  | 1738             | 1621             | 18786        |
| Total Workers      | 532                       | 1087                   | 765                  | 1906                 | 1548              | 1939                 | 1504                   | 1529            | 1416                  | 1183             | 1026             | 14435        |
| Main Workers       | 514                       | 1064                   | 750                  | 1890                 | 1521              | 1758                 | 1435                   | 1506            | 1340                  | 1179             | 1002             | 13959        |
| Marginal Workers   | 18                        | 23                     | 15                   | 16                   | 27                | 181                  | 69                     | 23              | 76                    | 4                | 24               | 476          |

Literacy In the district 70.19 per cent population is literate. The literacy is 73.6 per cent in urban areas and 67.2 per cent in rural areas. The literacy among scheduled castes in urban areas is 69.8 per cent and 54.5 per cent in rural areas.



Work Participation Rate in the total population of the surveyed village is 26764 of as much as 96.6 per cent are workers and rest of 3.4 per cent are non-worker. Among workers 96.6 per cent are main workers and rest of 3.4 per cent are marginal workers. In absolute terms females outnumber males as main worker and marginal workers as well.

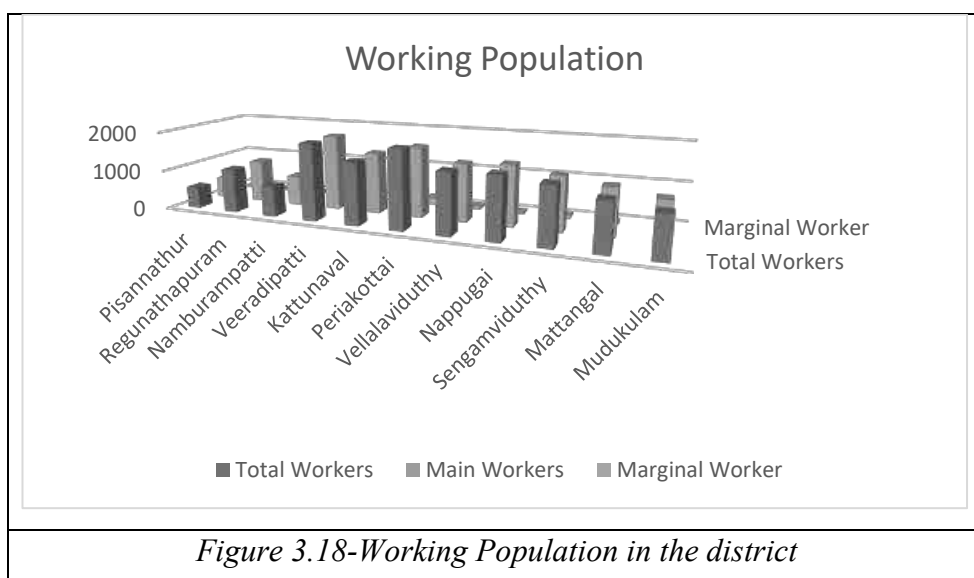




Figure 3.19-Socio Economic Site Visit Photo

### Socio-Economic Survey

In order to assess and evaluate the likely impacts arising out of any developmental project on socio-economic environment, it is necessary to measure the apprehensions of the people in the project area. Socio-economic survey serves as an effective tool for fulfilling this requirement. The nearby villages were identified for socio-economic survey. The lists of villages are as given in Table, respondents (adult's male and female) were chosen for collection of awareness and opinion, by using random sampling/ focused group discussion, method representing various socio-economic sections of the community.



**Table 3.24-Socio Economic Field Survey Report**

| Sl.No.       | Surveyed Villages | No. of People Interviewed |          | Total     |
|--------------|-------------------|---------------------------|----------|-----------|
|              | Particulars       | Male                      | Female   |           |
| 1            | Pisannathur       | 2                         | 1        | 3         |
| 2            | Regunathapuram    | 2                         | 1        | 3         |
| 3            | Namburampatti     | 2                         | 1        | 3         |
| 4            | Veeradipatti      | 2                         | 1        | 3         |
| 5            | Kattunaval        | 2                         | 1        | 3         |
| 6            | Periakottai       | 2                         | 1        | 3         |
| 7            | Vellalaviduthy    | 1                         | 1        | 2         |
| 8            | Nappugai          | 2                         | 1        | 3         |
| 9            | Sengamviduthy     | 2                         | 1        | 3         |
| 10           | Mattangal         | 2                         | 0        | 2         |
| 11           | Mudukulam         | 2                         | 0        | 2         |
| <b>Total</b> |                   | <b>21</b>                 | <b>9</b> | <b>30</b> |

The impact of development projects occurs in different forms, among the people interviewed 50% of the people accepted the project, 30% were unaware of the project, 20% were against the project. Among the total People interviewed 70% were literates, there is no Habitat within 500m of project site, uncultivated land around the project for many years.

### 3.3.10 Traffic Study

To evaluate the current traffic conditions and assess the impact of the proposed Common Bio-Medical Waste Treatment Facility (CBWTF), a detailed traffic study was undertaken. The study adhered to the guidelines outlined in **IRC:106-1990**, focusing on road capacity and the Level of Service (LOS) during peak traffic hours.

#### 3.3.10.1 Traffic Monitoring Methodology

Traffic volume counts were manually recorded over a 16-hour period, from **06:00 A.M. to 10:00 P.M.**, using hand-held tally counters and field data sheets. The counts were conducted in both directions (bi-directional) at two key locations along roads leading to the project site:

- 1) L1 – Toll Plaza to Pisanathur
- 2) L2 – Four-way Pisanathur

These locations were selected based on their connectivity to the project site and their significance in handling current and future traffic volumes related to the project.

### 3.3.10.2 Traffic Flow Observations

The peak hourly traffic was recorded between **8:00 A.M. and 9:00 A.M.**, with the following Peak Hour Passenger Car Unit (PCU) values

**Table 3.25-Traffic Study Locations**

| Location                 | Peak Hour PCU/hr |
|--------------------------|------------------|
| Toll Plaza to Pisanathur | 93.45            |
| Four-way Pisanathur      | 59.25            |

### 3.3.10.3 Level of Service (LOS) Evaluation

The Volume-to-Capacity (V/C) ratio was calculated for both road segments to assess current service levels. The design capacity for each road is estimated at **3,600 PCU/hr**. The results are summarized below

**Table 3.26-Evaluation of LOS for the study locations**

| Road                          | Direction | Volume (PCU/hr) | Capacity (PCU/hr) | V/C Ratio | LOS |
|-------------------------------|-----------|-----------------|-------------------|-----------|-----|
| L1 – Toll Plaza to Pisanathur | To & Fro  | 93.45           | 3600              | 0.02      | A   |
| L2 – four-way Pisanathur      | To & Fro  | 59.25           | 3600              | 0.02      | A   |

As per IRC:106-1990, a V/C ratio of **0.2** corresponds to **Level of Service A**, which indicates **excellent traffic conditions**, minimal congestion, and high driving comfort.

**Table 3.27-Interpretation of LOS Classifications (IRC:106-1990)**

| V/C Ratio Range | LOS | Performance Description |
|-----------------|-----|-------------------------|
| 0.0 – 0.2       | A   | Excellent               |
| 0.2 – 0.4       | B   | Very Good               |
| 0.4 – 0.6       | C   | Good                    |
| 0.6 – 0.8       | D   | Fair/Average            |
| 0.8 – 1.0       | E   | Poor                    |
| >1.0            | F   | Very Poor               |

Given the current traffic volumes and road capacity, the **existing road infrastructure is operating at an optimal level (LOS A)**. The addition of trucks for the proposed CBWTF is expected to have a **negligible impact on the existing traffic flow**, and the **access roads are adequately equipped** to accommodate the project's transportation needs.

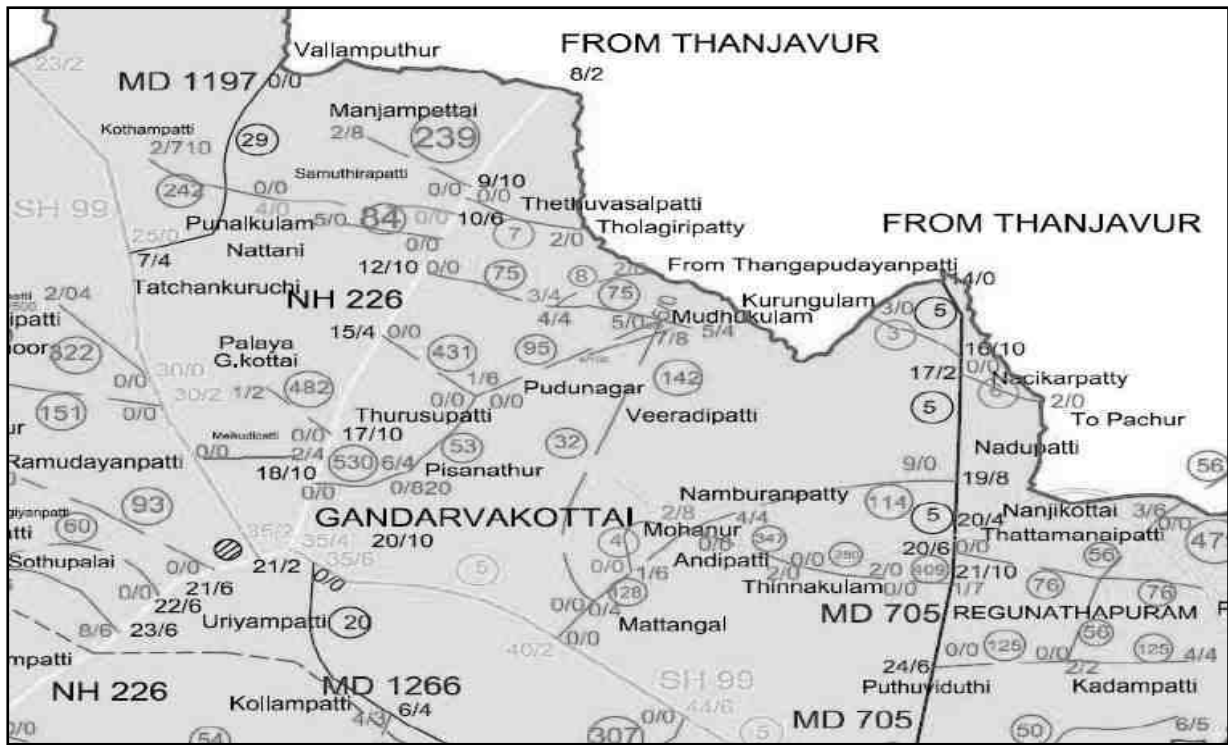


Figure 3.20-Road Network around the Proposed project Site (Source: TNRIDC)

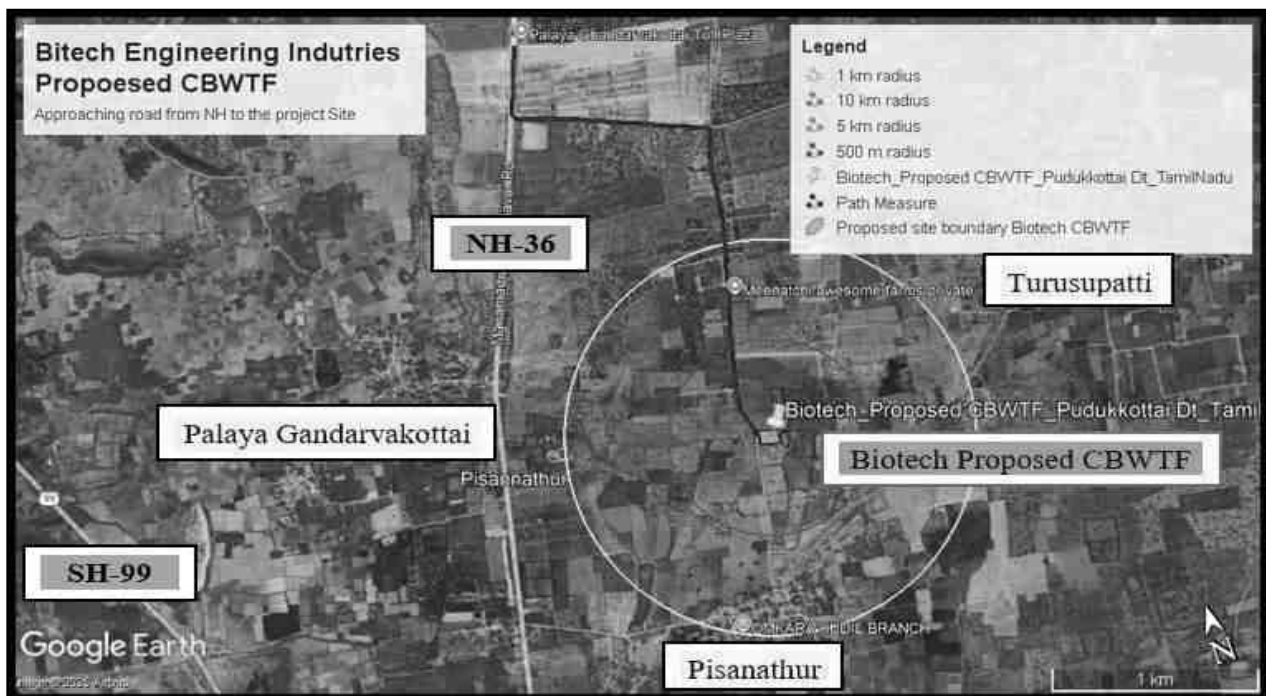


Figure 3.21-Connectivity to Project site from Surrounding Districts

The traffic connectivity map (ref: TNRIDC) shows the project site is well connected to the

- ❖ **NH 36** - It is a National Highway in India that starts at Vikravandi and ends at Manamadurai. Which is olderly called as **NH-226**.
- ❖ **SH-99** Road that Thirukattuppalli - Sengippatti - Pattukkottai Road.

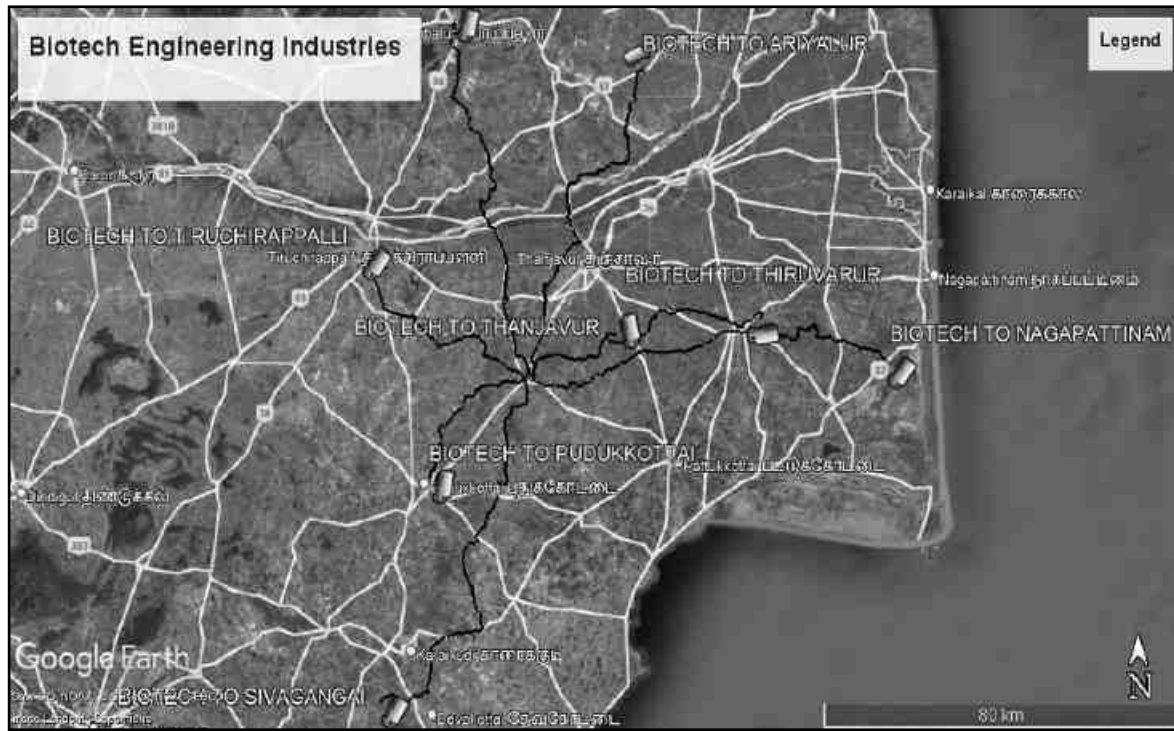


Figure 3.22-Route map - Collection of biomedical waste from the nearby districts



Figure 3.23-Traffic Study on Proposed CBWTF Pisanathur village

## CHAPTER 4

### **ANTICIPATED IMPACTS AND MITIGATION MEASURES**

#### **4.1 Details of Investigated Environmental Impacts**

After completing baseline environmental studies, the next important step in the Environmental Impact Assessment (EIA) process is identifying potential environmental impacts. Predicting these impacts is essential, as it helps evaluate the effects of development activities on physical, ecological, and socio-economic environments.

Various scientific techniques and methodologies are available to forecast these impacts, which are then analysed against baseline environmental data to determine their significance.

Accurate impact prediction is crucial in mitigating adverse effects on environmental quality, both before and after project implementation. Primary impacts are those that result directly from the project, while secondary impacts occur indirectly, often influencing associated investments and altering social and economic activity patterns due to the proposed development.

#### **4.2 Impact during Construction Phase**

During the construction phase, environmental impacts are expected to be localized and temporary, primarily arising from construction activities and equipment installation. These impacts will be limited to the duration of the construction period. The key activities that may contribute to environmental effects during the development of the proposed Common Biomedical Waste Treatment Facility (CBWTF) include:

- Site preparation and clearing.
- Construction of the plant and associated infrastructure.
- Operation and movement of heavy machinery and vehicles.
- Influx of construction personnel.

#### **4.3 Identification of Activities & Anticipated Impacts during the Construction Phase**

Various activities during the construction phase can lead to environmental impacts across multiple sectors. The key activities and their potential effects are outlined below:

##### **a) Site Clearing and Land Preparation**

Activities such as excavation, earth movement, cutting, and compaction may result in:

- **Air Quality:** Generation of fugitive dust emissions.
- **Emissions:** Pollutants released from construction machinery and equipment.
- **Water Resources:** Increased runoff, potentially affecting nearby water bodies.
- **Land Degradation:** Loss of fertile topsoil due to earthmoving activities.

## b) Transportation and Storage of Construction Materials/Equipment

The movement and storage of materials may cause:

- **Air Quality:** Dust emissions from traffic movement.
- **Emissions:** Exhaust pollutants from transportation vehicles.
- **Water Contamination:** Spillage of construction materials and runoff from storage areas.
- **Soil Impact:** Deposition of spilled materials, leading to contamination of soil and nearby water streams.
- **Noise Pollution:** Increased noise levels due to vehicle movement and operation of construction equipment.

## c) Civil Construction Activities

During structural construction, the following impacts may occur:

- **Air Quality:** Fugitive dust emissions from construction zones.
- **Water Contamination:** Runoff containing oils, paints, cement, and other construction materials, potentially polluting nearby water sources.

## 4.4 Impacts on Land Use and Topography

The proposed Common Biomedical Waste Treatment Facility (CBWTF) is to be established at Pisanathur Village, Pudukkottai District. The project site has been pre-analysed and approved by the Tamil Nadu Pollution Control Board (TNPCB), with a site suitability and gap analysis report confirming its appropriateness for the intended operations. The existing land use will not undergo significant alteration, as the site has been evaluated for compatibility with industrial activities related to biomedical waste treatment. There are no water bodies or natural drainage channels passing through the site; hence, the natural drainage pattern will remain unaffected.

To prevent environmental contamination, all biomedical waste and raw materials will be stored in closed chambers or covered storage areas with properly lined surfaces, ensuring no risk of leachate formation. Additionally, proper site levelling and grading will be carried out to ensure stability and erosion control. Best practices in waste management and dust suppression, such as periodic water spraying and controlled material handling, will be implemented to prevent soil degradation and air pollution during construction. Through these mitigation measures, the project will ensure minimal impact on land use and topography while maintaining environmental safety.

Moreover, air pollution control systems will be in place to capture any particulate matter generated during waste treatment. Any collected dust or residues will be managed appropriately within the facility, ensuring that no additional solid waste requiring external disposal is generated.

#### 4.4.1 Mitigation Measures

To prevent ground and surface water contamination during the construction of the Common Biomedical Waste Treatment Facility (CBWTF), the following precautionary and preventive measures will be implemented:

- **Waste Minimization:** Efforts will be made to generate the least amount of construction waste.
- **Water Containment:** Runoff water will be prevented from leaving the construction site to avoid contamination.
- **Debris Management:** Construction debris will be disposed of only in designated and approved areas.
- **Storm water Management:** Diversion channels will be constructed to redirect stormwater runoff away from construction zones.
- **Rainy Season Precautions:** To reduce soil erosion and sedimentation, construction activities will be minimized during heavy rainfall.
- **Drainage Control:** Proper drainage systems and designated construction zones will be established to prevent water contamination from soil erosion.
- **Wastewater Management:** Untreated or inadequately treated wastewater will not be discharged into canals or drains to safeguard water quality and prevent adverse effects on agriculture and human health.
- **Waste Utilization:** Construction waste will be repurposed for land levelling where possible.
- **Safe Disposal of Hazardous Waste:** Any solid waste containing harmful substances will be properly managed to prevent negative impacts on land, water quality, and overall environmental health.

By implementing these mitigation measures, the project will ensure minimal disruption to land use and topography while maintaining environmental sustainability.

#### 4.5 Impacts on Air Environment

Excavation and site levelling will be essential for the construction of the Common Biomedical Waste Treatment Facility (CBWTF). A key concern during this phase is the generation of fugitive dust, which can impact air quality. Particulate matter, including PM10 and PM2.5, may be released due to construction activities. The primary sources of dust emissions include material handling, topsoil removal, and vehicular movement on unpaved surfaces.

##### 4.5.1 Impacts and mitigation on Air Environment during Construction Phase

Various construction activities can contribute to air pollution, primarily through:

- **Dust emissions** from vehicle movement on unpaved surfaces.
- **Exhaust pollutants** released by construction machinery and transport vehicles.
- **Airborne dust and debris** from material unloading and waste disposal.
- **Temporary accumulation** of excavated earth materials.

These activities may cause short-term air quality impacts, but they will be localized within the project site. Due to the presence of a high boundary wall, dust dispersion beyond the plant's perimeter is expected to be minimal, ensuring negligible impact on the surrounding environment. Implementing effective mitigation measures will help further reduce any adverse effects.

#### 4.5.2 Mitigation Measures during construction phase

To minimize dust emissions and air pollution during construction, the following preventive measures will be implemented:

- **Regular water sprinkling** will be carried out to suppress dust and prevent it from becoming airborne.
- **Excavated earth** will be reused within the project site, reducing the need for transporting cut and fill materials.
- **Tarpaulin covers** will be used for all vehicles transporting construction materials to prevent dust and debris from spreading.
- **A high boundary wall** is already in place, ensuring minimal dust movement beyond the project site.

These measures will help mitigate air quality impacts and ensure that construction activities remain environmentally sustainable.

#### 4.5.3 Impacts and mitigation on Air Environment during Operation Phase

During the operational phase of CBWTF, industrial operation activities can contribute to air pollution, primarily through

- **Dust emissions** from vehicle movement on transportation of BMW from HCFs to CBWTF.
- **Exhaust pollutants** released from stacks during operation of incinerators and DG set.

The possible environmental impacts during operational phase in respect to air environment is achieved by scientific techniques and methodologies. Such scientific predictions are superimposed over the baseline data of environmental conditions to arrive at impacts.

#### 4.5.4 Assessment of Impacts on Air Quality Using Dispersion Model

To assess air pollution dispersion, computer-based modelling techniques are employed, utilizing the Gaussian Dispersion Formula. In this study, the "AERMOD View" software by Lakes Environmental has



been used to estimate the maximum ground-level concentration of pollutants, providing a reliable analysis of air quality impacts.

**Table 4.1-Predicted GLC of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>x</sub>, NO<sub>x</sub>**

| Label | Location        | Decimal Degree |           | Incremental value    |                      |                      |                      |
|-------|-----------------|----------------|-----------|----------------------|----------------------|----------------------|----------------------|
|       |                 |                |           | PM <sub>10</sub>     | PM <sub>2.5</sub>    | So <sub>2</sub>      | No <sub>x</sub>      |
|       |                 | Latitude       | Longitude | (µg/m <sup>3</sup> ) | (µg/m <sup>3</sup> ) | (µg/m <sup>3</sup> ) | (µg/m <sup>3</sup> ) |
| L1    | Project Site    | 10.591316      | 79.035469 | 5.43                 | 1.79                 | 0.69                 | 3.00                 |
| L2    | Pisanathur      | 10.584583      | 79.032694 | 5.21                 | 1.75                 | 0.65                 | 2.88                 |
| L3    | Turusupatti     | 10.602202      | 79.047231 | 0                    | 0                    | 0                    | 0                    |
| L4    | Gandarvakottai  | 10.573678      | 79.017201 | 4.00                 | 1.70                 | 0.61                 | 1.18                 |
| L5    | Pudunagar       | 10.607024      | 79.037918 | 0                    | 0                    | 0                    | 0                    |
| L6    | Sundampatti     | 10.542028      | 79.036155 | 0.19                 | 0.51                 | 0                    | 0                    |
| L7    | Veralipatti     | 10.641506      | 78.96685  | 0                    | 0                    | 0                    | 0                    |
| L8    | Kallukaranpatti | 10.532081      | 79.006858 | 1.30                 | 0.85                 | 0.09                 | 0                    |

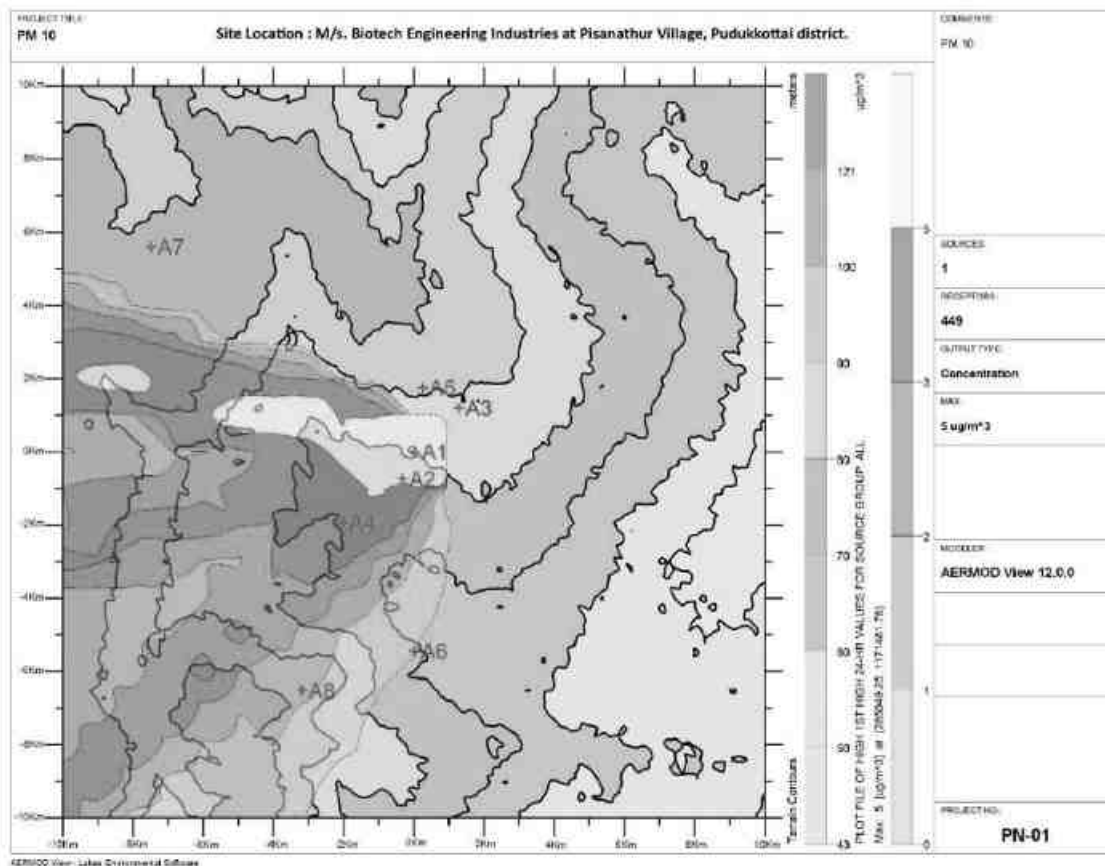


Figure 4.1- Predicted GLC of PM10

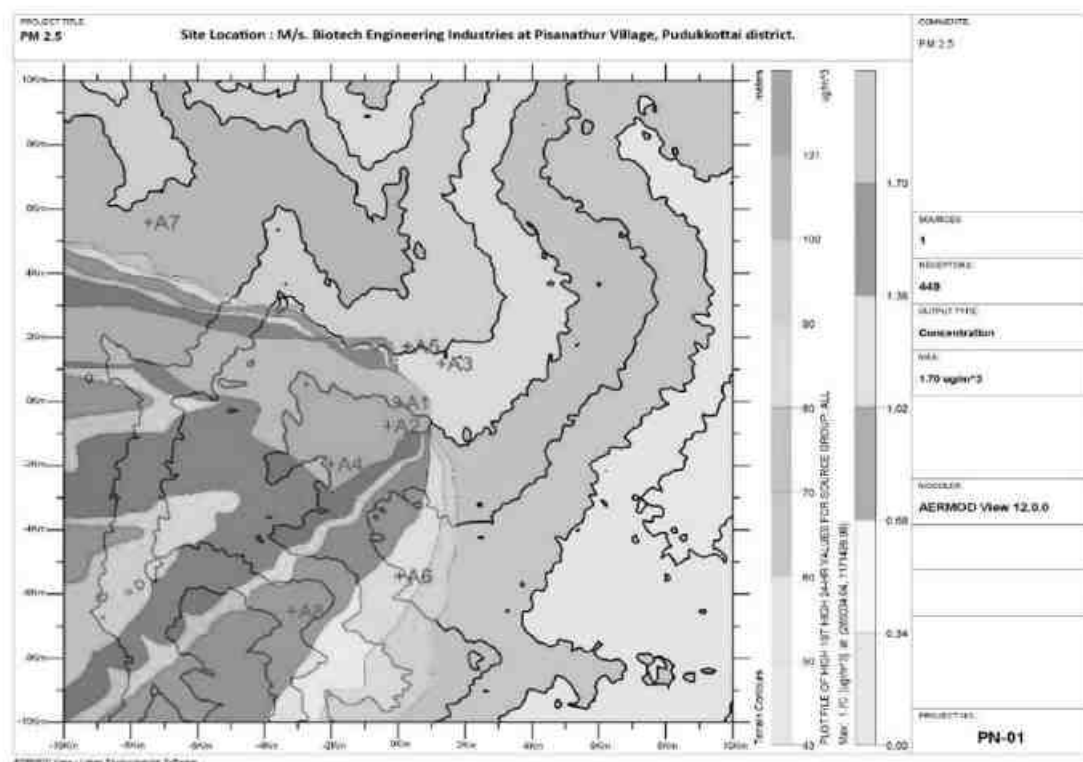


Figure 4.2- Predicted GLC of PM2.5

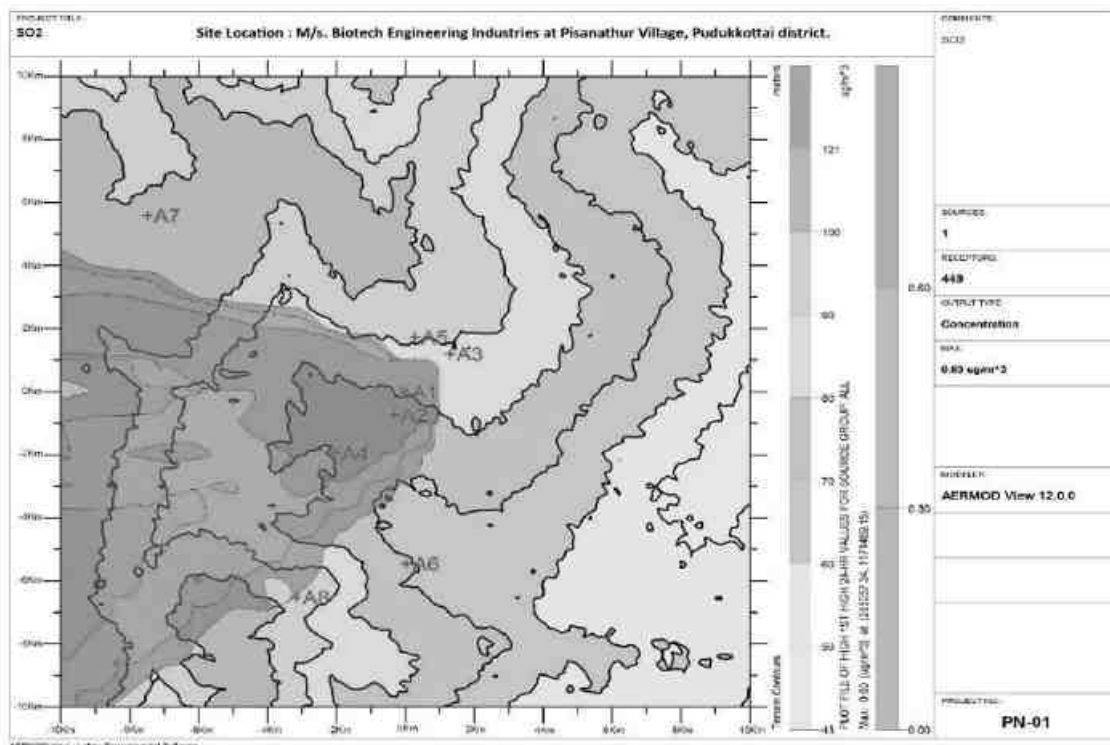
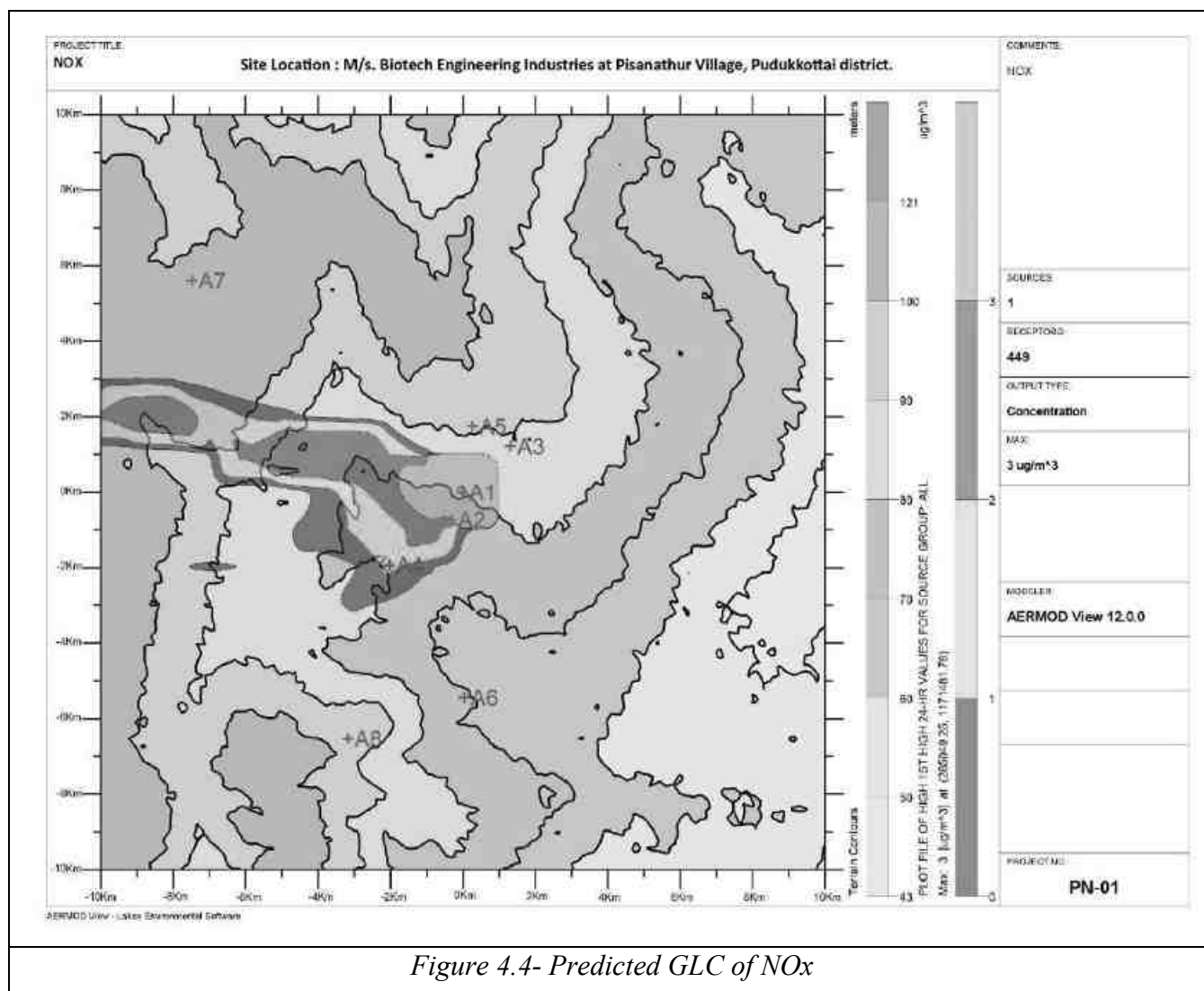


Figure 4.3- Predicted GLC of SOx



## Interpretation

The maximum anticipated concentrations of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, and NO<sub>x</sub> over an 8-hour average period at the project site have been analysed. The Air Quality Modelling study was conducted to predict the resultant incremental load of pollutants and the ground level concentration. It is derived from the above AQM figures of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, and NO<sub>x</sub> that the probable pollution load during operation phase will be within the permissible limits prescribed by the Central Pollution Control Board (CPCB). The predicted ground-level concentrations resulting from project operations were superimposed on the existing baseline ambient air quality data. The combined concentrations were found to be within the permissible limits specified under the National Ambient Air Quality Standards (NAAQS).

#### 4.5.5 Mitigation Measures during operational phase

- **Regular water sprinkling** will be carried out to suppress dust and prevent it from becoming airborne.
- **Greenbelt development** around the project boundary will be maintained to act as a natural dust barrier.
- **A high boundary wall** is already has been provided, ensuring minimal dust movement beyond the project site.
- **Air Pollution Control Devices** will be maintained and operated efficiently to control the operational emissions. In addition to this Online Continuous Emission Monitoring System is proposed to be installed to monitor the emission of flue gases from the stack. The emission data will be monitored by TNPCB officials.

#### 4.6 Impacts on Noise Environment & Mitigation Measures

##### 4.6.1 Noise Impacts during Construction Phase & Mitigation Measures

Construction activities such as foundation work, structural fabrication, and operation of heavy machinery, material handling, and vehicle movement are expected to contribute to an increase in ambient noise levels. These activities may generate noise levels of approximately 100 dB (A), primarily affecting areas in close proximity to the site. However, since the immediate surroundings of the facility consist of open land with no nearby residential settlements, the overall noise impact is expected to be minimal.

##### 4.6.2 Mitigation Measures on Noise during Construction Phase

To minimize noise pollution during construction, the following measures will be implemented

- **Limiting high-noise activities** to daytime hours to reduce disturbances.
- **Enforcing vehicle regulations**, including maintaining speed limits and restricting the use of horns unless necessary.
- **Providing personal protective equipment (PPE)** such as earplugs and earmuffs to workers operating noise-generating machinery.
- **Maintaining greenbelt plantations** around the project boundary to act as a natural sound barrier.

These mitigation strategies will help ensure compliance with noise regulations and reduce potential disturbances during construction.

##### 4.6.3 Noise Impacts during Operational Phase & Mitigation Measures

During the operational phase of the Common Biomedical Waste Treatment Facility (CBWTF), the primary sources of noise pollution will be waste treatment equipment, material handling, and vehicular movement. Industrial facilities typically contain multiple noise-generating sources, which may be housed

in buildings of different structural compositions or installed in open areas and sheds. The sound attenuation properties of these structures depend on the materials used in construction.

Noise levels outside the plant boundary have been recorded at approximately 56–58 dB (A) during site visits. Within the operational area, maintaining ambient noise levels below 85 dB (A) may not always be feasible due to machinery operations. To ensure worker safety, protective gear such as earplugs and earmuffs will be provided to personnel working in high-noise zones. According to Occupational Safety and Health Administration (OSHA) standards, the maximum permissible noise exposure for workers is 90 dB (A) for an 8-hour shift.

To further reduce noise pollution, preventive measures will be implemented, such as optimal equipment layout, installation of sound barriers, acoustic enclosures with sound-absorbing materials, and greenbelt development around the facility to act as a natural noise buffer.

#### **4.6.4 Mitigation Measures on Noise during Operation Phase**

To control noise pollution during facility operation, the following mitigation measures will be adopted:

- **Procurement of noise-controlled equipment**, ensuring compliance with EPA 1986 and OSHA noise level standards to minimize emissions.
- **Installation of noise barriers, shields, and enclosures** around high-noise machinery to limit sound propagation.
- **Acoustic insulation and enclosures** for equipment to effectively attenuate noise emissions.
- **Personal protective equipment (PPE)**, such as earmuffs and earplugs, will be provided to workers operating in high-noise areas.
- **Development of a dense greenbelt** around the facility boundary to absorb and diffuse noise levels, reducing its impact on the surrounding environment.

By implementing these mitigation measures, the CBWTF will ensure compliance with noise regulations while maintaining a safe working environment for personnel.

### **4.7 Impacts on Water Environment & Mitigation Measures**

#### **4.7.1 Impacts on Water Environment during Construction Phase**

During the construction phase of a Common Biomedical Waste Treatment Facility (CBWTF), several activities may pose risks to the water environment, including surface runoff, wastewater discharge, and accidental spills. The key potential impacts include

- **Increased Sedimentation:** Excavation, levelling, and land clearing may lead to soil erosion, increasing sediment load in nearby water bodies.

- **Surface Water Contamination:** Runoff from construction sites may carry cement, oils, chemicals, and debris into local water sources, affecting water quality.
- **Groundwater Pollution:** Improper disposal of construction wastewater or accidental spills of hazardous materials may seep into the groundwater.
- **Wastewater Generation:** Activities such as curing, cleaning, and vehicle/equipment washing may generate wastewater that, if not managed properly, could pollute the surroundings.
- **Disturbance to Natural Drainage:** Construction activities may alter the natural drainage patterns, leading to waterlogging or disruption of nearby water flow.

Implementing effective mitigation measures such as proper drainage, controlled waste disposal, and sedimentation control structures can help minimize these impacts and protect water resources during construction.

#### 4.7.2 Mitigation Measures on Water during Construction Phase

- **Proper Wastewater Management:** Treating wastewater from construction activities before disposal to prevent contamination.
- **Spill Prevention and Containment:** Using drip trays and spill kits to manage accidental leaks of oils, fuels, and chemicals.
- **Controlled Surface Runoff:** Constructing temporary drains and diversion channels to prevent runoff from carrying pollutants into nearby water sources.
- **Designated Washing Areas:** Ensuring vehicle and equipment washing is done in designated areas with wastewater collection and treatment systems.
- **Proper Storage of Construction Materials:** Keeping cement, chemicals, and other materials in covered storage to prevent leaching into soil and water.
- **Preservation of Natural Drainage:** Avoiding obstruction of natural water flow and ensuring proper site planning to prevent water stagnation.
- **Regular Water Quality Monitoring:** Conducting periodic checks on groundwater and nearby water bodies to detect any contamination early.
- **Rainwater Management:** Implementing rainwater harvesting or controlled discharge of rainwater to prevent excessive runoff.
- **Awareness and Training:** Educating construction workers on best practices for water conservation and pollution prevention.

These measures will help protect the water environment and ensure compliance with environmental regulations during the construction phase of the CBWTF.

#### 4.7.3 Impacts on Water Environment during Operation Phase

The operation of a Common Biomedical Waste Treatment Facility (CBWTF) may pose potential risks to the water environment through wastewater generation, accidental spills, and surface runoff from the site. The primary sources of water pollution include effluents from waste treatment processes, washing of equipment, and leachate from waste storage areas. If not managed properly, these discharges can lead to contamination of groundwater and nearby water bodies, affecting both water quality and aquatic ecosystems.

#### 4.7.4 Mitigation Measures on Water during Operational Phase

- **Installation of Effluent Treatment Plant (ETP):** Ensuring proper treatment of wastewater before discharge or reuse.
- **Leak-proof Storage Areas:** Using impermeable flooring and covered storage to prevent leachate contamination.
- **Proper Drainage System:** Constructing well-designed drains to channel runoff safely without polluting nearby water bodies.
- **Regular Water Quality Monitoring:** Conducting periodic testing of groundwater and surface water to detect any contamination.
- **Zero Liquid Discharge (ZLD) Approach:** Recycling and reusing treated water within the facility to minimize wastewater generation.
- **Rainwater Harvesting:** Implementing rainwater collection systems to optimize water use and reduce dependence on external sources.
- **Spill Prevention Measures:** Installing spill containment systems and training staff to handle accidental spills effectively.
- **Restricted Use of Water:** Promoting water conservation measures within the facility through efficient usage practices.
- **Awareness and Training:** Educating workers on best practices for wastewater management and pollution prevention.

These mitigation measures will help minimize water pollution risks and ensure compliance with environmental regulations.

#### 4.8 Impacts on Ecological Environment & Mitigation Measures

The proposed Common Biomedical Waste Treatment Facility (CBWTF) is not located in an ecologically sensitive or protected and fragile areas, National Parks, Corridors and Wildlife pathways and there are no sites of ecological significance within the project vicinity. As the construction activities will primarily



involve the installation of machinery within a designated area, tree felling or habitat destruction will not be required. Temporary sheds will be set up for construction activities, ensuring minimal disturbance to the local ecosystem.

During the operational phase, potential ecological impacts may arise due to air pollutant deposition from facility emissions. However, air quality modelling indicates that pollution dispersion will remain confined within 50 meters of the plant, making any significant ecological impact unlikely.

- **Potential Ecological Impacts:**

Minor air pollutant deposition from emissions.

Temporary disturbance to localized flora and fauna during construction.

- **Impacts on Agriculture:**

The site is not adjacent to active agricultural lands; however, indirect risks may arise from dust, air emissions, or potential water contamination.

- **Impacts on Water Bodies (Tanks and Reservoirs):**

Although there is no reservoir nearby, surface runoff or accidental spills could not affect the nearby water channels.

- **Impacts on Groundwater Table:**

Minimal risk, as the project does not involve significant groundwater withdrawal or deep excavation.

#### **4.8.1 Mitigation Measures Ecological Environment**

- **Use of Advanced Air Pollution Control Systems:** Installation of wet scrubbers, venture scrubbers, cyclone Separators to minimize dust emissions.
- **Water Sprinkling Systems:** Regular water spraying at material handling points to control fugitive dust.
- **Restricted Pollutant Dispersion:** Air quality modelling indicates that emissions will remain confined within 50 meters of the plant.
- **Proper Waste Management:** Safe handling and disposal of biomedical waste to prevent contamination of nearby ecosystems.
- **Green Belt Development:** Plantation of trees which are native species of various height and crown sizes, around the facility to act as a natural barrier against air and noise pollution.
- **Regular Environmental Monitoring:** Continuous assessment of air and soil quality to detect and mitigate any potential ecological impact.

- **Minimal Land Disturbance:** Construction activities limited to designated areas without affecting nearby habitats or agricultural land.

These measures will help ensure that the CBWTF operates sustainably with minimal impact on the surrounding ecological environment.

#### For Ecological Protection

- **Advanced Air Pollution Control:** Installation of wet scrubbers, venturi scrubbers, and cyclone separators to reduce dust and gas emissions.
- **Green Belt Development:** Planting of native species around the facility to create a pollution buffer and support local biodiversity.
- **Restricted Construction Zones:** Temporary sheds and machinery only within designated zones to avoid unnecessary land disturbance.
- **Continuous Environmental Monitoring:** Routine assessment of air and soil quality to detect and mitigate ecological risks early.

#### For Agricultural Safeguards

- **Controlled Pollutant Dispersion:** Air dispersion modelling ensures emissions stay within a 50-meter radius, well clear of agricultural areas.
- **Fugitive Dust Control:** Regular water sprinkling and covered material storage to prevent dust drift onto nearby fields.
- **Safe Biomedical Waste Handling:** Preventing any release of contaminants that could affect soil quality or crop health.

#### For Protection of Surface Water Bodies

- **Effluent Treatment Plant (ETP):** All wastewater will be treated to meet CPCB standards before safe disposal or reuse.
- **Impervious Surfaces & Drains:** Paved areas and storm water drains will prevent accidental spills from entering natural water bodies.

#### For Groundwater Protection

- **Zero Discharge Policy:** Ensuring treated effluent is reused or disposed of safely, avoiding percolation into the soil.
- **Groundwater Quality Monitoring:** Regular testing of nearby bore wells and wells to detect changes in water quality or contamination.

#### General Construction Mitigation

- **Minimal Land Disturbance:** Strict adherence to construction boundaries to avoid impacts on nearby ecosystems or land use.
- **No Tree Cutting Policy:** Ensuring that no natural vegetation is removed as part of the site development.

#### 4.9 Socio-Economic Impacts & Mitigation Measures

The proposed Common Biomedical Waste Treatment Facility (CBWTF) at Pisanathur Village is expected to bring both positive and negative socio-economic impacts to the surrounding community.

- **Employment Generation:** The project will create job opportunities for both skilled and unskilled workers during the construction and operational phases.
- **Economic Growth:** Increased demand for local goods and services will benefit small businesses and service providers.
- **Health and Safety Concerns:** Improper waste management or emissions could lead to public health concerns, affecting the well-being of nearby residents.
- **Community Perception and Acceptance:** Resistance from local communities may arise due to concerns about pollution, odour, and potential health risks.
- **Infrastructure Development:** The project may contribute to improved roads and utilities but could also lead to increased traffic and congestion.

##### 4.9.1 Mitigation Measures on Socio-Economic

- **Local Employment Opportunities:** Prioritizing local hiring for both skilled and unskilled jobs to enhance community benefits.
- **Skill Development Programs:** Providing training for local workers to improve employability in waste management and related industries.
- **Public Health and Safety Measures:** Implementing strict waste handling, air pollution control, and sanitation protocols to ensure a safe environment. In the study area, there are no reports of respiratory distress problems arising due to the nearby industrial area.
- **Community Engagement and Awareness:** Conducting regular consultations with local residents to address concerns and provide transparent information about safety measures.
- **Traffic and Infrastructure Management:** Coordinating with local authorities to ensure proper traffic management and improve road infrastructure where necessary.
- **Grievance Redressal Mechanism:** Establishing a system for residents to report concerns and receive timely responses.

- **Green Belt Development:** Planting trees around the facility to reduce dust, noise, and visual impacts on the community.
- **Environmental Compliance:** Ensuring adherence to all environmental and safety regulations to prevent socio-economic disruptions.

These mitigation measures will help ensure that the CBWTF contributes positively to the local economy and community while minimizing any adverse socio-economic impacts.

#### **4.10 Carbon Emission and GHG Assessment and Mitigation for CBWTF**

The Environmental Impact Assessment for the CBWTF has analysed the carbon emissions associated with facility operations. This includes analysing emissions from waste incineration, transportation of biomedical waste, and energy consumption within the facility.

The operations of the CBWTF has been designed to mitigate the process emissions and the accumulation of greenhouse gases (GHGs). A comprehensive action plan will be developed by the proponent to implement eco-friendly measures that promote the sustainable management of natural resources both within the facility and in the surrounding areas. This plan will focus on reducing carbon emissions, optimizing resource utilization, enhancing energy efficiency, and integrating renewable energy solutions. Additionally, strategies such as waste minimization, water conservation, green belt development, and strict adherence to environmental regulations will be adopted to ensure environmentally responsible operations.

##### **4.10.1 Impacts of Carbon Emissions from CBWTF**

- **Greenhouse Gas Emissions:** Incineration of biomedical waste releases carbon dioxide (CO<sub>2</sub>), nitrous oxides (NO<sub>x</sub>), and other greenhouse gases, which might contribute to climate change.
- **Air Pollution:** Emission of particulate matter (PM), furans and dioxins can degrade air quality.
- **Energy Consumption:** High energy usage for incinerators, autoclaves, and other equipment might increase the facility's carbon footprint.
- **Transportation Emissions:** Vehicles used for waste collection and transportation generate additional CO<sub>2</sub> and other pollutants.
- **Heat Generation:** Incineration processes might contribute to localized temperature rise, impacting the microclimate.

**Table 4.2 Details of expected annual carbon emission of proposed CBWT facility**

| Emission stage                                                                                                                            | Plant Specific Activity                                                                                                                                                                                                                                                              | Carbon Emission per Day (tCO <sub>2</sub> e) | Carbon Emission per Annum (tCO <sub>2</sub> e) |
|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------|
| <b>Construction Phase</b>                                                                                                                 | <ul style="list-style-type: none"> <li>• Machinery &amp; Generators</li> <li>• Material Transportation</li> <li>• Worker Transportation</li> <li>• Electricity Usage (Grid)</li> </ul>                                                                                               | 0.32                                         | 58.49                                          |
| <b>Operational Phase</b>                                                                                                                  | <ul style="list-style-type: none"> <li>• Incinerator (200 kg/hr)</li> <li>• Incinerator (100 kg/hr)</li> <li>• DG Set (120 kVA)</li> <li>• Autoclave &amp; Shredder</li> <li>• Employee Commuting</li> <li>• Waste Transport Vehicles</li> <li>• Electricity Usage (Grid)</li> </ul> | 3.77                                         | 1,375.33                                       |
| <b>Total Emissions</b>                                                                                                                    |                                                                                                                                                                                                                                                                                      | <b>4.09</b>                                  | <b>1,433.82</b>                                |
| <b>Note:</b> 2.68kg CO <sub>2</sub> e/lit of Diesel; DG Set - 150 kVA Generator requires approximately 15L/h (50% load) fuel consumption. |                                                                                                                                                                                                                                                                                      |                                              |                                                |

#### 4.10.2 Mitigation Measures and action plan for carbon emission reduction

- **Use of Energy-Efficient Incinerators and Autoclave:** It has been planned for adoption of **advanced combustion technology** to optimize fuel efficiency and reduce emissions.
- **Carbon Sink Development:** Establishing a **green belt around the facility** to absorb CO<sub>2</sub> and lower ambient temperatures.

A greenbelt development is planned over an area of **2115.44 Sq.m (0.52 acres)**, within which about **100 trees** are proposed to be planted. Based on an average carbon sequestration rate of **21 kg of CO<sub>2</sub> per tree per year** for mature trees, the plantation is expected to start contributing significantly to carbon absorption after approximately three years. Once the trees are fully established, the greenbelt is estimated to absorb around **2.1 tonnes of CO<sub>2</sub> annually**, thereby serving as a natural carbon sink in the form of above and below carbon stock and contributing to climate change mitigation.

With reference to Intergovernmental Panel on Climate change (IPCC 2006), industrial plantation systems such as greenbelts around factories, the carbon stock is typically distributed as follows: 50–60% in above ground biomass, 20–30% in belowground roots, and 10–30% or more in soil organic carbon (SOC), depending on the management practices and species used

- **Emission Control Systems:** Installation of **air pollution control devices** such as **scrubbers, Droplet separator** to capture harmful pollutants.
- **Renewable Energy Integration:** Incorporating the use of **solar energy sources (such as roof top solar panels)** to reduce reliance on fossil fuels.
- **Optimized Waste Collection Routes:** Implementing **efficient transportation logistics** to reduce fuel consumption and vehicle emissions. Battery operated vehicles will be introduced in a phased manner to reduce fossil fuel consumption.
- **Periodic air quality Monitoring:** Conducting **regular emission monitoring** to ensure compliance with environmental standards.
- **Awareness and Training:** Educating staff on **best practices for energy conservation and sustainable waste management**.

These measures will help **minimize carbon emissions, improve air quality, and contribute to climate change mitigation**, ensuring sustainable operations of the CBWTF.

#### **4.11 Impacts on Occupational Health in CBWTF & Mitigation Measures**

- **Exposure to Hazardous Waste:** Workers handling biomedical waste may come into contact with infectious materials, sharp objects, and toxic substances, increasing health risks.
- **Heat Stress and Burns:** High temperatures from incinerators and autoclaves pose risks of heat-related illnesses and accidental burns.
- **Noise Pollution:** Continuous operation of incinerators, shredders, and heavy machinery may lead to hearing impairments over time.
- **Ergonomic Strain:** Manual handling of heavy waste bags and materials can cause musculoskeletal disorders and physical fatigue.
- **Chemical Exposure:** Use of disinfectants and cleaning agents may lead to skin irritation, allergic reactions, or chemical burns.
- **Psychological Stress:** Prolonged exposure to hazardous waste and demanding work conditions may cause mental stress and fatigue.

#### **4.11.1 Mitigation Measures on Occupational Health**

- **Personal Protective Equipment (PPE):** Mandatory use of gloves, masks, goggles, protective suits, and earplugs to minimize exposure risks.
- **Proper Ventilation and Air Filtration:** Installation of exhaust fans and air purification systems to reduce airborne pollutants in work areas.
- **Heat Stress Prevention:** Provision of cooling areas, hydration stations, and scheduled breaks to prevent heat-related illnesses.
- **Noise Control Measures:** Use of soundproof enclosures for noisy machinery and enforcement of hearing protection protocols for workers.
- **Training and Awareness Programs:** Regular health and safety training for workers on proper waste handling, risk management, and emergency response.
- **Automated Waste Handling:** Introduction of mechanized systems for waste collection and transportation to reduce physical strain and injury risks.
- **Medical Surveillance and Health Check-ups:** Routine health screenings and medical check-ups to detect and address occupational health issues early.
- **Emergency Preparedness:** Availability of first aid kits, fire extinguishers, emergency showers, and clearly marked evacuation routes within the facility.
- **Psychosocial Support:** Implementation of counselling services and stress management programs to promote workers' mental well-being.

By implementing these mitigation measures, facility can ensure a safer work environment, reduce occupational health risks, and promote worker well-being.

## CHAPTER 5

### ANALYSIS OF ALTERNATIVES

#### 5.1 Alternatives for Site

As per ToR Identification No. TO24B3301TN5162069N dated 22.10.2024, under specific terms of reference point no. 1.1 - The PP shall discuss the alternative sites to the proposed site. Preferably, alternative site should be away from the residential area, sensitive area, water body and may be selected in discussion with PCB. The Site Suitability Letter has been obtained from the Member Secretary, TNPCB vide Letter. No. T6/TNPCB/F.019201/BMW/2025, dated 09.05.2025.

#### 5.2 Details of Alternate Sites Examined

We have examined alternate sites and the details are furnished below.

**Table 5.1-Comparative statement on details of Alternative sites**

|                             | <b>Plot at Pisanathur Village<br/>(Site-1)</b>                                                                                                                                                                                                                                                                                                                   | <b>Plot at Kallukaranpatii Village<br/>(Site-2)</b>                                                                                                                                                                                                                                                                                                 |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Location</b>             | Survey number:17/7, Pisanathur Village, Gandharvakottai Tk, Pudukkottai Dt, TN                                                                                                                                                                                                                                                                                   | Survey number 161/1A2B, 161/3A1, 161/3A2, 161/3B. Kallukaranpatti village, Pudukkottai Tk, Pudukkottai Dt, TN.                                                                                                                                                                                                                                      |
| <b>Geo<br/>Co-Ordinates</b> | 10°35'28.64"N 79° 2'8.45"E                                                                                                                                                                                                                                                                                                                                       | 10°32'3.19"N 79° 0'17.66"E                                                                                                                                                                                                                                                                                                                          |
| <b>Land</b>                 | Dry land with an area of 1.55 acres.                                                                                                                                                                                                                                                                                                                             | Dry land with an area of 6.5 acres                                                                                                                                                                                                                                                                                                                  |
| <b>Road Approach</b>        | The connecting pisanathur village branch road (0.43km away from Toll) from NH-36 to the site is at a distance of 2.55 Km (Aerial distance NH to Site-1.2Km). Pisanathur village habitation is located down south of the proposed project site.<br>(population-958 Persons)<br><b>There is no habitation between branch road of NH and proposed project site.</b> | The project site is located in the Kalukaranppatti- Budur road which is connected to the NH-36 at a distance of 3.5 Km at kalukaranppatti. (Aerial distance NH to Site-3Km).<br>(population-1605 Persons)<br>From NH-36 along Kalukaranppatti-Budur road up to 700m, <b>the habitation is located on either side towards proposed project site.</b> |



|                                                                                                                                                                                                | Plot at Pisanathur Village<br>(Site-1)                                                                                                                                                                                                                                           | Plot at Kallukaranpatii Village<br>(Site-2)                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Surrounding                                                                                                                                                                                    | The surrounding land is mostly barren and there are few cashew plantations.                                                                                                                                                                                                      | The site is surrounded on all sides by agricultural land where groundnut, sesame and millets are cultivated.                            |
| Nearby features                                                                                                                                                                                | Habitation - Pisanathur village 0.77Km south.<br>Water Body - Pisanathur village pond 650 m south.                                                                                                                                                                               | Habitation – Budur village 0.67 km North west.<br>Water Body - Seeppukaranpatti village pond 1.65 km south.                             |
| Environmental aspects                                                                                                                                                                          | The Pisanathur village is located on the southern end of Pisanathur village road.<br>Our proposed site is located north of 770 meters away from the village.<br>The entry and exit are from NH to Project site only through the Northern side and <b>not through habitation.</b> | The village road for the proposed project site for entry and exit <b>is only through the habitation of the Kallukaranpatti village.</b> |
| Inference                                                                                                                                                                                      | <b>Based on the above findings and other observations, site-1 (Pisanathur village plot) is proposed.</b>                                                                                                                                                                         |                                                                                                                                         |
| <div></div> <div></div> |                                                                                                                                                                                                                                                                                  |                                                                                                                                         |

Figure 5.1-Alternate site photos

On consideration of the merit and weightage of the site selection criteria the above said alternate sites did not comply with the CPCB guidelines. Therefore, M/s. Biotech Engineering Industries has proposed to establish a Common Biomedical Waste Treatment & Disposal Facility capacity of 10 tonnes per day at Survey No: 17/7, Pisanathur Village, Gandarvakkottai taluk, Pudukkottai District, TamilNadu. in a plot area of 6250 Sq.m (1.55 acres).

### **5.2.1 Compliance to site selection criteria of CPCB guidelines & revised guidelines of CBWTF**

The proposed project site at Survey No: 17/7, Pisanathur Village, Gandarvakkottai taluk, Pudukkottai District is meeting site selection criteria of CPCB guidelines as well as the site selection criteria of CBWTF and tabulated as **Table 5.2**

**Table 5.2 - Compliance to the Site selection conditions**

| Sl. No | Parameter           | Criteria for the selection of project site                                                                                                                                                                                          | Compliance & Details                                                                                                                                                                                                            |
|--------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.     | Location            | Buffer zone requirement                                                                                                                                                                                                             | no requirement for buffer zone.                                                                                                                                                                                                 |
|        |                     | CBWTF shall be near to the area of operation                                                                                                                                                                                        | The proposed site at Pisanathur falls within the 75 Km radius of the HCFs in 6 districts.                                                                                                                                       |
| 2.     | Conformity to norms | The location of the CBWTF should be in conformity to the CRZ Norms and other provisions notified under the Environment (Protection) Act, 1986. The location shall be decided in consultation with the State Pollution Control Board | The site does not fall under CRZ zone and there is no eco sensitive zone.<br><br>TNPCB has issued the site suitability letter confirming the plot location. The site suitability letter issued by TNPCB is given as Annexure 5. |
| 3.     | Land Requirement    | CBWTF shall be set up on a plot size of not less than 1 acre                                                                                                                                                                        | The proposed facility will be set in the plot size of 1.55 acres (6250 Sq.m)                                                                                                                                                    |

| Sl. No | Parameter     | Criteria for the selection of project site                                                                                                                                                                                           | Compliance & Details                                                                                                                         |
|--------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 4.     | Coverage Area | CBWTF shall be allowed to cater healthcare units situated at a radial distance of 75 KM.                                                                                                                                             | The proposed CBWTF will collect and treat the BMW generated in HCFs within 75 Km radial distance.                                            |
|        |               | In case, number of beds is exceeding >10,000 beds in a locality (i.e. coverage area of the CBWTF under reference) and the existing treatment capacity is not adequate, in such a case, a new CBWTF may be allowed in such a locality | The number of beds is expected to increase above 10,000 in many districts in the future due to rise in population and any probable pandemic. |

As per Revised Guidelines for Common Bio-medical Waste Treatment and Disposal Facilities, 2016 under Section 6 Location criteria, The selected CBWTF site at Pisanathur village, Pudukkottai District will be located near to its area of operation in order to minimize the transportation distance in waste collection, thus enhancing its operational flexibility as well as for ensuring compliance to the time limit for treatment and disposal of bio-medical waste as stipulated under the BMW Rules (i.e., within 48 hours). As the proposed project location complies the guidelines for setting up of CBWTF, no other alternative site is considered.

### 5.3 Alternatives for Technology

As per ToR, Under the SEAC Specific conditions point no. 11- Details of various state of art of technology available for this filed and justification for selection of a particular technology. M/s. Biotech Engineering Industries have proposed to adopt the technology of incinerator, autoclave and shredder based on consideration and requirement of BMW quantity.

### **5.3.1 Advantages over other alternate process technology**

As per Bio-Medical Waste Management Rules, 2016 and as per the guidelines published by CPCB for BMW management incinerator is selected for disposing the following Biomedical waste covered under schedule 1 of Biomedical waste management rules, 2016 such as;

- i. Human Anatomical Waste,
- ii. Animal Anatomical Waste,
- iii. Soiled Waste,
- iv. Chemical Waste,
- v. Discarded linen, mattresses, beddings contaminated with blood or body fluid will be treated in Incinerator in the proposed CBWTF project. Thus, plasma pyrolysis technology which is of high procurement cost is not required.

Autoclave equipment will be used as it is a tested process for sterilization, superior and sufficient type of sterilization.

### **5.3.2 Plasma Pyrolysis for Biomedical Waste Treatment**

The proper treatment of biomedical waste is crucial for safeguarding public health and protecting the environment from harmful pollutants. In most Common Biomedical Waste Treatment Facilities (CBWTF), incineration is the standard method for treating waste effectively and efficiently. However, technological advancements have introduced plasma pyrolysis as an alternative solution, promising cleaner emissions and energy recovery.

Plasma pyrolysis is an advanced waste treatment technology that uses plasma, the fourth state of matter, to treat biomedical waste at extremely high temperatures exceeding 3,000°C. Waste is fed into a plasma reactor where plasma torches generate intense heat, breaking down organic materials into syngas—a mix of hydrogen and carbon monoxide and converting inorganic materials into a solid glass-like substance called slag. The syngas can be used as a fuel for generating energy, while the slag is safe for disposal in landfills. This high-temperature process destroys pathogens, toxic compounds, and hazardous chemicals, ensuring minimal environmental impact.

Plasma pyrolysis offers several advantages that make it an attractive alternative to traditional waste treatment methods. It significantly reduces waste volume, often by up to 95%, making it highly efficient. The high temperatures ensure complete thermal destruction of toxins like dioxins and furans, which are sometimes emitted by incinerators. Additionally, plasma pyrolysis produces syngas that can potentially be harnessed for energy recovery, supporting sustainability goals. Its versatility allows it to handle mixed

waste streams, reducing the need for waste segregation. Moreover, the process generates minimal solid residue, which is inert and non-toxic, simplifying disposal requirements.

However, the challenges associated with plasma pyrolysis are substantial. The technology requires expensive equipment and a high initial investment for installation, which can strain budgets. Plasma torches consume a large amount of electricity, leading to high operational costs. Moreover, the system's complexity necessitates skilled personnel for operation and maintenance, which may not always be available. Another major limitation is that plasma pyrolysis is still in the pilot or small-scale stage in many regions, making it difficult to implement in large-scale facilities. These limitations raise concerns about its practicality and economic viability.

The proposed CBWTF at Pisanathur Village will be capable of handling 10 tons of biomedical waste per day. This setup includes two incinerators with capacities of 200 kg/hr and 100 kg/hr, autoclaves with a capacity of 1220 litres/hr each for waste disinfection, and a shredder with a capacity of 200 kg/hr. This system is not only cost-effective but also efficient in meeting our operational needs while adhering to regulatory standards.

Incineration process is a proven technology that effectively treats large volumes of waste. Modern emission control devices such as scrubbers and filters, have further minimized the environmental impact of incineration, making it a practical choice for large-scale operations.

Comparing plasma pyrolysis and incineration, it is evident that while plasma pyrolysis offers environmental benefits and energy recovery opportunities, it is hindered by high costs, energy demands, and complex operational requirements. On the other hand, incineration is a more affordable, scalable, and straightforward technology that is well-suited for managing high volumes of biomedical waste. Its compatibility with our current operational setup and its ability to handle the regulatory requirements of a CBWTF make it the most practical choice for our facility.

In conclusion, plasma pyrolysis is a promising technology with significant environmental advantages and the potential for energy recovery. However, its high costs, energy consumption, and operational challenges make it impractical for our facility in its current state. Incineration, being a proven and reliable technology, remains the most viable option for managing the 10 tons of biomedical waste our CBWTF handles daily. While we recognize the potential of plasma pyrolysis, we recommend continuing with incineration and exploring plasma pyrolysis in the future if technological advancements reduce its cost and complexity. This approach ensures the safe, efficient, and cost-effective management of biomedical waste while staying open to innovative technologies.

## CHAPTER 6

### **ENVIRONMENTAL MONITORING PROGRAM**

#### **6.1 Technical aspects of monitoring the effectiveness of mitigation measures**

The environmental monitoring program covers key environmental parameters, including air, water, soil, and noise. It outlines the sampling locations and the frequency of monitoring for each of these components. The purpose of environmental monitoring is to assess the performance and effectiveness of the mitigation measures outlined in the Environmental Management Plan (EMP) and to recommend improvements if necessary.

#### **6.2 Overview of Environmental Monitoring**

Environmental monitoring provides valuable feedback on the actual environmental impacts of a project. It plays a crucial role in ensuring compliance with environmental standards and facilitating necessary changes in project design or operations. This program is essential as it offers useful information that supports the following objectives:

- Promoting good environmental practices through effective planning, commitment, and continuous improvement.
- Ensuring compliance with regulatory standards set by the Tamil Nadu Pollution Control Board (TNPCB) and the Environmental Protection Act.
- Clarifying responsibilities and facilitating communication between contractors, environmental monitors, and project proponents regarding environmental issues.
- Identifying key monitoring parameters and establishing a clear monitoring framework.
- Evaluating the operational performance and effectiveness of control measures outlined in the Environmental Management Plan (EMP), while recommending necessary improvements.
- Ensuring that day-to-day activities are conducted in alignment with regulatory requirements and approved by the relevant authorities.

The environmental monitoring program has been developed to assess the adherence to the Environmental Management Plan (EMP) and implement corrective actions if necessary. It includes:

- Continuous monitoring of emissions from the incinerator stack.
- Ensuring emission standards are met through regular checks.
- Monitoring ambient air quality and noise levels in the project area.
- Analysing influent and treated wastewater from the Effluent Treatment Plant (ETP).

Conducting periodic checks on hazardous waste generated, such as incineration ash, sludge from the ETP, and used oil from the diesel generator (DG) set.

### 6.3 Applicable environmental regulatory framework

The proposed project will abide by the following Acts, Rules & Notifications issued by the Government of India to protect the environment and development in sustainable way.

1. The Environmental (Protection) Act, 1986.
2. The Water (Prevention & Control of Pollution) Act, 1974
3. The Air (Prevention & Control of Pollution) Act, 1981
4. The Hazardous and other Wastes (Management and Transboundary Movement) Rules, 2016.
5. The Noise Pollution (Regulation and Control) Rules, 2000 and its amendments

### 6.4 Measurement Methodology – Construction & Operation Phase

Ambient air quality, stack emissions, noise levels, water and wastewater, and soil will be monitored regularly. All environmental samples will be tested in accordance with the guidelines established by the MoEF&CC, CPCB, and SPCB. The monitoring methods will follow those recommended or approved by these agencies. For parameters not covered by MoEF&CC or CPCB guidelines, standard procedures will be applied.

Monitoring will take place during the following phases:

- a. **Construction Phase** – Monitoring will be conducted throughout the construction period
- b. **Operation Phase** – Monitoring will continue once the project is operational.

#### a. Construction phase

Environmental impacts during the construction phase are primarily associated with site preparation activities and the mobilization of the workforce. These impacts are generally short-term and are expected to diminish gradually once construction is completed. However, once the facility becomes operational, the impacts from its operations will overlap with any residual effects from the construction phase.

Key construction activities involved in setting up the CBWTF facility include the construction of sheds for treatment units, storage areas, administrative block, and utilities. Major components of the facility include the incinerator, autoclave, shredder, diesel generator, and other essential civil, mechanical, and electrical equipment. The construction process will require the mobilization of materials and equipment and is anticipated to span several months. During the construction phase of the CBWTF facility, the quality of construction will be carefully monitored at each stage, including base preparation and equipment installation. Environmental monitoring during the construction phase will be conducted as outlined in **Table 6.1**.

**Table 6.1 – Environmental monitoring program during construction phase**

| Sl. No   | Aspect               | Mitigation Measures                                                                                   | Monitoring Parameters                                                                | Monitoring Frequency           |
|----------|----------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------|
| <b>1</b> | <b>Air Emissions</b> | Operate all equipment within specified design parameters.                                             | Equipment logs/manuals                                                               | Monthly (Random checks)        |
|          |                      | Minimize vehicle trips.                                                                               | Vehicle trip sheets                                                                  | Monthly (During construction)  |
|          |                      | Compact soil during construction to reduce dust.                                                      | Construction log Registers                                                           | Regular checks                 |
|          |                      | Maintain construction DG sets to meet stipulated emission standards.                                  | Emission levels (SO <sub>2</sub> , HC, CO, NO <sub>x</sub> )                         | Monthly (During construction)  |
|          |                      | Monitor ambient air quality in project vicinity.                                                      | PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> , CO levels | As per CPCB/TNPCB requirements |
| <b>2</b> | <b>Noise Control</b> | List all noise-generating machinery such as compactors, onsite with age details.                      | Equipment log books, Noise readings                                                  | Weekly (During construction)   |
|          |                      | Minimize night-time work.                                                                             | Work hour records                                                                    | Periodic (During construction) |
|          |                      | Reduce vehicular noise.                                                                               | Vehicle maintenance records                                                          | Periodic checks                |
|          |                      | Implement good working practices (equipment selection, siting, noise enclosures, and ear protection). | Site working practices, Noise readings                                               | Regular checks                 |



| Sl. No | Aspect                                       | Mitigation Measures                                                                  | Monitoring Parameters                                             | Monitoring Frequency           |
|--------|----------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------|
|        |                                              | Install acoustic mufflers/enclosures for large engines.                              | Presence of mufflers/enclosures                                   | Prior to equipment use         |
|        |                                              | Monitor noise levels within project premises.                                        | Noise meter readings                                              | As per CPCB/TNPCB requirements |
| 3      | <b>Wastewater Discharge</b>                  | Ensure no direct discharge into surface water, groundwater, or soil.                 | No discharge hoses near watercourses                              | Monthly (During construction)  |
| 4      | <b>Soil Erosion</b>                          | Limit site clearance to designated boundaries.                                       | Site boundary adherence                                           | Monthly (During construction)  |
|        |                                              | Protect topsoil stockpile.                                                           | Effective cover in place                                          | Monthly (During construction)  |
| 5      | <b>Drainage Management</b>                   | Ensure effective drainage system and design.                                         | Visual inspection of drainage system                              | Monthly (During construction)  |
| 6      | <b>Solid Waste Management</b>                | Implement a waste management plan covering collection, handling & disposal.          | Waste Management Plan compliance (C&D Waste Rules 2016, EPA 1986) | Monthly (During construction)  |
| 7      | <b>Safety Aspects in Working Environment</b> | Develop an emergency response plan and disaster management plan to handle incidents. | Mock drills & training records                                    | Tool box training every day    |
| 8      | <b>Health &amp; Safety</b>                   | Conduct regular health check-ups for employees & migrant workers.                    | Health parameters                                                 | As per Factories Act           |

## **b. Operation phase**

During operational phase, air emissions from incinerators, DG set and other process if any, wastewater characteristics, incineration ash generation etc. are monitored. The following attributes which need to be regularly monitored based on the environmental setting and nature of project activities are listed below.

- Ambient air quality
- Point Source emissions
- Noise levels (equipment and machinery noise levels, occupational exposures and ambient noise levels)
- Ground water quality
- Water & wastewater quality & quantity
- Non-Hazardous waste and Hazardous Waste
- Soil quality
- Green Belt

Monitoring will be carried out according to the guidelines provided in the "Revised Common Biomedical Waste Treatment and Disposal Facility" guidelines by the CPCB, 2016.

### **A. Air Environment**

Environmental impact studies indicate that air quality is one of the most significantly affected aspects. Air quality monitoring will be conducted in accordance with the guidelines set forth by the Ministry of Environment, Forest and Climate Change (MoEF & CC), the Central Pollution Control Board (CPCB), and the State Pollution Control Board (TNPCB). The monitoring methods will follow standard protocols approved or recommended by these agencies. Regular monitoring of ambient air quality and stack emissions will be performed, as outlined in Table 6.2. All monitoring activities will be carried out by a laboratory accredited by NABL or MoEF.

#### **i. Monitoring of Emission from Incinerator & DG set**

The incinerator and diesel generator (DG) set are the primary sources of emissions at the CBWTF. Emissions from the incinerator should be monitored for the specific parameters outlined in the Environment (Protection) Rules of 1986 and the Biomedical Waste Management Rules of 2016. In addition to manual monitoring, emissions will be continuously monitored for parameters specified by the CPCB and TNPCB using an online continuous emission monitoring system, which will be connected to their respective online portals.

- The online Continuous Emission Monitoring Systems for the incinerators must undergo periodic calibration.

- A sampling platform will be established in accordance with CPCB guidelines to collect air pollutant samples from the chimney whenever required. Holes will be made in the chimney following CPCB standards, with specific size calculations.
- Online access to continuous monitoring data will be provided to the local regulatory board or committee. Additionally, a Six months compliances report will be published, detailing operations and compliance with regulatory requirements.

## ii. Monitoring of Dioxins and Furans from Incinerator

Dioxins and furans are harmful compounds produced during the incineration of hazardous waste. Dioxins and furans may be found in emissions from incinerators.

The monitoring of these substances will be monitored by outsourced laboratory accredited by NABL or registered with MoEF & CC. This monitoring will be done once a year.

### B. Noise Environment:

- **Objective:** Monitor noise levels to prevent excessive noise caused by poorly maintained equipment and machinery.
- **Method:** A standard noise level meter will be used. The meter will be placed 3 meters from the noise source (e.g., diesel generator) and at the plant boundary.
- **Frequency:** Noise levels will be monitored every 24 hours.

### C. Water Environment:

- **Objective:** Monitor effluents from activities such as APCDs, vehicle washing, and floor washing.
- **Method:** Effluents will be treated at the on-site Effluent Treatment Plant (ETP) and reused for APCDs.
- **Frequency:** Monthly monitoring will be conducted for parameters prescribed by CPCB in the Biomedical Waste Management (BMW) guidelines.

### D. Soil Quality:

- **Objective:** Prevent soil contamination from incineration ash and biomedical waste.
- **Method:** Store incineration ash under a shed to prevent rainwater ingress, and dispose of it at the nearby TSDF .
- **Frequency:** Soil quality will be sampled and analysed annually.

### E. Solid Waste Management:

- **Non - Hazardous Waste:**
  - Municipal Solid Waste, Shredded Plastic waste, Sterilized Glassware and Needles.
  - Incineration ash and sterilization waste (60% incinerable, 40% sterilization waste).

- Hazardous Waste**

- Spent oil from DG set
- Incineration ash and ETP sludge

- Disposal:** Non-Hazardous waste will be disposed to authorised vendors and Hazardous waste will be disposed to TSDF

The environmental monitoring during operation phase is given in **Table 6.2**

**Table 6.2 – Environmental Monitoring program during operation phase**

| Sl. No | Monitoring Attribute                                      | Parameter to be monitored                                                                                                                         | Sampling Frequency                                       |
|--------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| 1.     | Ambient Air Quality                                       | PM <sub>10</sub> , PM <sub>2.5</sub> , NO <sub>2</sub> , SO <sub>2</sub> , O <sub>3</sub> , CO, Volatile Organic Compounds (VOC's), Hydrocarbons. | Once a month:<br>24 hourly period                        |
| 2.     | Noise                                                     | Ambient Equivalent continuous Sound Pressure Levels (Leq) at day and Night time.                                                                  | Once every season                                        |
| 3.     | Stack emission from incinerator                           | Temperature, Particulate matter, CO, CO <sub>2</sub> , SO <sub>2</sub> , NO <sub>x</sub> , HCl and O <sub>2</sub>                                 | Continuous monitoring which is connected to PCB servers. |
|        |                                                           | Temperature, Particulate matter, NO <sub>x</sub> , HCl, Hg and its compounds                                                                      | Once in three months (sampling)                          |
|        |                                                           | Dioxins & Furans                                                                                                                                  | Once in a year (minimum)                                 |
| 4.     | Exhaust from DG Set                                       | PM <sub>10</sub> , PM <sub>2.5</sub> , NO <sub>x</sub> , SO <sub>2</sub> & CO                                                                     | Quarterly                                                |
| 5.     | Soil (within project site)                                | Physicochemical properties, Nutrients, Heavy metals                                                                                               | Yearly Once                                              |
| 6.     | Treated effluent                                          | pH, TSS, TDS, COD, NH <sub>3</sub> -N any other parameters as per the inlet characteristics for CETP.                                             | Once in a month                                          |
| 7.     | Hazardous Waste (Incineration Ash, Sludge from ETP etc.,) | Quality & Quantity monitoring                                                                                                                     | Periodically                                             |

| Sl. No | Monitoring Attribute                     | Parameter to be monitored                                                                                                                                                               | Sampling Frequency                         |
|--------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| 8.     | Groundwater quality                      | pH, Color, Turbidity, EC, TOC, TSS, TDS, BOD, COD, Heavy metals, Fe, CN, F, As and Mn, Cl, NO <sub>3</sub> , SO <sub>4</sub> , TKN, Total Alkalinity, Total Hardness – as per IS 10500. | Twice a year post monsoon and pre monsoon. |
| 9.     | Occupational Health screening            | Blood pressure, diabetes, pulse oximetry test, lung capacity test, vision test etc.,                                                                                                    | Once a year                                |
| 10.    | Calibration of online monitor, Autoclave | -                                                                                                                                                                                       | Once a year                                |
| 11.    | Greenbelt                                | No. of trees, species and condition of greenbelt                                                                                                                                        | Once a year                                |

## 6.5 Green Belt Development Plan

The green belt has been recommended as one of the major components of the EMP which will further enhance the environmental quality through

- Mitigation of air pollution problems.
- Attenuation of noise level.
- Maintaining the Bio-diversity of the area and improve aesthetics.

Therefore, development of green belt is nowadays imperative around industrial complexes. Adequate plantation programme in and around the project site have been planned.

### 6.5.1 Development of green belt

1. Plantation along the boundary / periphery and all over the project site for protection against particulate dispersion and noise dispersion. The peripheral greenbelt will vary in width to suit the plant design requirement.
2. Plantation along approach road and pathways for protection against noise and vehicular emissions.

The following general guidelines and measures will be adopted:

- The plantation of trees will be initiated with start of the construction stage so that substantial growth may be achieved when the project is completed. The greenbelt development programme will be drawn to conform to natural climatic conditions and adaptability of the species.

- Species involved in plantation / afforestation should include indigenous, fast growing and eco-friendly.
- Proper drainage system and proper plantation techniques should be adopted.
- Plantation should be properly maintained and protected by fencing from grazing and felling. The plantations would consist of a mixture of carefully chosen locally available species of trees, shrubs and herbs, preferably evergreen and resistant to pollution.

Native variety species varieties will be planted in the green belt of the site. Total Greenbelt Area of the site is 2155.44 Sq.m (33.85%).

## 6.6 Documentation and Reporting

- A methodology for monitoring (sampling and analysis) will be prepared and maintained in the form of separate Standard Operating Procedures (SOPs), as required.
- Monitoring records will be documented and, upon completion of each scheduled monitoring, the report will be forwarded to the relevant regulatory agencies (TNPCB).

## 6.7 Budget & Procurement Schedules

The budget for environmental management will be reviewed regularly, with necessary provisions made based on requirements. The budget will cover:

- Environmental Monitoring Program
- Operation & Maintenance of environmental technologies/equipment
- Laboratory works related to environmental management
- Emergency purchases of materials, equipment, tools, services, and PPEs (Personal Protective Equipment).

Monitoring Budget Plans during Construction and Operation Phases are detailed in **Table 6.3 & Table 6.4**, respectively.

**Table 6.3 – Monitoring Budget Plan during Construction Phase**

| S. No. | Item        | Parameters                                                               | Frequency | Cost per Sampling & Analysis (Rs.) | Cost per Month (Rs.) | Cost for 6 months (Rs.) |
|--------|-------------|--------------------------------------------------------------------------|-----------|------------------------------------|----------------------|-------------------------|
| 1      | Air Quality | PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> | Monthly   | 3500                               | 7000                 | 42,000                  |

| S. No.                          | Item                | Parameters                              | Frequency | Cost per Sampling & Analysis (Rs.) | Cost per Month (Rs.) | Cost for 6 months (Rs.) |
|---------------------------------|---------------------|-----------------------------------------|-----------|------------------------------------|----------------------|-------------------------|
| 2                               | Noise Level         | Equivalent Noise Level                  | Monthly   | 150                                | 600                  | 3,600                   |
| 3                               | Ground Water        | Physical, Chemical, and Bacteriological | Monthly   | 3500                               | 3500                 | 21,000                  |
| 4                               | Soil                | General Parameters                      | Monthly   | 3500                               | 3500                 | 21,000                  |
| 5                               | Occupational Health | First Aid                               | -         | 5000                               | -                    | 5000                    |
| <b>Total cost of monitoring</b> |                     |                                         |           |                                    |                      | <b>92,600</b>           |

**Table 6.4 – Monitoring Budget Plan during Operation Phase**

| S. No. | Particulars                         | Parameters                                                                                     | Frequency   | Samples per annum | Cost per sampling & Analysis (Rs.) | Cost per annum (Rs.) |
|--------|-------------------------------------|------------------------------------------------------------------------------------------------|-------------|-------------------|------------------------------------|----------------------|
| 1.     | Ambient Air quality at project site | PM <sub>10</sub> , PM <sub>2.5</sub> , NO <sub>x</sub> , SO <sub>2</sub> , CO, NH <sub>3</sub> | Monthly     | 48                | 3500                               | 1,68,000             |
| 2.     | Noise Monitoring                    | Equivalent Noise Level                                                                         | Monthly     | 48                | 150                                | 7,200                |
| 3.     | Stack monitoring from Incinerator   | Particulate matter, NO <sub>x</sub> , HCl, Hg and its compounds                                | Monthly     | 24                | 3250                               | 78,000               |
|        |                                     | Total Dioxins and Furans                                                                       | Once a year | 2                 | 5000                               | 10,000               |

| S. No. | Particulars                                     | Parameters                                                                                                                                                            | Frequency                                 | Samples per annum | Cost per sampling & Analysis (Rs.) | Cost per annum (Rs.) |
|--------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------|------------------------------------|----------------------|
| 4.     | DG stack monitoring                             | PM, NO <sub>x</sub> , So <sub>x</sub> , CO <sub>2</sub>                                                                                                               | Monthly                                   | 12                | 3250                               | 39,000               |
| 5.     | Effluent Analysis (Inlet & Outlet)              | pH, TSS, TDS, COD, NH <sub>3</sub> -N any other parameters as per the inlet & outlet characteristics for ETP.                                                         | Monthly                                   | 24                | 3500                               | 84,000               |
| 6.     | Groundwater quality                             | pH, Colour, Turbidity, EC, TOC, TSS, TDS, BOD, COD, Heavy metals, Fe, CN, F, As and Mn, Cl, NO <sub>3</sub> , SO <sub>4</sub> , TKN, Total Alkalinity, Total Hardness | Twice a year (post monsoon & pre monsoon) | 2                 | 3500                               | 7,000                |
| 7.     | Soil environment within project premises        | pH, EC, Colour, TDS, TOC, PAH, Permeability, Heavy metals, Hg, CN, F                                                                                                  | Once a year                               | 1                 | 3500                               | 3,500                |
| 8.     | Hazardous Waste (Incineration Ash & ETP sludge) | Quality & Quantity monitoring                                                                                                                                         | Once a year                               | 2                 | 5000                               | 10,000               |



| S. No.                          | Particulars                   | Parameters                | Frequency   | Samples per annum | Cost per sampling & Analysis (Rs.) | Cost per annum (Rs.) |
|---------------------------------|-------------------------------|---------------------------|-------------|-------------------|------------------------------------|----------------------|
| 9.                              | Occupational Health screening | Full body health check-up | Once a year | 50                | 1000                               | 50,000               |
| 10.                             | Calibration of online monitor | -                         | Once a year | 2                 | 10,000                             | 20,000               |
| <b>Total cost of monitoring</b> |                               |                           |             |                   |                                    | <b>4,76,700</b>      |

### 6.8 Post Project Monitoring Plan

The project involves a Common Bio-Medical Waste Treatment Facility with the following features

- Sheds built with G.I. sheets and M.S. pillars supported by cement blocks and impervious flooring.
- An impermeable ETP for bio-medical waste treatment.

In the event of facility closure:

- The facility can be dismantled, including the equipment, and transported elsewhere.
- No lasting impact on human health or the environment is expected post-closure, as the facility will no longer operate, eliminating sources of air pollution, soil contamination, and water quality degradation.

## **CHAPTER 7**

### **ADDITIONAL STUDIES**

#### **7.1 Risk Assessment – Introduction**

Risk Assessment is carried for identification, quantification and computation of undesirable events or hazards that can lead to a risk in an industry, factory or building etc. The risk is then analyzed and assessed for the estimation of its extent of damage, magnitude and the chances of harmful effects to the facility equipment's, personnel working in the facility and neighboring populations. It requires through detailed study of failure probability, credible accident scenario and vulnerable exposure to the hazard.

The proponent of the facility has to take measures to identify the hazards and assess the associated risks and to bring the risks to tolerable level.

##### **7.1.1 Objective of the study**

Risk involves the occurrence or potential occurrence of some accidents consisting of an event or sequence of events. The risk assessment study covers the following:

- Identification of the potential risk area.
- Assessing risk levels due to the operations of the facility.
- Identification of the risk mitigation measures to bring the potential risk within acceptable range.
- To suggest general safety improvement measures
- Preparation of Disaster Management Plan and Emergency Response Plan.
- To help in avoiding all accidents at site.
- To identify emergency scenarios and suggest mitigation measures.

##### **7.1.2 Identification of Probable risks**

The risks that may for building construction and during operational phase include:

- Safety hazards that lead to worker accidents.
- Injuries during operation of construction equipment and working at heights during construction.
- Manual lifting of Equipment.
- Structural design failure of building.
- Electrical Mishap - Fire hazard in the site and CBWTF building.
- Exposure to infectious microbes due to handling of BMWs.
- Operation of Incinerator, Autoclave, Shredder and treatment plants during operation phase.
- Natural disaster that may occur.

## **7.2 Assessment of risk level and mitigation of risk**

### **7.2.1 Safety hazards that lead to worker accidents**

Worker may undergo accidents such as falling down, injury due to materials handling and falling on them. The risk may be minimal to high depending the work carried out and height from which fall takes place etc. This risk can be minimised to great extent by following the safety standards as per HSA standards and BIS standards for construction safety.

To mitigate risk, the construction worker should be provided with personal safety equipment such as boots, helmet, gloves, mask, tie ropes etc. They should be trained regularly on safety measures.

During construction of buildings, regular personal safety measures can be adopted.

### **7.2.2 Injuries during operation of construction equipment**

In construction phase risk is probable during operation of equipment and machinery during excavation Work, scaffolding work, crane operations, hoisting, forklift operations, near ladders etc. These can be avoided by ensuring that Excavation deeper than 2 meters is guarded by rails or barriers. Vehicles working, too close to the side of the trench or rubble piled on the sides may cause collapse and therefore at most care should be taken with regular supervision. The ropes, hooks, chains, slings, etc. used in the lifting operations, must be inspected regularly for their worn out. When mobile cranes are used, care must be taken to prevent overturning of cranes and ropes.

Wearing appropriate personal protective equipment is always important. Workers must be instructed to wear gloves, helmets and other personal protective equipment as appropriate, when working with hoists and cables and during welding.

### **7.2.3 Fire hazard in the site and building**

Fires may be possible due to electrical line faults and damages. This is can be prevented by careful observation and alertness. If the workers find a fault or malfunctioning piece of equipment, they should take it out of operation, and make the necessary arrangements to have the equipment repaired. Misusing of electrical equipment may lead to an accident. The workers should also make sure that the work area is safe and free from all electrical hazards. Employers must provide necessary personal protective equipment in particular rubber gloves and shoes.

During operation, fire safety measures are planned for placing at suitable locations and used. Fire extinguishers and sand buckets are placed in every floor. Fire hydrant, Water hydrant and fire water sump are planned and checked regularly its operation and maintenance.

#### **7.2.4 Structural design failure of building**

Incompetent structural design of the building, such as a poor foundation and inadequate column & beam design, can lead to the failure of the building due to the installation and operation of equipment inside the facility.

This risk is generally prevented by designing the building as per prevalent National Building Codes (NBC) of India.

#### **7.2.5 Operation of Common Biomedical Waste Treatment Facility**

During operation the major risk involved in Common Biomedical Waste Treatment Facility is handling of biomedical waste from collection point to the disposal. The other risks involved in the CBWTF are incineration of BMW, Autoclave, shredding of recyclable waste, Effluent Treatment Plant (ETP) for industrial effluents generated in the facility, BMW carrying vehicle wash water treatment. Workers handling and disposing biomedical waste are at potential risk of exposure to infection from contaminated materials like cotton, bandages, sharps, air borne microbes and pathogens, leak in containers transporting the waste, or spills of waste materials, sharps, needles contaminated with blood of the patient, loading of the wastes to incinerator etc. are the potential risks to the work men in the facility. The mitigation or safety measures to be considered to reduce the risk of exposure to infection by are as follows

##### **1. Safety measures for handling of biomedical waste:**

- Biomedical Waste are collected from the authorised HCFs which follows the procedure of collection and segregation of biomedical waste in the stipulated colour coded bags according to the Biomedical Management Rules, 2016.
- The BMWs are collected and stored in a separate storage area in a secured manner. It must be disinfected with sodium hypochlorite solution.
- BMW is transported to the facility in the designated vehicles of the facility following the protocol for secured transportation. The vehicle must be a covered one and it should be fitted with GPS to track the movement of the vehicle.
- After the unloading of the BMW from the vehicle, the vehicle should be washed and sanitised regularly.
- Personnel handling BMW are provided with personal protective equipment with cut proof gloves, gowns, masks, safety glasses and safety boots to protect them from physical and infectious risks.
- Only a trained and qualified personnel to be allowed for handling of biomedical waste.
- The workers in the facility before leaving the premises should have a shower and sanitize their

hands.

- The used PPEs are collected in the closed, leak proof bags for suitable disposal and decontamination.
- To provide first aid room in case of exposure to biohazards.
- Regular training to the staff on safety measures.
- Ensure no stray animal enters the CBWTF premises. To avoid the entry of animals, facility should have cattle traps at the entrance of the facility.

## **2. Safety measures while using Incinerators:**

- Personnel operating incinerators to be provided with proper PPEs to protect them from infectious microbes, Eye protection goggles and face mask when loading and opening the door or visually checking the incinerator to protect against glass shards from exploding ampoules and bottles.
- Heavy duty gloves and aprons to be wear during opening and operation of incinerator.
- Incineration ash to be removed using only by mechanical equipment's regularly at the interval.
- To carry out visual inspections of the facility for corrosion, leaks, mortar and seal failures, etc. on a periodic basis.
- To maintain records of maintenance activities to prevent premature failure, increase life and track performance of incinerator.
- Only a trained and qualified operator to operate or supervise the incineration process.
- Start-up and shutdown procedures to operate incinerator to be followed.

## **3. Safety measures during operation & maintenance of Autoclave**

- Personnel operating the autoclave should wear personal protective equipment (PPE), such as a lab coat and heat-resistant gloves, to prevent burns from heat and steam.
- Inspect the door gasket (seal) for any cracks or bulges.
- Clean the drain screen of debris if necessary.
- The autoclave should be turned on, and time should be allowed for the jacket to reach the sufficient temperature and pressure.
- Flammable, combustible, reactive, corrosive, toxic, or radioactive materials should not be autoclaved.
- Items should be placed in an autoclave tub on a rack. Never place items directly on the autoclave bottom or floor.

#### 4. Safety measures during operation & maintenance of ETP:

- Personnel working in ETP should wear personal protective equipment and chemical-resistant clothing to avoid exposure of the skin or eyes to corrosive and/or polluted solids, liquids, gases, or vapours.
- ETP operator should undergo routine health checking to reveal early symptoms of chronic effects or allergies.
- To obey all safety-instructions regarding the storage, transport, handling or pouring of chemicals.
- Not to smoke, eat or drink in areas where chemical or biological contamination may be expected.

#### 7.2.6 Natural disaster that may occur

Natural disasters such as cyclones, floods, tsunami, earthquakes etc. may happen in any site. Based on the severity the risk and damage may be high or low. Emergency preparedness during such times is important for safety and special team to be formed and trained to handle any natural disaster.

#### 7.2.7 Hazards on Solid waste

No hazardous substances shall be placed unauthorized. Hazardous materials must be collected, stored, and regularly disposed to nearby TSDF. The unit shall be equipped with safety equipment for storage, depending on the nature of the hazard.

ETP sludge and incineration ash should be collected separately and placed in closed containers. These wastes must be disposed of at the TSDF and the recyclable wastes are sent to authorized recyclers. Waste sharps are stored in the encapsulation pit inside the facility.

#### 7.2.8 Air pollution Hazard

The unit shall regularly monitor the air in and around the unit as per the conditions laid down in Pollution Control Board consent order. The workers to be provided with mask to avoid dust pollution and regular health check to be conducted as per the prevailing rules.

### 7.3 Accident Reporting

Any accident occur during the handling of Bio Medical Waste in the healthcare facility is having potential to either harm the environment or safety of the human health must be recorded. As per the Bio Medical Waste Management Rules, 2016, (Source: CPCB Guidelines for Management of Healthcare Waste as per Bio-Medical Waste Management Rules, 2016) the accidents are classified into-

#### 1. Major Accidents

Major accidents include but not limited to following

- Toppling of the truck carrying bio-medical waste
- Accidental release of bio-medical waste in any water body.

It is mandatory under BMW Rules 2016, for health care facilities to report each/any major accidents, to the respective State Pollution Control Board/Pollution Control Committee, occurred during the handling of BMW along with the records of remedial actions taken including corrective and preventive actions.

The Accident Report is needed to be forwarded in written to the respective SPCB within 24 hours of accident.

## **2. Minor Accidents**

Minor accidents include but not limited to following

- Needle stick injuries,
- Splash exposure or
- Spillage of mercury / chemicals etc.,

Such minor accidents need not to be immediately reported to the State Pollution Control Board but is required to be recorded by the facility and appropriate remedial actions must be taken by health care facility.

Facility also needs to submit consolidated report on accidents both major or minor, along with the number of persons affected, remedial actions taken and number of fatalities, along with the annual report (for the preceding calendar year) to be submitted to SPCB.

### **7.4 Training of healthcare Workers**

As per Bio Medical Waste Management Rules, 2016 it is mandatory for all the employee of the healthcare facility to be trained on handling of biomedical waste management and handling. Employees handling and transporting biomedical waste will be trained to follow the SOP which will be updated from time to time based on safety management and regulations.

### **7.5 Fire Safety**

As per Revised Guidelines for Common Biomedical Waste Disposal and Treatment Facilities, 2016, Fire safety equipment such as sand buckets and fire extinguishers should be provided at all the salient points of the CBWTF including at the diesel storage areas, diesel tanks connected with the incinerator etc. Fire alarm also should be provided within the CBWTF to prompt the workers in the event of any fire hazard. Workers should also be trained in First Aid administration.

## **7.6 Occupational Safety**

Occupational safety is the responsibility of the CBWTF facility to ensure the occupational health and safety of the workers involved in handling of biomedical waste from collection of waste from HCEs to disposal of solid and hazardous waste. As per Bio Medical Waste Management Rules, 2016 occupational safety of the workers working in CBWTF has to be ensured in following methods

- Providing appropriate Personal Protective Equipments to the workers handling biomedical waste. Use of PPE while handling biomedical waste must be encouraged and monitored regularly to ensure occupational safety of workers.
- Personal Protective Equipments (PPE) includes
  - Heavy Duty Gloves (Workman's Gloves)
  - Gum Boots for persons collecting biomedical waste
  - Safety shoes for the workers in the CBWTF
  - Face mask
  - Head Cap
  - Splash Proof Gowns or aprons etc.
  - Disposal gloves for waste handlers
- Conducting health check-up at the time of induction and at least once in a year for all its healthcare workers and others involved in handling of bio-medical waste and maintain the records for the same.
- Ensuring that all the staff involved in handling of BMW is immunized at least against the Hepatitis B and Tetanus.
- Taking remedial steps in accordance to any accident occurred, leading to any harm to the employee, during the handling of Bio medical waste.

### **7.6.1 Employee Health Check Up**

As per Bio Medical Waste Management Rules, 2016, every facility must ensure that a comprehensive health check-up of each employee and other workers involved in BMW handling is carried out at the time of induction and also as a mandatory procedure to be followed for each year for every employee.

Comprehensive Health Check-up includes following but not limited to:

1. Present Complaints (If any), with duration
2. Vaccination History (especially with respect to Hepatitis B and Tetanus Thyroid)
3. Past Medical History
4. Past Surgical History



5. General Physical Examination
6. Dental Examination
7. Systemic Examination including Cardiovascular system, Respiratory system etc.,
8. Lab Investigations.
9. Radiological Investigations (if needed)
10. Inference with Diagnosis

Health Check-up records of all the employees are needed to be maintained in the personal record of each employee for proving compliance. The formats prescribed in the guidelines to be followed.

#### **7.6.2 Immunization**

All the staff involved in handling of Bio Medical Waste in the CBWTF must be immunized against the communicable diseases especially against COVID, Hepatitis B and Tetanus. Evaluation of immunization status of the staff must be included in the annual health checkup. Hospital needs to maintain the immunization records of all the staff with dates of immunization and due date of first dose, second dose and booster dose.

#### **7.7 Disaster Management Plan**

As per the Disaster Management Act -"Disaster" means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or manmade causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area."

Disaster impacts may include loss of life, injuries, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation

Thus, a disaster may have the following main features: Unpredictability, Unfamiliarity, Speed, Urgency, Uncertainty and Threat. Disaster causes massive loss of life and property, disrupts normal life, requires external aid and affects a large number of people.

A common principle of disaster management involves recognition of four basic elements of disaster cycles. These includes

- Mitigation,
- Preparedness
- Response
- Recovery.

Tamil Nadu has witnessed havoc caused by cyclones and storm surge in the coastal regions, earthquakes, monsoon floods, landslides, and Tsunami. Increase in urban population coupled with the construction of man-made structures often poorly built and maintained, subject to greater levels of risk to life and property in the event of earthquakes, flood and other natural hazards.

### 7.7.1 Objectives of DMP

To describe the emergency preparedness, the resource availability and response actions applicable to deal with various types of emergencies that could occur in shortest time possible causing the emergency.

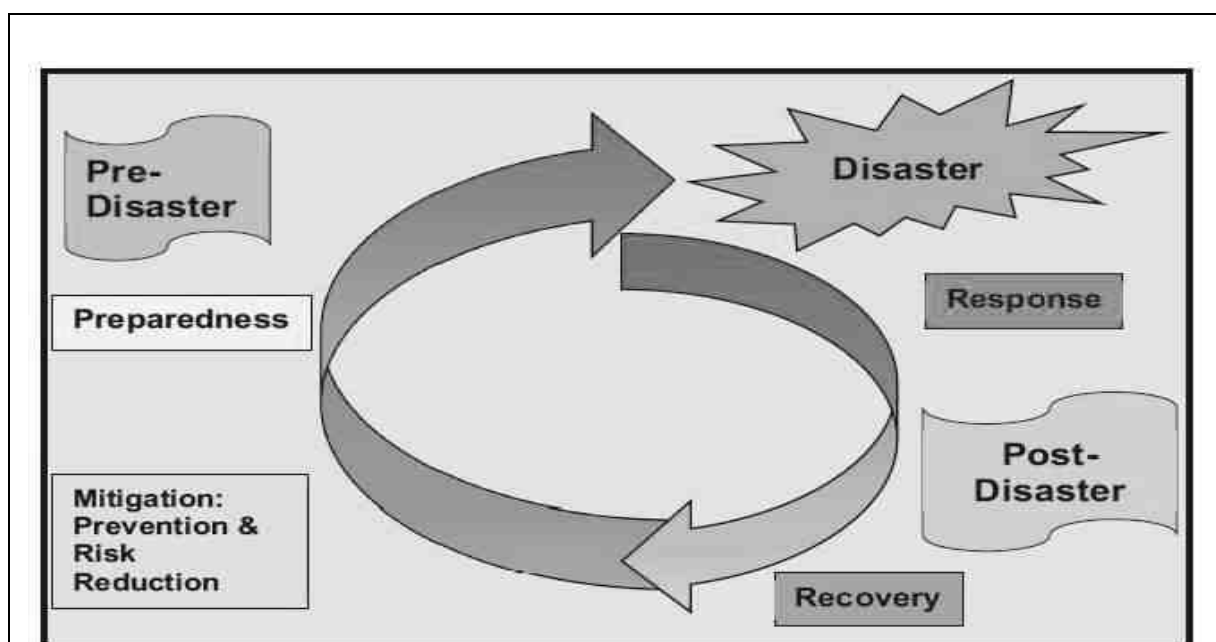


Figure 7.1 – Disaster Management cycle

Source: NDMP 2019

### 7.7.2 Types of Disaster Management plan

1. Natural Disaster Management Plan
2. Man Made Disaster Management Plan

#### 7.7.2.1 Natural Disaster and Management Plan

Natural disaster may be broadly classified as

1. **Geophysical:** Geological process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. Hydro-meteorological factors are important contributors to some of these processes.

2. **Hydrological:** Events caused by deviations in the normal water cycle and/or overflow of bodies of water caused by wind set-up
3. **Meteorological:** Events caused by short-lived/small to meso-scale atmospheric processes (in the spectrum from minutes to days)
4. **Climatological:** Events caused by long-lived meso- to macro-scale processes (in the spectrum from intra-seasonal to multi\_-decadal climate variability)
5. **Biological:** Process or phenomenon of organic origin or conveyed by biological vectors, including exposure to pathogenic micro-organisms, toxins and bioactive substances that may cause loss of life, injury, illness or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

#### **7.7.2.2 Identified Natural Hazards**

The study area is not located in a high-risk zone for natural disasters, but the following possibilities have been considered:

- Seismic Activity – Earth Quake (Zone III - Moderate Risk Zone)
- Flooding during Monsoon Season
- Cyclones and Heavy Rainfall (Tamil Nadu Coastal Zone)
- Drought Conditions

##### **1. Earthquake**

- It can happen at any time of the year. It can damage the property as well as life. They can inflict tremendous damage within seconds and without warning at any time of day, on any day of the year. Ground shaking and surface faulting are often just the forerunners of secondary damage, such as fires, floods (caused by dam bursts), landslides, quick soil and tsunami (seismic sea waves).
- The whole area falls under zone II (low Damage Risk Zone).
- Construction agency would use appropriate structural codes for construction of this building.

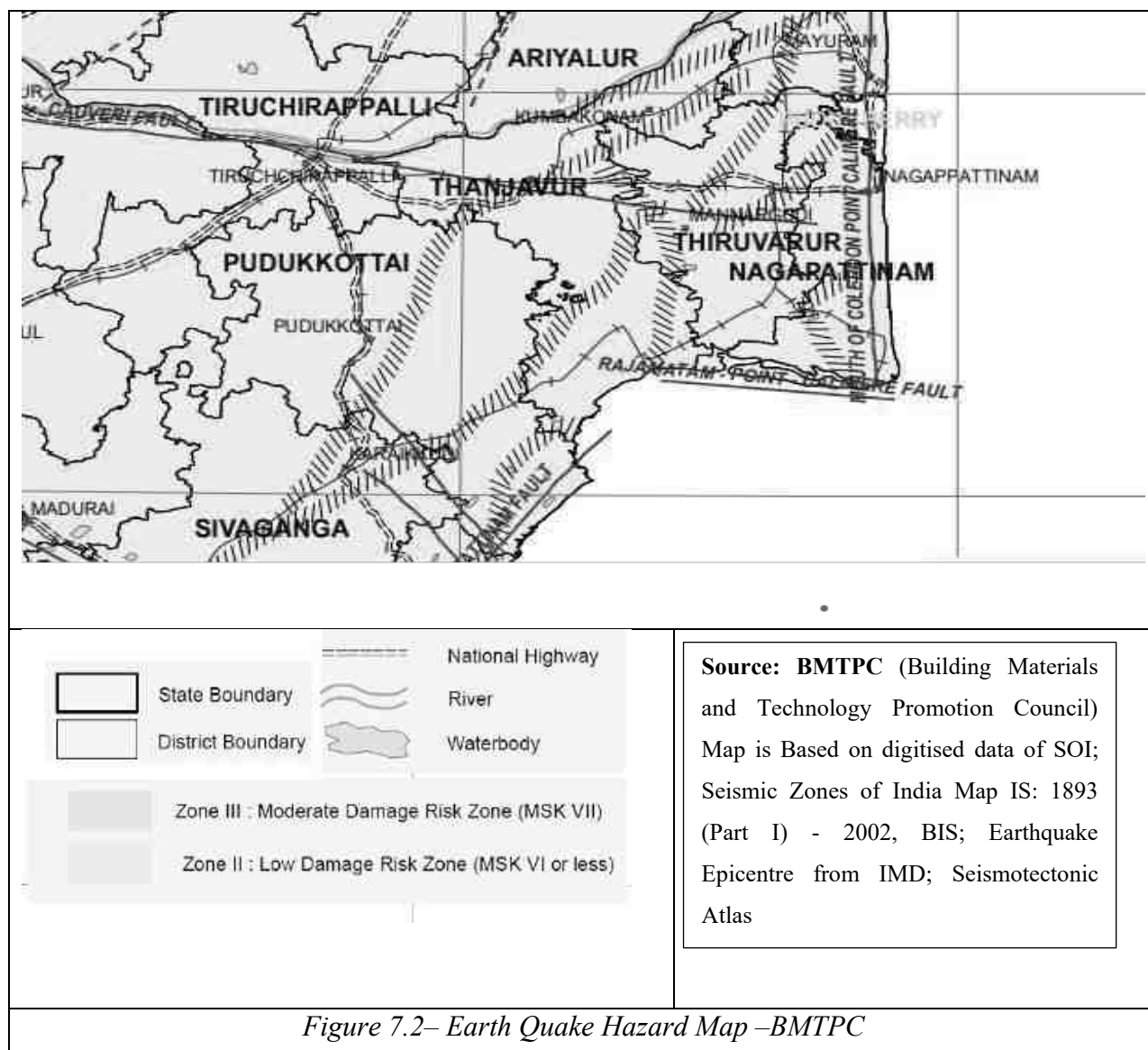


Figure 7.2– Earth Quake Hazard Map –BMTPC

## 2. Flood

- It is natural made disaster. If it is not dealt professionally, it can cause health hazard to the resident, and it can also affect the structural design on the building.
- Proper drainage strategy has been already adopted for the proposed building.
- The storm water drainage will be checked and clean regularly by the society.
- Special effort would be taken prior to monsoon period for cleaning the drainage and nearby sewer lines. If needed, developer would assist in this activity.
- As per BMTPC flood hazard map, the probable maximum surge height of flood is 3.5 meter and the project site does not liable to floods.

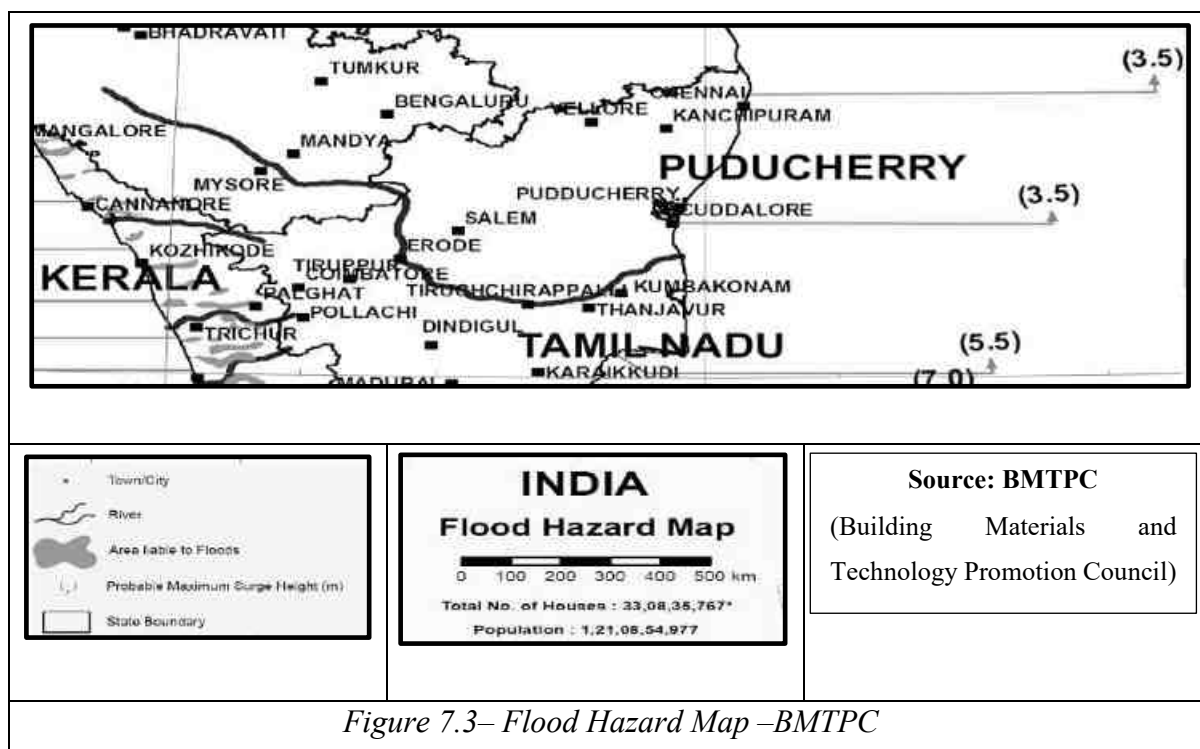


Figure 7.3– Flood Hazard Map –BMTPC

### 3. Cyclone

Our proposed project site for the CBWTF lies at a distance of about 85 km aerial distance from the coast line and hence the risk of storms is moderate.

Due to the location there is no risk of tsunami to the proposed project.

### 4. Preventive Measures

#### • Cyclone & Flood Management:

- Site designed with proper **stormwater drainage system**.
- Waste storage & critical infrastructure elevated above known flood levels.
- Greenbelt development to act as a wind buffer.
- Adequate stock of fuel, food, and medical supplies during cyclonic alerts.
- Coordination with TNPCB, PWD & District Disaster Management Authorities.

#### • Seismic Preparedness:

- All structures designed as per Seismic Zone III guidelines (IS 1893).
- Emergency exit routes clearly marked.

#### • Drought Management:

- Minimal dependency on groundwater; water requirement to be met by Local body supply.
- Rainwater harvesting pits within the premises.

### **7.7.2.3 Man-Made Disaster Management Plan**

The National Policy on Disaster Management NPDM 2009 notes that rise in population, rapid urbanization and industrialization, development within high-risk zones, environmental degradation, and climate change aggravates the vulnerabilities to various kinds of disasters. Due to inadequate disaster preparedness, communities, and animals are at increased risk from many kinds of human-induced hazards arising from accidents (industrial, road, air, rail, on river or sea, building collapse, fires, mine flooding, urban flooding, oil spills, etc.). Hazards due to CBRN threats and events rank very high among the causes that are human induced acts. Terrorist activities and secondary incidences arising from intentional or non-intentional activities also add to these risks and calls for adequate preparedness and planning.

### **7.7.2.4 Identified Man-Made Hazards**

- Probable Fire or Explosion in incineration unit, waste storage area.
- Occupational exposure to infectious waste for workers handling Biomedical Waste.
- Air emission beyond permissible limits due to probable Air Pollution Control Devices technical failure.
- Chemical spills such as Fuel, Disinfectants, Oil, etc. spillage.
- Accidents during transportation of Bio-Medical Waste.

### **7.7.2.5 Preventive Measures**

- Installation of fire hydrant system, fire extinguishers, smoke detectors.
- Designated PPE protocols and training to employees.
- Installation of Continuous Emission Monitoring System (CEMS).
- Safe transportation of waste with GPS tracking of vehicles as per BMW Rules, 2016 and CPCB revised guidelines of CBWTF, 2016.
- Periodic inspection and preventive maintenance of equipment.

## **7.8 Emergency Response Plan**

A Common Bio-Medical Waste Treatment Facility (CBWTF) handles hazardous medical waste, necessitating a well-defined emergency response plan to safeguard human health and the environment. This document details the On-site and Off-site Emergency Plan to manage potential risks effectively.

### **7.8.1 Objectives**

- Ensure the safety of employees, nearby communities, and the environment.
- Mitigate risks associated with fire, chemical leaks, equipment failures, and natural disasters.
- Clearly define roles and responsibilities during emergencies.
- Establish coordination with external emergency response agencies.

## **7.8.2 Types of Emergency Response Plan**

### **7.8.2.1 On-Site Emergency Plan**

To control and mitigate emergencies within the plant premises, minimize loss to life and property, and restore normal operations.

#### **7.8.2.2 Risk Identification**

1. Fire or explosions due to incineration and chemical storage.
2. Accidental chemical spills and exposure to hazardous substances.
3. Equipment malfunctions leading to toxic gas release.
4. Electrical failures causing operational disruptions.
5. Natural calamities such as floods or earthquakes.

#### **7.8.2.3 Key Components of ERP**

##### **1. Emergency Organization Structure**

- Site Controller: Plant Manager
- Incident Controller: EHS Manager and Site Supervisor
- EHS Team: Includes firefighting, first aid, and communication roles.

##### **2. Emergency Facilities**

- Adequate fire-fighting equipment's such as fire extinguishers, first aid kits, emergency sirens and safety signage will be installed at strategic locations.
- Emergency contact numbers and guidelines will be displayed prominently for quick reference during any untoward incident.

##### **3. Evacuation Plan**

- Clearly defined escape routes and designated assembly points have been identified and will be prominently displayed across the facility.
- Periodic evacuation mock drills will be conducted for all workers of CBWTF to ensure familiarity with emergency procedures and enhance preparedness.

##### **4. Medical Facilities**

- A well-equipped First Aid Room will be established within the admin room premises to address any immediate medical needs.
- Formal tie-ups will be arranged with nearby hospitals to ensure timely medical assistance in case of emergencies.

##### **5. Communication System**

- An internal communication system (Public Address System) will be installed to facilitate effective communication during emergencies.
- External communication channels will be maintained with the District Administration, Tamil Nadu Pollution Control Board (TNPCB), and PWD authorities to ensure timely coordination and support during any emergency situation.

#### **7.8.2.4 Off-Site Emergency Plan**

To minimize the impact of an emergency that could extend beyond the facility and affect surrounding population and environment.

##### **Key Components**

#### **1. Coordination with District Authorities**

To ensure an effective response during emergencies, the facility will coordinate with relevant district authorities such as District Collector, Revenue Department: Police Department, Fire Services Department, Tamil Nadu Pollution Control Board (TNPCB) etc

#### **2. Public Warning System**

A well-defined warning system is critical for alerting the community in case of an emergency:

- **Emergency Sirens:** Installed within the facility and in nearby villages.
- **Awareness Campaigns:** Regular sessions in nearby villages to educate residents on emergency response actions.

#### **3. Transportation Emergency Management**

Proper handling and transport of bio-medical waste is crucial to prevent accidents

- **Training of Drivers and Handlers:** Regular training on handling hazardous materials and emergency procedures.
- **Emergency Contact Details on Vehicles:** Each vehicle must display emergency contact numbers for quick response.
- **Coordination with Police and Local Administration:** Ensures prompt action in case of accidents during transportation.

#### **4. Medical Support**

- **Informing nearby Hospitals and PHCs:** Establishing a communication protocol with hospitals and Primary Health Centers (PHCs) for mass casualty management.
- **Equipping the Facility with First Aid Centers:** Ensuring availability of medical kits and trained personnel within the premises.

#### **5. Environmental Monitoring**



- **Immediate Monitoring of Air, Water, and Soil:** In case of a major incident, environmental quality assessments will be conducted to measure contamination levels and take remedial action.

## 6. Mock Drills & Training

- **Quarterly On-Site Mock Drills:** Conducted to ensure staff preparedness.
- **Annual Off-Site Mock Drill:** Organized in coordination with the District Disaster Management Authority.
- **Regular Training Programs:** For employees on disaster management, fire-fighting techniques, and hazardous waste handling.
- **Public Awareness Programs:** Conducted in nearby villages to educate the community about emergency response measures.

**Table 7.1 -Types & Frequency of mock drills**

| S. No. | Type of Drill/Training      | Frequency                               |
|--------|-----------------------------|-----------------------------------------|
| 1.     | On-Site Emergency Drill     | Once every 3 months                     |
| 2.     | Off-Site Emergency Drill    | Once every 12 months (Annual)           |
| 3.     | Firefighting & PPE Training | Once every 6 months                     |
| 4.     | First Aid Training          | Once every 6 months                     |
| 5.     | Public Awareness Program    | Once every year in surrounding villages |

**Table 7.2- Summary of Emergency Preparedness Measures**

| Disaster Type                                  | Preventive Measures                                                     | Response Measures                                                              |
|------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Natural Disasters (Flood, Cyclone, Earthquake) | Elevated structures, storm water drainage, seismic-resistant design     | Emergency supplies, safe shelter identification, coordination with authorities |
| Man-Made Disasters (Fire, Spills, Accidents)   | Fire safety equipment, PPE, preventive maintenance, waste handling SOPs | Emergency Response Team, Firefighting, Medical aid, Evacuation plan            |
| On-Site Emergency                              | Defined emergency roles, alarm system, evacuation drills                | Incident control, employee evacuation, medical aid                             |
| Off-Site Emergency                             | Awareness to nearby population, liaison with District Administration    | Public warning system, external medical support, environmental monitoring      |

## 7.9 Review of DMP

Evaluating the effectiveness of plans involves a combination of training events, exercises etc. to determine whether the goals, objectives, decisions, actions and timing outlined in the plan will result in an effective response. Indicative guidelines for monitoring and evaluation of the plan are as given below:

- Check the efficacy of the plan after any major disaster/emergency in the district and see what did work and what did not work and make amendments to the plan accordingly.
- As per Sub Section (4) of Section 31 of the Disaster Management Act, 2005, the plan would be reviewed and updated annually and the year in which the plan has been reviewed would be clearly mentioned in shape of header in each page of the plan.
- Update coordinates of responsible personnel and their roles / responsibility every six months or whenever a change happens. Names and contact details of the officers/officials who are the nodal officers or the in-charge of resources to be updated on regular basis.
- Plan should be circulated to all stakeholder departments, agencies and organizations so that they know their role and responsibilities and also prepare their own plans
- Regular Drills / exercises should be conducted to test the efficacy of the plan and check the level of preparedness of various departments and other stakeholders. It would ensure that all parties understand their roles and responsibilities clearly and understand the population size and needs of vulnerable groups.
- Regular training and orientation of the officers/officials responsible to implement the plan should be done so that it becomes useful document to the district administration.

## 7.10 Emergency Action Committee

To ensure coordinated action, an Emergency Action Committee should be constituted. Emergency Action Committee will prepare the evacuation plan and procedures for implementation based on local needs and facilities available. The plan should include:

- Demarcation of the areas to be evacuated with priorities,
- Safe area and shelters,
- Security of property left behind in the evacuated areas,
- Functions and responsibilities of various members, and
- Setting up of joint control action.

All personnel involved in the Emergency Action Plan will be thoroughly familiar with all the elements of the project area and their responsibilities. The staff at the site will be trained for problem detection, evaluation and emergency remedial measures. Individual responsibility to handle the segments in

emergency plan must be allotted. Success of an emergency plan depends on public participation, their response to warning notifications and timely action. Public has to be educated on the hazards and key role in disaster mitigation by helping in the rescue operations. It is essential to communicate by whom and how a declared emergency will be terminated. There will be proper notification to the public on de-alert signals regarding termination of the emergency. The notification will be clear so that the evacuees know precisely what to do when re-entering or approaching the affected areas.

## **CHAPTER 8**

### **PROJECT BENEFITS**

#### **8.1 Introduction**

After the COVID-19 pandemic, the amount of biomedical waste generated has also been increasing with the increase in number of people tested and affected all over the world.

Due to increase in biomedical waste generation, there occurs disposal of biomedical waste as dumped alongside the public places, roads. The trash dumped in the public place contains used PPE kits, aprons used in hospitals, gloves, medicine boxes and syringes as noticed in the Newspaper article “Tamil Nadu: Biomed waste dumped in open again; officials apathy blamed” dated 18th January 2021.

As the generation of the biomedical waste is increasing and need to be treated, there is necessity for establishment of a greater number of Common Biomedical Waste Treatment and Disposal facilities to monitor the proper management of Biomedical waste.

#### **8.2 Environmental Benefits**

- Organized methods for Bio-medical Waste Treatment i.e. Incineration, autoclaving & shredding will be adopted. A complete bio medical waste disposal solution using the best technology methods will be provided.
- Minimizes pollution load on environment with an additional benefit of green and clean surroundings.
- Management of wastes is relatively easier and economically viable at a common facility
- Reduced environmental liability due to captive storage of biomedical waste in the premises of HCF.
- Prevention of natural resource contamination

#### **8.3 Financial Benefits**

- The project will create direct and indirect employment for local people for which skilled and unskilled manpower will be needed. About 50 people will be deployed temporarily during construction/installation of the project and about 25 people (as regular employee) will get employment during the operational stage of the project.
- Common Biomedical waste treatment & disposal facility is economic in both capital & operating costs over Individual facility.

#### **8.4 Social Benefits**

- M/s. Biotech Engineering Industries Biomedical Waste Management will provide services to healthcare units.

- The Centralized system of waste management is the best method in terms of cost reduction and minimizes legal and ethical hassles of health care staff authority.
- Installation of individual treatment facilities by small healthcare establishments requires comparatively high capital investment. In addition, it requires separate manpower and Infrastructure development for the proper operations and maintenance of treatment systems.
- Green belt development.
- Unauthorized dumping will be reduced or eliminated.
- The general infrastructures in the region and roads will be developed with the establishment of proposed project. Its rate of returns to the society will be higher. They provide general incentives for growth of the region.
- Infrastructural development obviously, helps to grow the transport modes and means in the region.
- Families settled around the Pisanathur village will have positive response of growing transport facilities and various commercial establishments in the villages due to the project.

### **8.5 Other Benefits**

- The facility will also Provide training opportunity on the plant operations, treatment methods, safety standards, etc., for students, doctors, medical professionals, and local communities to enhance their knowledge and awareness of medical waste disposal and treatment.
- The facility will also provide opportunity for implant training to engineering students of various branches.
- The facility will also Conduct health camps for local communities, offering medical check-ups.

## CHAPTER 9

### **COST BENEFIT ANALYSIS**

#### **9.1 Overview**

The Environmental Cost-Benefit Analysis evaluates the relative merits and demerits of the proposed Common Biomedical Waste Treatment Facility (CBWTF) project. This Analysis highlights the probable benefits with respect to the environmental financial and socioeconomic point impacts, mitigation measures and benefits

##### **9.1.1 Project Scope**

The project encompasses the handling, transportation, storage, treatment, and disposal of biomedical waste generated Pudukkottai, Tiruchirappalli, Ariyalur, Perambalur, Nagapattinam, Thiruvavur, Thanjavur, and Sivagangai districts in the radius of 75 Km from the proposed CBWTF. The initial project budget is ₹2.83 crores.

##### **9.1.2 Process activities of proposed CBWTF**

1. **Incineration:** The incinerable biomedical waste, adhering to Bio-medical Waste Management Rules, 2016 will be processed as per norms.
2. **Autoclaving and Shredding:** Recyclable waste such as glassware, needles and plastic waste are sterilized in autoclave and plastic wastes are shredded and the wastes are sent to authorized recyclers.
3. **Effluent Treatment Plant:** ETP treats effluent from process APCD of incineration, autoclaving and also from vehicle and floor washing. The treated water is reused for industrial process and other green belt irrigation purposes.
4. **Ash and Sludge Management:** Disposal of ash from incineration and sludge from Effluent Treatment Plant to authorized Treatment Storage and Disposal Facilities (TSDF).
5. **Greenbelt Development:** About 33% of the project site will be developed as a greenbelt to enhance ecology and also to improve the air quality.
6. **Occupational Health and Safety:** OHS measures will be prioritized during both construction and operation phases.
7. **Corporate Environmental Responsibility:** Funds will be allocated as per norms to support social and environmental development activities in surrounding communities.

#### **9.2 Environmental Cost Benefit Analysis (ECBA) For Proposed CBWTF**

Environmental Cost Benefit Analysis (ECBA) For Proposed Common Bio-Medical Waste Treatment Facility (CBWTF), Pisanathur Village, Gandharvakottai Taluk, Pudukkottai District,

**Project Cost:** ₹ 2.83 Crores and **Plot Area:** 1.55 Acres

### 9.2.1 Project Overview:

The proposed CBWTF project aims to provide scientific, safe, and environmentally sound treatment and disposal of bio-medical waste generated from healthcare units in the surrounding four districts. The project will contribute to public health protection, pollution prevention, and sustainable waste management.

#### A. Capital Cost Details

**Table 9.1-Capital Cost Details**

| Component                                                  | Cost (₹ Lakhs) |
|------------------------------------------------------------|----------------|
| Land Cost (1.55 acres)                                     | 16             |
| Building & Infrastructure                                  | 20             |
| Plant & Machinery (Incinerator, Autoclave, Shredder, etc.) | 175            |
| Utilities (Power, Water, DG, etc.)                         |                |
| Effluent Treatment Plant, Air pollution Control            | 40             |
| Environmental Compliance & Safety                          | 10             |
| Contingencies & Miscellaneous                              | 10             |
| Other Assets                                               | 12             |
| <b>Total Capital Cost</b>                                  | <b>283</b>     |

#### B. Operating Cost (Annual)

**Table 9.2-Operating Cost Details**

| Particulars                                            | Annual Cost (₹ Lakhs) |
|--------------------------------------------------------|-----------------------|
| Manpower (30 persons)                                  | 90                    |
| Power & Utilities                                      | 15                    |
| Fuel (Incinerator, DG Set)                             | 10                    |
| Repairs & Maintenance                                  | 20                    |
| Administrative & Miscellaneous                         | 10                    |
| Environmental Compliance (Air, Water monitoring, etc.) | 7                     |
| <b>Total Annual operating Cost</b>                     | <b>152</b>            |

#### C.Revenue Estimation

- Biomedical Waste Collection & Treatment Charges: estimated ₹30,000 per tonne (subject to regional variation)
- Sale of recyclables: Plastics & Metals after disinfection

- By-product recovery: If applicable

**Table 9.3-Revenue Estimation**

| Details                               | Estimate                 |
|---------------------------------------|--------------------------|
| Daily Waste Handling                  | Initially 3.5 TPD        |
| Annual Waste (365 days)               | 1277.5 Tonnes            |
| Treatment Charges (Avg ₹20,000/Tonne) | ₹ 2.555 Crores per annum |
| Other Recyclable Profit               | ₹ 8 Lakhs per annum      |

### 9.2.2 Cost Benefit Analysis Summary.

**Table 9.4-Cost Benefit Analysis**

| Particulars                           | ₹ Lakhs   |
|---------------------------------------|-----------|
| Total Project Cost                    | 283.00    |
| Annual Operational & Maintenance Cost | 152.00    |
| Estimated Annual Revenue              | 263.50    |
| Estimated Payback Period              | 3-5 years |

### 9.3 Environmental and Social Benefits

The Environmental Cost Benefit Analysis indicates that the proposed CBWTF project at Pisanathur Village, Pudukkottai District is of immense benefit to the society in terms of environmental and health aspects. The proposed project is also economically viable to the proponent and increases the employment opportunities in the region. The long-term environmental and public health benefits significantly outweigh the project cost and operational expenditure and the short-term temporary impact caused during construction phase.

The facility will contribute positively to sustainable waste management, environmental protection, and socio-economic development of the region.

- **Scientific Handling of Bio-Medical Waste:** The facility will treat approximately 10 tonnes per day (TPD) of biomedical waste using scientific and standardized methods.
- **Prevention of Environmental Pollution:** Emissions and effluent discharges will be strictly controlled to minimize environmental pollution.
- **Public Health & Hygiene Improvement:** Proper waste treatment reduces the risk of infections and contamination, contributing to better public health and hygiene.
- **Employment Generation:** The project will create employment for around 30 individuals directly and 75 indirectly, fostering local job growth.



- **Compliance with Environmental Laws:** Operations will be in full compliance with CPCB, TNPCB, and MoEF & CC guidelines and regulations.
- **Revenue Generation for Local Economy:** The project supports local economic development through engagement with local services, labour, and suppliers.
- **Greenbelt Development:** Around 33% of the total project area will be allocated for greenbelt development to enhance ecological balance. Greenbelt also acts as carbon sink thus reducing the pollution in the surrounding areas.

A greenbelt development is planned over an area of 0.211544 hectares, within which 100 trees are proposed to be planted. Based on an average carbon sequestration rate of 21 kg of CO<sub>2</sub> per tree per year for mature trees, the plantation is expected to start contributing significantly to carbon absorption after approximately three years. Once the trees are fully established, the greenbelt is estimated to absorb around 2.1 tons of CO<sub>2</sub> annually, thereby serving as a natural carbon sink and contributing to climate change mitigation.

- **Public Awareness & Training:** Regular awareness and training programs will be conducted for healthcare establishments and the general public to promote responsible waste handling.

## CHAPTER 10

### **ENVIRONMENTAL MANAGEMENT PLAN**

#### **10.1 Overview of Environmental Management Plan**

Implementing an Environmental Management Plan (EMP) is crucial for ensuring that environmental mitigation measures are effectively executed throughout a project's lifecycle. Without a structured management plan, the desired outcomes from these measures may not be achieved. The EMP outlines strategies for implementing mitigation measures to minimize the adverse impacts of project activities.

Key aspects of an EMP include:

- **Pollution Control and Mitigation:** Strategies to reduce undesirable impacts during construction and operation phases.
- **Institutional Framework:** Identifying and recommending the organizational setup necessary for EMP implementation.
- **Post-Project Monitoring:** Conducting environmental monitoring after project completion.
- **Budget Allocation:** Allocating funds for environmental protection measures and EMP implementation.

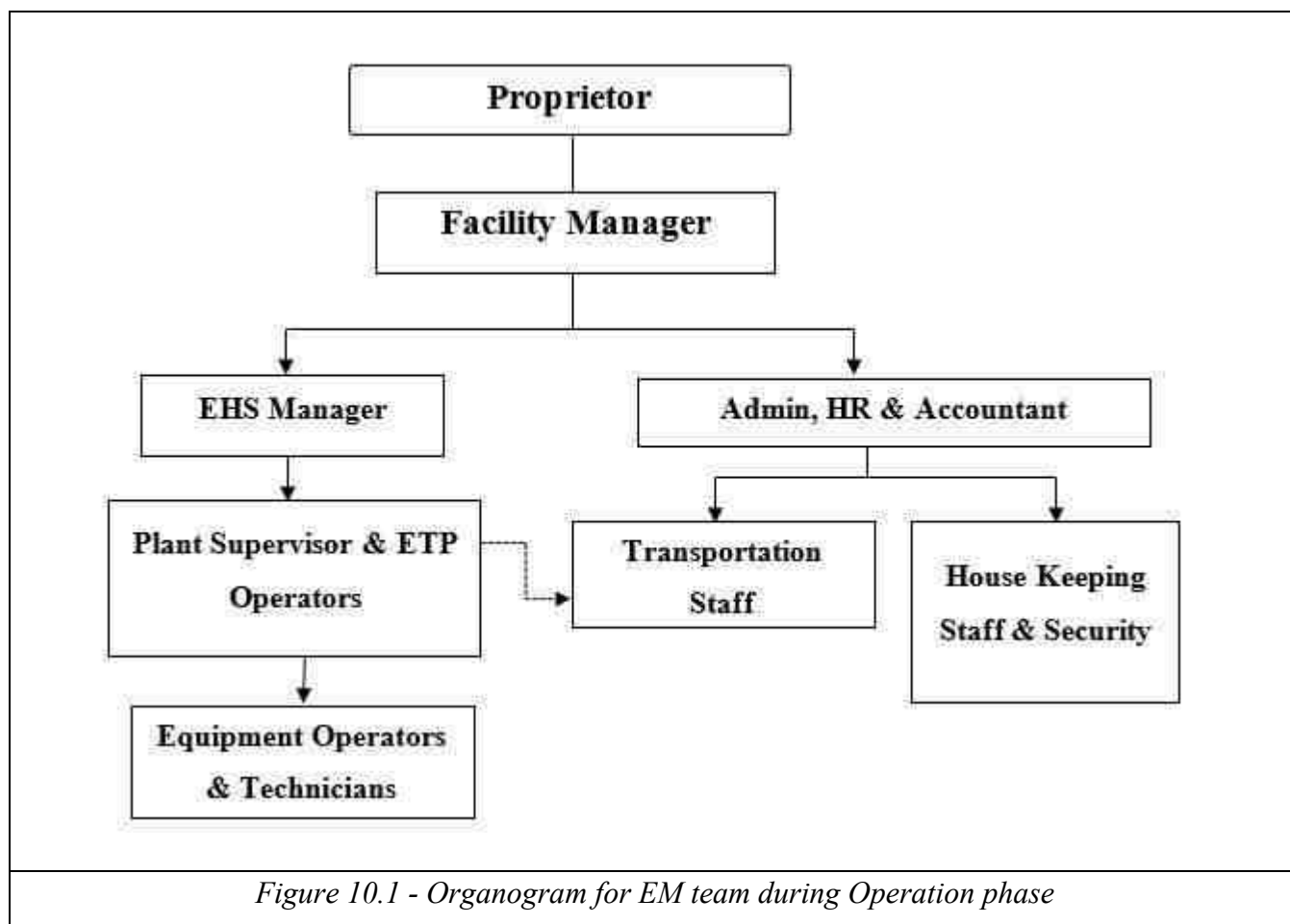
A well-structured EMP includes administrative components such as Greenbelt development, Rainwater Harvesting, Septic Tank systems, and Grey Water Treatment Plants (GWTP).

##### **10.1.1 Success Factors for EMP Implementation**

The success of an EMP depends on several factors:

- **Management Support:** Active involvement from management.
- **Efficiency of Environmental Management Cell:** Effective functioning of the environmental management team.
- **Acceptability of Environmental Quality:** Meeting regulatory and public standards for environmental quality.
- **Promoting Environmental Awareness:** Educating employees and contractors about their roles in environmental management.
- **Linking Project Performance to Environmental Performance:** Integrating environmental goals into project objectives.

## 10.2 Organizational Structure of CBWTF



### 10.2.1 Administrative Organizational Structure

#### Proprietor

- **Role:** The Proprietor is responsible for management of the overall functioning and strategy of the biomedical waste treatment facility.
- **Responsibilities:**
  - Setting the strategic direction and long-term goals of the facility.
  - Ensuring the facility complies with regulatory requirements (e.g., CPCB, Tamilnadu Pollution Control Boards).
  - Managing relationships with key stakeholders such as hospitals, healthcare facilities, government bodies, and the public.
  - Allocating budgets and ensuring financial sustainability.
  - Approving policies related to environmental health and safety.
  - Ensuring compliance with Environmental Impact Assessments (EIA) and other regulatory requirements.

- Monitoring the performance of the management team.
- Ensuring legal and regulatory compliance.

### **Facility Manager**

- **Role:** Oversees all technical operations of the facility, including waste treatment, equipment management, and compliance with technical standards.
- **Responsibilities:**
  - Overseeing the safe and efficient treatment of biomedical waste (e.g., incineration, autoclaving, and shredding).
  - Implementing and improving waste treatment technologies and operational processes.
  - Ensuring compliance with environmental regulations related to air, water, and soil.
  - Supervising the maintenance of treatment equipment and plant infrastructure.
  - Coordinating with regulatory authorities for compliance and reporting.
  - Monitoring safety protocols and ensuring safety measures for staff handling hazardous waste.

### **EHS (Environment, Health, and Safety) Manager**

- **Role:** Ensures the facility complies with environmental, health, and safety regulations and implements policies to safeguard worker health.
- **Responsibilities:**
  - Developing and implementing environmental and safety policies.
  - Conducting regular safety audits and inspection.
  - Ensuring that the facility complies with CPCB and State Pollution Control Board guidelines for air, water, and noise pollution.
  - Conducting regular safety drills and emergency response training.
  - Managing environmental monitoring (e.g., effluent treatment, emissions, waste segregation).
  - Liaising with regulatory bodies regarding health and safety audits and certifications.

### **Plant Supervisor**

- **Role:** Oversees day-to-day operations on the ground at the treatment facility, ensuring that all processes are functioning smoothly and safely.
- **Responsibilities:**
  - Supervising the waste treatment process and ensuring that operations are running as per defined protocols.

- Monitoring equipment performance, handling minor troubleshooting, and ensuring preventive maintenance.
- Ensuring that safety guidelines are followed by workers handling waste treatment operations.
- Liaising with technical staff, maintenance teams, and management to report issues and improve processes.
- Managing waste segregation and collection systems within the facility.

#### **Support Staff - Technicians / Operators**

- **Role:** Technicians and operators handle the day-to-day tasks related to the actual treatment of biomedical waste.
- **Responsibilities:**
  - Operating incinerators, autoclaves, shredders, and other treatment equipment.
  - Performing regular maintenance and checks on equipment to ensure they are functioning properly.

Assisting in waste segregation and manual handling of waste if required.

#### **10.2.2 Technical Organizational Structure**

The technical structure focuses on the operational, engineering, and scientific aspects of the biomedical waste treatment process. This includes waste segregation, treatment methods (such as autoclaving, incineration, shredding, chemical treatment), and ensuring that all waste is treated safely and effectively.

#### **EHS Manager**

- Responsible for overseeing all technical & safety aspects of the biomedical waste treatment process.
- To implement & monitor the Environmental Management Plan
- Ensures that treatment methods are efficient, cost-effective, and compliant with environmental regulations.
- Coordinates with CPCB and TNPCB for regular reporting compliance statement and annual reports as per norms.
- Coordinates with the EHS team to ensure safety and environmental standards are maintained and regular training for all staffs.

#### **Plant Supervisor**

- Supervises the collection, sorting, and segregation of biomedical waste from various healthcare sources

- Ensures adherence to safety procedures during waste handling, treatment, and disposal.
- Conducts safety drills, ensures staff wear personal protective equipment (PPE), and supervises emergency response protocols.
- Monitor efficiency of all pollution control equipment regularly and maintain online monitoring system attached to emission from incinerator.
- Identifies potential hazards and risks in the facility and implements corrective measures.
- Maintain records of waste treated, including weight, types of waste, and treatment methods.

#### **Operational Staff and Technicians**

- Responsible for collection, segregation and treat different categories of waste based on its type and hazard level.
- Responsible for monitoring and operating treatment equipment such as incinerators, autoclaves, and shredders.
- Perform routine maintenance and repairs on equipment.
- Ensure proper operation of waste treatment processes.
- At the operational level, the staff including operators of Incinerator, Autoclave, Shredder, ETP of ensures the hands-on implementation of tasks related to the treatment, handling, and documentation of biomedical waste.
- Cleaning & Maintenance team: Responsible for maintaining the cleanliness of the treatment facility and ensuring that equipment is properly maintained and safe to use.

#### **Transport Staff**

- Manages logistics for the transportation of biomedical waste from collection points (hospitals, clinics, labs) to the treatment facility.
- Ensures compliance with safety standards during transportation, including appropriate labelling, handling, and storage.
- Ensures proper documentation and tracking of waste transported through GPS.

### **10.3 Proposed Environmental Impact Mitigation Measures**

The major impacts due to different project activities and their mitigation measures have been identified as given in the flowing table. These measures together constitute part of Environmental Management Plan (EMP). The environmental impact mitigation measures for construction and operation phases are given below.

**Table 10.1 - Proposed Environmental Impact Mitigation Measures**

| Project Activity based on process plant and support services |                                                                                                                                                                                                   |                                                                                                                                                                             |                                                                                                                                                                                                                                                             |                         |               |                                      |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|--------------------------------------|
| Activity                                                     | Aspects                                                                                                                                                                                           | Impacts                                                                                                                                                                     | Mitigation Measures                                                                                                                                                                                                                                         | Budget<br>(in<br>Lakhs) | Time<br>Frame | Responsibility                       |
| Construction<br>Phase                                        | <b>Water</b><br>Waste Water generated from Domestic use.                                                                                                                                          | Probable impact on Ground Water & Surface water quality                                                                                                                     | 1. Domestic Waste water will be treated by septic tank with soak pit provided within the site premises.<br>2. There will not be any discharge in the nearby surface water.                                                                                  | 0.75                    | 6 months      | Civil Contractors & Biotech EHS Team |
|                                                              | <b>Air Quality</b><br>1. Dust from Construction equipment during earthwork and construction material handling.<br>2. Transportation of materials by means of vehicles lead to vehicular emission. | Generation of airborne particles such as PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>x</sub> , NO <sub>x</sub> , CO etc., may lead to changes in the Ambient Air Quality | 1. Effective dust screens, sheeting and netting will be provided to enclose the construction materials & scaffoldings<br>2. Regular sprinkling of water in the construction site to control fugitive dust during Vehicle transport & construction activity. | 0.35                    | 6 months      | Civil Contractors & Biotech EHS Team |

| Project Activity based on process plant and support services |                                                                                                                                                           |                                                                   |                                                                                                                                                                                                                                                                                |                         |               |                                      |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|--------------------------------------|
| Activity                                                     | Aspects                                                                                                                                                   | Impacts                                                           | Mitigation Measures                                                                                                                                                                                                                                                            | Budget<br>(in<br>Lakhs) | Time<br>Frame | Responsibility                       |
| Construction<br>Phase                                        | <b>Ambient Noise</b><br>Noise from the operation of Construction machinery & vehicle and construction activities such as erection, drilling, welding etc. | Probable increase in the Ambient Noise Level.                     | 1. Civil works will be carried out only during day time.<br>2. Regular maintenance will be carried out for all vehicles & machineries to reduce operational noise.<br>3. Protective wears such as ear muffs & Disposable ear plugs will be provided to construction personnel. | 0.1                     | 6 months      | Civil Contractors & Biotech EHS Team |
|                                                              | <b>Solid Waste</b><br>Construction and Demolition waste & Municipal Solid Waste and excavated soil waste.                                                 | Probable impact due to the generation of solid waste and disposal | 1. There is no generation of C&D waste since it is a proposed building.<br>2. Municipal Solid waste will be sent to authorized vendor<br>3. Excavated soil will be used for backfilling during construction activity                                                           | 0.1                     | 6 months      | Civil Contractors & Biotech EHS Team |



| Project Activity based on process plant and support services |                                                                                                                                            |                                                                   |                                                                                                                                                                                                                                      |                         |                                                       |                     |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------------|---------------------|
| Activity                                                     | Aspects                                                                                                                                    | Impacts                                                           | Mitigation Measures                                                                                                                                                                                                                  | Budget<br>(in<br>Lakhs) | Time<br>Frame                                         | Responsibility      |
|                                                              |                                                                                                                                            |                                                                   | 4. Top soil will be stored separately and later used for filling up the proposed green areas.                                                                                                                                        |                         |                                                       |                     |
| Operation<br>Phase                                           | Water<br>Waste Water generated<br>from domestic use                                                                                        | Probable impact<br>on Ground Water<br>& Surface water<br>quality  | Sewage is discharged to Septic tank and soak pit provided within site premises.                                                                                                                                                      | 0.1                     | Annually<br>(throughout<br>the<br>operation<br>phase) | Biotech<br>EHS Team |
|                                                              | Effluent<br>1. Trade effluent from<br>Air Pollution Control<br>Devices (venturi<br>scrubbers, wet<br>scrubbers and droplet<br>separators.) | Probable impact<br>on Ground Water<br>& Surface water<br>quality. | 1. The effluent water from APCDs and vehicle washing will be sent to 15 KLD ETP provided within the site premises.<br>2. The quality of influent to ETP and treated effluent from ETP will be monitored regularly as per CPCB norms. | 1.4                     | Annually<br>(throughout<br>the<br>operation<br>phase) | Biotech<br>EHS Team |

| Project Activity based on process plant and support services |                                                                                                                                                                                                   |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |                                              |                               |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------|-------------------------------|
| Activity                                                     | Aspects                                                                                                                                                                                           | Impacts                                      | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                      | Budget<br>(in<br>Lakhs) | Time<br>Frame                                | Responsibility                |
|                                                              | 2. Effluent from vehicle washing.                                                                                                                                                                 |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |                                              |                               |
| Operation Phase                                              | <p>Air Quality</p> <p>1. Emission of PM, NO<sub>x</sub>, SO<sub>x</sub> &amp; CO from Incinerator stacks and DG set.</p> <p>2. Vehicular Emission during transportation of Bio Medical Waste.</p> | Probable changes in the Ambient Air Quality. | <p>1. Incineration stacks will be provided with Air Pollution Control Measures (Venturi Scrubbers, Wet Scrubbers, and Droplet Separators) and adequate stack height.</p> <p>2. Back up DG set will comply with the applicable emission norms and adequate stack height is provided.</p> <p>3. Back up DG set will be used only during power failure.</p> <p>4. Vehicles will be maintained well and will comply with emission norms.</p> | 0.5                     | Annually<br>(throughout the operation phase) | Biotech Management & EHS team |

| Project Activity based on process plant and support services |                                                                                                                   |                                                                   |                                                                                                                                                   |                         |                                              |                                |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------|--------------------------------|
| Activity                                                     | Aspects                                                                                                           | Impacts                                                           | Mitigation Measures                                                                                                                               | Budget<br>(in<br>Lakhs) | Time<br>Frame                                | Responsibility                 |
|                                                              |                                                                                                                   |                                                                   | 4. Regular monitoring of emissions from Incineration Stacks, DG set and ambient air quality will be carried out as per norms.                     |                         |                                              |                                |
| Operation<br>Phase                                           | Ambient Noise<br>Noise Generated during operation of DG set.                                                      | Probable changes in Ambient Noise Quality.                        | DG set will be provided with acoustic enclosures as per norms to control the noise from DG set.                                                   | 0.1                     | Annually<br>(throughout the operation phase) | Biotech EHS team               |
|                                                              | Solid Waste<br>1. Municipal Solid Waste.<br>2. Plastic Waste from shredder<br>3. Autoclaved Glassware and Needles | Probable impact due to the generation of solid waste and disposal | 1. Municipal Solid waste will be sent to authorised vendor.<br>2. Shredded plastic waste and glassware will be sent to authorised waste recycler. | 0.2                     | Annually<br>(throughout the operation phase) | Biotech management & EHS team. |

| Project Activity based on process plant and support services |                                                                                              |                                                                       |                                                                                                                                                                    |                         |                                           |                                |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------------|--------------------------------|
| Activity                                                     | Aspects                                                                                      | Impacts                                                               | Mitigation Measures                                                                                                                                                | Budget<br>(in<br>Lakhs) | Time<br>Frame                             | Responsibility                 |
|                                                              | 4. E-waste and battery waste                                                                 |                                                                       | 3. Needles will be stored in encapsulation pit within the site premises.<br>4. E-waste and battery waste, whenever generated will be sent to authorised recyclers. |                         |                                           |                                |
| Operation Phase                                              | Hazardous waste<br>1.spent oil from DG set,<br>2.Ash from Incinerators,<br>3.Sludge from ETP | Probable impact due to the generation of Hazardous waste and disposal | 1. Used oil from DG sets are sold to registered recyclers.<br>2. ETP Sludge and Incineration Ash will be sent to nearby TSDF                                       | 0.3                     | Annually (throughout the operation phase) | Biotech Management & EHS team. |
|                                                              | Rain Water Harvesting                                                                        | Ground Water Recharge                                                 | Rainwater harvesting pits will be provided throughout the projects site.                                                                                           | 0.1                     | Annually (throughout the                  | Biotech EHS team               |

| Project Activity based on process plant and support services |                                   |                                  |                                                                                                                                                                                                                                                    |                         |                                                       |                  |
|--------------------------------------------------------------|-----------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------------|------------------|
| Activity                                                     | Aspects                           | Impacts                          | Mitigation Measures                                                                                                                                                                                                                                | Budget<br>(in<br>Lakhs) | Time<br>Frame                                         | Responsibility   |
|                                                              |                                   |                                  | Storm water drains are planned to be constructed in the site.                                                                                                                                                                                      |                         | operation<br>phase)                                   |                  |
|                                                              | Fire Protection                   | Working<br>Environment<br>Safety | Adequate fire protection facilities will be installed including fire detectors, fire alarm and firefighting system as per National Building Code of India.                                                                                         | 0.1                     | Annually<br>(throughout<br>the<br>operation<br>phase) | Biotech EHS team |
| Operation<br>Phase                                           | Occupational Health &<br>Training | Working<br>Environment<br>Safety | 1. Training and awareness on risk and safety in the working environment will be provided every month by Biotech EHS manager.<br><br>2. Annual Health check-up and vaccination camp will be carried out for every employee working at the facility. | 0.5                     | Annually<br>(throughout<br>the<br>operation<br>phase) | Biotech EHS team |

| Project Activity based on process plant and support services |                                                                                                                                   |                                                                                   |                                                                                                                                                                                                                                                                                                                |                         |                                              |                                       |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------|---------------------------------------|
| Activity                                                     | Aspects                                                                                                                           | Impacts                                                                           | Mitigation Measures                                                                                                                                                                                                                                                                                            | Budget<br>(in<br>Lakhs) | Time<br>Frame                                | Responsibility                        |
|                                                              |                                                                                                                                   |                                                                                   | 3. PPEs such face mask, gloves, safety shoes, aprons etc. will be provided to the workers handling Bio medical Waste.                                                                                                                                                                                          |                         |                                              |                                       |
|                                                              | 1. Odour generated due to Biomedical waste temporary storage<br>2. Dust generated due to transportation of BMW carrying vehicles. | Probable changes in the Surrounding environment due to dust generation and odour. | 1. odour generation will be controlled by regular cleaning with disinfectants such as sodium hypo chlorite and OdoServe (Industrial grade odour eliminator)<br>2. Dust suppression will be done by sprinkling of treated water.<br>3. Good House Keeping practices and proper maintenance will be carried out. | 0.2                     | Annually<br>(throughout the operation phase) | Biotech EHS team and facility manager |

| Project Activity based on process plant and support services |            |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                    |                         |                                                       |                  |
|--------------------------------------------------------------|------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------------|------------------|
| Activity                                                     | Aspects    | Impacts                                             | Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                | Budget<br>(in<br>Lakhs) | Time<br>Frame                                         | Responsibility   |
| Operation<br>Phase                                           | Land Scape | For Carbon<br>Emission Control,<br>Dust Suppression | <p>1. A total of 2718.38 Sq.m (33.53% of total plot area) has been allotted for development of green belt.</p> <p>2. Native varieties of trees such as Neem, Bamboo, Palm, Coconut etc. will be planted and maintained within the site premises which would serve the dual purpose of controlling fugitive dust and as carbon sinks.</p> <p>3. The green belt will improve the aesthetics of the project site.</p> | 0.7                     | Annually<br>(throughout<br>the<br>operation<br>phase) | Biotech EHS team |

#### 10.4 Environmental Management Budget Allocation

A capital cost provision of about Rs.142 Lakhs has been kept in the project cost towards the environmental protection, control & mitigation measures and implementation of the EMP. The budgetary cost estimate for the EMP is given in **Table 10.2**.

**Table 10.2 - Environmental Budget**

| Sl.No.       | Description                                             | Capital Cost<br>(Rs. Lakhs) | Overall<br>Recurring Cost<br>(Rs. Lakhs) |
|--------------|---------------------------------------------------------|-----------------------------|------------------------------------------|
| 1.           | Stack for Incinerator & DG set                          | 35                          | 0.5                                      |
| 2.           | Noise pollution control – Acoustic                      | 0.5                         | 0.1                                      |
| 3.           | Treatment Plants (ETP & Septic tank)                    | 25                          | 1.5                                      |
| 4.           | Green Belt Area – Development & Maintenance             | 1                           | 0.7                                      |
| 5.           | Dust Suppression, Odour Control and House Keeping       | 1                           | 0.5                                      |
| 6.           | Biomedical Waste Transport Vehicles                     | 60                          | 2.0                                      |
| 7.           | Fire Prevention & Fighting                              | 8                           | 0.1                                      |
| 8.           | Rainwater Harvesting                                    | 1.5                         | 0.1                                      |
| 9.           | Environmental Monitoring Budget                         | -                           | 1.5                                      |
| 10.          | Solid and Hazardous Waste Storage & Disposal            | 2                           | 0.5                                      |
| 11.          | Occupational Health & Environmental Management Training | 2                           | 0.5                                      |
| 12.          | Corporate Environmental Responsibility                  | 6                           | -                                        |
| <b>Total</b> |                                                         | <b>142</b>                  | <b>8</b>                                 |

##### 10.4.1 Environmental Impacts on Project Land and its Surroundings Developments

##### Impacts on Socio-Economic Conditions

**M/s. Biotech Engineering Industries**, has proposed to provide all basic facilities such as, Centralized water supply distribution system, drainage system, drainage disposal system, storm water disposal system and irrigation system etc.



**Table 10.3 - Impacts on Socio-Economic Conditions**

| S.No     | Impacts                           | Negative Impacts |           | Positive Impacts |           | No Impacts |
|----------|-----------------------------------|------------------|-----------|------------------|-----------|------------|
|          |                                   | Short term       | Long term | Short term       | Long term |            |
| <b>A</b> | <b>Construction phase</b>         |                  |           |                  |           |            |
| 1        | Displacement of people            |                  |           |                  |           | ✓          |
| 2        | Change of land use                |                  |           |                  |           | ✓          |
| 3        | Loss of trees/vegetation          |                  |           |                  |           | ✓          |
| 4        | Shifting of utilities             |                  |           |                  |           | ✓          |
| 5        | Impact on archaeological property |                  |           |                  |           | ✓          |
| <b>B</b> | <b>Operational phase</b>          |                  |           |                  |           |            |
| 1        | Increase in air and noise levels  | ✓                |           |                  |           |            |
| 2        | Disposal of waste water           |                  |           |                  |           | ✓          |
| 3        | Induced development               |                  |           |                  | ✓         |            |
| 4        | Quality of life                   |                  |           |                  | ✓         |            |

### 10.5 Greenbelt Management

The important objectives of green belt development are to protect natural environments and to reduce the presence of particulate matter in air, which may arise due to vehicle movement and fugitive emissions. The trees help in retention of soil moisture and utilize the rainwater for the growth. Noise attenuation is also an important feature of the trees planted along the periphery of the plant boundary. The green belt layout of the proposed project is shown in **Annexure 8**.

The main objective of green belt development around the facility is to:

1. Mitigation of impacts due to fugitive emissions
2. Attenuation of noise levels
3. Odour control
4. Ecological restoration
5. Improvement in aesthetic environment quality
6. Wastewater treatment and reuse.
7. Soil erosion prevention

8. It acts as an indicator to the quality of the environment by observing its health

Native trees suitable for the local weather conditions will be selected and grown. Evergreen varieties with dense canopy will be selected so that any noise and dust arising during plant operations, vehicle movement, will be reduced to a maximum extent.

Thick green belt will be developed along the periphery of the premises. The proposed species suitable for the region as per CPCB recommended are provided below in **Table 10.4**. The tree species act as dust barrier and also help in the reduction of vehicular noise. Development of a greenbelt of trees all around the CBWTF site involves creating a buffer zone of vegetation to mitigate environmental impacts, such as noise and air pollution, and also enhancing the aesthetics of the area.

- ❖ This process includes selecting suitable tree and shrub species for the agro climatic zone, planning the layout as per the site dimension and infrastructure and also implementing proper planting and maintenance techniques.
- ❖ Trees will be planted with adequate spacing to allow for growth and to create a visually appealing and functional greenbelt.
- ❖ Planting will be carried out in staggered rows to enhance the visual appeal and allow for better tree growth.
- ❖ A mix of short and tall trees will be selected to create a layered effect and provide different benefits, such as noise and dust absorption.
- ❖ Native and indigenous tree species that are well-suited to the local climate and soil conditions and which are that are resistant to pollution and can tolerate industrial emissions are selected.
- ❖ Trees will be planted in well-prepared pits with appropriate spacing, as recommended by horticultural guidelines and adequate watering will be ensured.
- ❖ Greenbelt which includes flowering and fruit bearing trees will significantly enhance the visual appeal of the site and provide habitat for birds and thus promoting biodiversity.
- ❖ This green belt can help prevent soil erosion during heavy rainfall and protecting top soil.

The following green belt plan has been developed based on CPCB Guidelines for developing Greenbelts shown in **Table 10.4**.

**Table 10.4- Green Belt Plan – as per CPCB Guidelines**

| S.No | Botanical name         | Tamil Name      | English / Common name | Height | Crown shape & Details    |
|------|------------------------|-----------------|-----------------------|--------|--------------------------|
| 1    | Hibiscus rosasinnensis | Sembarutthi     | Shoe flower plant     | 3 m    | oblong, evergreen shrub  |
| 2    | Poinciana pulcherrima  | Mayil konrai    | Peacock flower        | 3 m    | oblong, evergreen shrub  |
| 3    | Tabermontana divetara  | Nandiavattai    | Crape jasmine         | 3 m    | round, evergreen shrub   |
| 4    | Lawsomnia inermis      | Marudhani       | Henna                 | 5m     | round evergreen shrub    |
| 5    | Thespesia Populnea     | Poovarasu       | Indian tulip          | 10 m   | round, evergreen tree    |
| 6    | Pongamania pinnata     | Pongam          | Indian Beech          | 10m    | Round, evergreen tree    |
| 7    | Mimusops elengi        | Magilam         | Bakul                 | 10m    | Oblong, evergreen tree   |
| 8    | Terminalia arjuna      | Marudha maram   | Arjuna                | 15 m   | oblong, deciduous        |
| 9    | Ficus religiosa        | Arasa maram     | Sacred fig            | 20 m   | round evergreen tree     |
| 10   | Azadirachta indica     | Vembu           | Neem tree             | 20 m   | spreading evergreen tree |
| 11   | Bambusa arudinacia     | Moongil Tree    | Bamboo                | 20m    | crown shape oblong       |
| 12   | Citrus aurantium       | Naraathai Maram | beng tree             | 5m     | crown oblong             |

The location selected for greenery development is shown in the greenery site plan layout. The trees are selected based on the adaptation to the local climate. The number of trees proposed to be planted in 0.52 acres is approximately 100 nos. The trees will be planted for a period of 6 months. A mix of tall trees,

large canopy trees, and medium sized shrubs are selected to form a thick belt, so that fugitive and gaseous emissions from ground and vehicles are mitigated.

### 10.6 Rainwater Harvesting

The Biotech Engineering Industries at S.F.No.17/7, Pisanathur Village, Gandarvakottai Taluk, Pudukkottai District has a total project area of 1.55 acres i.e. 6250 Sq.m. In that, total built-up area would be around 1148.10 Sq.m (18.56 %).

The balance area will be completely used for greenbelt, Parking Area, Vacant area and Road coverage area. The present site is barren land. The soil of the land is rocky, sandy with gravel stones.

During the industrial operations, the water requirement is for generation of steam and for cooling flue gas only. The water generated from steam condensate & flue gas scrubber are collected and recycled.

No wastewater is let out; there by always achieve zero discharge. The toilet effluent is collected in septic tank and disposed with soak pit arrangements.

From the above, it is clear that no water adds to the land at any circumstances. The required water per day 8 KLD is drawn from local water supply. The present site located at higher elevation with respect to Pisanathur pond. The unit site on all sides are elevated. Hence, no rainwater enters in our land. The rainwater falls in our area, drains at east edge corner of the Rain water harvesting pond drain. Hence, no rainwater is stagnated in our land & no flooding. As per the record, Pudukkottai rainfall as below:

The average rainfall for last 16 years of Pudukkottai District is 857.80mm (Source: Pudukkottai District Statistical Handbook – 2022-23)

**Table 10.5 – Average Rainfall of Pudukkottai District**

| S.No                  | Season               | Normal Rainfall (mm) | Percentage (%) |
|-----------------------|----------------------|----------------------|----------------|
| 1.                    | Winter (Jan – Feb)   | 170.7                | 18.98%         |
| 2.                    | Summer (March – May) | 59.8                 | 6.65%          |
| 3.                    | Southwest Monsoon    | 311.2                | 34.61%         |
| 4.                    | Northeast monsoon    | 357.6                | 39.77%         |
| <b>Total Rainfall</b> |                      | <b>899.2</b>         | <b>100%</b>    |

The maximum rainfall in a day was recorded around 9.6 cm. Most of the year, the Pudukkottai District is dry & sunny.

According to above table & dry weather, most of the rainwater will be absorbed by the soil itself & no runoff. The only rainwater runoff takes place during Northeast monsoon that too maximum rainfall in a day reaches above 9.6 cm will observe most of the rainwater.

From the above the rainfall in winter, summer & south west monsoon rain water will be absorbed into soil due to dry weather condition so there will not be any run-off.

During North East monsoon there will be a run off so the rain fall quantity is:

$$\text{Rain fall} = (357.60/1000) \times 6250 = 2235.0 \text{ KL}$$

$$10\% \text{ will be run-off} = 223.5 \text{ KL}$$

Also, as per Run-off co-efficient formula,

$$Q_Y = K P_Y;$$

$Q_Y$  - Yearly Run-off in cm

$P_Y$  - Yearly Precipitation in cm

$K$  - Co-efficient 0.05 for farm land.

$$Q_Y = 0.05 \times (899.2/1000) \times 6250 = 281.0 \text{ KL}$$

We have proposed to build ground area around 1148.10 Sq.m consist of Incinerator, Shredder & Autoclave, Office & admin room, etc.,

Each building will have rainwater-harvesting facility. No rainwater will be let out. The balance area 5101.9 Sq.m will be green belt & road. The entire soil will absorb the rainwater & there will be some run-off.

$$\text{Rainwater} = (899.2/1000) \times 5101.9 = 4587.62 \text{ KL}$$

$$10\% \text{ will be run off} = 458.762 \text{ KL}$$

From the above, the maximum runoff will be 458.762 KL only.

Now we have proposed to build 8 nos of rainwater-harvesting pits of size 1m x 1m x 2m and Rain water harvesting pond of size 5m x 4m x 2m depth throughout the plot area. The balance quantity will be let into existing storm water drain. Hence there will not be any flooding in the unit site. The collected rain water from pits will be directed for ground water recharge. The storm water & RWH structure layout of the proposed project is enclosed as Annexure 18.

The above said quantity is a very meagre quantity flow which will not have any impact either in our site & to the surrounding area. This type of runoff may take place 2 or 3 days in a year that too particularly during the North East monsoon.

Alternative calculation as per CPHEEO (Run-off) peak hour calculation maximum rainfall 0.40 mm/hr.

**Table 10.6 - Runoff peak hour calculation (approximately)**

| S.No                                                                                                                             | Category           | Area (Sq.m) | Intensity of Rainfall (m/hr) | Im-permeability Factor | Harvestable Water = Intensity x Area x Imp.Factor (cu.m/hr) |
|----------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------|------------------------------|------------------------|-------------------------------------------------------------|
| 1.                                                                                                                               | Building Roof Area | 1148.10     | 0.0004                       | 0.9                    | 0.413316                                                    |
| 2.                                                                                                                               | Green Belt         | 2115.44     | 0.0004                       | 0.3                    | 0.2538528                                                   |
| 3.                                                                                                                               | Road/Parking area  | 763.56      | 0.0004                       | 0.7                    | 0.2137968                                                   |
| 4.                                                                                                                               | Vacant land        | 2222.90     | 0.0004                       | 0.3                    | 0.266748                                                    |
| <b>Run-off water per hour</b>                                                                                                    |                    |             |                              |                        | <b>1.477136</b>                                             |
| For 15 minutes retention time (approximately)                                                                                    |                    |             |                              |                        | <b>0.066687</b>                                             |
| <i>Intensity of rainfall per hour is calculated value based on the maximum rainfall recorded, which is expressed in 24 hours</i> |                    |             |                              |                        |                                                             |

Total Surface runoff rainwater will be directed to recharge pits. Hence, there will not be flooding of inside & outside the unit area of establishing the Bio-medical waste treatment facility.

### 10.7 Septic Tank

A septic tank is a key component of a septic system, a small-scale sewage treatment system common in areas that lack connection to main sewage pipes provided by local governments or private corporations. Septic systems are a type of onsite sewerage facility. The term "septic" refers to the anaerobic bacteria environment that develops in the tank which decomposes or mineralizes the waste discharged into the tank.

Septic tanks can be coupled with other onsite water treatment such as bio filters aerobic systems involving artificially forced aeration. Periodic preventive maintenance is required to remove solids that remain and gradually fill the tank, reducing its efficiency.

M/s. Biotech Engineering Industries has designed septic tank system with soak pit for 12 KLD of black water. The dimension of the Septic tank is 2 x 2 x 3 m which is located at North of the Admin and Worker room area.

### 10.8 Grey Water Treatment Plant

Grey Water is the kind of waste water generated because of various domestic uses of water, excluding toilets. Greywater contains only one-tenth of the nitrogen that black water does and significantly fewer pathogens. As a result, the organic content of grey water decomposes more rapidly than that of black

water and thus, its treatment is easier. These characteristics make it reusable as a sustainable source of water for irrigation, and also for other purposes, but only after treatment which allows it to meet specific quality criteria.

Grey water treatment is the process of reducing the amount of contamination in waste water before its reuse / disposal. The treated water can be used for gardening, toilet flushing etc.

M/s. Biotech Engineering Industries has proposed a Grey Water Treatment Plant to treat wastewater from the workers' rest area, which can then be reused for gardening and firefighting purposes. The wastewater from the workers' area is directed into the greywater treatment plant, which consists of a Sand Filter and a Carbon Filter. The water passing through these two filters is free from microorganisms and is suitable for use in gardening.

### **10.9 4R Principle – (Recycle/Reduce/Reuse/Recover)**

The 4R's are a solid waste management strategy that stands for reduce, reuse, recycle, and recover. The 4R's are a way to reduce waste production and avoid contributing to landfills.

#### **4 Rs in Biomedical Waste**

As per Biomedical Waste (Management and Handling) Rules, 2016 of India, BMW is defined as “Any waste generated during the process of diagnosis and treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological or in health camps”.

#### **1. Reduction of waste**

Preventing waste material (also known as waste reduction) is a significant method of management of wastes. Segregating waste is the best way to reduce the volume of hazardous wastes requiring special treatment.

Waste generated from CBWTF are ash from incinerator, sludge from ETP, waste oil from DG set, Disinfected Glassware, Shredded Waste and solid waste (organic, inorganic and domestic). Here are some ways to reduce waste in a Common Bio-Medical Waste Treatment Facility (CBWTF):

- **Proper Storage of waste**

Waste generated from the incinerator and ETP are collected in a separate container and store it in designated areas for waste storage.

- **Regular cleaning**

Regularly clean the storage area and roads to prevent a build-up of waste and dust.

- **Reuse or recycle**

Disinfected materials like glass and shredded plastic to be authorized recyclers periodically. Hazardous waste like incinerator ash, Waste oil and ETP sludge are sent to TSDF

- **Proper treatment of waste:** by shredding needles, syringes, and nozzles and cleaning and disinfecting the glassware.

## 2. Reuse of waste

The bio medical waste materials generated from the HCFs includes hazardous waste which is treated by incineration process. The ash generated as the result of incineration process and ETP sludge are collected separately and sent to TSDF.

## 3. Recycling of waste

All the recyclable waste generated from HCF are sterilized using autoclaving followed by shredding. Recyclable waste must never be disposed of along with general waste in dry stream and the same is required to be disposed of only through registered or authorized recyclers. *(Source: Guidelines for management of Healthcare Waste as per Biomedical Waste Management Rules, 2016.)*

## 4. Recovering of waste

Recovering means to transform wastes into resources. This process can help reduce the amount of waste in storage, preserve natural resources, and control greenhouse gas emissions. Waste recovery includes material recovery such as glass, paper, cardboard, and light packaging.

Some recovery process in CBWTF plant are,

- **Recycling:** Treated waste can be sent to authorized recyclers. Disinfected glass waste can be recycled after cleaning with detergent and sodium hypochlorite.
- **Energy recovery:** Treated waste can be used for energy recovery.
- **Road making:** shredded plastics can be used for road making.
- **Iron foundries:** Treated waste can be sent to iron foundries that have consent from the State Pollution Control Board.

## 10.10 Energy Conservation

The proposed CBWTF will adopt energy efficiency measures in accordance with Bureau of Energy Efficiency (BEE) guidelines to minimize energy consumption and environmental impact. Key initiatives include:

- **ECBC Compliance:** The building will be designed using energy-efficient materials like insulated walls and roofs as per Energy Conservation Building Code (ECBC).



- **Star-Rated Equipment:** All electronic equipment including motors, will be BEE star-rated to ensure high energy performance.
- **Renewable Energy:** Rooftop solar panels will be installed to supplement the facility's power needs.
- **Efficient Lighting:** LED lighting and daylight harvesting techniques will be used to reduce lighting energy demand.
- **Efficient Motors:** IE3 motors will be installed for critical applications.
- **Energy Audits:** Periodic energy audits will be conducted to identify inefficiencies and implement corrective actions.

### **10.11 Solar Energy utilization**

Biotech Engineering Industries is dedicated to sustainable energy solutions, and as part of this commitment, a solar power generation system has been implemented to reduce reliance on conventional energy sources. The installation of high-efficiency solar panels allows the facility to harness renewable energy effectively. Strategically positioned for optimal sunlight exposure, these panels ensure maximum power generation, significantly contributing to the plant's daily energy requirements. With consistent solar availability, the system generates a substantial amount of electricity, covering 25% of the facility's daily needs. In the initial phase solar panels will be installed to meet 25% of the facility energy needs with a commitment to progressively increase solar energy generation to achieve 50% target in the subsequent years.

### **10.12 Corporate Environment Responsibility (CER Activity)**

Corporate Environment Responsibility (CER) is the part of Environmental Management Plan (EMP) wherein the project proponent is mandated to carry out certain activities for environment safeguard in the immediate surroundings of the project based on the issues raised during the public consultation and /or social need-based assessment carried during EIA studies.

As per OM F.No.22-65/2017-IA.III dated 30.09.2020 issued by MOEF & CC referred above, units expanding their manufacturing activity or setting up a new unit/ facility are required to keep aside funds for social upliftment in/ around the project area as Corporate Environment Responsibility. The fund allocation for the CER Greenfield Project is 2.0% of Capital investment for industries having capital amount  $\leq$  100 crores. The details of planned CER activities for Rs.5.66 lakhs are listed below

**Table 10.7 - Corporate Environment Responsibility**

| S. NO        | CER Activity                                       | Cost of CER in Lakhs | Description                                                                                                                                                                                       | Name of Selected Village (Within 5 Km from project site)               |
|--------------|----------------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| 1.           | Health camps along with free medicine distribution | 3                    | Health camps will be conducted once a year for screening of diseases and providing medicines free of cost.                                                                                        | 1. Pisanathur<br>2. Pudunagar<br>3. Turusupatti<br>4. Gandarvakkottai  |
| 2.           | Skill Development and Training                     | 1.5                  | Skill Development & Training will be implemented to improve the economic status, standard of living, confidence to pursue own occupation, better employment opportunities & higher education etc. | 1. Pisanathur<br>2. Pudunagar<br>3. Turusupatti<br>4. Gandarvakkottai  |
| 3.           | Tree Plantation in villages                        | 1.5                  | Trees will be planted along roads for providing shade over a period of 7 years. Public area such as schools, Hospitals, temples will also be selected for tree planting.                          | 1. Pisanathurs<br>2. Pudunagar<br>3. Turusupatti<br>4. Gandarvakkottai |
| <b>Total</b> |                                                    | <b>6 Lakhs</b>       |                                                                                                                                                                                                   |                                                                        |

## CHAPTER 11

### SUMMARY AND CONCLUSION

#### 11.1 Overall Justification for Implementation of the Project

The Environmental Impact Assessment (EIA) studies carried out by M/s. Olympia Eco Solutions Private Limited - Chennai, a NABET accredited EIA Consultant for the proposed project of M/s. Biotech Engineering Industries has been completed. The copy of NABET certificate is enclosed as Annexure 19.

**Table 11.1 - Description of the project**

|                                 |                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------|
| <b>Project Name</b>             | Proposed Common Bio Medical Waste Treatment Facility                                         |
| <b>Capacity</b>                 | 10 TPD                                                                                       |
| <b>Project Site</b>             | Survey No. 17/7, Pisanathur Village, Gandarvakottai Taluk, Pudukkottai District, Tamil Nadu. |
| <b>Proposal Number</b>          | SIA/TN/INFRA2/494961/2024 (from Parivesh Portal)                                             |
| <b>Geo Co-ordinates of site</b> | 10° 35' 28.64" N 79° 02' 08.45" E                                                            |
| <b>Project Land Area</b>        | <b>Total plot area</b> – 1.55 acres (6250 Sq.m)                                              |
| <b>Project Cost</b>             | Rs.2.83 Crores Only/-                                                                        |

The Environmental Impact Assessment (EIA) study for the proposed Common Bio-Medical Waste Treatment Facility (CBWTF) at Pisanathur Village Pudukkottai District, comprehensively evaluates various aspects of the project. This includes the necessity of the facility, the entire waste management process—covering collection, transportation, storage, treatment, and disposal—along with the assessment of water consumption, wastewater generation, treatment methods, air pollution sources, control strategies, and hazardous waste management practices.

##### 11.1.1 Baseline environmental Study

Additionally, the study has analysed meteorological data and baseline environmental conditions and anticipate potential project-related impacts, an extensive environmental monitoring program was conducted at 8–10 selected locations within a 10 km radius of the proposed Common Bio-Medical Waste Treatment Facility (CBWTF) at Pisanathur Village Pudukkottai District. These locations were identified based on factors such as proximity to sensitive receptors, prevailing wind direction, water sources, habitation clusters, and industrial activities. It also examines the local biodiversity, including flora and fauna, as well as the socio-economic and demographic structure of the surrounding community.

The baseline environment study conducted during Jan 13 to April 3 covered the following key environmental components: air quality, water quality (surface and groundwater), noise levels, and soil characteristics. The sampling and analysis was conducted by NABL accredited laboratory femo labs Chennai. Based on these assessments, an Environmental Impact Statement has been formulated to evaluate the potential effects of the proposed facility on key environmental components such as air, water, land, biological diversity, and the socio-economic landscape.

### **11.1.2 Environmental Management Plan**

To mitigate any potential environmental concerns, a comprehensive Environmental Management Plan (EMP) has been designed. This plan outlines necessary measures for environmental protection during both the construction and operational phases of the project. An environmental monitoring framework has also been proposed, detailing monitoring locations, frequencies, data analysis methodologies, and reporting mechanisms. Additionally, a thorough risk assessment has been conducted to identify hazards associated with bio-medical waste storage before treatment, along with preventive and management strategies to address such risks.

The study concludes that while the proposed CBWTF project may have minor environmental impacts, these are not expected to significantly alter the natural ecosystem of the area. On the contrary, the project is expected to yield positive outcomes, such as employment generation for the local population and a safer, more efficient system for the treatment and disposal of bio-medical waste, thereby reducing the risk of infectious disease transmission.

To ensure continuous environmental compliance, an Environmental organizational structure will be established to oversee the implementation of the EMP and incorporate technological advancements to minimize operational impacts.

In summary, M/s. Biotech Engineering Industries is deeply committed to sustainable development and acknowledges the environmental implications of the proposed project. The company is dedicated to executing the project responsibly, ensuring that no significant adverse environmental impacts occur, and strictly adhering to the recommendations of the EMP.

The Executive Summary of this EIA study report is available in both Tamil and English as **Annexure 20**.

## 11.2 Mitigation measures for identifying impacts

The measures adopted to mitigate the impacts due to proposed project are given in Table 11.1 below.

**Table 11.2 – Measures adopted to mitigate the impact**

| S.No. | Pollution Source        | Parameter                                                                                    | Mitigation Measures                                                                                                                                                                                                        |
|-------|-------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Water Pollution         | Wastewater from industrial process, equipment, vehicle, and floor washing                    | Treated in an Effluent Treatment Plant (ETP) to meet prescribed standards.                                                                                                                                                 |
| 2     | Air Pollution           | Diesel Generator (DG) Set                                                                    | Installation of a stack with adequate height and acoustic enclosures.                                                                                                                                                      |
|       |                         | Incinerator                                                                                  | Equipped with a 30-meter-high chimney (AGL) and Air Pollution Control (APC) devices, such as a cyclone separator and venturi scrubber.<br><br>Adequate greenbelt development to reduce pollutions and acts as carbon sink. |
| 3     | Noise Pollution         | DG Set                                                                                       | Acoustic enclosures to minimize noise pollution.                                                                                                                                                                           |
| 4     | Solid & Hazardous Waste | Domestic Solid Waste                                                                         | Segregation of organic and inorganic waste at the source. Organic waste will be composted, while inorganic waste will be handed over to authorized agents for safe disposal.                                               |
|       |                         | Hazardous Waste                                                                              | Incinerator ash and ETP sludge will be stored in a secured area and disposed of at the TSDF facility                                                                                                                       |
| 5     | Bio-Medical Waste       | Yellow Category (Human & animal anatomical waste, soiled waste, expired/discarded medicines, | Treated through incineration.                                                                                                                                                                                              |

| S.No. | Pollution Source | Parameter                                               | Mitigation Measures                                                                                              |
|-------|------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|       |                  | chemical & laboratory waste, chemical liquid waste)     |                                                                                                                  |
|       |                  | Red Category (Contaminated recyclable waste)            | Subjected to disinfection by autoclaving and shredding, followed by disposal through authorized recyclers.       |
|       |                  | White Category (Translucent) (Sharps, including metals) | Autoclaved (Disinfected) and stored in encapsulated pits within site premises before disposal at iron foundries. |
|       |                  | Blue Category (a) (Glassware)                           | Disinfected by autoclaving and then sent for recycling through authorised recycler.                              |
|       |                  | Blue Category (b) (Metallic body implants)              | Disinfected by autoclaving and then sent for recycling through authorised recycler.                              |

### 11.3 References

- [https://censusindia.gov.in/2011census/dchb/3301\\_PART\\_B\\_DCHB\\_PUDUKKOTTAI.pdf](https://censusindia.gov.in/2011census/dchb/3301_PART_B_DCHB_PUDUKKOTTAI.pdf)
- <https://pudukkottai.nic.in/>
- <https://surveyofindia.gov.in/pages/downloads>
- <https://bhuvan-app1.nrsc.gov.in/bhuvan2d/bhuvan/bhuvan2d.php>
- <https://tnhighways.tn.gov.in/index.php/en/list-of-roads/statehighways>
- <http://cgwa-noc.gov.in/LandingPage/index.htm>
- <http://cgwb.gov.in/>
- <https://cpcb.nic.in/bio-medical-incinerators/>
- <https://tnpcb.gov.in/wastenew.php>

## CHAPTER 12

### **DISCLOSURES OF CONSULTANTS ENGAGED**

#### **12.1 The Names of the consultants engaged**

**Address: M/s. OLYMPIA ECO SOLUTIONS PRIVATE LIMITED**

No. 19/12, Bansali Chemical Avenue, SIDCO Industrial Estate, North Phase,

1st Cross Main Road, Ambattur, Chennai - 600098

Ph.: 044-48506222

E mail id – olympia.eiacons@gmail.com

**M/s. OLYMPIA ECO SOLUTIONS PRIVATE LIMITED (OESPL)** is environmental consultancy organization accredited by NABET- QCI. **Our consultancy Division** consists of highly qualified experienced professionals as accredited EIA team members from various functional areas. We conduct EIA study, Gap analysis, due diligence study, Initial Environmental and Social Assessment, environmental audits etc. to satisfy to various statutory requirements.

**Our Engineering Division and O&M Division** provides a turnkey project implementation in the area of Water and Wastewater Treatment and Allied Infrastructure development. Our group companies have highly specialized Technical strength with over 20 years of experience in the field of water treatment in India and abroad.

**OESPL** has successfully designed, engineered, manufactured, erected and commissioned more than 600 Water Treatment Plants with overall installed plant capacity of over 100 million liters of water per day all across the country and abroad, through their group concerns. Olympia has successfully applied the Zero Discharge & Reverse Osmosis Technology for the Treatment of Industrial effluents.

**OESPL** has also pioneered the trend of using Reverse Osmosis (RO) and Ultra Filtration (UF) technology for treatment of tertiary industrial effluent and municipal sewage in India & Abroad. Following are some of the technologies and systems used by Olympia, for implementation of projects for water & Waste Water Treatment.

By virtue of these advanced technologies and systems coupled with our quest for continuous improvement through extensive Research & Development (R&D) at Chennai and Madurai, Coimbatore & Dubai, we are able to offer comprehensive Water Treatment Solutions for all Industries & Applications.

**M/s. OLYMPIA ECO SOLUTIONS PRIVATE LIMITED**, through its group companies, has some very interesting and unique Water and Wastewater Treatment projects to its credit for either consultation or execution, we offer a wide range of innovative and cost-effective water and waste water treatment solutions through our various state of the art technologies.



Figure 12.1-Olympia NABET Certificate



**Table 12.1 Declaration for Involvement in EIA Study**

| <b>Project details</b>                            |                                                                                                                                                                                                                                                      |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name &amp; address</b>                         | M/s. Biotech Engineering Industries at S.F.No.17/7,<br>Pisanathur Village, Gandarvakottai Taluk, Pudukkottai District,<br>Tamil Nadu-613301                                                                                                          |
| <b>Status</b>                                     | Greenfield Project                                                                                                                                                                                                                                   |
| <b>Type</b>                                       | Establishment of Common Bio-medical Waste Treatment Facility<br>(CBWTF)                                                                                                                                                                              |
| <b>Category as per<br/>EIA Notification, 2006</b> | Category B- serial No.7[d (a)] in the schedule under EIA notification-2006                                                                                                                                                                           |
| <b>NABET Sector</b>                               | 32 A- Bio-medical waste treatment facilities                                                                                                                                                                                                         |
| <b>EIA consultant details</b>                     |                                                                                                                                                                                                                                                      |
| <b>Name &amp; address</b>                         | M/S. OLYMPIA ECO SOLUTIONS PRIVATE LIMITED<br>No. 19/12, Bansali Chemical Avenue, SIDCO Industrial Estate, North Phase,<br>1 <sup>st</sup> Cross Main Road, Ambattur, Chennai - 600098<br>Ph.: 044-48506222<br>E mail id – olympia.eiacons@gmail.com |
| <b>Status</b>                                     | NABET- QCI Accredited EIA Consultant<br>NABET/EIA/2225/RA 0271<br>Valid up to: 07.09.2025                                                                                                                                                            |
| <b>Details of Laboratory engaged in EIA study</b> |                                                                                                                                                                                                                                                      |
| <b>Name &amp; address</b>                         | M/s. Femo Labs Private Limited<br>No. 19/12, Bansali Chemical Avenue Road,<br>SIDCO Industrial Estate, Ambattur, Chennai-600098.                                                                                                                     |
| <b>Status</b>                                     | NABL certified laboratory<br>Certificate Number: TC-8645<br>Valid up to: 17.01.2029.                                                                                                                                                                 |



# **ANNEXURE – 01**

## **Sale Deed**

TP/148641370/8023



தமிழ்நாடு தமிழ்நாடு TAMILNADU

AA 083017

தேதி : 20/11/2023  
 பெயர் : P. கார்த்திக்  
 உண் : மெட்ரோபொலிஸ்  
 ரூபாய் : 5000/-

C.K. கார்த்திக்  
 மு.க.க. கார்த்திக்  
 மெட்ரோபொலிஸ்  
 உத்தரவு எண் 2/2023



1680/2023

கிரைய ஆவணம்

கிரையம்: ரூ. 1,56,250/-

மதிப்பு: ரூ. 1,56,250/-

2023-ம் ஆண்டு ஏப்ரல் மாதம் 21-ம் தேதி (இருபத்தி ஒன்று தேதி) தஞ்சாவூர் மாவட்டம் தஞ்சாவூர் தாலுக்கா மெடிக் கல் காலேஜ் இந்திரா நகர் கதவு எண் 6-3 என்ற முகவரியில் வசிக்கும் திரு. போலீஸ் அவர்களின் குமாரர்

**திரு. போ. கர்ணன்** (ஆதார் அடையாள அட்டை எண்: 4702 6029

9031, CELL NO: 9894818108) அவர்களுக்கு

எழுதிக்கொடுப்பவர்

P. K. கார்த்திக்

எழுதி வாங்குபவர்

திரு. போ. கர்ணன்

|    |                    |      |      |
|----|--------------------|------|------|
| 1  | புத்தகம்           | 2023 | 1680 |
| 12 | தாள்களைக் கொடுத்து |      |      |
| 1  | வரு குறு           |      |      |



தமிழ்நாடு தமிழ்நாடு TAMILNADU

AA 083018 AA 083018

தேதி : 20/4/2023  
பெயர் : P. ராஜ்  
ஊர் : திண்டிவனம்  
குபாய் : 5000/-

C.K. சிவசுந்தர்  
மு.தான் விநியோகப்பாளர்  
பஸ் ஸ்டாண்ட் ரோடு,  
சுற்றுலா கோட்டை,  
உபிரமம் எண்: 9/2000



(2)

தஞ்சாவூர் மாவட்டம், தஞ்சாவூர் தாலுக்கா, வல்லம் அருகில், திருக்கானூர்பட்டி, தேவாரம் நகர் பிளாட் எண் 50 இல்லத்தில் வசிக்கும் திரு.புருஷோத்தமன் குமாரர் திரு.ப.தனுஷ் ராஜ்(ஆதார் அட்டை எண்:4913 3513 2647,CELL NO:9894869582)ஆகிய நான் எழுதிக்கொடுத்த சுத்தக்கிரைய சாசன ஆவணம்.

எழுதிக்கொடுப்பவர்

எழுதிவாங்குபவர்

P. R.

சு.ராஜ்

|                 |           |         |      |
|-----------------|-----------|---------|------|
| 1               | பந்தம்    | 2023    | 1680 |
| 2               | நாற்குளம் | சு.ராஜ் |      |
| 2               | விநியோக   |         |      |
| சாப்பிடுவான்    |           |         |      |
| சுற்றுலா கோட்டை |           |         |      |



தமிழ்நாடு தமிழ்நாடு TAMILNADU

AS 978721

தேதி : 20/4/2023  
பெயர் : P. கர்ணன்  
கணர் : கிண்டி  
ரூபாய் : 500/-

C.K. சிவசுப்பிரமணியன்  
மு.தலாஸ் கல்வி கல்வி  
பஸ் ஸ்டாண்ட் ரோடு  
கத்திரிவகோட்டை  
உரிமம் எண்: 9/2000

(3)

என்னவென்றால், இந்த ஆவணத்தில் கண்ட சொத்தானது சென்ற 29-03-2023 தேதியில் எனது பெயருக்கு கிரையம் பெற்று மேற்கண்ட ஆவணம் கந்தர்வக்கோட்டை சார்பதிவகத்தில் 1 புத்தகம் 1363/2023 -ம் எண் ஆவணமாக பதிவு செய்யப்பட்டு என் பெயரில் பட்டா எண் 2450 மாறுதலாகி அதுமுதல் நான் ஆண்டு அனுபோகம் செய்து வந்த சொத்தை நான் தங்களிடம் கிரையம் விலை பேசி நிர்ணயம் செய்து கொண்ட ரூபாய்:1,56,250/- இந்த ரூபாய் ஒரு லட்சத்து ஐம்பத்தி ஆறாயிரத்து இரநூற்றி ஐம்பது நான் தங்களிடம் எனது குடும்பச் செலவுக்காக நேரில் ரொக்கமாக பெற்றுக்கொண்டு விட்டபடியால் இந்த ஆவணத்தில் கண்ட சொத்தை இதுவே சுத்தக்கிரைய சாசனமாய் தானாதி வினிமய விற்கிரையங்களுக்கு யோக்கியமாய் தங்கள் புத்திர, பெளத்திர பாரம்பரியமாய் ஆண்டு அனுபவித்துக்கொண்டு அதறிதள்ள சர்க்கார்திலவரி தீர்வையையும் தாங்களே செலுத்திக்கொண்டு பட்டாவையும்...ம் தங்கள் பெயருக்கே மாற்றிக்கொள்ள வேண்டியது.

எழுதிக்கொடுப்பவர்

2 வது தாள்

எழுதிவாங்குபவர்

P. D. சிவசுப்பிரமணியன்

சுப்பிரமணியன்





(5)

## சொத்து விபரம்

புதுக்கோட்டை பதிவு மாவட்டம் கந்தர்வகோட்டை துணைபதிவு மாவட்டம் கந்தர்வக்கோட்டை தாலுக்கா பிசானத்தூர் வட்டம் **பிசானத்தூர்** கிராமம் பட்டா எண்.2450.

சர்வே எண் 17-7 புன்செய் ஹெக் 0.62.5 முழுவதும் கிரையம் இதற்கு சமமான 1 ஏக்கர் 55 செண்ட் முழுவதும் கிரையம்.

மேற்கண்ட சொத்தின் தற்கால சந்தை மதிப்பு ரூ = 1,56,250/-

எழுதிகொடுப்பவர்

எழுதி வாங்குபவர்

P. D. [Signature]

[Signature]

சாட்சிகள்:

1. [Signature] ச/ சிவசுந்தரன், தஞ்சாவூர்

2. [Signature] ச/ சிவசுந்தரன், தஞ்சாவூர்

வரைவு தயார் செய்தவர்:



[Signature]

A.T.S. சுப்ரமணியம்

சுவண எழுத்தர் உரிமம் எண் B10/90/pui

கந்தர்வக்கோட்டை

செல்: 9486606072

திருவோணம் A.T.S. சுப்ரமணியம், உரிமம் எண் B10/90/pui.

கணினி வழங்கியவர்: S.S. VELMURUGAN.B.E.

செல்வமுருகன் கம்யூட்டர் பிரிண்டர்ஸ், கந்தர்வக்கோட்டை, தஞ்சாவூர்

2023 1680

12/5

தஞ்சாவூர்

சுப்பிரமணியம்

கந்தர்வக்கோட்டை

சொத்தானது நீர்நிலை பகுதியில் அமையப் பெறவில்லை என்பதற்கான  
சான்று/உறுதிமொழி(Declaration)(நீதிபேராணை எண் 22163/2018ல்  
வழங்கப்பட்ட தீர்ப்புரையைகாண்க)

இந்த ஆவணத்தில் கண்ட சொத்தானது நீர்நிலைகள் நீர்வழிப்பாதைகள் நீர்பிடிப்பு பகுதிகளில் கட்டுப்படவில்லை என சான்றளிக்கிறோம்.மேலும் இதனில் தங்களுக்கு தவறான தகவல் அல்லது சான்று அளிக்கப்பட்டதாக பின்னாளில் கண்டுபிடிக்கப்பட்டால் அதனால் நான்/நாங்கள் சட்ட பூர்வ நடவடிக்கைகளுக்கு உட்படுத்தப்படுவோம் என்பதையும் அறிவேன்/அறிவோம்.

ஆவணத்தை எழுதிகொடுப்பவர்கள்

P. D. [Signature]

ஆவணத்தை எழுதிபெறுபவர்கள்

[Signature]

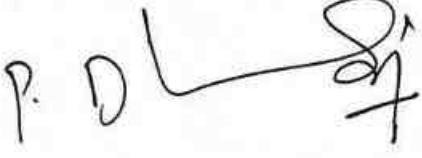
1 பத்தகம் 2023 1680  
12 நூல்களளக்கொண்டது  
6 வகுதான்  
சான்பதிவாளர்  
கந்தர்வக்கோட்டை





R/கந்தர்வகோட்டை/புத்தகம்-1/1680/2023

2023 ஆம் ஆண்டு ஏப்ரல் மாதம் 21ம் தேதி மு.ப. 11:27 மணியளவில் கந்தர்வகோட்டை சார்பதிவாளர் அலுவலகத்தில் தாக்கல் செய்து கட்டணம் ₹ 3,355/- செலுத்தியவர்.

|                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <p>இடது பெருவிரல்</p>                                             |  <p>கூடுதல் விவரங்கள் ஆவண வாசகத்தில் உள்ளபடி</p>                                                                                                                                                                                                                                                    |                                                                                       |
| <p>எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர்<br/>இடது பெருவிரல்</p>   |  <p>"சம்மதத்துடன் கூடிய ஆதார் அங்கீகாரம்" என்ற வழி இந்த நபரின் அடையாளம் விரல் ரேகை மூலம் ஆதார் ஆணையத்துடன் சரிபார்க்கப்பட்டது. ஒப்பீட்டு எண் :<br/>UKC:946947ad863d83b6de49b09d0fa660a0818653<br/>(Details from UIDAI : Dhanush Raj Purushothaman S/O: Purushothaman, 05-03-1992, xxxxxxxx2647)</p> |    |
| <p>எழுதி வாங்கியதாக ஒப்புக் கொண்டவர்<br/>இடது பெருவிரல்</p>   |  <p>"சம்மதத்துடன் கூடிய ஆதார் அங்கீகாரம்" என்ற வழி இந்த நபரின் அடையாளம் விரல் ரேகை மூலம் ஆதார் ஆணையத்துடன் சரிபார்க்கப்பட்டது. ஒப்பீட்டு எண் :<br/>UKC:602325e04add235e52473c882cdb1fbc60d7e2<br/>(Details from UIDAI : Karnan Police S/O Police, 15-02-1974, xxxxxxxx9031)</p>                   |  |

2023 ஆம் ஆண்டு ஏப்ரல் மாதம் 21ம் நாள்

  
 ஸ்ரீகாந்த் ப  
 சார்பதிவாளர்  
 கந்தர்வகோட்டை

2023 1620  
 புத்தகம்.....ம் வருடத்திய.....ம் ஆவணம்  
 12.....தாள்களைக்கொண்டது  
 7.....வது தாள்  
 சார்பதிவாளர்  
 கந்தர்வகோட்டை

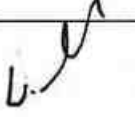


R/கந்தர்வகோட்டை/புத்தகம்-1/1680/2023

R/கந்தர்வகோட்டை/புத்தகம்-1/1680/2023 எண்ணாகப் பதிவு செய்யப்பட்டது.

நாள்: 21/04/2023

கந்தர்வகோட்டை



மூலகந்த ப

சார்பதிவாளர்  
கந்தர்வகோட்டை



1 புத்தகம் 2023 1680  
12 ம் வருடத்திய ம் ஆவணம்  
8 தாள்களைக்கொண்டது  
8 வது தாள்  
சார்பதிவாளர்  
கந்தர்வகோட்டை



தமிழக அரசு

வருவாய்த் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

மாவட்டம் : புதுக்கோட்டை

வட்டம் : கத்தரவகோட்டை

வருவாய் கிராமம் : பிசானத்தூர்

பட்டா எண் : 2450

உரிமையாளர்கள் பெயர்

1. புருஷோத்தமன்

மகன்

தனுஷ் ராஜ்

| புல எண் | உட்பிரிவு | புன்செய்    |         | நன்செய்     |         | மற்றவை      |         | குறிப்புரைகள்                               |
|---------|-----------|-------------|---------|-------------|---------|-------------|---------|---------------------------------------------|
|         |           | பரப்பு      | தீர்வை  | பரப்பு      | தீர்வை  | பரப்பு      | தீர்வை  |                                             |
|         |           | ஹெக்ட - ஏர் | ரூ - பை | ஹெக்ட - ஏர் | ரூ - பை | ஹெக்ட - ஏர் | ரூ - பை |                                             |
| 17      | 7         | 0 - 62.50   | 0.77    | --          | --      | --          | --      | 2023/0103<br>/22/241542---<br>-- 29-03-2023 |
|         |           | 0 - 62.50   | 0.77    |             |         |             |         |                                             |

குறிப்பு2 :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 22/13/017/02450 /110731 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 20-04-2023 அன்று 11:04:43 AM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

1 பத்திரம் 2023 1680

12 நாளைக்குகொண்டது

9 வருது துள்

சாப்பிடுவாளர்  
கத்தரவகோட்டை



**இந்திய அரசாங்கம்**  
Government of India

கர்ணன் போலீஸ்  
Karnan Police

பிறந்த நாள் / DOB 15/02/1974  
ஆண்பால் / Male

4702 6029 9031

எனது ஆதார், எனது அடையாளம்

**இந்திய தனிப்பட்ட அடையாள ஆணையர்**  
Unique Identification Authority of India

முகவரி S/O போலீஸ், 6/3, 12  
தெரு, இந்திரா நகர், மெடிக்கல்  
காலேஜ் ரோடு, தஞ்சாவூர்,  
வவுசி நகர், தமிழ் நாடு. 613007

Address: S/O Police, 6/3, 12  
STREET, INDRA NAGAR,  
MEDICAL COLLEGE ROAD,  
Thanjavur, Voc Nagar, Tamil  
Nadu, 613007

4702 6029 9031

1947

help@uidai.gov.in

www.uidai.gov.in

*சுஜி*

2022 1680

1. பிறந்த நாள் ..... ம் வருடத்திய ..... ம் திதியின்

12. தாள் களைக்கொண்டது

10. வது தான்

சான்றிவராள்

கத்திடக்கொண்டது

**இந்திய அரசாங்கம்**  
**Government of India**

தனுஷ் ராஜ் புருஷோத்தமன்  
 Dhanush Raj Purushothaman  
 பிறந்த நாள் / DOB : 05/03/1992  
 ஆண்பால் / Male

4913 3513 2647

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

**இந்திய அரசாங்கம்**  
**Government of India**

ஆதார்  
 முகவரி:  
 தந்தை / தாய் பெயர்:  
 புருஷோத்தமன் பண்ட எண் 50.  
 தேவாரம் தகர், வல்லம்  
 அருவி, தஞ்சாவூர் தாலுக்கா.  
 திருக்கானுர்பட்டி, தஞ்சாவூர்.  
 திருக்கானுர்பட்டி, தமிழ் நாடு.  
 613303

Address:  
 S/O: Purushothaman, PLOT NO  
 50, DEVARAM NAGAR, NEAR  
 VALLAM, THANJAVUR TALUK,  
 Thirukanurpatti, Thanjavur,  
 Tirukanurpatti, Tamil Nadu,  
 613303

4913 3513 2647

1947  
 1800 300 1947

help@uidai.gov.in

www.uidai.gov.in

P. D. S.

2023 1680

..... இந்திய மின்னணுவியல் .....  
 P2 .....  
 1/ .....  
 ..... வசூலிப்பது

L. J.

செய்தியைச்  
 சந்தர்ப்பக்கோட்பாடு



**இந்திய அரசாங்கம்**  
Government of India

புலீஸ் குழந்தைசாமி  
Police Kulandaisamy

தந்தை குழந்தைசாமி  
Father : Kulandaisamy

பிறந்த நாள் / DOB : 04/03/1941

ஆண்பால் / Male

9875 0284 2873

எனது ஆதார், எனது அடையாளம்

**Unique Identification Authority of India**

முகவரி: S/O: குழந்தைசாமி, 6/3  
12வது தெரு, இந்திரா நகர்  
மும்பனார் காலனி, எம் சி ரோடு.  
தஞ்சாவூர், தஞ்சாவூர், வ உ சி  
நகர், தமிழ் நாடு. 613007

Address: S/O: Kulandaisamy, 6/3  
12TH STREET, INDRA NAGAR  
MOOPANAR COLONY, M C  
ROAD, thanjavur, Thanjavur, Voc  
Nagar, Tamil Nadu, 613007

9875 0284 2873

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16.11.2023

**இந்திய அரசாங்கம்**  
Government of India

திவாகர் மதியழகன்  
Dhivahar Mathiyalagan

பிறந்த நாள் / DOB : 05/05/1995

ஆண்பால் / Male

6870 6433 0093

ஆதார் - சாதாரண மனிதனின் அதிகாரம்

**Unique Identification Authority of India**

முகவரி: தாய் பெயர்:  
மதியழகன், 159, ஞானம் நகர்,  
8வது குறுக்கு தெரு, தஞ்சாவூர்  
தாலுக்கா, பின்னையல்லூர்,  
மாரியம்மன்கோயில், தஞ்சாவூர்,  
தமிழ் நாடு, 613501

Address:  
S/O: Mathiyalagan, 159,  
GNANAM NAGAR, 8TH CROSS,  
THANJAVUR TALUK, Pinnai  
Nallur, Mariammancoll, Thanjavur,  
Tamil Nadu, 613501

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1800 300 1947

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M-15

1 முதலாம் 2023

12 தாள்களைக் கொண்டு

12 வது தாள்

சார்புரிவாளர்  
சந்தர்வர்கோன்





## **ANNEXURE – 02**

### **Land Use Classification**

அனுப்புநர்  
திரு. Ar.பிரபாகரன் .A. B.Arch., M.C.P.,  
துணை இயக்குநர் (பொ),  
மாவட்ட நகர் ஊரமைப்பு அலுவலகம்.  
எண்.2, முன்னால் படைவீரர் நல அலுவலகம்  
முதல் தளம், கல்யாணராமபுரம் முதல் வீதி,  
திருக்கோகர்ணம் அஞ்சல்,  
புதுக்கோட்டை- 622002.  
E.Mail id:dtcp.pudukottai@gmail.com  
Phone No.04322-236699

பெறுநர்  
திரு.கர்ணன்,  
12-முதல் தெரு,  
அபிராமபுரம்,  
தஞ்சாவூர்-613007,

ந.க.எண்.586/2023- புமா

நாள் . 08.05.2023

திருவள்ளூர் ஆண்டு 2054, சோபகிருது வருடம்,சித்திரை திங்கள் 25-ஆம் நாள்

**பொருள்** நில உபயோக விபரம் (Land use) - மாவட்ட நகர் ஊரமைப்பு அலுவலகம். புதுக்கோட்டை மாவட்டம் - கந்தர்வக்கோட்டை வட்டம் - பிசானத்தூர் கிராமம் - சர்வே எண். 17/7 - நில உபயோக விபரம் வழங்க கோரியது - குறித்து.

**பார்வை** 1. மனுதாரர் திரு .P.கர்ணன் அவர்களின் கடிதம், நாள் .04.05.2023  
2. நகர் ஊரமைப்பு இயக்குநர், சென்னை அவர்களின் கடிதம் ந.க.எண். T12-2011. நாள் .22.9.2011 (14.9.2011-ல் நடைபெற்ற அலுவலர் கூட்ட நடவடிக்கை).

பார்வை 1 இல் கண்ட தங்கள் கடிதத்தில் மேற்குறிப்பிட்ட இடத்திற்கு நில உபயோகச் சான்று கோரப்பட்டது தொடர்பாக கீழ்க்கண்ட விவரங்கள் தெரிவிக்கப்படுகிறது.

1. புதுக்கோட்டை மாவட்டம், கந்தர்வக்கோட்டை வட்டம், பிசானத்தூர் கிராமம், சர்வே எண். 17/7-ல் அமையும் பகுதிக்கு நகர் ஊரமைப்பு சட்டம் 1971-ன்படி இத்துறையால் எவ்வித நில உபயோகமும் வகைப்படுத்தப்படவில்லை. திட்டமில்லாத பகுதியில் அமைகிறது.
2. மேலும் மேற்கூறிய இடத்தில் எந்த உபயோகத்திற்காகவும் மனைப்பிரிவு, கட்டிடம் கட்டுவதற்கு முன் நகர் ஊரமைப்பு சட்டம் 1971 பிரிவு 47A-ன்படி நகர் ஊரமைப்பு துறையின் முன் அனுமதி பெற்ற பின்னரே கட்டிடம் கட்டப்பட வேண்டும். இத்துறையின் அனுமதி பெறப்படாத மேம்பாடுகள் அனைத்தும் அனுமதியற்ற கட்டுமானமாக கருதப்படும். மனை இடத்தில் நிறுவனம் செயல்பட்டு வரும் பட்சத்தில் இத்துறையின் அனுமதி பெறப்படாத காரணத்தால் இந்த நிலஉபயோகச் சான்று இக்கட்டிடத்திற்கு பொருந்தாது.



3. மேற்படி இடம் அறிவிப்பு செய்யப்பட்ட மலையிடப் பகுதி மற்றும் கடற்கரை கட்டுப்பாட்டுப் பகுதியிலும் அமையவில்லை.
4. நில உபயோகவிபரம் தகவலுக்காக மட்டுமே வழங்கப்படுகிறது. இதனை இத்துறையின் சட்டப்படியான அனுமதியாகவோ, மனைப்பிரிவு, கட்டிட அனுமதி, நிறுவன அனுமதியாகவோ, தடையின்மைச் சான்றாகவோ கருதக் கூடாது எனவும் தெரிவிக்கப்படுகிறது. மேலும் இதனை நீதிமன்ற வழக்கு சம்பந்தமான ஆவணமாகவோ பதிவுத்துறை சம்பந்தமான ஆவணமாகவோ, நிறுவன அனுமதி தொடர்பான ஆவணமாகவோ பயன்படுத்தக் கூடாது எனவும் தெரிவிக்கப்படுகிறது.

துணை இயக்குநர் (பொ),  
மாவட்ட நகர் ஊரமைப்பு அலுவலகம்,  
புதுக்கோட்டை.  
பாடுசாலை 8/10/23

**ANNEXURE – 03**

**Newspaper Advertisement from TNPCB**

**dated on 11.11.2018**

## Newspaper Advertisement From TNPCB dated on 11.11.2018

The Hindu 11-11-2018

**TAMILNADU POLLUTION CONTROL BOARD**

**Tamilnadu Pollution Control Board invites application from the project proponents to identify suitable land and to establish Common Bio-medical Waste Treatment and Disposal Facility in the State of Tamilnadu.**

Common Bio-medical Waste Treatment and Disposal Facility (CBWTF) is a facility to treat biomedical waste generated from health care facilities located in Tamilnadu.

There are 11 Common Bio-medical Waste Treatment and Disposal Facilities located in Kancheepuram (2 Nos), Coimbatore (2 Nos), Thanjavur, Vellore, Virudhunagar, Salem, Tirunelveli, Nilgiris and Ramanathapuram Districts. In addition, three common facilities are under establishment in Tiruvallur, Cuddalore and Tiruppur Districts.

As per the Biomedical Waste Management Rules, 2016, the Biomedical waste generated from Hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks, ayush hospitals, clinical establishments, research or educational institutions, health camps, medical or surgical camps, vaccination camps, blood donation camps, first aid rooms of schools, forensic laboratories and research labs should be treated properly as per the said Rules.

As the generation of the biomedical waste is increasing and need to be treated, there is necessity for establishment of more number of Common Biomedical Waste Treatment and Disposal Facilities in Tamilnadu and as per Rule 6 of the Biomedical Waste Management Rules, 2016, State Pollution Control Board is responsible to monitor the proper management of the Biomedical waste.

**Member Secretary,  
Tamilnadu Pollution Control Board,  
Chennai.**

DIPR/1501/Display/2018



# **ANNEXURE – 04**

## **Terms of Reference Issued by SEIAA on 22/10/2024**



**File No: 11227**  
**Government of India**  
**Ministry of Environment, Forest and Climate Change**  
**(Issued by the State Environment Impact Assessment Authority(SEIAA),**  
**TAMIL NADU)**

\*\*\*



Dated 22/10/2024



To,

Thiru. KARNAN  
Thiru. KARNAN  
No.12, First street, Abiramapuram, M.C. Road, Thanjavur - 613007, Tamil Nadu., PUDUKKOTTAI,  
TAMIL NADU, 613007  
biotechengineering2023@gmail.com

**Subject:** Grant of Terms of Reference under the provision of the EIA Notification 2006-as amended regarding.

**Sir/Madam,**

SEIAA, TN – Proposed Common Biomedical Waste Treatment Facility (CBWTF) at S.F. No: 17/7 of Pisanathur Village, Gandarvakottai Taluk, Pudukkottai District, Tamil Nadu by M/s. Biotech Engineering Industries., – Category “B1” & Schedule Item No. 7(da)-“Bio-Medical Waste Treatment Facilities” of EIA Notification, 2006 – Issue of Terms of References (ToR) with Public Hearing – Regarding

**Ref:**

1. Online Proposal No. SIA/TN/INFRA2/494961/2022 dated 02.09.2024.
2. Your application for Terms of Reference dated: 04.09.2024.
3. Minutes of the 501st Meeting of SEAC held on 27.09.2024.
4. Minutes of the 764th Meeting of SEIAA held on 14.10.2024.

2. The particulars of the proposal are as below :

|                                            |                                                             |
|--------------------------------------------|-------------------------------------------------------------|
| (i) TOR Identification No.                 | TO24B3301TN5162069N                                         |
| (ii) File No.                              | 11227                                                       |
| (iii) Clearance Type                       | TOR                                                         |
| (iv) Category                              | B1                                                          |
| (v) Project/Activity Included Schedule No. | 7(da) Bio-Medical Waste Treatment Facilities                |
| (vii) Name of Project                      | Proposed Common Biomedical Waste Treatment Facility (CBWTF) |
| (viii) Name of Company/Organization        | KARNAN                                                      |
| (ix) Location of Project (District, State) | PUDUKKOTTAI, TAMIL NADU                                     |
| (x) Issuing Authority                      | SEIAA                                                       |

|                                             |    |
|---------------------------------------------|----|
| (xii) Applicability of General Conditions   | no |
| (xiii) Applicability of Specific Conditions | no |

1. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1 (Part A and B) were submitted to the SEIAA for an appraisal by the SEAC under the provision of EIA notification 2006 and its subsequent amendments.

2. The above-mentioned proposal has been considered by (SEIAA) Appraisal Committee of SEIAA in the meeting held on 14/10/2024. The minutes of the meeting and all the Application and documents submitted [(viz. Form-1 Part A, Part B,)] are available on PARIVESH portal which can be accessed by scanning the QR Code above.

3. The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations on all technical aspects recommended the proposal for grant of Terms of Reference under the provision of EIA Notification, 2006 and as amended thereof subject to the stipulation of specific and general conditions as detailed in Annexure (2).

4. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the SEAC hereby decided to issue the following Terms of Reference for instant proposal of Thiru. KARNAN under the provisions of EIA Notification, 2006 and as amended thereof.

5. The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.

6. The Terms of Reference to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.

7. This issues with the approval of the Competent Authority.

8. The TORs prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per O.M. No. J-11013/41/2006-IA-II (I)(part) dated 29th August, 2017.

#### **Copy To**

1. The Principal Secretary to Government, Environment, Climate Change and Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
2. The , Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi - 110 032.
3. The Chairperson, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.
4. The APCCF (C), Regional Office, MoEF & CC (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai - 34.
5. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC, Paryavaran Bhavan, CGO Complex, New Delhi - 110 003.
6. Stock File.

#### **Annexure 1**

#### **Specific Terms of Reference for (Bio-medical Waste Treatment Facilities)**

#### **1. Seac Conditions - Site Specific**

| <b>S. No</b> | <b>Terms of Reference</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1.1</b>   | <p>1. The PP shall discuss the alternative sites to the proposed site. Preferably, alternative site should be away from the residential area, sensitive area, water body and may be selected in discussion with PCB. The details of the same shall be included in the EIA report. Also, the Site suitability report for the proposed site shall be obtained from the TNPCB.</p> <p>2. The PP shall furnish the gap-analysis studies undertaken by the concerned SPCBs duly</p> |

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | <p>highlighting the difference in the BMW generated vis-à-vis the treatment capacity available.</p> <p>3. Enumerate the details of habitations/residential area, sensitive area upto 2km radius and the implication of the proposal with particular reference to wind direction, both monsoon seasons shall be included in the EIA report. The CBMWTF should have a buffer distance of preferably 500 m so that it shall have minimal impact on these areas.</p> <p>4. Enumerate the details of nearby water bodies i.e., tank &amp; reservoir, water table upto 2km radius and the implication of the proposal shall be included in the EIA report. Also, implication of the proposal on the Pisanathur lake located at 650m shall be included.</p> <p>5. Enumerate the details of agriculture, type of crops, harvesting period and the implication of the proposal shall be included in the EIA report. Also, the implication on flora &amp; fauna shall be included in the EIA report.</p> <p>6. The Proponent shall furnish the details on Vehicle-wise route chart for collection, transportation of bio-medical waste from the member HCFs, No. of vehicles and feature of vehicles, etc., Also, details of the existing access road(s)/walkways to the designed operations in the site and its layout.</p> <p>7. The PP shall furnish an affidavit stating that he will not extract the Ground water for the proposed activity and shall obtain commitment letter for connection for fresh water supply and disposal of excess treated water from the local body /TWAD.</p> <p>8. Details of the treatment equipment's capacity and detailed design specification of the proposed incinerator, Autoclave, shredders, etc., shall be included.</p> <p>9. Details of various state of art of technology available for this filed and justification for selection of a particular technology.</p> <p>10. Details of the incineration system – a statement on the compliance to CPCB guidelines for common bio medical waste incinerators in respect of waste feed cut-offs, operating parameters of combustion chambers, flue gas cleaning, ash handling, etc.</p> <p>11. Details on fuel requirement for incineration.</p> <p>12. Details on flue gas emissions discharge through stack and proposed pollution control technologies.</p> <p>13. Land requirement for the facility including its break up for various purposes, its availability and optimization.</p> <p>14. Details of proposed layout clearly demarcating various activities such as security, Waste Storage Rooms, Waste Treatment Equipment Rooms/Areas, Treated Waste Storage Room, Pollution Control Devices like APCS and ETP, ash storage/disposal area, vehicle washing areas, and others such as admin area, worker's room, health centres, greenbelt, etc.</p> <p>15. Details of waste storage facilities/rooms.</p> <p>16. Details on residue/ash generation and management.</p> <p>17. Details of waste heat utilization, if any.</p> <p>18. Details of the proposed overall safety and health protection measures.</p> <p>19. Land use map based on satellite imagery including location specific sensitivities such as national parks / wildlife sanctuary, villages, industries, etc.</p> <p>20. Topography details.</p> <p>21. Surface water quality of nearby water bodies.</p> <p>22. Details on proposed groundwater monitoring wells, locations, frequency of monitoring, parameters, etc.</p> <p>23. Action plan for the greenbelt development in accordance to CPCB guidelines.</p> <p>24. Details on pollution control technologies and online monitoring equipment.</p> <p>25. Details on monitoring of pollutants at source –performance of the incinerator, including operating hours, fuel consumption, operating parameters (Combustion chamber – temperature, pressure, Stack temperature, total particulate matter, HCl, NOx as per Bio Medial Waste (Management &amp; Handling) Rules 1998.</p> <p>26. Stack and fugitive emissions may be monitored for SPM, HCL &amp; NO2 as per Bio Medial Waste (Management &amp; Handling) Rules 2016.</p> <p>27. Specific programme to monitor safety and health protection of workers.</p> |

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | <p>28. Details of administrative and technical organizational structure.</p> <p>29. Details of the emergency preparedness plan and on-site &amp; off-site disaster management plan. Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural and man-made disaster.</p> <p>30. The EIA/EMP shall conform to the 'Revised Guidelines for Common Bio-medical Waste Treatment and Disposal Facilities' issued by the Central Pollution Control Board.</p> <p>31. PP shall strive to generate a minimum of 50% of energy consumption by way of solar energy.</p> <p>32. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project will be given.</p> <p>33. The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP will be clearly spelt out.</p> |

## 2. Seiaa Specific Conditions:

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.1   | <p>After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant Terms of Reference (TOR) with Public Hearing subject to the conditions as recommended by SEAC &amp; normal conditions in addition to the followings ToRs.</p> <ol style="list-style-type: none"> <li>1. As per the MoEF&amp; CC office memorandum F.No.22-65/2017-IA.III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan.</li> <li>2. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.</li> <li>3. The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.</li> <li>4. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.</li> <li>5. The Environmental Impact Assessment should study impact on standing trees and the trees should be numbered.</li> <li>6. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and hydrological cycles.</li> <li>7. The Environmental Impact Assessment should study impact on climate change, GHG emissions, temperature rise, pollution and above soil &amp; below soil carbon stock.</li> <li>8. The Environmental Impact Assessment shall include study of impact of the proposed activity on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways.</li> <li>9. The project proponent shall furnish the details of trees in the project site with all trees numbered and protected.</li> <li>10. The project proponent shall furnish a detailed study on the impact of proposed activity with mitigation measures on the nearby environmental fragile areas.</li> <li>11. The project proponent shall furnish the detailed study on health with regard to respiratory distress due to allergens on workers and nearby villagers.</li> <li>12. The project proponent shall furnish the impact on dust pollution on the nearby habitation and livelihoods.</li> <li>13. The project proponent shall furnish the Risk assessment plan, EMP and Disaster management plan which should be prepared after thorough study.</li> <li>14. The GPS co-ordinates for the boundaries at the green belt proposed &amp; proposed project site shall be furnished separately.</li> <li>15. Air quality modelling study shall be conducted for the CPCB primary air pollutants specified by considering the impact on the proposed plant to the nearby villages.</li> </ol> |



| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | <p>16. The details of quantity of steam to be generated, fuel and equipment to be used shall be furnished.</p> <p>17. The proponent shall ensure that the activities do not cause any damage to water environment, air quality and are carbon neutral.</p> <p>18. The proponent shall ensure that the activities undertaken do not result in carbon emission and temperature rise in the area.</p> <p>19. The activities shall not in any no way cause emissions and build-up of Green House Gases. Action plan shall be furnished for eco-friendly actions that support sustainable management of the natural resources within and outside the plant premises.</p> <p>20. Details regarding the implementation of 4R (Recycle/reduce/reuse/recover) principle in the plant shall be furnished.</p> <p>21. The Proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality &amp; flora/fauna.</p> <p>22. Measures proposed for prevention of odour emanating from solid waste processing plant and STP.</p> <p>23. The Environmental Impact Assessment shall include Study on the energy conservation measures conforming to energy conservation norms prescribed by the Bureau of Energy Efficiency.</p> <p>24. Impact of the proposed activity on soil, water and air envisaged shall be studied and mitigation measures proposed shall be detailed.</p> |

**Standard Terms of Reference for (Bio-Medical Waste Treatment Facilities)**

**1. Project Details**

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1   | Importance and benefits of the project.                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 1.2   | Reasons for selecting the site with details of alternate sites examined/rejected/selected on merit with comparative statement and reason/basis for selection. The examination should justify site suitability in terms of environmental damages, resources sustainability associated with selected site as compared to rejected sites. The analysis should include parameters considered along with weightage criteria for short-listing selected site. |
| 1.3   | The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.                                                                                                                                                                                                                                                                                                                |
| 1.4   | Details of various waste management units with capacities for the proposed project. Details of utilities indicating size and capacity to be provided.                                                                                                                                                                                                                                                                                                   |
| 1.5   | List of waste to be handled and their characteristics. Details of temporary storage facility for storage of Bio-medical waste at project site.                                                                                                                                                                                                                                                                                                          |
| 1.6   | Other chemicals and materials required with quantities and storage capacities.                                                                                                                                                                                                                                                                                                                                                                          |
| 1.7   | Detailed design of pre-treatment and waste stabilization facility of Biomedical waste.                                                                                                                                                                                                                                                                                                                                                                  |
| 1.8   | Project proponents would also submit a write up on how their project proposal conform to the                                                                                                                                                                                                                                                                                                                                                            |

| S. No | Terms of Reference                                                                                                                                            |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | stipulations made in the Bio-Medical Waste Management Rules, 2016 , notified by the MoEF&CC on 28th March, 2016.                                              |
| 1.9   | Process description along with major equipment and machineries, process flow sheet (quantitative) from Bio-Medical waste material to disposal to be provided. |
| 1.10  | Details of man-power requirement (regular and contract).                                                                                                      |
| 1.11  | A detailed layout of the project site indicating all the project components.                                                                                  |

## 2. Road And Traffic

| S. No | Terms of Reference                                                                                     |
|-------|--------------------------------------------------------------------------------------------------------|
| 2.1   | Submit the details of the road/rail connectivity along with the likely impacts and mitigative measures |
| 2.2   | Examine the details of transportation of Bio-Medical wastes, and its safety in handling.               |

## 3. Land Environment

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.1   | Detailed soil analysis of the site including its permeability, water holding capacity be included.                                                                                                                                                                                                                                                                                                                                                               |
| 3.2   | Submit the present land use and permission required for any conversion such as forest, agriculture etc                                                                                                                                                                                                                                                                                                                                                           |
| 3.3   | Specify the land area and space allotted for each activity proposed within the facility. The area requirements for each activity shall be calculated as per the CPCB guidelines for the specified activity.                                                                                                                                                                                                                                                      |
| 3.4   | Status of the land purchases in terms of land acquisition Act. If acquisition is not complete, stage of the acquisition process and expected time of complete possession of the land.                                                                                                                                                                                                                                                                            |
| 3.5   | The EIA would address to the conformity of site to the stipulations as made in the Bio-Medical Waste Management Rules, 2016 and Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016 and will have a complete chapter indicating conformity to the said rules. NOC shall be obtained from State Pollution Control Board/Committee (SPCB/SPCC) regarding site suitability for establishment of Bio-Medical Waste Treatment Facilities. |
| 3.6   | Post project reclamation management program with financial allocation.                                                                                                                                                                                                                                                                                                                                                                                           |

## 4. Environmental Monitoring And Management

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.1   | Examine and submit the details of on line pollutant monitoring.                                                                                                                                                                                                                                                                                                                                                                                                   |
| 4.2   | Project proponent must ensure Good Combustion Practice (GCP) to reduce the possibilities of formation of 'Total dioxins and furans'. In addition, GCP must be coupled with appropriate End-of-the-pipe treatment at low temperature to reduce the emission of 'Total dioxins and furans' below the standards. Further, the project proponent must provide detailed Standard operating procedure (SOPs) for sampling and monitoring of 'Total dioxins and furans'. |
| 4.3   | Environmental Management Plan should be accompanied with Environmental Monitoring Plan and environmental cost and benefit assessment. Regular monitoring shall be carried out for odour control                                                                                                                                                                                                                                                                   |
| 4.4   | Water quality around the landfill site shall be monitored regularly to examine the impact on the ground water.                                                                                                                                                                                                                                                                                                                                                    |
| 4.5   | A detailed draft EIA/EMP report should be prepared in accordance with the above additional TOR and should be submitted to the Ministry in accordance with the Notification.                                                                                                                                                                                                                                                                                       |
| 4.6   | Air Quality Index shall be calculated for base level air quality.                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4.7   | Baseline data on Ground water quality is required.                                                                                                                                                                                                                                                                                                                                                                                                                |
| 4.8   | Possible carbon footprint contribution from each activities and mitigation measures proposed shall be included as part of Environment Management Plan.                                                                                                                                                                                                                                                                                                            |

## 5. Waste Management

| S. No | Terms of Reference                                                                                                                                                                                                         |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5.1   | Examine and submit details of the proposed odour control measures.                                                                                                                                                         |
| 5.2   | The storage and handling of Bio-Medical wastes shall be as per the Bio-Medical Waste Management Rules, 2016.                                                                                                               |
| 5.3   | Details of storage and disposal of pre-processing and post-processing rejects/inerts and products. List of proposed end receivers for the rejects/inerts/products should be provided. MoUs to be submitted in this regard. |
| 5.4   | Details of hazardous/solid waste generation and their management.                                                                                                                                                          |

## 6. Water Environment

| S. No | Terms of Reference                                                                                              |
|-------|-----------------------------------------------------------------------------------------------------------------|
| 6.1   | Detailed hydro-geological studies and possible impact if any accidental contamination occurs shall be included. |
| 6.2   | Examine and submit details of monitoring of water quality around the landfill site.                             |

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                             |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.3   | Examine and submit details of impact on water body and mitigative measures during rainy season.                                                                                                                                                                                                                                                                |
| 6.4   | Details of Drainage of the project up to 5 km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided. |

## 7. Water Management

| S. No | Terms of Reference                                                                                                                                                                                                                                                      |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7.1   | Details of effluent treatment and recycling process.                                                                                                                                                                                                                    |
| 7.2   | A certificate from the local body supplying water, specifying the total annual water availability with the local authority, the quantity of water already committed, the quantity of water allotted to the project under consideration and the balance water available. |

## 8. Energy Management

| S. No | Terms of Reference                                                                                                                       |
|-------|------------------------------------------------------------------------------------------------------------------------------------------|
| 8.1   | A certificate of adequacy of available power from the agency supplying power to the project along with the load allowed for the project. |

## 9. Disaster Management Plan

| S. No | Terms of Reference                                                                                                              |
|-------|---------------------------------------------------------------------------------------------------------------------------------|
| 9.1   | Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural and man-made disaster. |
| 9.2   | Hazard identification and proposed mitigation measures.                                                                         |

## 10. Green Belt

| S. No | Terms of Reference                          |
|-------|---------------------------------------------|
| 10.1  | A detailed Plan for green belt development. |

## 11. Socioeconomic Environment

| S. No | Terms of Reference                                                                                                                                                                                                                                                                              |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.1  | Public hearing to be conducted for the project in accordance with provisions of Environmental Impact Assessment Notification, 2006 and the issues raised by the public should be addressed in the Environmental Management Plan. The Public Hearing should be conducted based on the ToR letter |

| S. No | Terms of Reference                                                                                                                                                                     |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | issued by the Ministry and not on the basis of Minutes of the Meeting available on the web-site.                                                                                       |
| 11.2  | The project proponents shall satisfactorily address all the complaints/suggestions that have been received against the project till the date of submission of proposals for Appraisal. |

## 12. Court Cases

| S. No | Terms of Reference                                                                                                                               |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 12.1  | Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given. |

## 13. Miscellaneous

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                        |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 13.1  | Any further clarification on carrying out the above studies including anticipated impacts due to the project and mitigative measure, project proponent can refer to the model ToR available on Ministry website <a href="http://moef.nic.in/Manual/Incinerator">http://moef.nic.in/Manual/Incinerator</a> |

Signature Not Verified

Digitally Signed by : A R Rahul Nadh IAS  
Member Secretary, SEIAA

Date: 22/10/2024 ☐



# **ANNEXURE – 05**

## **Site Suitability Letter MS**



## TAMIL NADU POLLUTION CONTROL BOARD

**From**

Thiru R Kannan, M.Tech.,  
Member Secretary,  
Tamil Nadu Pollution Control Board,  
76, Mount Salai, Guindy,  
Chennai – 600 032.

**To**

Mr. Karnan,  
Proprietor,  
M/s Bio Tech Engineering Industries,  
No. 12, First Street, Abiramapuram,  
Thanjavur-613007

**Lr. No. T6/TNPCB/F.019201/BMW/2025, Dated: 09.05.2025**

**Sir/Madam,**

**Sub:** TNPCB-BMWM- CBMWTF- M/s. Bio Tech Engineering Industries proposed at S.F.No 17/7 Pisanathur Village, Gandharvakottai Taluk, Pudukottai district- Site suitability report & gap analysis - Communicated- Regarding.

**Ref:**

1. Unit's letters dated: 21.08.2023 & 24.01.2025
2. SEIAA - TOR identification ID. No.TOR24B3301TN5162069N dated: 22.10.2024
3. Lr.No.T3/TNPCB/F.019223/BMW/2025, Dated: 13.02.2025
4. Lr.No.T3/TNPCB/F.019223/BMW/2025-2, Dated: 13.02.2025

In continuation to the letter cited 4<sup>th</sup> above, it is informed that, the proposed CBMWTF, M/s BioTech Engineering Industries at S.F.No 17/7, Pisannathur Village, Gandharvakottai Taluk, Pudukkottai District has requested to issue site suitability letter for the proposed site as per the guidelines for CBMWTFs.

In this regard, the proposed site for the establishment of the CBMWTF, M/s BioTech Engineering Industries at S.F.No 17/7, Pisannathur Village, Gandharvakottai Taluk, Pudukkottai District was inspected by the officials of TNPCB on 08.09.2023 & 31.07.2024 and the report on the compliance of CPCB "Revised Guidelines for Common Bio-Medical Waste Treatment and Disposal facilities", 2016 (as on 08.08.2024) is as follows:

1. Criteria for development of a new CBMWTF & Coverage area of CBMWTF:
  - Existing CBMWTF, M/s. Medicare Enviro Systems, Sengipatti, Thanjavur Taluk, Thanjavur District (located at a distance of 15km from this proposed site) covers more than 75 Km distance and 10,000 Nos. of beds specified in the said guidelines.
  - Based on the details obtained from the DEEs of the Thanjavur, Nagapattinam, Thiruvavur, Mayiladuthurai, Trichy, Ariyalur, Pudukkottai and Sivagangai Districts covered by the existing CBMWTF and from the annual report for the calendar year January 2023-December 2023, the gap analysis was carried out as per the Annexure-1 of the CPCB Guidelines and the details of HCF covered by the existing CBMWTF is as follows:
    - No. of Districts covered: 8 Nos (Thanjavur, Nagapattinam, Thiruvavur, Mayiladuthurai, Trichy, Ariyalur, Pudukkottai and Sivagangai)
    - Distance covered: nearly 140 KM

No. 76, MOUNT SALAI, GUINDY, CHENNAI - 600 032.

Tel : 044-22353134 - 139 Fax : 044-22353068

Email : tnpcb-chn@gov.in Web : tnpcb.gov.in

- Total No. of HCFs covered: 4198 Nos
- Total No. of beds covered: 30,687
- BMW quantity as per the BMW authorization issued to the HCFs: 7650 Kg/day
- BMW treated & disposed by existing CBMWTF as per the 2023 Annual return: 4076 Kg/Day.
- Hence, there is gap of  $7650 - 4076 = 3574$  Kg/day of BMW.
- New CBMWTF is required for effective coverage of above said districts and Bio-medical Waste Management as per the CPCB guidelines, 2016.
- Further, public hearing was conducted for the establishment of another new CBMWTF, M/s Medicare Environmental Management Private Limited, Plot No.C-6, SIPCOT Industrial Park, Seikalathur Village, Manamadurai Taluk, Sivagangai District-630606 on 21.02.2024 (At present, this facility has obtained Consent to Establish vide TNPC Board's Proceedings dated 05.12.2024).

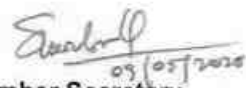
## 2. Location Criteria

- The proposed CBMWTF at S.F.No 17/7, Pisannathur Village, Gandharvakottai Taluk, Pudukkottai District has obtained land use classification certificate from the DTCP, Pudukkottai as non-planned area (which is not a notified industrial area).
- As per the GPS Survey conducted by the Department of Civil Engineering, Coimbatore Institute of Technology, Coimbatore, the shortest distance from the proposed site to Pisannathur Village Lake is 650 m and the Pisannathur village is located at 776 m from the proposed site which is greater than 500m specified in the said guidelines.
- The Tahsildar and Block Development officer, Gandharvakottai has issued NOC vide letter dated 16.12.2023 and 22.02.2024 respectively, that there is no approved residential area, schools, hospital, worship places, ancient monuments, highways within 500 m of the proposed site.

## 3. Land Requirement

- The proposed site covers 0.625 hectares (1.54 acres) of area which is greater than 1 acre specified in the said guidelines.

The receipt of this letter may be acknowledged.

  
For Member Secretary



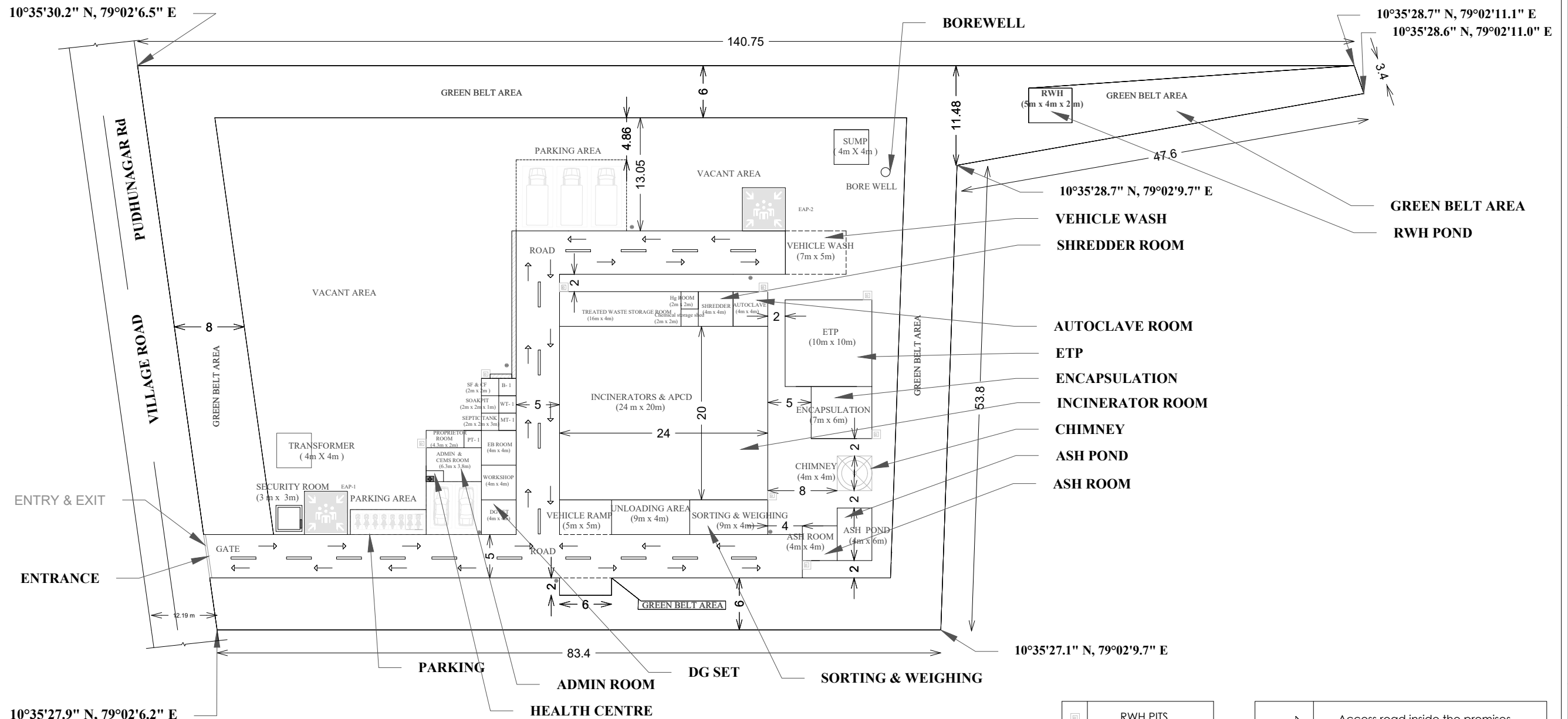




## **ANNEXURE – 06**

### **Access Roads Walkway Design**

# THE SITE PLAN LAYOUT OF PROPOSED CBWTF M/s. BIOTECH ENGINEERING INDUSTRIES, S.NO: 17/7, Pisanathur Village, Gandarvakottai taluk, Pudukkottai District, TamilNadu



## ACCESS ROADS / WALKWAYS TO THE DESIGNED OPERATIONS IN THE SITE LAYOUT PLAN

|  |                 |
|--|-----------------|
|  | RWHPITS         |
|  | FIRE HYDRANT    |
|  | FIRST AID BOX   |
|  | EAP             |
|  | GREEN BELT AREA |

|  |                                 |
|--|---------------------------------|
|  | Access road inside the premises |
|  | Entry and Exit of the Facility  |

|                            |            |                                                                                                                                                                                        |          |
|----------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| SK                         | SAKTHI D K | SK                                                                                                                                                                                     | SK       |
| DESIGN                     | DRAWN      | CHECKED                                                                                                                                                                                | APPROVED |
| TITLE: PROPOSED_CBWTF      |            | <div><div>OLYMPIA ECO<br/>SOLUTIONS PRIVATE<br/>LIMITED<br/>CHENNAI-600 037<br/>INDIA</div></div> |          |
| PROJECT: 1                 |            |                                                                                                                                                                                        |          |
| CLIENT: 01                 | DRG NO: 01 |                                                                                                                                                                                        |          |
| ALL DIMENSIONS ARE IN Sq.m |            | SCALE : 04                                                                                                                                                                             | SHEET:01 |
|                            |            | REV: 00                                                                                                                                                                                |          |

# **ANNEXURE – 07**

## **TWAD - Acknowledgement**

To  
The Executive Engineer,  
TWAD Board,  
Pudukottai District.

Date: 13.05.2025

**Subject:** Request for Fresh Water Supply –Environmental Clearance process for Proposed Common Bio Medical Waste Treatment Facility (CBWTF) Project- at S.F. No. 17/7, Pisanathur Village, Gandarvakottai Taluk, Pudukkottai District, Tamil Nadu.

**(Ref: SEIAA TOR Identification No: TO24B3301TN5162069N; File No: 11227)**

Dear Sir/Madam,

We, M/s Biotech Engineering Industries, are in the process of establishing a Common Biomedical Waste Treatment Facility (CBWTF) at S.F. No. 17/7, Pisanathur Village, Gandarvakottai Taluk, Pudukkottai District, Tamil Nadu. **The project has received Terms of Reference (ToR) approval from SEIAA TN.**

**ToR Point No. 7** *The PP shall furnish an affidavit stating that he will not extract the Ground water for the proposed activity and shall obtain commitment letter for connection for fresh water supply and disposal of excess treated water from the local body /TWAD.*

we require a fresh water supply connection for the following purposes:

1. **Construction Stage:** 5 KLD – For construction activities, site preparation, and related works.
2. **Operational Stage:** 15 KLD – For industrial processes, domestic use, and gardening.

| Our Project site location details |                                                                                            |
|-----------------------------------|--------------------------------------------------------------------------------------------|
| Site Location                     | S.F. No. 17/7, Pisanathur Village, Gandarvakottai Taluk, Pudukkottai District, Tamil Nadu. |
| Total Plot Area                   | 6250 Sq.m (1.55 Acres)                                                                     |
| Geo coordinates                   | 10° 35' 28.64" N 79° 02' 08.45" E                                                          |

We kindly request to provide the necessary fresh water supply to our project site, (Copy of SEIAA ToR approval enclosed herewith) Thank you.

Yours sincerely,  
For Biotech Engineering Industries,

  
Karnan.P

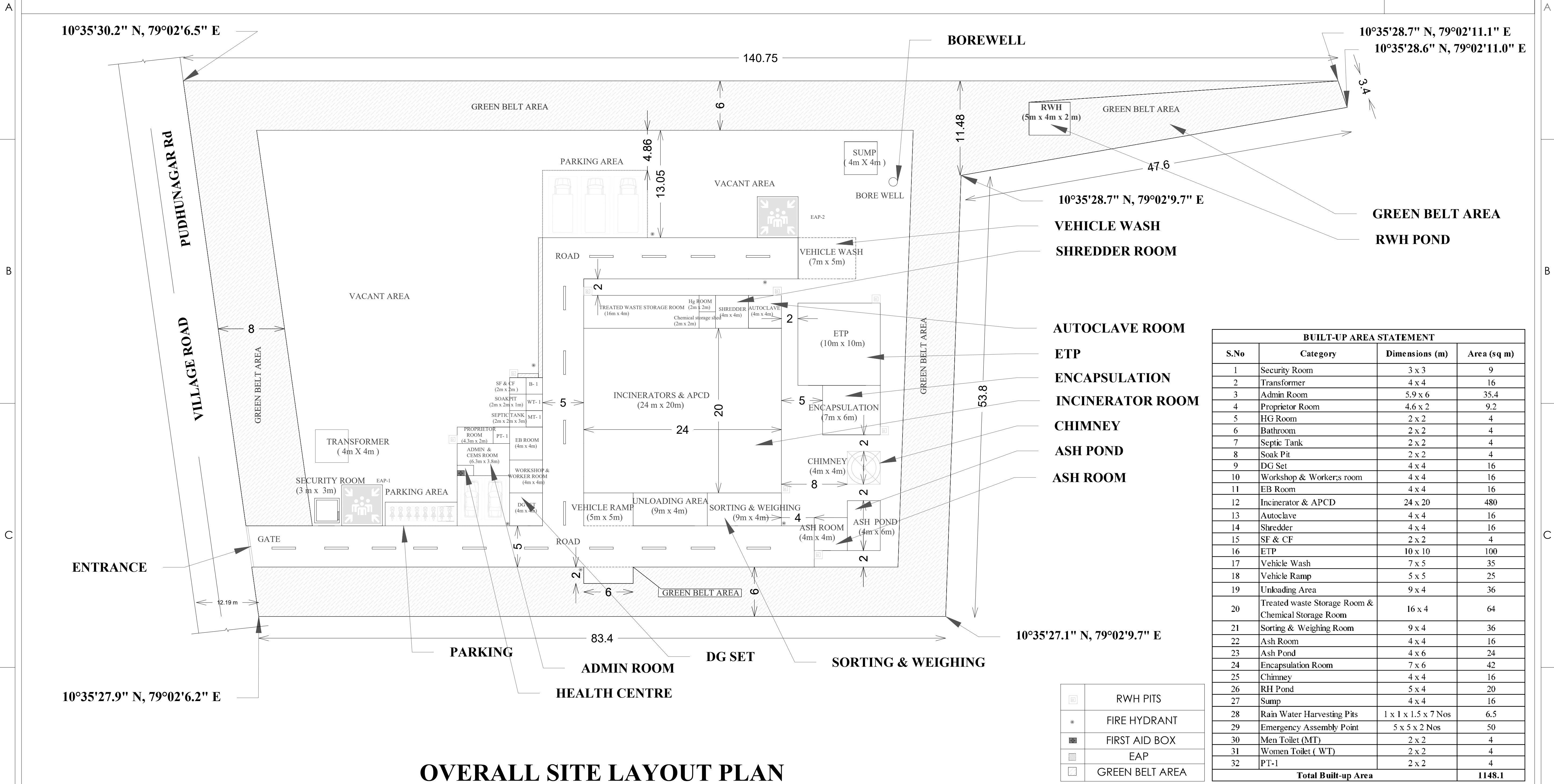


## **ANNEXURE – 08**

### **Overall Site Plan Layout**



THE SITE PLAN LAYOUT OF PROPOSED CBWTF M/s. BIOTECH ENGINEERING INDUSTRIES,  
S.NO: 17/7, Pisanathur Village, Gandarvakottai taluk, Pudukkottai District, TamilNadu



| BUILT-UP AREA STATEMENT |                                                    |                     |             |
|-------------------------|----------------------------------------------------|---------------------|-------------|
| S.No                    | Category                                           | Dimensions (m)      | Area (sq m) |
| 1                       | Security Room                                      | 3 x 3               | 9           |
| 2                       | Transformer                                        | 4 x 4               | 16          |
| 3                       | Admin Room                                         | 5.9 x 6             | 35.4        |
| 4                       | Proprietor Room                                    | 4.6 x 2             | 9.2         |
| 5                       | HG Room                                            | 2 x 2               | 4           |
| 6                       | Bathroom                                           | 2 x 2               | 4           |
| 7                       | Septic Tank                                        | 2 x 2               | 4           |
| 8                       | Soak Pit                                           | 2 x 2               | 4           |
| 9                       | DG Set                                             | 4 x 4               | 16          |
| 10                      | Workshop & Workers room                            | 4 x 4               | 16          |
| 11                      | EB Room                                            | 4 x 4               | 16          |
| 12                      | Incinerator & APCD                                 | 24 x 20             | 480         |
| 13                      | Autoclave                                          | 4 x 4               | 16          |
| 14                      | Shredder                                           | 4 x 4               | 16          |
| 15                      | SF & CF                                            | 2 x 2               | 4           |
| 16                      | ETP                                                | 10 x 10             | 100         |
| 17                      | Vehicle Wash                                       | 7 x 5               | 35          |
| 18                      | Vehicle Ramp                                       | 5 x 5               | 25          |
| 19                      | Unloading Area                                     | 9 x 4               | 36          |
| 20                      | Treated waste Storage Room & Chemical Storage Room | 16 x 4              | 64          |
| 21                      | Sorting & Weighing Room                            | 9 x 4               | 36          |
| 22                      | Ash Room                                           | 4 x 4               | 16          |
| 23                      | Ash Pond                                           | 4 x 6               | 24          |
| 24                      | Encapsulation Room                                 | 7 x 6               | 42          |
| 25                      | Chimney                                            | 4 x 4               | 16          |
| 26                      | RH Pond                                            | 5 x 4               | 20          |
| 27                      | Sump                                               | 4 x 4               | 16          |
| 28                      | Rain Water Harvesting Pits                         | 1 x 1 x 1.5 x 7 Nos | 6.5         |
| 29                      | Emergency Assembly Point                           | 5 x 5 x 2 Nos       | 50          |
| 30                      | Men Toilet (MT)                                    | 2 x 2               | 4           |
| 31                      | Women Toilet ( WT)                                 | 2 x 2               | 4           |
| 32                      | PT-1                                               | 2 x 2               | 4           |
| Total Built-up Area     |                                                    |                     | 1148.1      |

|  |                 |
|--|-----------------|
|  | RWHPITS         |
|  | FIRE HYDRANT    |
|  | FIRST AID BOX   |
|  | EAP             |
|  | GREEN BELT AREA |

|                            |                     |                                                                                                                                                                                        |                |         |
|----------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------|
| SK<br>DESIGN               | SAKTHI D K<br>DRAWN | SK<br>CHECKED                                                                                                                                                                          | SK<br>APPROVED |         |
| TITLE: PROPOSED_CBWTF      |                     | <div><div>OLYMPIA ECO<br/>SOLUTIONS PRIVATE<br/>LIMITED<br/>CHENNAI-600 037<br/>INDIA</div></div> |                |         |
| PROJECT: 1                 |                     |                                                                                                                                                                                        |                |         |
| CLIENT: 01                 | DRG NO: 01          |                                                                                                                                                                                        |                |         |
| ALL DIMENSIONS ARE IN Sq.m |                     | SCALE : 04                                                                                                                                                                             | SHEET:01       | REV: 00 |

OVERALL SITE LAYOUT PLAN

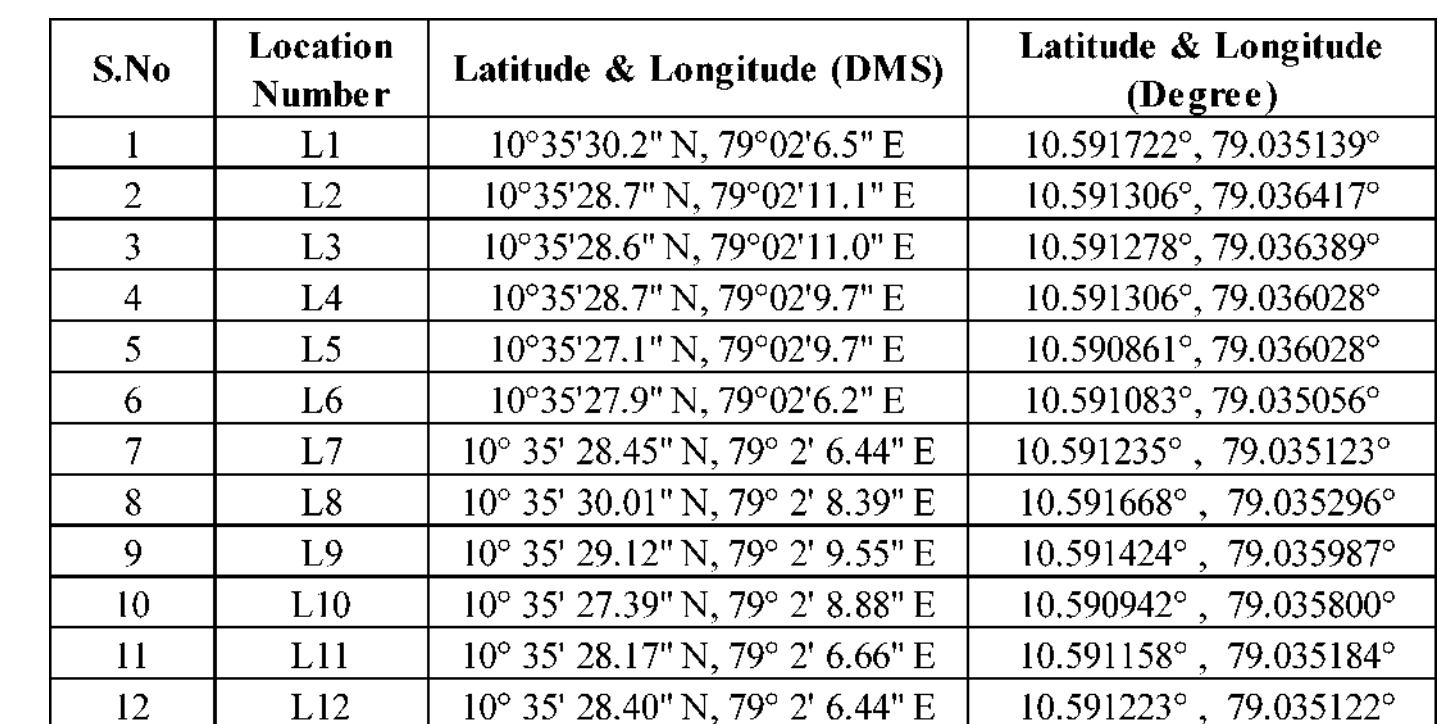
## **ANNEXURE – 09**

### **Layout showing GPS Co-Ordinate**





NORTH



|                                                                                       |                 |
|---------------------------------------------------------------------------------------|-----------------|
|  | RWHP PITS       |
|  | FIRE HYDRANT    |
|  | FIRST AID BOX   |
|  | EAP             |
|  | GREEN BELT AREA |

|                            |  |            |  |                                                                                                                                                                                        |  |          |  |            |  |  |  |
|----------------------------|--|------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------|--|------------|--|--|--|
| SK                         |  | SAKTHI D K |  | SK                                                                                                                                                                                     |  | SK       |  |            |  |  |  |
| DESIGN                     |  | DRAWN      |  | CHECKED                                                                                                                                                                                |  | APPROVED |  |            |  |  |  |
| TITLE: PROPOSED_CBWTF      |  |            |  | <div><div>OLYMPIA ECO<br/>SOLUTIONS PRIVATE<br/>LIMITED<br/>CHENNAI-600 037<br/>INDIA</div></div> |  |          |  |            |  |  |  |
|                            |  |            |  |                                                                                                                                                                                        |  |          |  |            |  |  |  |
|                            |  |            |  |                                                                                                                                                                                        |  |          |  | PROJECT: 1 |  |  |  |
| CLIENT: 01                 |  | DRG NO: 01 |  |                                                                                                                                                                                        |  |          |  |            |  |  |  |
| ALL DIMENSIONS ARE IN Sq.m |  |            |  | SCALE : 04                                                                                                                                                                             |  | SHEET:01 |  | REV: 00    |  |  |  |

## GREEN BELT LAYOUT PLAN



## **ANNEXURE – 10**

### **Acknowledgement letter from PWD**

To

Date: 05.05.2025

The Executive Engineer,  
Public Works Department (PWD),  
No.98, First Floor, Santhanathapuram,  
Pudukkottai 622001,  
Tamil Nadu

**Subject:** Request for Drainage Details and Flood Data – Environmental Clearance process for Proposed Common Bio Medical Waste Treatment Facility (CBWTF) Project- at S.F. No. 17/7, Pisanathur Village, Gandarvakottai Taluk, Pudukkottai District, Tamil Nadu.

**Reference:**

- SEIAA- TOR Identification No: TO24B3301TN5162069N; File No: 11227

Dear Sir/Madam,

We, M/s **Biotech Engineering Industries**, are in the process of establishing a Common Biomedical Waste Treatment Facility (CBWTF) at S.F. No. 17/7, Pisanathur Village, Gandarvakottai Taluk, Pudukkottai District, Tamil Nadu.

As part of the Terms of Reference (ToR) conditions issued by **SEIAA TN**.

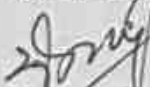
*ToR Point No. 6.4: Details of Drainage of the project up to 5 km radius of study area. If the site is within 1 km radius of any major river, peak and lean season river discharge as well as flood occurrence frequency based on peak rainfall data of the past 30 years. Details of Flood Level of the project site and maximum Flood Level of the river shall also be provided.*

we are required to provide the above said details for the project site and its surroundings:

| Our Project site location details |                                                                                            |
|-----------------------------------|--------------------------------------------------------------------------------------------|
| Site Location                     | S.F. No. 17/7, Pisanathur Village, Gandarvakottai Taluk, Pudukkottai District, Tamil Nadu. |
| Total Plot Area                   | 6250 Sq.m (1.55 Acres)                                                                     |
| Geo coordinates                   | 10° 35' 28.64" N 79° 02' 08.45" E                                                          |

We kindly request your department to provide the above information to enable us to comply with the regulatory requirement, Thank You

Yours sincerely,

  
Karnan.R



# **ANNEXURE – 11**

## **Gross Fixed Asset**

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the value of Proposed Gross Fixed Assets of the unit of M/s BIOTECH ENGINEERING INDUSTRIES located at S.F.NO 17/7, PESANATHUR VILLAGE, GANDARVAKOTTAI TALUK, PUDUKOTTAI DIST., TAMILNADU as on 29.05.2023 is as follows

| S No | Assets            | Value of Gross Fixed Assets as on 29.05.2023 (Rs in Lakhs) at cost |
|------|-------------------|--------------------------------------------------------------------|
| 1    | Land              | 16,00,000.00                                                       |
| 2    | Building          | 20,00,000.00                                                       |
| 3    | Plant & Machinery | 1,75,00,000.00                                                     |
| 4    | ETP / APC         | 40,00,000.00                                                       |
| 5    | Other Assets      | 32,00,000.00                                                       |
|      | <b>Total</b>      | <b>2,83,00,000.00</b>                                              |

The Gross Value of Fixed Assets stated above is true and fair to the best of our knowledge and belief

Name: CA S Subamangala

M No: 224130

UDIN: 23224130BGYOHH1500

Place: Thanjavur

Date : 29.05.2023



FOT SRN ASSOCIATES

 PARTNER

## **ANNEXURE – 12**

### **Technical Specification of Incinerator 200 Kg\hr & 100 Kg/hr**

# **ALFA-THERM COMMITTED TO A CLEAN & GREEN ENVIRONMENT**



ATL/2024-25/INC/163

Date: 11<sup>th</sup> Nov, 2024

**M/S. BIOTECH ENGINEERING INDUSTRIES  
PUDUKKOTTAI**

**KIND ATTN:- Mr. Sudharsaan C S**

**SUB: PROPOSAL FOR “ALFA-THERM” INCINERATOR**

Dear Sir,

This has reference to your email in connection with your requirement of incinerator for Biomedical waste.

Please find enclosed herewith our offer for below machines models:-

**“Alfa-Therm” Incinerator model WSS-100 & WSS-200 with the capacity of 100 kgs/hr and 200 kgs/hr with Wet Scrubbing System.**

We hope that you will find our offer in line with your requirement and look forward to receive your valued order at the earliest.

In case you need any further information, please do not hesitate to contact us.

Thanking you and best regards,  
For Alfa Therm Limited  
Neha Kapoor  
(Sales Coordinator-Incinerator Division)  
+91-9958691914 / 9958311117

# What we deliver.....



**Alfa Therm deliver integrated design, supply, installation and project management services for waste incineration, solid waste management, shredding and process heating from more than 30 year as old leading manufacturing and engineering company of India .**



**TECHNO-COMMERCIAL PROPOSAL**

**FOR**

**“ALFA-THERM”**

**INCINERATOR MODEL**

**WSS-100 & WSS-200**

**WITH WET SCRUBBING SYSTEM**

# DESIGN SPECIFICATION



FUEL TYPE- DIESEL

WASTE TYPE- BIO MEDICAL WASTE

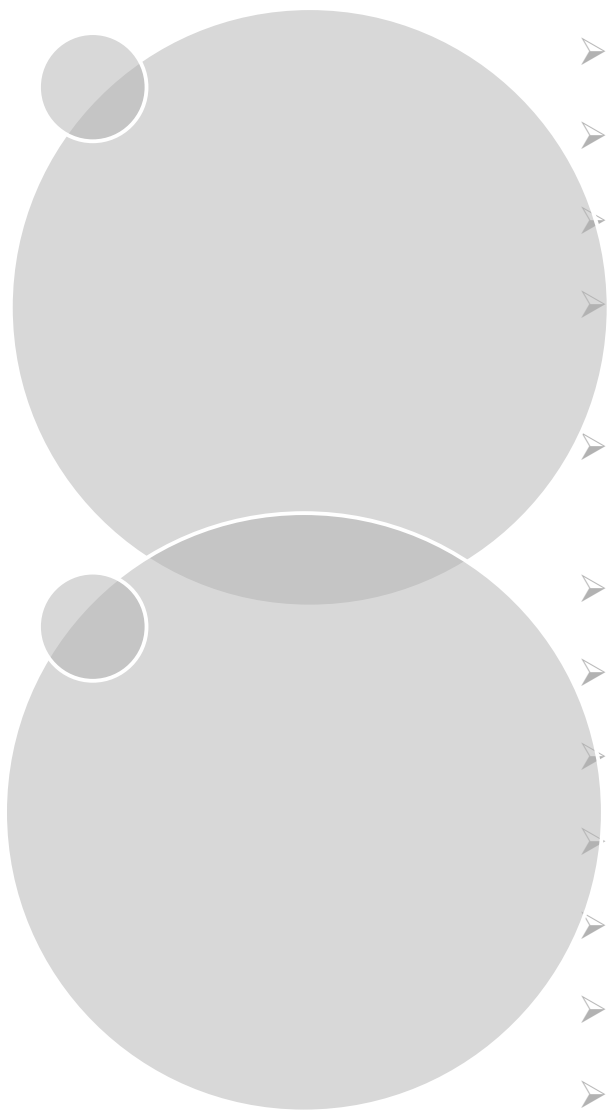
CAPACITY- 100 kgs/hr & 200 kgs/hr

OPERATION TIME- 8 to 12 HOURS

PRIMARY TEMPERATURE-  $850 \pm 50$  °C

SECONDARY TEMPERATURE-  $1000 \pm 100$  °C

# SCOPE OF SUPPLY

- 
- PRIMARY CHAMBER
  - SECONDARY CHAMBER
  - QUENCHER
  - AIR POLLUTION CONTROL DEVICE – VENTURI SCRUBBER
  - DROPLET SEPARATOR & WATER RE-CIRCULATION TANK (INTEGRAL)
  - PACKED BED SCRUBBER
  - MIST ELIMINATOR
  - I. D. FAN
  - COMBUSTION FAN
  - BURNERS
  - CONTROL PANEL
  - CHIMNEY OF 30 MTRS HEIGHT

# 1. PRIMARY CHAMBER

The first phase of the incineration is combustion without air, comparable to gasification. This combustion in a reduced atmosphere produces a combustion gas rich in CO and not in CO<sub>2</sub>. This is a considerable advantage for the post-combustion of gases - CO is combustible. The process runs in a complete self-combustion and doesn't need any other combustible, except for the preheating or the starting, if waste has a calorific power superior to 2000 kcal/kg.

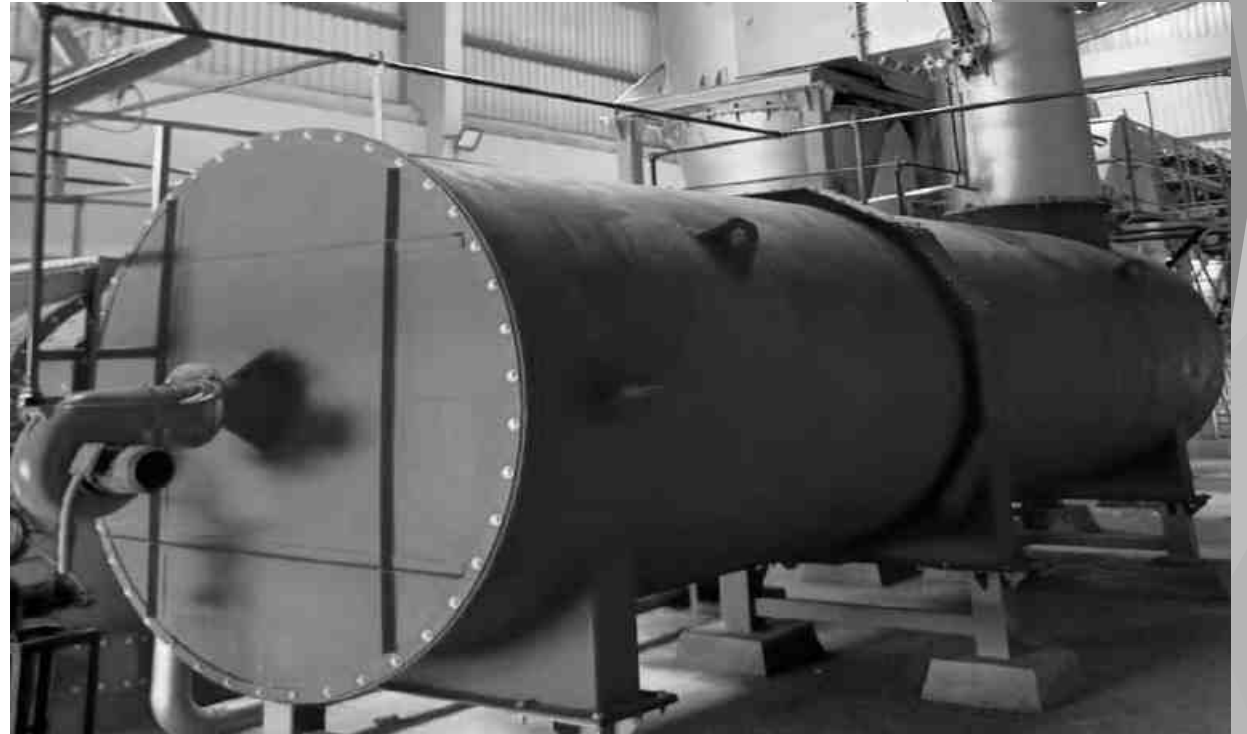
- ▶ It will be Static Solid Hearth type.
- ▶ Construction material will be Mild Steel.
- ▶ Design temperature will be 1400°C.
- ▶ Waste charging will be automatic through DFDV System
- ▶ Manual ash removal.
- ▶ Combustion Fan provided.
- ▶ Burner provided.
- ▶ Ash amount for Static – (5-8)%



## 2. SECONDARY CHAMBER

The second phase is a post-combustion (secondary chamber) at high temperature of the gases produced by the rotary furnace. The high content of CO in these gases permits a re-lighting by simple air injection without using any other combustible. This process is therefore especially well adapted for a treatment on the site.

- ▶ It will be Static Solid Hearth type.
- ▶ Construction material will be Mild Steel.
- ▶ Design temperature will be 1400°C.
- ▶ Residence time for flue gas is 2 seconds.
- ▶ Combustion Fan provided.
- ▶ Burner provided.



### **3. AIR POLLUTION CONTROL DEVICE - QUENCHER**

- **Provided to reduce flue gas temperature before venturi scrubber**

### **4. VENTURI SCRUBBER**

- **It will be high pressure jet type.**
- **Gas outlet temperature - (78-80)°C.**
- **Scrubbing media will be water with 5% caustic.**
- **Centrifugal pump provided for water re-circulation.**

## **5. DROPLET SEPARATOR & WATER RE-CIRCULATION TANK (INTEGRAL)**

- It will be cyclonic type.
- It helps to separate water droplets from the flue gases.

## **6. PACKED BED SCRUBBER**

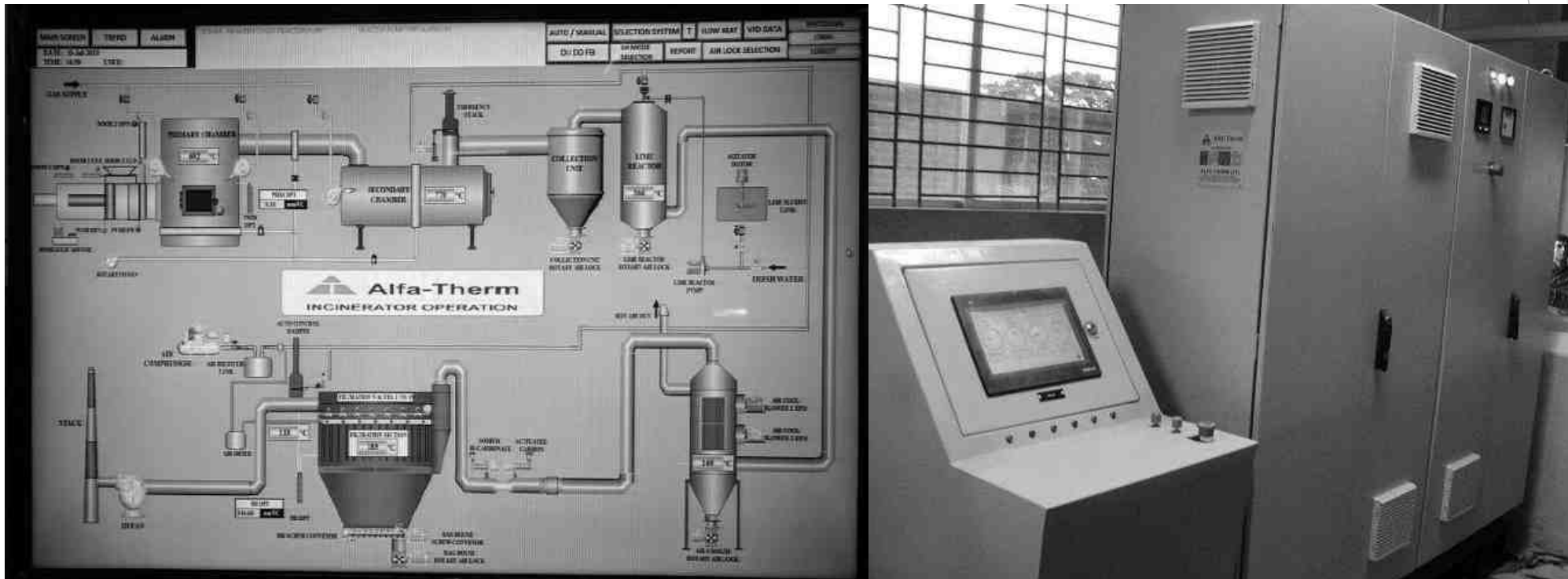
- Packing media will be PP saddles.
- Centrifugal pump provided for water re-circulation.

## **7. MIST ELIMINATOR**

- To remove the water droplet from the gases
- Provided for internal protection

## 8. CONTROL PANEL

- ▶ It will be PLC (Programmable Logic Control) based.
- ▶ PLC will be made of Schneider/Equipment.
- ▶ HMI provided for display of plant operations and temperature controls.
- ▶ Audio-visual alarm system provided.





## 9. CHIMNEY OF 30 mtrs HEIGHT

- ▶ Chimney will be self-supporting.
- ▶ Chimney will be made of mild steel.
- ▶ Height of the chimney from the ground level is 30 mtrs.
- ▶ The chimney is painted externally with two coats of heat resistant aluminum paint.
- ▶ Chimney will be provided with ladder till the top.



# EMISSION STANDARD

The concentration of any harmful substance in the exhaust gas of incinerator shall not exceed the maximum allowable limits listed in the table below. Emission standard as per CPCB guideline.

## EMISSION NORMS

|                 |   |                        |                                                                        |                                                  |
|-----------------|---|------------------------|------------------------------------------------------------------------|--------------------------------------------------|
| Particulates    | : | 50 mg/Nm <sup>3</sup>  | Total Organic Carbon                                                   | 20 mg/Nm <sup>3</sup>                            |
| SO <sub>2</sub> | : | 50 mg/Nm <sup>3</sup>  | HF                                                                     | 1 mg/Nm <sup>3</sup>                             |
| CO              | : | 50 mg/Nm <sup>3</sup>  | NO <sub>x</sub> (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> ) | 200 mg/Nm <sup>3</sup>                           |
| HCl             | : | 10 mg/nm <sup>3</sup>  | Total dioxins and furans                                               | 0.1 ng TEQ/Nm <sup>3</sup>                       |
| NO <sub>x</sub> | : | 200 mg/Nm <sup>3</sup> | Cd + Th + their compounds                                              | 0.05 mg/Nm <sup>3</sup> (depends on input waste) |
|                 |   |                        | Hg and its compounds                                                   | 0.05 mg/Nm <sup>3</sup> (depends in input waste) |
|                 |   |                        | Sb + As + Pb + Cr + Co + Cu + Mn + Ni + V + their compounds            | 0.5 mg/Nm <sup>3</sup> (depends in input waste)  |

Combustion Efficiency (CE) shall be at least 99.9% and shall be computed as follows:-

►  $CE = \% CO_2 \times 100 / 9\% CO_2 + \% CO$

Temperature of primary chamber shall be at least 850+50 deg. C.

Secondary chamber gas retention time shall be at least 2 (two) seconds at 1100 deg. C. within minimum 3% Oxygen in the stack gas

# PRICE SCHEDULE

## OUR PRICES ARE EX-WORKS, KUNDLI, DISTT. SONEPAT, HARYANA

| S. No. | Description                                                                        | Amount (Rs.) |
|--------|------------------------------------------------------------------------------------|--------------|
| A      | Price for Incinerator Model WSS-100, Capacity 100 kgs/hr with Wet Scrubbing System | 45,00,000    |
| B      | Price for Incinerator Model WSS-200, Capacity 200 kgs/hr with Wet Scrubbing System | 60,00,000    |
| C      | Chimney of 30 mtrs height from ground level                                        | 15,00,000    |
| D      | Installation and Commissioning Charges                                             | Extra        |

### **EXCLUSIONS (IN CLIENT'S SCOPE)**

- All civil and foundation works wherever required.
- Electrical Cable and cable tray as per (ATL will provide drawing for the required material according to site requirement).
- All internal electrification and lighting of the shed.
- Electrical cable and cable tray incinerator MCC panel to field equipment.
- Air compressor with air dryer.
- Unloading and storage of material at your site.
- Heavy crane and Hydra for installation of equipment.
- Piping from main supplies to our battery limits.
- Continuous Emission Monitoring System (CEMS).
- All consumables (required at the time of commissioning like wood, diesel, electrical supply, chemicals, etc.).
- Stack monitoring, Authorization/Consent/NOC of Statutory Authorities e.g. Local Pollution Control Authorities, Civil Aviation, Explosives Inspectorate etc.
- All applicable taxes, transit insurance and freight charges.
- Any other item that is not specifically mentioned in our offer.

# TERMS & CONDITION

|    |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Price Basis                        | Ex-Works, Kundli, Distt. Sonapat, Haryana – INDIA                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2  | Packing & Insurance Charges        | Extra if required                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3  | Freight Charges                    | Freight charges will be extra at actual to be paid by you and the same will be intimated to you before dispatch of material.                                                                                                                                                                                                                                                                                                                                                    |
| 4  | Payment Terms                      | 50% advance along with purchase order.<br>50% against Proforma Invoice prior to dispatch of material from our factory.<br>The advance paid is non-refundable.                                                                                                                                                                                                                                                                                                                   |
| 5  | Inspection of Unit before dispatch | If the client or their third party wants to inspect the incinerator physically, the same can be inspected at our works, Kundli, Distt. Sonapat, Haryana.<br><br>Once the equipment will be ready for dispatch, we shall send an email OR call for inspection of the unit.<br><br>If we do not receive your reply/call within 3-5 days of the inspection call/email, it will be treated as a waiver of inspection and thereafter we will not be bound to get the unit inspected. |
| 6  | Loading and Unloading              | Loading of materials at our place shall be in Alfa-Term's Scope, whereas unloading and safe storage of material at site shall be in client's scope. In case material is not unloaded at site within the same day, holding charges for the vehicles will be to client's account.                                                                                                                                                                                                 |
| 7  | Validity Period                    | Our offer is valid for 30 days from the date of this offer.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 8  | Delivery Period                    | We shall dispatch the equipment within 3-4 months from the date of receipt of your order along with advance payment and approved drawing.                                                                                                                                                                                                                                                                                                                                       |
| 9  | Damage/Missing Items               | Any damage, short supply OR missing items to be notified in writing to Alfa-Therm within 2-3 days of receipt of material at site as per the packing list. Alfa-Therm shall not be held responsible for any notification beyond 2-3 days of material receipt at site.                                                                                                                                                                                                            |
| 10 | Civil & Foundation work            | All Civil and foundation works wherever required will be client's scope.                                                                                                                                                                                                                                                                                                                                                                                                        |
| 11 | Warranty                           | The equipment shall be warranted for a period of 12 months from date of commissioning or 18 months from date of dispatch against any manufacturing defects, whichever is earlier.                                                                                                                                                                                                                                                                                               |

# SATISFIED CLIENTS

|                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|    |    |    |    |    |    |    |    |
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|    |    |    |    |    |    |    |    |
|   |   |   |   |   |   |   |   |
|  |  |  |  |  |  |  |  |

and many more...

# **ANNEXURE – 13**

## **Technical Specification of Autoclave 1220 Lt/hr**

BS/ 136 /2425  
October 26, 2024

M/s. Olympia Eco Solutions Pvt Ltd,  
Chennai

**Kind Attn.: Ms.Mahalakshmi**

Dear Ms.Mahalakshmi,

**Sub: our offer for Horizontal Rectangular Steam Sterilizer**

First of all we thank you very much for your enquiry for the subject equipment, against which we take pleasure in enclosing herewith our offer for the following model of Horizontal Rectangular Steam Sterilizer.

- **Model SSH 2204 - 2'x2'x4' (WxHxD) – Semi Automatic Microprocessor Based Model**
- **Model SSH 3305 - 3'x3'x5' (WxHxD) – Semi Automatic Microprocessor Based Model**

We have offered special discounted prices in our offer, which may kindly be noted. Along with the offer please find enclosed herewith necessary catalogue, Partial list of users etc for your kind perusal. We now kindly request you to go through the offer and let us know if you need any other information in this regard.

Thanking you and looking forward to hearing from you,

**Yours faithfully,  
for Borg Scientific**

**S.Sivachezhiyan**

**Cell: +91 99400 04217**

## SSH 2204 HORIZONTAL STEAM STERILIZER

### GENERAL SPECIFICATIONS

| Sr. No. | PARAMETER                  | REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                      |                           |          |
|---------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------|
| 1.1     | Type                       | Direct steam type                                                                                                                                                                                                                                                                                                                                                                                                                                |                           |          |
| 1.2     | Door                       | Single door with radial locking system for automatic locking during operation as a safety measure. Triple Walled construction to be fabricated from polished S.S. – 316 plate. Sealing by means of Single Piece moulded Silicone gasket. The Door is made of SS 316 with 12mm thickness, radial locking mechanism, Hinge and Stand are made of epoxy painted Mild Steel. Door will not open unless the pressure in the chamber is reduced fully. |                           |          |
| 1.3     | Chamber Dimensions (WxDxH) | 600 x 1200 x 600 mm                                                                                                                                                                                                                                                                                                                                                                                                                              |                           |          |
| 1.4     | Operating pressure         | 1.2 bar – inner chamber<br>2.0 bar – outer jacket                                                                                                                                                                                                                                                                                                                                                                                                |                           |          |
| 1.5     | Working Temperature        | 121° C                                                                                                                                                                                                                                                                                                                                                                                                                                           |                           |          |
| 1.6     | Material of construction   | 1.6.1                                                                                                                                                                                                                                                                                                                                                                                                                                            | Inner chamber             | S.S.316  |
|         |                            | 1.6.2                                                                                                                                                                                                                                                                                                                                                                                                                                            | Thickness (inner chamber) | 6 mm     |
|         |                            | 1.6.3                                                                                                                                                                                                                                                                                                                                                                                                                                            | Outer chamber             | S.S. 304 |
|         |                            | 1.6.4                                                                                                                                                                                                                                                                                                                                                                                                                                            | Thickness (outer chamber) | 6 mm     |
| 1.7     | Insulation & Polishing     | All outer surfaces except the door shall be insulated with mineral wool and polished S.S. cladding. All the exposed parts will be polished.                                                                                                                                                                                                                                                                                                      |                           |          |



|     |                     |                                                                                                                                                                                                                                                                                                                                                                                                         |                                              |
|-----|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| 1.8 | Nozzles and ports   | 1.8.1                                                                                                                                                                                                                                                                                                                                                                                                   | Steam inlet to chamber from jacket           |
|     |                     | 1.8.2                                                                                                                                                                                                                                                                                                                                                                                                   | Safety valves for inner and outer chambers   |
|     |                     | 1.8.3                                                                                                                                                                                                                                                                                                                                                                                                   | Steam inlet to jacket                        |
|     |                     | 1.8.4                                                                                                                                                                                                                                                                                                                                                                                                   | Chamber drain out                            |
|     |                     | 1.8.5                                                                                                                                                                                                                                                                                                                                                                                                   | Jacket drain out                             |
|     |                     | 1.8.6                                                                                                                                                                                                                                                                                                                                                                                                   | Vacuum Drier port                            |
|     |                     | 1.8.7                                                                                                                                                                                                                                                                                                                                                                                                   | Common drain with check valve and Steam trap |
| 1.9 | Fittings and gauges | Dial pressure gauge, Dial pressure-vacuum gauge, Pneumatic valves for Automatic control.                                                                                                                                                                                                                                                                                                                |                                              |
| 2.0 | Carriage            | SS carriage – 1no, and MS Trolley - 1no.                                                                                                                                                                                                                                                                                                                                                                |                                              |
| 2.1 | Mounting            | The autoclave shall be mounted on Epoxy painted Mild Steel tubular stand structure with height adjustable legs.                                                                                                                                                                                                                                                                                         |                                              |
| 2.2 | Steam Generator     | Integrated Steam generator made of 6mm thick SS 304 sheet with 12kw heater in 3 phase power supply. <b>Steam Generator has in-built critical water level cut off using Float sensor in the basic system.</b> Automatic Water feed using feed pump with gauge glass indication as well as digital low water level indication present in the steam generator. Heavy Duty ISI Mark heating coils are used. |                                              |
| 2.3 | Hydro Testing       | Testing of Jacket, inner chamber and Steam Generator are done at 1.5times of the operating pressure, necessary test certificates will be submitting along with the machine.                                                                                                                                                                                                                             |                                              |
| 2.4 | Piping work         | All pipelines and pipefitting, integral with the Autoclave unit shall be of stainless steel. Critical joining shall be of Flanges / Quick release type couplings and where necessary, welding shall be of Argon arc process.                                                                                                                                                                            |                                              |

# Borg

|     |                |                                                                                                                                                                                                                                                                                     |
|-----|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.5 | Control System | Semi Automatic Control system with Mild Steel powder coated control panel which houses the microprocessor controller with necessary contactors, relays etc for operation of the Sterilizing unit. Microprocessor based PID Temperature controller with in-built timer upto 999mins. |
| 2.6 | Power Supply   | 415V, 50Hz, Three Phase, 13KW load.                                                                                                                                                                                                                                                 |

## Cost of Supply:

**TOTAL COST FOR THE ABOVE PACKAGE**

**Rs.13,50,000.00**

## Note:

1. Pneumatic Air required for Valve operation atleast 4bar

## Borg Scientific

Tel : +91 98400 69654  
Email : [info@borgscientific.com](mailto:info@borgscientific.com)  
Web : [www.borgscientific.com](http://www.borgscientific.com)

Regd. Office : Plot No.: T-150A, SIDCO Women's Industrial Park, Thirumullaivoyal, Chennai – 600 062  
Works : Plot No.: 153, SIDCO Women's Industrial Park, Thirumullaivoyal, Chennai – 600 062

## SSH 3305 HORIZONTAL STEAM STERILIZER

### GENERAL SPECIFICATIONS

| Sr. No. | PARAMETER                  | REQUIREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                      |                           |          |
|---------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------|
| 1.1     | Type                       | Direct steam type                                                                                                                                                                                                                                                                                                                                                                                                                                |                           |          |
| 1.2     | Door                       | Single door with radial locking system for automatic locking during operation as a safety measure. Triple Walled construction to be fabricated from polished S.S. – 316 plate. Sealing by means of Single Piece moulded Silicone gasket. The Door is made of SS 316 with 12mm thickness, radial locking mechanism, Hinge and Stand are made of epoxy painted Mild Steel. Door will not open unless the pressure in the chamber is reduced fully. |                           |          |
| 1.3     | Chamber Dimensions (WxDxH) | 900 x1500 x 900 mm                                                                                                                                                                                                                                                                                                                                                                                                                               |                           |          |
| 1.4     | Operating pressure         | 1.2 bar – inner chamber<br>2.0 bar – outer jacket                                                                                                                                                                                                                                                                                                                                                                                                |                           |          |
| 1.5     | Working Temperature        | 121° C                                                                                                                                                                                                                                                                                                                                                                                                                                           |                           |          |
| 1.6     | Material of construction   | 1.6.1                                                                                                                                                                                                                                                                                                                                                                                                                                            | Inner chamber             | S.S.316  |
|         |                            | 1.6.2                                                                                                                                                                                                                                                                                                                                                                                                                                            | Thickness (inner chamber) | 6 mm     |
|         |                            | 1.6.3                                                                                                                                                                                                                                                                                                                                                                                                                                            | Outer chamber             | S.S. 304 |
|         |                            | 1.6.4                                                                                                                                                                                                                                                                                                                                                                                                                                            | Thickness (outer chamber) | 6 mm     |
| 1.7     | Insulation & Polishing     | All outer surfaces except the door shall be insulated with mineral wool and polished S.S. cladding. All the exposed parts will be polished.                                                                                                                                                                                                                                                                                                      |                           |          |

|     |                     |                                                                                                                                                                                                                                                                                                                                                                                                         |                                              |
|-----|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| 1.8 | Nozzles and ports   | 1.8.1                                                                                                                                                                                                                                                                                                                                                                                                   | Steam inlet to chamber from jacket           |
|     |                     | 1.8.2                                                                                                                                                                                                                                                                                                                                                                                                   | Safety valves for inner and outer chambers   |
|     |                     | 1.8.3                                                                                                                                                                                                                                                                                                                                                                                                   | Steam inlet to jacket                        |
|     |                     | 1.8.4                                                                                                                                                                                                                                                                                                                                                                                                   | Chamber drain out                            |
|     |                     | 1.8.5                                                                                                                                                                                                                                                                                                                                                                                                   | Jacket drain out                             |
|     |                     | 1.8.6                                                                                                                                                                                                                                                                                                                                                                                                   | Vacuum Drier port                            |
|     |                     | 1.8.7                                                                                                                                                                                                                                                                                                                                                                                                   | Common drain with check valve and Steam trap |
| 1.9 | Fittings and gauges | Dial pressure gauge, Dial pressure-vacuum gauge, Pneumatic valves for Automatic control.                                                                                                                                                                                                                                                                                                                |                                              |
| 2.0 | Carriage            | SS carriage – 1no, and MS Trolley - 1no.                                                                                                                                                                                                                                                                                                                                                                |                                              |
| 2.1 | Mounting            | The autoclave shall be mounted on Epoxy painted Mild Steel tubular stand structure with height adjustable legs.                                                                                                                                                                                                                                                                                         |                                              |
| 2.2 | Steam Generator     | Integrated Steam generator made of 6mm thick SS 304 sheet with 18kw heater in 3 phase power supply. <b>Steam Generator has in-built critical water level cut off using Float sensor in the basic system.</b> Automatic Water feed using feed pump with gauge glass indication as well as digital low water level indication present in the steam generator. Heavy Duty ISI Mark heating coils are used. |                                              |
| 2.3 | Hydro Testing       | Testing of Jacket, inner chamber and Steam Generator are done at 1.5times of the operating pressure, necessary test certificates will be submitting along with the machine.                                                                                                                                                                                                                             |                                              |
| 2.4 | Piping work         | All pipelines and pipefitting, integral with the Autoclave unit shall be of stainless steel. Critical joining shall be of Flanges / Quick release type couplings and where necessary, welding shall be of Argon arc process.                                                                                                                                                                            |                                              |

# Borg

|     |                |                                                                                                                                                                                                                                                                                     |
|-----|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.5 | Control System | Semi Automatic Control system with Mild Steel powder coated control panel which houses the microprocessor controller with necessary contactors, relays etc for operation of the Sterilizing unit. Microprocessor based PID Temperature controller with in-built timer upto 999mins. |
| 2.6 | Power Supply   | 415V, 50Hz, Three Phase, 19KW load.                                                                                                                                                                                                                                                 |

## Cost of Supply:

**TOTAL COST FOR THE ABOVE PACKAGE**

**Rs.18,50,000.00**

## Note:

1. Pneumatic Air required for Valve operation atleast 4bar

## Borg Scientific

Tel : +91 98400 69654  
Email : [info@borgscientific.com](mailto:info@borgscientific.com)  
Web : [www.borgscientific.com](http://www.borgscientific.com)

Regd. Office : Plot No.: T-150A, SIDCO Women's Industrial Park, Thirumullaivoyal, Chennai – 600 062  
Works : Plot No.: 153, SIDCO Women's Industrial Park, Thirumullaivoyal, Chennai – 600 062

## Terms and conditions

1. The above prices are Ex-Works prices, Taxes – viz, GST extra at 18% (HSN Code 84186910), Freight & insurance at actuals
2. Delivery – Within 60 days from the receipt of Technically and Commercially clear order.
3. Payment terms - 50% advance, balance 40% against inspection before despatch and 10% against delivery and acceptance
4. Warranty – 12 months from the date of installation, against defects arising out of faulty design, material or workmanship.
5. Validity of the offer : 90 days
6. Our GST Number : 33AAKFB7209C1ZV

for Borg Scientific,

S.Sivachezhiyan  
Cell: +91 99400 04217

# **ANNEXURE – 14**

## **Technical Specification of Shredder 200Kg/hr**

**M/s. Reliance Instruments Corporation**

#217, SIDCO Industrial Estate, North Phase, Ambattur, Chennai - 600 098

**Tele Fax:** 044-48572311 **Mobile:** 09962567028/34

**E-Mail:** [reico@relianceinstruments.com](mailto:reico@relianceinstruments.com) **Web Site:** [www.relianceinstruments.com](http://www.relianceinstruments.com)

**SHREDDER**

| S. No | Description           | Parameter                   |
|-------|-----------------------|-----------------------------|
| 1.    | Type                  | Bio-Medical Waste Shredder  |
| 2.    | Load Capacity         | 100 Kg/hr                   |
| 3.    | MOC                   | M.S.Powder Coated           |
| 4.    | Hopper                | M.S.Powder Coated           |
| 5.    | Cutting Blade         | NO Corrosive Hardened Steel |
| 6.    | In feed Opening       | 345 X 545                   |
| 7.    | Shaft                 | Hexagonal 2 Nos             |
| 8.    | Motor                 | 15 HP 3 Phase               |
| 9.    | Reduction Gear Box    | Planetary Type              |
| 10.   | Waste Collection Tray | Provided                    |
| 11.   | Control Panel         | PLC / VFD                   |
| 12.   | Auto Reverse System   | Provided                    |

**Shredder with Twin Shaft Low Speed Gearbox With 15 Hp Motor and Special Blades is**

**Rs.10,40,000/- (Ten Lakh Forty Thousand Only)**





**Terms & Conditions:**

|                             |                                                                  |
|-----------------------------|------------------------------------------------------------------|
| Price:                      | Ex- works                                                        |
| P & F and delivery charges: | Extra @ actuals                                                  |
| Tax:                        | GST@ 18% (Extra)                                                 |
| Delivery Period:            | 10 -12 Weeks                                                     |
| Validity:                   | 30 days                                                          |
| Warranty:                   | 1 Year Against manufacturing                                     |
| Payment:                    | 50% Advance, 40% Before Dispatch and 10% Against<br>Installation |

(Note: The above mentioned Taxes & Duties have been considered as per the Rates prevailing at the time of dispatch. If there is any change on this, the same shall be to your account)

Thank you,

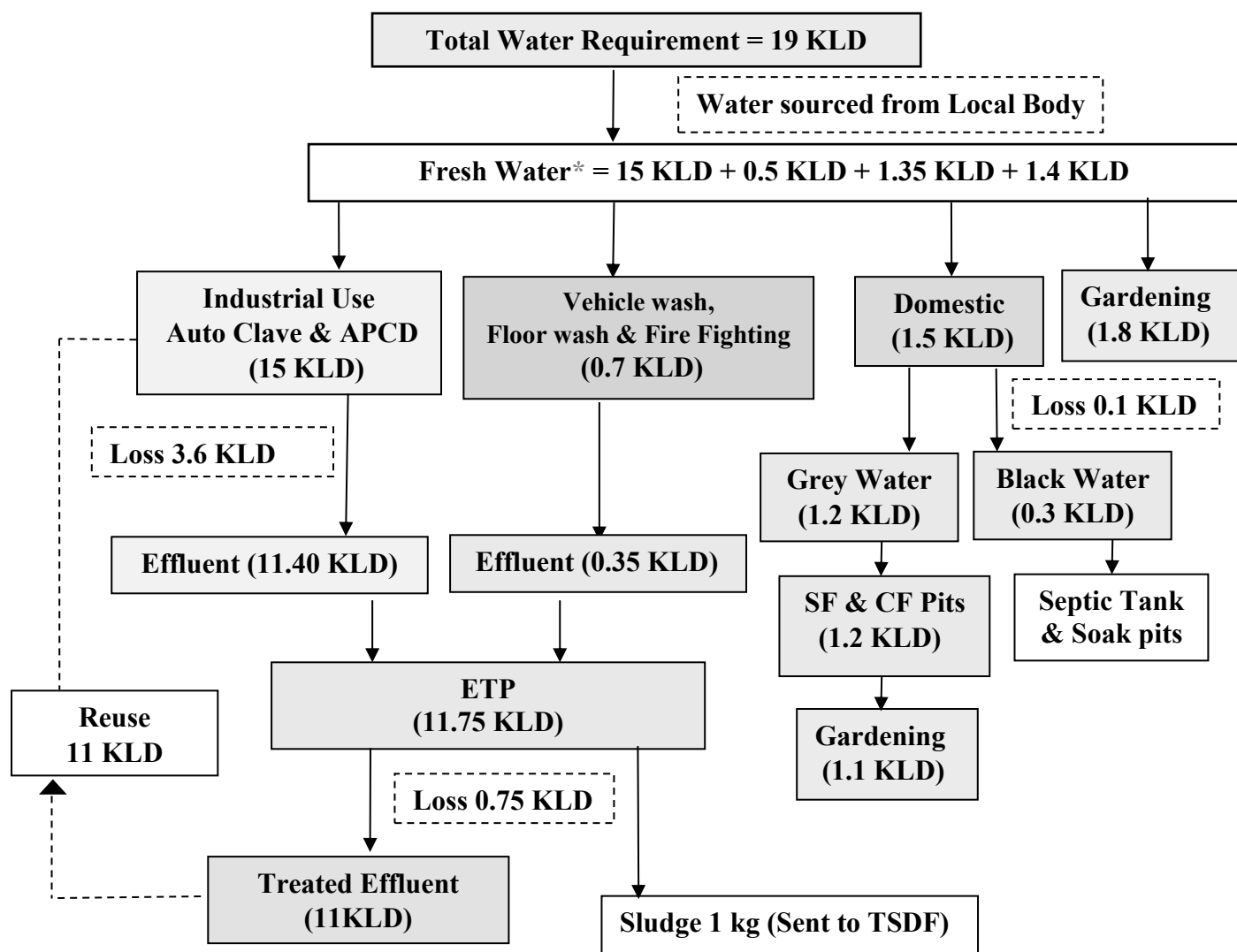
Yours faithfully,

**For Reliance Instruments Corporation**

# **ANNEXURE - 15**

## **Water Balance Chart**

## WATER BALANCE CHART



|                                        |                                           |         |
|----------------------------------------|-------------------------------------------|---------|
| *Day 2                                 | 11 KLD Recycled water + 8 KLD Fresh water |         |
| Daily Requirement                      | Industrial                                | 4 KLD   |
|                                        | Vehicle, Floor wash & Fire Fighting       | 0.7 KLD |
|                                        | Domestic use                              | 1.5 KLD |
|                                        | Gardening                                 | 1.8 KLD |
|                                        | Total                                     | 8 KLD   |
| ETP capacity                           | 25 KLD                                    |         |
| SF – Sand Filter, CF – Charcoal Filter |                                           |         |



# **ANNEXURE – 16**

## **Technical Specification of ETP – 25 KLD**

To,  
M/S. BIOTECH ENGINEERING INDUSTRIES  
NO.12, FIRST STREET,  
ABIRAMAPURAM, M.C.  
ROAD, THANJAVUR - 613007,  
TAMILNADU.

Ref No : OESPL/PEC/ETP/0425/13  
Date : 22.04.2025  
Kind Attn. : Mr. KARNAN P – PROPRIETOR.

Dear Sir,

**SUB:** PROPOSAL FOR DESIGN, SUPPLY, ERECTION AND COMMISSIONING OF EFFLUENT TREATMENT PLANT FOR A CAPACITY OF 25 KLD FOR THE CBMWTF UNIT- reg.

We thank your esteemed enquiry for SUPPLY, ERECTION & COMMISSIONING OF EFFLUENT TREATMENT PLANT FOR A CAPACITY OF 25 **KLD**.

With Reference to the discussion, we are pleased to submit our technical and commercial offer for your kind approval.

Kindly note that we have designed the plant as per the guidelines of Common Bio Medical Waste Treatment Facilities Dated 12.04.2025 Section 9 (K) which mentioned to include the Biological Treatment Process in the ETP. (Copy attached)

**ENCLOSURES:**

1. DESIGN BASIS.
2. PROCESS DESCRIPTIONS
3. TECHNICAL SPECIFICATIONS (Mechanical)
4. EXCLUSIONS
5. SCOPE OF CUSTOMER AND SUPPLIER.
6. COMMERCIAL & PRICE DETAILS.
7. TERMS AND CONDITIONS.

**OLYMPIA ECO SOLUTIONS PRIVATE LIMITED**

NO.19/12, BANSALI AVENUE ROAD, SIDCO INDUSTRIAL ESTATE (NORTH PHASE), AMBATTUR, CHENNAI – 98.

**P:** 044 4850 6222 **F:** 044 4850 1919 **E:** ask.olympia@gmail.com **W:** www.olympiaecosolutions.com

## **INTRODUCTION:**

### **About OLYMPIA ECO SOLUTIONS,**

We would like to introduce ourselves as one of the pioneers in Design, Engineering, Supply, Erection & Commissioning of Water Treatment Plants, Waste Water Treatment Plants, Zero Discharge Plants, (Reverse Osmosis / Ultra Filtration / Demineralization) and Sewage Treatment Plants, Environmental projects and Allied Infrastructure works.

We also have State of art **NABL (National Accreditation Board for Laboratories)** accredited Lab for Testing and Analysis of Air, Water, Wastewater, Soil & Noise.

We also manufacture entire range of Water Treatment & Waste Water Treatment Chemicals with the Latest State of Art Technology under one roof.

Based on our experience and expertise of executing projects, we have a multi-disciplinary team of professionals when would work in close co-ordination with your company and bring out the best and most viable solutions in your requirements.

## **DESIGN BASIS:**

The plant has been designed based on the following effluent characteristics: (approx.)

Plant Running Hours : 16 Hrs. / day.

### **RAW EFFLUENT CHARACTERISTICS:**

|                        |   |          |
|------------------------|---|----------|
| Total Suspended Solids | : | 400ppm   |
| pH                     | : | 7-8      |
| BOD                    | : | 200 Max  |
| COD                    | : | 250 Max. |
| O&G                    | : | 10 mg/l  |

### **TREATED EFFLUENT CHARACTERISTICS:**

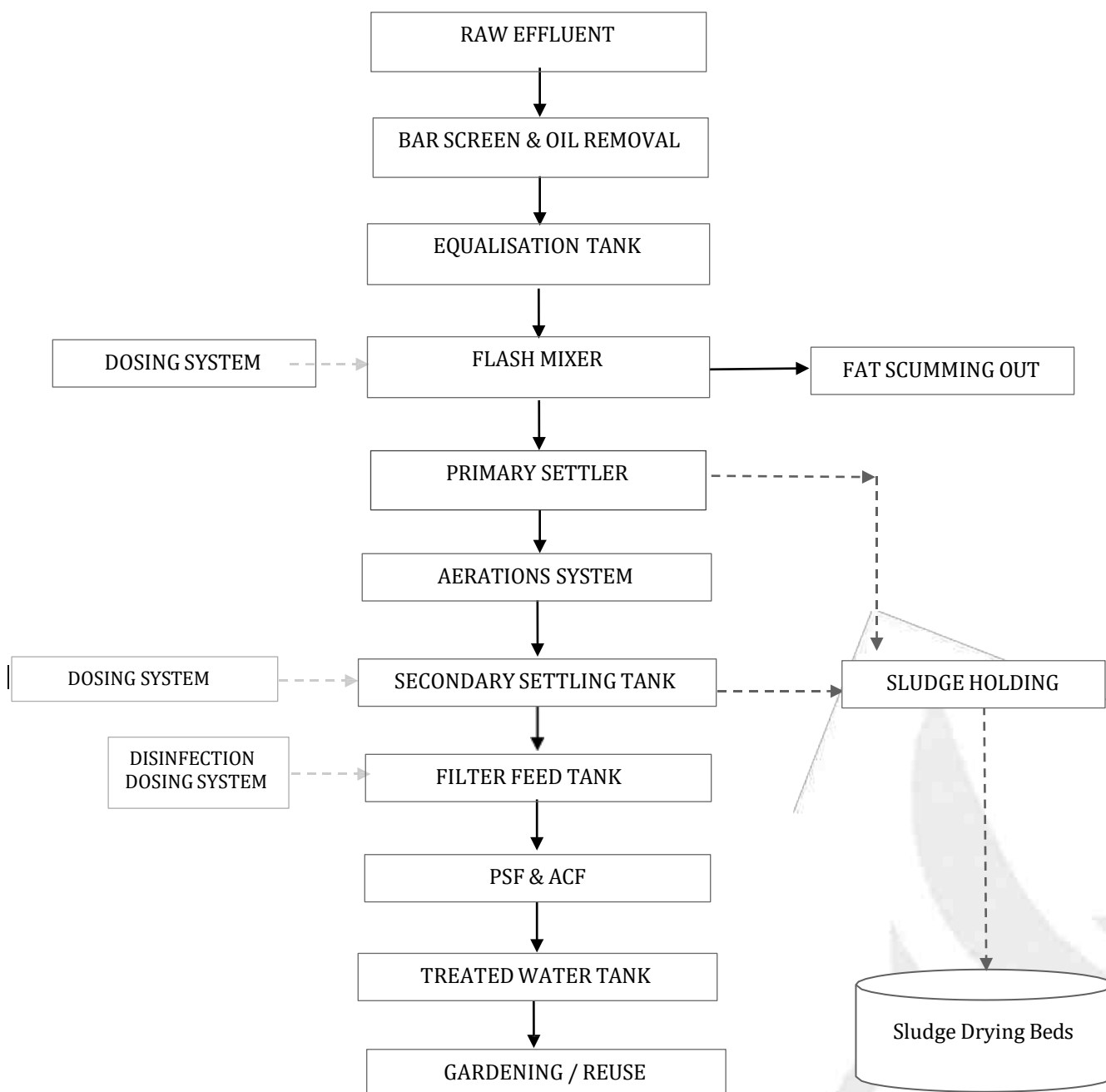
|                        |   |          |
|------------------------|---|----------|
| Total Suspended Solids | : | <10 ppm  |
| pH                     | : | 7-8      |
| BOD                    | : | <20 Max  |
| COD                    | : | <70 Max. |
| O&G                    | : | <NIL     |

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## PROCESS FLOW DIAGRAM



### OLYMPIA ECO SOLUTIONS PRIVATE LIMITED

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**TREATMENT PHILOSOPHY:**

The Effluent treatment system for the treatment of waste from CBMWTF UNIT will be Treated as follows.

**PROPOSED EQUIPMENTS:**

- ✓ The Proposed ETP will be Constructed at Above the ground level.
- ✓ The tanks / structures such as Screening, Collection tank, PST, Aeration tank & SST will be constructed in RCC.
- ✓ The Aerobic / Biological system is included as per the guidelines.
- ✓ The Aerations system will be constructed with RCC with ASP Technology.
- ✓ The Primary & Secondary Settling tanks will be constructed with RCC with the Tube settler medias.
- ✓ The ACF & PSF will be of FRP with multiport valve arrangement,
- ✓ After filtration the treated effluent will be sent for re usage of treated water.
- ✓ The treated water and intermediate water storage tanks will be of Sintex.
- ✓ The whole system will be Erected and Commissioned to meet the standards of TNPCB.

**RAW EFFLUENT SCREENING & EQUALISATION:**

In this process the effluent from the Source shall flow by Pumping through a bar screen chamber to Raw Effluent Collection Tank. A bar screen shall be provided at the inlet point in the bar screen chamber and the effluent will flow through this bar screen in to the Tank. Bar screen shall be so designed that it can be cleaned regularly from the Tank.

The effluent transfer pumps shall pump the effluent at a uniform rate to the Primary Settling tube settler System Through Flash Mixer. One Pump shall be on duty and the other on standby. Diffused Aeration grid is provided at the bottom of the tank for the purpose of Equalization and to keep the solids in suspension.

**OIL REMOVAL SYSTEM:**

The oil removal system will be operated in Two stages, first stage oil will be removed by physical separation and the second stage will be using a mechanical Oil Skimmer.

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**PRIMARY SETTLING TANK:**

The equalized effluent shall flow by pumping to the flow channel / flocculator located prior to primary settler tank. The waste water will be subjected to chemical coagulation with Coagulants & Flocculants to remove dissolved organics by 40 ~ 50% and precipitate the TSS. The Settling Chemicals will be prepared in a preparation tank and the same will be sent to the Mechanical Flash Mixer. The flash mixer will be equipped with the Stirrer agitator mechanism for proper mixing of the chemicals with effluent.

Then the effluent shall flow to the Hopper bottom settling tank equipped with PVC Tube settler for the separation of Sludge from the effluent. The solids will retain in the bottom and the supernatant shall be sent to the downstream process of biological treatment. The Accumulated sludge in the Primary Settler shall be pumped out and dewatered by mechanically operated filter press unit. Filtrate will be returned to the collection tank.

The clear water shall flow via Overflow weir fixed in the top of the Primary settler for the further Biological process. The overflow from the primary settler will be collected in the intermediate collection tank of capacity 10.0 KL. The effluent will be pumped to Aeration system.

**BIO AERATION SYSTEM:**

The effluent from intermediate tank shall be sent to the Secondary Aeration Tank for removal of BOD, COD and to maintain the Turbidity less than 5 NTU. The BIOAERATION tank shall be equipped with the fine Bubble Diffusers, Air Blowers, Air feed Lines & RAS Lines.

Primary treated effluent shall be received in a 10 KL feed tank where nutrient like urea and DAP shall be added. Effluent shall be further pumped to the Two stage biological treatment using feed pumps.

The reactors in RCC shall be provided for the biological treatment system. In the reactor circulation is induced through the action of air bubbles injected into the tank by diffuser systems placed at the bottom of the reactor receiving air from dedicated Air Blowers. Air diffusers shall be made to provide a uniform distribution of fine bubble air release in the system resulting in efficient oxygenation. Fine bubble diffusers would be provided with suitable size and would be tubular type. Diffuser MOC will be EPDM.

**SECONDARY SETTLER TANK:**

In the Settler, Hopper bottom with Tube settler medias would be provided to enhance settling of the sludge with attached setting process. Through the use of the medias, the liquid in the settler is maintained in quiescent condition with allows the solids to get settled at the bottom for collection. The accumulating solids known as "Sludge" shall be pumped back in to the Aeration tank by sludge recycle pumps if required. This return sludge undergoes further digestion in the aeration tank and also provides the active organism needed to digest the incoming Effluent.

The settler shall be provided with overflow weir to collect the treated effluent and a scum baffle shall keep any floating mater from passing out in the final treated water. Treated water from settler shall over flow in to the filter feed tank where hypochlorite solution shall be dosed to disinfect the treated effluent.

Excess sludge from the bottom of the settler shall be pumped to sludge holding tank for further sludge drying process in Drying Beds.

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**CLARIFIED WATER TANK:**

The Clarified water from the Secondary settler will be collected in the Clarifier water tank. The Disinfection process will be done using Chlorination process.

**FILTERS – PSF & ACF**

The Treated effluent from the clarified water tank shall be pumped to the Pressure sand filter and Activated carbon filter for removal of suspended particles and water polishing and removal; dissolved organics, if any. This water now is amenable for feed to the Ultra-Filtration Plant.

**TREATED EFFLUENT STORAGE TANK:**

Treated effluent storage tank shall receive the filtered effluent from DMF. Treated effluent storage tank of 75 m<sup>3</sup> in RCC shall be provided as per the clients requirements.

Treated effluent pumps shall be provided which will be used for transferring treated effluent for gardening or tertiary treatment. The same pumps shall also be used for backwashing the DMF. Dirty DMF backwash shall be routed back to the collection sump.

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## **TECHNICAL SPECIFICATIONS:**

### **BAR SCREEN TANK:**

|                  |   |                            |
|------------------|---|----------------------------|
| Design flow rate | : | 1.5 m <sup>3</sup> /h.     |
| MOC of the Tank  | : | RCC (Client Scope)         |
| Positioning      | : | Elevated Above Ground      |
| Dimension        | : | 0.5Mx 0.5M x 0.5M SWD +0.3 |
| No. of Tanks     | : | 1 Nos.                     |
| MOC of Screen    | : | Mild Steel Epoxy Painted.  |

### **RAW EFFLUENT COLLECTION TANK:**

|                  |   |                                               |
|------------------|---|-----------------------------------------------|
| Holding Capacity | : | 15 KL.                                        |
| Design flow rate | : | 1.5 m <sup>3</sup> /h.                        |
| MOC of the Tank  | : | RCC (Client Scope)                            |
| Positioning      | : | Elevated Above Ground                         |
| Dimension        | : | 2.5 x 2.5 x 2.5 M SWD +0.3                    |
| No. of Tanks     | : | 1 Nos.                                        |
| Protection       | : | Water Proofing work with Epoxy Coated inside. |

### **RAW EFFLUENT TRANSFER PUMPS:**

The collected effluent be pumped using a submersible pump.

|                                 |   |                           |
|---------------------------------|---|---------------------------|
| No. of pumps                    | : | 2 Nos (1W + 1S)           |
| Design flow rate                | : | 1.5 m <sup>3</sup> /h.    |
| Delivery head                   | : | 35 -40 m                  |
| Maximum size of solids expected | : | 10 – 15 mm                |
| Type of the pump provided       | : | Submersible, non – clog,  |
| Operation                       | : | Heavy duty, Self-priming. |
| Size of solids passage provided | : | 15 mm                     |
| Make of the pump                | : | CRI / Eql.                |

### **OIL & GREASE TRAP – 1 - MANUAL**

|                       |   |                        |
|-----------------------|---|------------------------|
| Dimension of the tank | : | 1.5 x 1.0 x 2.0 M SWD  |
| Design flow rate      | : | 1.5 m <sup>3</sup> /h. |
| MOC                   | : | RCC.                   |

### **OIL & GREASE TRAP – 2 - MECHANICAL.**

|                       |   |                       |
|-----------------------|---|-----------------------|
| Dimension of the tank | : | 1.0 x 1.0 x 1.5 M SWD |
| MOC of tank           | : | RCC                   |
| Type of Skimmer       | : | Mechanical belt type. |
| No. of belts          | : | 1 Nos.                |
| Make                  | : | Olympia.              |
| Motor                 | : | Crompton / BB.        |

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## **FLASH MIXER:**

|                    |   |                                                      |
|--------------------|---|------------------------------------------------------|
| No. of TANK        | : | 1 Nos.                                               |
| Design flow rate   | : | 1.50 m <sup>3</sup> /h.                              |
| MOC                | : | RCC                                                  |
| Surface Protection | : | Epoxy coating – Internal & Enamel Painted - External |
| Size of the tank   | : | 0.5 m x 0.5 m 1.0 m.                                 |
| Duty               | : | To mix the dosing chemicals on to effluent.          |

## **FLOW CHANNEL:**

|                    |   |                                                      |
|--------------------|---|------------------------------------------------------|
| No. of TANK        | : | 1 Nos.                                               |
| Design flow rate   | : | 1.50 m <sup>3</sup> /h.                              |
| MOC                | : | RCC                                                  |
| Surface Protection | : | Epoxy coating – Internal & Enamel Painted - External |
| Size of the tank   | : | 2.5 m x 1.5 m 0.3 m.                                 |
| Duty               | : | To mix the dosing chemicals on to effluent.          |
| Dosing system      | : | Through Dosing Pumps                                 |

## **LIME DOSING SYSTEM:**

|                    |   |                                             |
|--------------------|---|---------------------------------------------|
| Quantity           | : | 1 no                                        |
| Method             | : | Online dosing of LIME                       |
| Duty               | : | Continue to                                 |
| Pump Capacity      | : | 6 Lph. at 3.0 kg / cm <sup>2</sup> pressure |
| Preparation tank   | : | 100 liters capacity HDPE tank with Mixer    |
| Make               | : | Focus                                       |
| Operating pressure | : | 2.0 bar                                     |
| Agitator           | : | 1 Set of SS Agitator with rotor.            |

## **PAC DOSING:**

|                  |   |                                             |
|------------------|---|---------------------------------------------|
| Quantity         | : | 1 no                                        |
| Method           | : | Online dosing of Ferric Chloride            |
| Duty             | : | Continue to                                 |
| Pump Capacity    | : | 6 Lph. at 3.0 kg / cm <sup>2</sup> pressure |
| Preparation tank | : | 100 liters capacity HDPE tank               |
| Make             | : | Focus                                       |

## **POLY DOSING:**

|                    |   |                                             |
|--------------------|---|---------------------------------------------|
| Quantity           | : | 1 no                                        |
| Method             | : | Online dosing of Poly                       |
| Duty               | : | Continue to                                 |
| Pump Capacity      | : | 4 Lph. at 3.0 kg / cm <sup>2</sup> pressure |
| Preparation tank   | : | 50 liters capacity HDPE tank with Mixer     |
| Make               | : | Focus                                       |
| Operating pressure | : | 2.0 bar                                     |

## **OLYMPIA ECO SOLUTIONS PRIVATE LIMITED**

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## **PRIMARY SETTLING TANK - RCC:**

|                                   |   |                                              |
|-----------------------------------|---|----------------------------------------------|
| Inlet flow rate                   | : | 1.50 m <sup>3</sup> /h.                      |
| Optimum Solids removal expected   | : | 90%.                                         |
| Hydraulic retention time required | : | 3.0 hours                                    |
| Dimension of aeration tank        | : | 2.5 m X 2.5 x 2.75 m SWD                     |
| Number Of tanks                   | : | 1 No.                                        |
| MOC of tank                       | : | RCC.                                         |
| Surface Protection                | : | Epoxy – Internal & Enamel Painted - External |
| Settling Media                    | : | PVC Tube deck media                          |
| Make of media                     | : | MM Aqua                                      |
| Height of media                   | : | 750 mm                                       |

## **BIO AERATION TANK - RCC:**

|                                   |   |                            |
|-----------------------------------|---|----------------------------|
| Inlet flow rate                   | : | 1.5 m <sup>3</sup> /h.     |
| F/M required                      | : | 0.1                        |
| Volume of aeration tank required  | : | 20 m <sup>3</sup>          |
| Hydraulic retention time required | : | 24 hours                   |
| Dimension of aeration tank        | : | 4.0 m x 2.5 m x 3.0 m SWD  |
| Free board                        | : | 0.5 m                      |
| Air Feed                          | : | Through Blowers            |
| Type of aeration                  | : | Fine Bubble Air Grids      |
| Replacement arrangement           | : | Inbuilt Retrievable System |
| Quantity                          | : | 1 Lot.                     |
| Type of Process                   | : | Activated Sludge Process.  |
| Recirculation                     | : | Through RAS Line.          |
| MOC of tank                       | : | RCC                        |

## **NUTRIENTS DOSING SYSTEM**

|                 |   |                      |
|-----------------|---|----------------------|
| Quantity        | : | 1 no.                |
| Type            | : | Electro magnetic     |
| Make            | : | Focus / Eql.         |
| Flow Rate       | : | 6 LPH                |
| Mixing Tank     | : | 1 No.                |
| Volume of tank  | : | 50 lit MS – FRP Tank |
| Mixing Chemical | : | Urea & DAP           |

## **AIR BLOWERS for PRIMARY & SECONDARY**

|                    |   |                       |
|--------------------|---|-----------------------|
| Quantity           | : | 2 Nos (1 W + 1 S)     |
| Design flow rate   | : | 100 CMH @ 4.0MWC      |
| Type               | : | Twin lobe compressor. |
| Motor Power        | : | 2.5 HP                |
| RPM                | : | 1440 RPM              |
| Make of the Blower | : | KPT / Eql.            |
| Make of Motor      | : | Kirloskar.            |
| Noise Level        | : | <90 dB (A)            |

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## **SECONDARY SETTLING TANK:**

The design of the unit is as follows

|                                   |   |                                              |
|-----------------------------------|---|----------------------------------------------|
| Inlet flow rate                   | : | 1.5 m <sup>3</sup> /h.                       |
| Optimum Solids removal expected   | : | 90%.                                         |
| Hydraulic retention time required | : | 3 hours                                      |
| Dimension of aeration tank        | : | 2.5 m x 2.5 x 2.75 m SWD                     |
| Number Of tanks                   | : | 1 No.                                        |
| MOC                               | : | RCC                                          |
| Surface Protection                | : | EPOXY – Internal & Enamel Painted - External |
| Settling Media                    | : | PVC Tube deck media                          |
| Make of media                     | : | MM Aqua                                      |
| Height of media                   | : | 750 mm                                       |

## **CLARIFIED WATER COLLECTION TANK:**

The design of the unit is as follows:

|                 |   |                          |
|-----------------|---|--------------------------|
| Inlet flow rate | : | 1.5 m <sup>3</sup> /hour |
| Capacity        | : | 10.0 KL.                 |
| MOC             | : | Sintex                   |
| Dimensions      | : | Circular.                |

## **DISINFECTANT DOSING SYSTEM**

|                 |   |                      |
|-----------------|---|----------------------|
| Quantity        | : | 1 no.                |
| Type            | : | Electro magnetic     |
| Make            | : | Focus / Eql.         |
| Flow Rate       | : | 6 LPH                |
| Mixing Tank     | : | 1 No.                |
| Volume of tank  | : | 50 lit MS – FRP Tank |
| Mixing Chemical | : | Chlorine             |

## **SLUDGE PUMPING:**

The collected bio – sludge will be pumped using a centrifugal pump.

The specifications of the pumps are as follows:

|                                 |   |                                  |
|---------------------------------|---|----------------------------------|
| No. of pumps                    | : | 1 No                             |
| Design flow rate                | : | 0.5 m <sup>3</sup> /h.           |
| Delivery head                   | : | 12 -15 m                         |
| Maximum size of solids expected | : | 25 - 40 mm                       |
| Type of the pump provided       | : | Horizontal Centrifugal, Non clog |
| Operation                       | : | Heavy duty, Self priming.        |
| Size of solids passage provided | : | 40 mm                            |
| Make of the pump                | : | Kirloskar/Eql.                   |

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## **RETURN SLUDGE PUMPING:**

The collected bio – sludge will be pumped using a centrifugal pump.

The specifications of the pumps are as follows:

|                                 |   |                                  |
|---------------------------------|---|----------------------------------|
| No. of pumps                    | : | 1 No                             |
| Design flow rate                | : | 0.5 m <sup>3</sup> /h.           |
| Delivery head                   | : | 12 -15 m                         |
| Maximum size of solids expected | : | 25 - 40 mm                       |
| Type of the pump provided       | : | Horizontal Centrifugal, Non clog |
| Operation                       | : | Heavy duty, Self priming.        |
| Size of solids passage provided | : | 40 mm                            |
| Make of the pump                | : | Kirloskar/Eql.                   |

## **FILTER FEED PUMPS :**

|          |   |                          |
|----------|---|--------------------------|
| Quantity | : | 2 nos. (1 W + 1SB)       |
| Capacity | : | 1.5 m <sup>3</sup> /hour |
| Head     | : | 30 m                     |
| Type     | : | Clear water pump         |
| Make     | : | Kirloskar / CRI          |

## **PRESSURE SAND FILTER:**

|                          |   |                                      |
|--------------------------|---|--------------------------------------|
| Inlet flow               | : | 1.5 m <sup>3</sup> /h                |
| Size of vessel           | : | 18 x 65 inches                       |
| Type of valve            | : | Multiport valve                      |
| Filter media             | : | Pebbles, Graded sand and anthracite. |
| Backwashing              | : | Manual, at 1 bar pressure loss.      |
| Material of construction | : | FRP                                  |

## **ACTIVATED CARBON FILTER:**

|                          |   |                                           |
|--------------------------|---|-------------------------------------------|
| Inlet flow               | : | 1.5 m <sup>3</sup> /h                     |
| Size of vessel           | : | 18 x 65 inches                            |
| Type of valve            | : | Multiport valve                           |
| Filter media             | : | Pebbles, Graded sand and Activated carbon |
| Backwashing              | : | Manual, at 1 bar pressure loss.           |
| Material of construction | : | FRP                                       |

## **INTER CONNECTING PIPELINES:**

|          |   |                                                                |
|----------|---|----------------------------------------------------------------|
| Quantity | : | 1 Lot.                                                         |
| Duty     | : | Connecting all tanks, pumps, filters within the battery limit. |
| MOC      | : | UPVC, MS & PVC etc.                                            |
| Make     | : | Tata, supreme / eql.                                           |

## **FILTERED TREATED WATER COLLECTION TANK:**

|                 |   |                                  |
|-----------------|---|----------------------------------|
| Quantity        | : | 1 No.                            |
| Volume of Tank  | : | 10 KL                            |
| Tank dimensions | : | 2.0 m x 2.0 m x 2.0 m SWD +0.25m |
| MOC of Tank     | : | RCC or Sintex (Client Scope)     |

## **OLYMPIA ECO SOLUTIONS PRIVATE LIMITED**

NO.19/12, BANSALI AVENUE ROAD, SIDCO INDUSTRIAL ESTATE (NORTH PHASE), AMBATTUR, CHENNAI – 98.

P: 044 4850 6222 F: 044 4850 1919 E: ask.olympia@gmail.com W: www.olympiaecosolutions.com

## **ELECTRICAL PANNEL BOARD:** 1 No.

One set of L&T / Siemens make Electrical Non compartmental panel board with complete electrical fixtures, necessary starters, safety switches with powder coated mild steel box and complete cabling for supplied Motors and pumps.

## **ELECTRO MAGNATIC FLOW METER :**

|           |   |                          |
|-----------|---|--------------------------|
| Quantity  | : | 2 nos.                   |
| Flow Rate | : | 1.5 m <sup>3</sup> /hour |
| Type      | : | EMFM                     |
| Make      | : | Nevo control / Eqvt.     |

## **SUPPLIER SCOPE:**

|     |                                           |                      |
|-----|-------------------------------------------|----------------------|
| 1.  | Bar Screen                                | : 1 No.              |
| 2.  | Mechanical Oil Skimmer                    | : 1 No.              |
| 3.  | Raw effluent transfer pumps (Submersible) | : 2 nos. (1W + 1 SB) |
| 4.  | Dosing System                             | : 5 Set              |
| 5.  | Dosing Mixer                              | : 2 Set              |
| 6.  | Flash Mixer                               | : 1 Set.             |
| 7.  | Sludge pumps                              | : 1 no.              |
| 8.  | RAS Pump                                  | : 1 No.              |
| 9.  | Air Grids for collection tank             | : 1 Lot.             |
| 10. | Air Blowers                               | : 2nos. (1W + 1 SB)  |
| 11. | Fine Bubble Diffusers                     | : 1 Lot.             |
| 12. | Tube Settler Medias                       | : 8 m <sup>3</sup>   |
| 13. | Filter Feed Pumps                         | : 2 nos. (1W + 1 SB) |
| 14. | Pressure Sand filter                      | : 1 Set.             |
| 15. | Activated Carbon filter                   | : 1 Set              |
| 16. | Dosing systems                            | : 1 Set.             |
| 17. | Plant pipelines (UPVC, MS)                | : 1 Set.             |
| 18. | Electrical Panel Board                    | : 1 Set.             |
| 19. | Electro Mechanical Flow Meter             | : 2 Nos.             |
| 20. | Erection & Commissioning                  | : LS.                |
| 21. | Commissioning of ETP                      | : LS.                |
| 22. | Operations Chemicals                      | : 1 Week             |

## **OLYMPIA ECO SOLUTIONS PRIVATE LIMITED**

NO.19/12, BANSALI AVENUE ROAD, SIDCO INDUSTRIAL ESTATE (NORTH PHASE), AMBATTUR, CHENNAI – 98.

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## **CUSTOMER SCOPE:**

- Complete civil works i.e., Tanks, system Foundation, Top roof etc. required for the system
- Feed storage, final water storage, intermediate storage tanks.
- All Sintex tanks for Storage tanks with accessories.
- Piping up to our system feed pump.
- All supports required for ETP with ladder.
- 3-Phase power distribution up to our system control panel
- All chemical consumables and power etc. after commissioning
- System un-loading & safe storage & Insurance.
- All Kinds of man Power, tools & Tackles that may be required at the time of erection and commissioning.

## **EXCLUSIONS:**

- Unloading and safe storage of equipment at site.
- Scaffolding works over the tanks wherever required.
- Utilities like water & electricity etc.
- All piping, cabling etc. and pipe lines replacements if required.
- All Consumables, chemicals, lubricants etc. & any other items not specifically mentioned in our scope.
- Food & Accommodation for Erection & Commissioning Team.
- Transportation of Goods to Site.

## **OLYMPIA ECO SOLUTIONS PRIVATE LIMITED**

NO.19/12, BANSALI AVENUE ROAD, SIDCO INDUSTRIAL ESTATE (NORTH PHASE), AMBATTUR, CHENNAI – 98.

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## COMMERCIAL DETAILS FOR EFFLUENT TREATMENT PLANT

| SL. NO | ITEM DESCRIPTION                                                                                                                                                                                                                       | QTY.   | CAPACITY                   | TOTAL PRICE                                                                 |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------|-----------------------------------------------------------------------------|
| 01     | DESIGN, DETAILED ENGINEERING, SUPPLY, ERECTION, TESTING & COMMISSIONING OF MECHANICAL EQUIPMENTS WITH MOTOR, PUMPS, FILTERS AND ETC. FOR THE ETP AS PER THE SPECIFICATION MENTIONED ABOVE EXCLUDING CIVIL TANK (AS PER SUPPLIER SCOPE) | 1 UNIT | 25 KLD (16 Hrs. Operation) | Rs. 24,75,000.00                                                            |
| 02     | SUPPLY & INSTALLATION OF ELECTRO MAGNETIC FLOW METERS.                                                                                                                                                                                 | 2 UNIT | 1.5 M3/HR.                 | Rs. 1,10,000.00                                                             |
| 03     | ERECTION AND COMMISSIONING AND REVAMPING OF ETP                                                                                                                                                                                        | 1 LOT  | LS                         | Rs. 1,25,000.00                                                             |
|        | <b>TOTAL COST</b>                                                                                                                                                                                                                      |        |                            | <b>Rs. 27,10,000.00/-</b><br>(Rupees Twenty Seven Lakhs Ten Thousand Only.) |

### OLYMPIA ECO SOLUTIONS PRIVATE LIMITED

NO.19/12, BANSALI AVENUE ROAD, SIDCO INDUSTRIAL ESTATE (NORTH PHASE), AMBATTUR, CHENNAI – 98.

P: 044 4850 6222 F: 044 4850 1919 E: ask.olympia@gmail.com W: www.olympiaecosolutions.com

### **Warrantee for the machineries:**

The Standard Warrantee for the supplied Machineries will be 12 months from the date of documented handing over of system in the running conditions against any manufacturing defects. Consumables, Electronic items, cables, starters, coils, windings, etc, would not be included in this warrantee.

### **Services for the machineries:**

Any services, priority maintenance required for the machineries will be done for free of cost within the warrantee period. After completion of warrantee period supplier will be ready to take annual Maintenance contract (AMC) with terms and conditions.

The operation and maintenance of the machineries would not be encouraged by any other than the suppliers within the warranty period, deviated from which, the warranty would stand cancelled.

### **TERMS AND CONDITIONS:**

|                                                                                                                                        |                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Payment Terms</b>                                                                                                                   | <ul style="list-style-type: none"> <li>• Advance of 50% Along with technically &amp; Commercially Cleared Purchase order</li> <li>• 45% against supply on pro rata basis along with 100% taxes and duties, levies, cess, etc against invoice.</li> <li>• 5% after commissioning of the plant.</li> </ul> |
| <b>Taxes</b>                                                                                                                           | GST @ 18.0% - Extra                                                                                                                                                                                                                                                                                      |
| <b>P&amp;F</b>                                                                                                                         | 2% Extra from Basic                                                                                                                                                                                                                                                                                      |
| <b>Freight</b>                                                                                                                         | At client scope.                                                                                                                                                                                                                                                                                         |
| <b>Delivery Period</b>                                                                                                                 | 60 days for delivery from the date of the receipt of technically and commercially clear Purchase order & advance                                                                                                                                                                                         |
| <b>Offer Validity</b>                                                                                                                  | 30 days only.                                                                                                                                                                                                                                                                                            |
| <b>Any other Tax Liability if applicable shall be in the scope of the purchaser. All disputed are subject to Chennai jurisdiction.</b> |                                                                                                                                                                                                                                                                                                          |

General Conditions : Order once placed cannot be cancelled.

We sincerely trust that the above would meet your kind approval and look forward to the pleasure of receiving your esteemed order.

Thanking you,

Yours faithfully,

**For OLYMPIA ECO SOLUTIONS PVT. LTD.,**

**SYED KASSALI A.**

Director.

89399 78787.

### **OLYMPIA ECO SOLUTIONS PRIVATE LIMITED**

NO.19/12, BANSALI AVENUE ROAD, SIDCO INDUSTRIAL ESTATE (NORTH PHASE), AMBATTUR, CHENNAI – 98.

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# **ANNEXURE – 17**

## **NABL Accreditation Certificate – FEMO Laboratory**



National Accreditation Board for  
Testing and Calibration Laboratories

**CERTIFICATE OF ACCREDITATION**

**FEMO LABS PRIVATE LIMITED**

has been assessed and accredited in accordance with the standard

**ISO/IEC 17025:2017**

**"General Requirements for the Competence of Testing &  
Calibration Laboratories"**

for its facilities at

19/12 BANSALI CHEMICAL AVENUE, SIDCO AMBATTUR INDUSTRIAL ESTATE NORTH PHASE,  
CHENNAI, TAMIL NADU, INDIA

in the field of

**TESTING**

Certificate Number: TC-8645

Issue Date: 18/01/2025

Valid Until: 17/01/2029

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website [www.nabl-india.org](http://www.nabl-india.org))

Name of Legal Entity: Femo Labs Private Limited

Signed for and on behalf of NABL



Anuja Anand  
Director

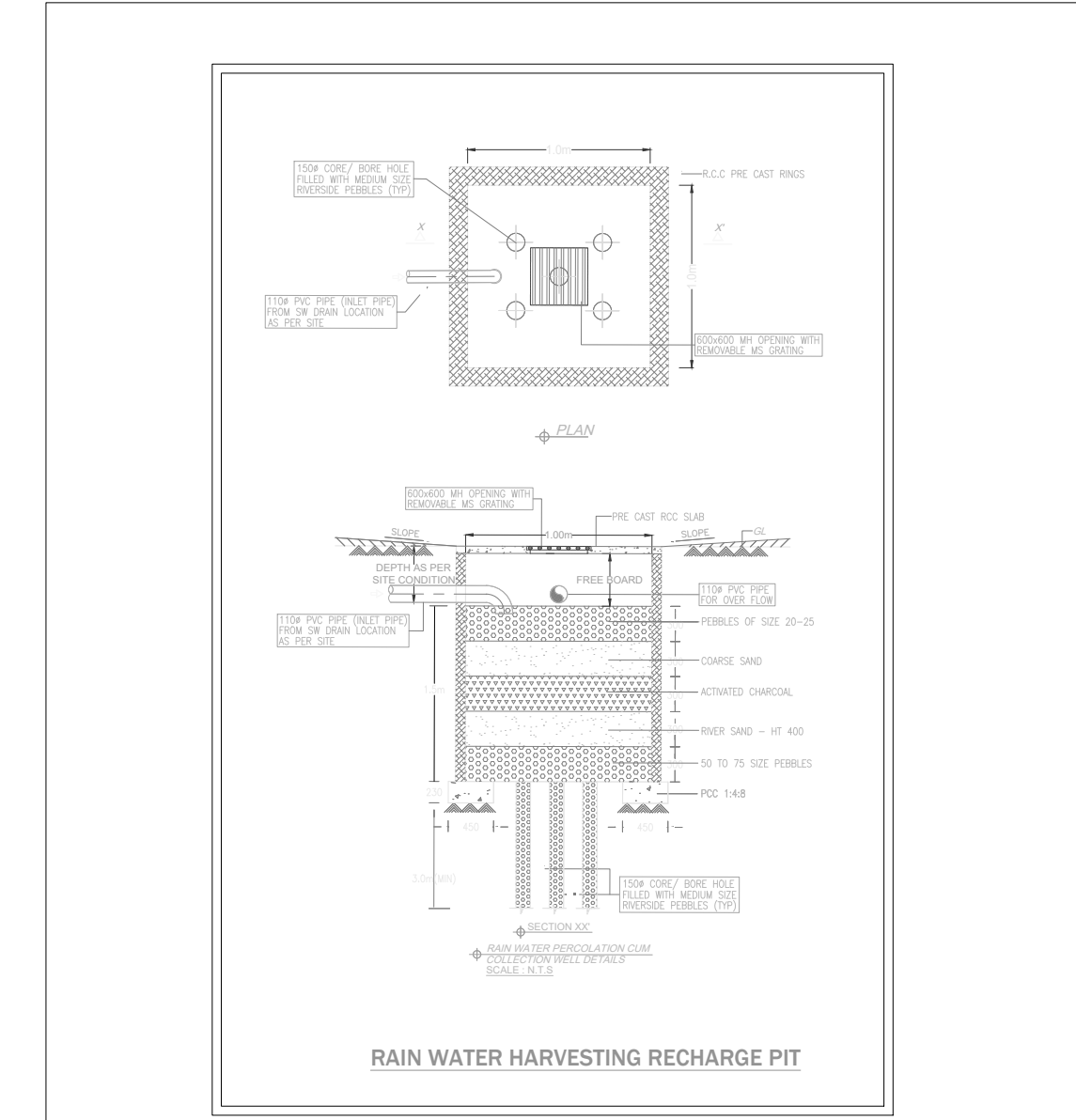
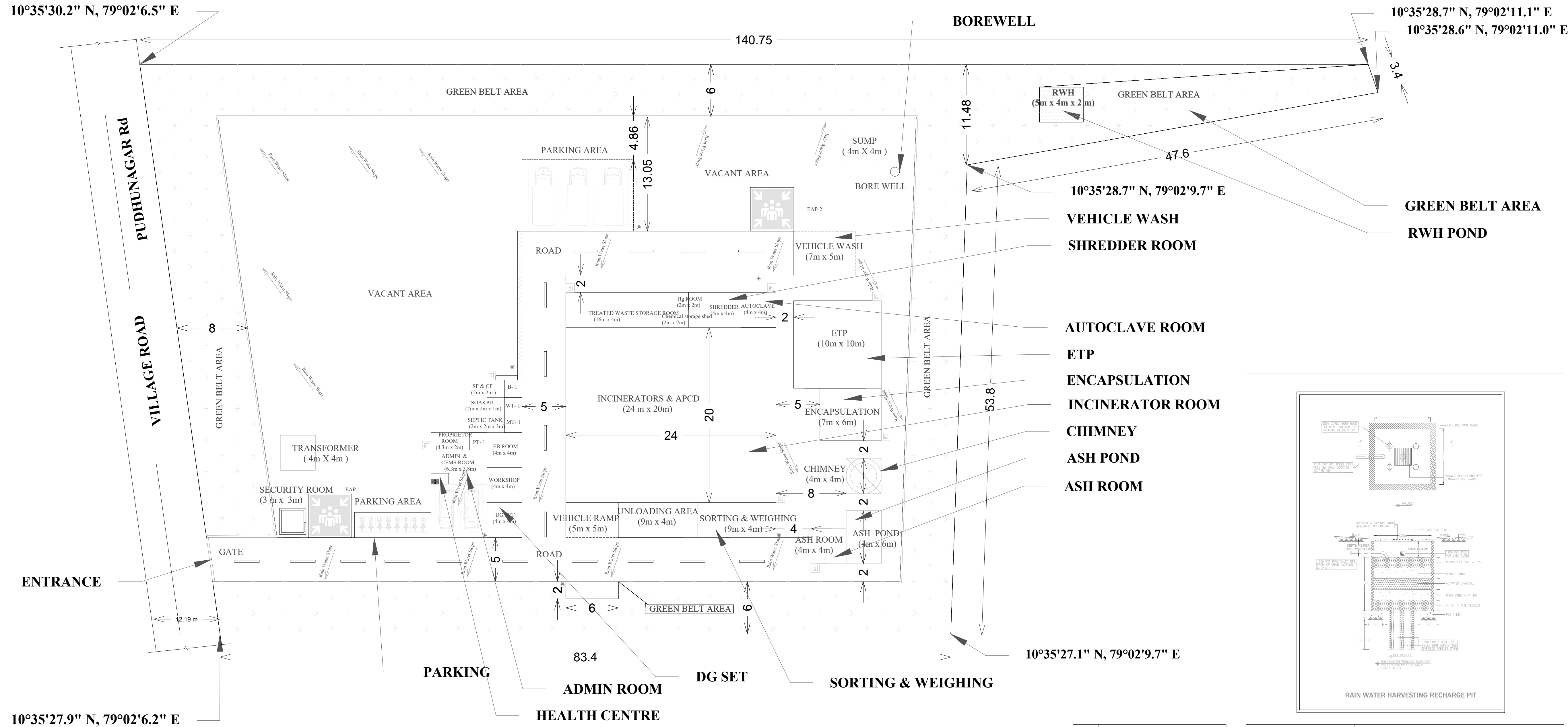
  
N. Venkateswaran  
Chief Executive Officer

# **ANNEXURE – 18**

## **Strom Water Layout**



THE SITE PLAN LAYOUT OF PROPOSED CBWTF M/s. BIOTECH ENGINEERING INDUSTRIES,  
S.NO: 17/7, Pisanathur Village, Gandarvakottai taluk, Pudukkottai District, TamilNadu



|  |               |
|--|---------------|
|  | RWH PITS      |
|  | FIRE HYDRANT  |
|  | FIRST AID BOX |
|  | EAP           |

|  |                                                          |
|--|----------------------------------------------------------|
|  | Rain Water Harvesting Pits - 8 Nos<br>(1.0 x 1.0 x 1.5m) |
|  | Rain Water Trench                                        |
|  | Rain Water Harvesting Pond - 1 No<br>(5m x 4m x 2 m)     |

|                            |                     |                                                                    |                |
|----------------------------|---------------------|--------------------------------------------------------------------|----------------|
| SK<br>DESIGN               | SAKTHI D K<br>DRAWN | SK<br>CHECKED                                                      | SK<br>APPROVED |
| TITLE: PROPOSED_CBWTF      |                     | <br>OLYMPIA ECO SOLUTIONS PRIVATE LIMITED<br>CHENNAI-600 037 INDIA |                |
| PROJECT: 1                 |                     |                                                                    |                |
| CLIENT: 01                 | DRG NO: 01          |                                                                    |                |
| ALL DIMENSIONS ARE IN Sq.m |                     |                                                                    |                |
| SCALE : 04                 |                     | SHEET:01                                                           | REV: 00        |

STORM WATER LAYOUT PLAN

# **ANNEXURE – 19**

## **NABET Accreditation Certificate - Olympia Eco Solutions Pvt. Ltd**





QUALITY COUNCIL  
OF INDIA

— ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 —



## National Accreditation Board for Education and Training

# Certificate of Accreditation

### Olympia Eco Solutions Private Limited, Chennai

19/12, Bansali Chemical Avenue, SIDCO Ambattur Industrial Estate North Phase, 1st Cross Main Road,  
Ambattur, Chennai, Tamil Nadu – 600098

The organization is accredited as **Category-A** under the QCI-NABET Scheme for Accreditation of EIA  
Consultant Organization, Version 3: for preparing EIA-EMP reports in the following Sectors –

| S.No | Sector Description                                                                                                                                                                                                                  | Sector (as per) |        | Cat. |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------|------|
|      |                                                                                                                                                                                                                                     | NABET           | MoEFCC |      |
| 1    | Thermal power plants                                                                                                                                                                                                                | 4               | 1 (d)  | B    |
| 2    | Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates) | 21              | 5(f)   | B    |
| 3    | Common hazardous waste treatment, storage and disposal facilities (TSDFs)                                                                                                                                                           | 32              | 7(d)   | B    |
| 4    | Bio-medical waste treatment facilities                                                                                                                                                                                              | 32A             | 7(d a) | B    |
| 5    | Common Effluent Treatment Plants (CETPs)                                                                                                                                                                                            | 36              | 7(h)   | B    |
| 6    | Building and construction projects                                                                                                                                                                                                  | 38              | 8(a)   | B    |
| 7    | Townships and Area development projects                                                                                                                                                                                             | 39              | 8(b)   | B    |

**Note:** Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated Nov 29, 2022 and posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no QCI/NABET/ENV/ACO/23/2647 dated Jan 23, 2023. The accreditation needs to be renewed before the expiry date by Olympia Eco Solutions Private Limited, Chennai following due process of assessment.

Sr. Director, NABET  
Dated: Jan 23, 2023

Certificate No.  
NABET/EIA/2225/RA 0271

Valid up to  
Sept 07, 2025

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to the QCI-NABET website.



# **ANNEXURE – 20**

## **Executive Summary English & Tamil**



## **EXECUTIVE SUMMARY**

### **1. Introduction**

M/s. Biotech Engineering Industries has proposed to set up a Common Bio-Medical Waste Treatment Facility (CBWTF) at Survey No: 17/7, Pisanathur Village, Gandarvakkottai taluk, Pudukkottai District, TamilNadu. The bio-medical wastes generated from healthcare units including veterinary institutions, animal house, pathological Laboratory, Blood Bank etc. from parts of in and around Pudukkottai, Tiruchirappalli, Thanjavur, Sivagangai, Nagapattinam, Thiruvavarur, Perambalur district will be suitably collected & treated to reduce the possible adverse effects.

The proposed establishment of common bio-medical waste treatment and disposal facility is covered under activity 7 [d (a)] and Category B1 of “Bio-medical Waste Treatment Facilities” as per the EIA Notification dated 14th September, 2006 and amendment no. S.O 1142 (E) dated 17th April 2015. The proposed project requires prior Environmental Clearance from SEIAA, Tamil Nadu.

Application seeking ToR was made with Form 1 & Pre-feasibility report to SEIAA, Tamil Nadu vide proposal no. SIA/TN/INFRA2/494961/2024 and File no. 11227. SEAC in its 501th meeting held on 27th September 2024 appraised the project. The Terms of Reference (ToR) for the study and preparation of EIA report, with identification no. TO24B3301TN5162069N was issued on 22.10.2024 by the SEIAA-TN.

### **2. Project Details**

**Table 1 – Details of the Project**

|                                 |                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------|
| <b>Project Name</b>             | Proposed Common Bio Medical Waste Treatment Facility                                         |
| <b>Capacity</b>                 | 10 TPD                                                                                       |
| <b>Project Site</b>             | Survey No: 17/7, Pisanathur Village, Gandarvakkottai taluk, Pudukkottai District, Tamil Nadu |
| <b>Proposal Number</b>          | SIA/TN/INFRA2/494961/2024 (from Parivesh Portal)                                             |
| <b>Geo Co-ordinates of site</b> | 10° 35' 28.64" N 79° 02' 08.45" E                                                            |
| <b>Project Land Area</b>        | <b>Total plot area - 1.55 acres (6250 Sq.m)</b>                                              |
| <b>Project Cost</b>             | Rs. 2.83 Crores                                                                              |

**Table 2 – Environmental Setting of the Project**

| Feature                            | Details                                                                     |         |    |
|------------------------------------|-----------------------------------------------------------------------------|---------|----|
| Village, Taluk, District, State    | Pisanathur Village, Gandarvakkottai Taluk, Pudukkottai District, Tamil Nadu |         |    |
| District head quarters             | Pudukkottai - 30.3 Km - SW                                                  |         |    |
| Max./Min Temp                      | 39.70°C / 17.80°C                                                           |         |    |
| Relative Humidity                  | 59-85%                                                                      |         |    |
| Annual rainfall                    | 857.80 mm                                                                   |         |    |
| Topography/ Soil Type              | Ferruginous Lateritic soil                                                  |         |    |
| Terrain, level with respect to MSL | Flat terrain and lies at an altitude of 100 m MSL                           |         |    |
| Nearest Habitation                 | Pisannathur                                                                 | 0.77 Km | S  |
|                                    | Pudunagar                                                                   | 2.76 Km | N  |
|                                    | Veeradipatti                                                                | 4.14 Km | SE |
|                                    | Palaya Gandarvakottai                                                       | 1.34 Km | W  |
| Nearest Major City                 | Thanjavur                                                                   | 20 km   | NE |
| Nearest Air port                   | Tiruchirappalli International Airport                                       | 59 km   | NW |
| Nearest Sea port                   | V. O. Chidambaranar Port                                                    | 223 km  | S  |
| Nearest Railway Station            | Thanjavur Railway station                                                   | 24 Km   | NW |
| Nearest Highway                    | (SH - 99) Thurukattupalli - Sengipatti- Pattukottai Road                    | 2.45 km | S  |
|                                    | (NH- 36) Pudukkottai- Tanjore Road                                          | 1.28 km | N  |
| Nearest Water Bodies               | Pisanathur Village Pond                                                     | 0.65 km | S  |
|                                    | Sivan Koil Kulam                                                            | 2.53 km | SW |
|                                    | Veeradipatti Vadaku Kulam                                                   | 4 km    | E  |
|                                    | Pudunagar Pond                                                              | 2.5 km  | N  |
|                                    | Mattangal pond                                                              | 2 km    | S  |
|                                    | Kovilur Pond                                                                | 2.5 km  | S  |
|                                    | Gandarvakottai Lake                                                         | 2.8 km  | W  |
| Nearest Forest                     | NIL                                                                         |         |    |
| Historical places                  | None within 10 km radius                                                    |         |    |
| Interstate boundary                | NIL                                                                         |         |    |
| Source: *DCHB Pudukkottai 2011     |                                                                             |         |    |

**Table 3 – List of Equipments**

| S.No. | Equipment                                                                                                                      | Installed Capacity  | Numbers |
|-------|--------------------------------------------------------------------------------------------------------------------------------|---------------------|---------|
| 1     | Static Incinerator                                                                                                             | 200 Kg Per Hour     | 1       |
| 2     | Static Incinerator                                                                                                             | 100 Kg Per Hour     | 1       |
| 3     | Autoclave                                                                                                                      | 1220 litre Per Hour | 1       |
| 4     | Shredder                                                                                                                       | 200 Kg Per Hour     | 1       |
| 5     | Effluent Treatment Plant                                                                                                       | 25 KLD              | 1       |
| 6     | Air Pollution Control Devices – Quencher (Spray cooler), Venturi Scrubber, Flue Gas Wet Scrubber, Droplet Separator and stack. |                     |         |
| 7     | Continuous Emission Monitoring System (CEMS)                                                                                   |                     |         |

The total water requirement is estimated to be 19 KLD, of which 8 KLD will be sourced by local body and the remaining 11 KLD will be met through treated water from the proposed Effluent Treatment Plant (ETP).

The industrial water requirement is 15 KLD, and the evaporation loss is estimated to be 3.75 KLD.

The wastewater generated will be treated in the proposed ETP, and the treated water will be reused for industrial purposes within the facility. Domestic wastewater generation is estimated at 1.5 KLD, which is further categorized into grey water and black water. Grey water, amounting to 1.2 KLD, will be treated in the Grey Water Treatment Plant (GWTP), and the treated water will be reused for gardening. Black water, estimated at 0.3 KLD, will be directed to a septic tank followed by a soak pit.

The total power required for the facility is estimated to be around 120 KW, which will be sourced from TANGEDCO and 1 X 120 kVA DG set will be used for power backup.

**Table 4 – The fuel required for the operation is given in table below.**

| S.No. | Components              | Fuel Required |
|-------|-------------------------|---------------|
| 1     | Incinerator- 200 kg/hr  | 35-37 Lt/hr   |
| 2     | Incinerator – 100 kg/hr | 25-27 Lt /hr  |
| 3     | DG set – 120 KVA        | 16 Lt /hr     |

In proposed project, the solid and hazardous waste generation during wastewater treatment & treatment of common bio-medical waste will be disposed to TSDF. The collected BMW is estimated to be 60% of incinerable waste and 40% of the sterilization waste (including autoclave and sharps/metallic body in plants). Approximately 250 kg/day of incineration ash and ETP sludge will be sent to TSDF for safe disposal. Municipal solid waste generated onsite will be disposed of daily in the nearest municipal bins, while waste oil from the DG set will be sent to an authorized oil recovery facility.

The proposed facility will have an employment of around 30 nos. The direct and indirect employment is envisaged for both skilled and unskilled.

### 3. Baseline Environmental Status

The baseline data study has been carried out during the period of 13<sup>th</sup> Jan, 2025 to 03<sup>rd</sup> April, 2025 (summer season). The baseline information on ambient air quality, water quality, noise levels, soil quality, ecology & biodiversity and socio-economic are given below.

#### Air Quality

Ambient Air quality was monitored at 8 locations within the study area of the project site. The locations were identified in downwind, cross wind and up wind directions. The air pollutants monitored are Particulate Matter (PM), Sulphur dioxide (SO<sub>2</sub>), Oxides of nitrogen (NO<sub>x</sub>), Carbon monoxide (CO) and Ozone (O<sub>3</sub>) as per the standard MoEF&CC guidelines and results were compared with stipulated standards of CPCB.

**Table 5 – Air Pollutants Monitoring Values**

| S. No | Parameters        | Range                       | LIMIT AS PER NAAQS |
|-------|-------------------|-----------------------------|--------------------|
| 1.    | PM <sub>10</sub>  | 40.85 – 56.55               | 100                |
| 2.    | PM <sub>2.5</sub> | 21.33 – 56.55               | 60                 |
| 3.    | SO <sub>x</sub>   | 0.00 – 14.97                | 80                 |
| 4.    | NO <sub>x</sub>   | 3.50 – 16.17                | 80                 |
| 5.    | CO                | Below Detection Limit (BDL) | 4.0                |
| 6.    | O <sub>3</sub>    | Below Detection Limit (BDL) | 180                |

#### Water quality monitoring

The ground and surface water samples were collected from different sources within the study area and analysed for all important physio-chemical and biological parameters to establish quality of water prevailing in the project surroundings.

Around 5 ground water and 5 surface water samples were collected. The ground water is collected from Pisanathur, Sundampatti, Gandarvakottai, Turusupatti & Kallukaranpatti.

The analysis of **Ground water samples** collected from various locations within the study area indicates that the **pH values** are within the acceptable range specified by CPCB guidelines.

**Table 6 – Ground Water Monitoring Values**

| S. No | Parameters                   | Range (mg/L) | PERMISSIBLE LIMIT AS PER<br>IS 10500-2012 Amendment 2018 |
|-------|------------------------------|--------------|----------------------------------------------------------|
| 1.    | Total Hardness               | 26 -220      | 600                                                      |
| 2.    | Total Dissolved Solids (TDS) | 172 -530     | 2000                                                     |
| 3.    | Chlorides                    | 21.2 -75.2   | 1000                                                     |
| 4.    | Nitrates                     | 3.5 – 12.2   | 45                                                       |
| 5.    | Magnesium                    | 2.4 – 25.2   | Not Specified                                            |
| 6.    | Potassium                    | 3.0 - 172    | Not Specified                                            |

The **surface water** was collected from Pisanathur Pond, Sundampati, Viralippatti, Pudunagar Pond & Gandarvakottai Lake.

The **Surface water samples** collected from selected locations within the study area were analyzed for various physico-chemical and biological parameters. The **pH values** of the samples were found to be within the acceptable range as per CPCB guidelines, indicating a neutral to slightly alkaline nature.

**Table 7 – Surface Water Monitoring Values**

| S. No | Parameters                   | Range (mg/L) | PERMISSIBLE LIMIT AS PER<br>IS 10500-2012 Amendment 2018 |
|-------|------------------------------|--------------|----------------------------------------------------------|
| 1.    | Total Hardness               | 56 - 210     | 600                                                      |
| 2.    | Total Dissolved Solids (TDS) | 90 - 364     | 2000                                                     |
| 3.    | Chlorides                    | 40 – 104.9   | 1000                                                     |
| 4.    | Nitrates                     | 2.32 – 12.2  | 45                                                       |
| 5.    | Magnesium                    | 22 – 102     | Not Specified                                            |
| 6.    | Potassium                    | 02 - 172     | Not Specified                                            |
| 7.    | Chemical Oxygen Demand       | 2.9 - 6.9    | 250                                                      |
| 8.    | BOD                          | BDL          | 30                                                       |

In conclusion, all tested parameters of the surface water sample and ground water samples were found to be within the permissible limits set by the **Central Pollution Control Board (CPCB)**, indicating that the water in the area is of good quality and suitable for various uses.

## **Noise Levels**

Noise was monitored at 8 locations within the study area of project site. The locations were identified based on existing noise level status, keeping in view of land use pattern, residential areas in villages, nearby hospitals, bus stands etc.

In the study area, noise levels during the daytime ranged from 45.8 dB(A) to 56.3 dB(A), while night time levels varied between 40.6 dB(A) and 48.8 dB(A). These measurements are well within the permissible limits prescribed by the Central Pollution Control Board (CPCB), which are 55 dB(A) for daytime and 45 dB(A) for night time in residential areas, and 75 dB(A) for daytime and 70 dB(A) for night time in industrial areas. Additionally, the hourly equivalent continuous noise levels (Leq) recorded at various monitoring locations across the study area complied with the applicable CPCB standards for both time periods and land use categories.

The traffic survey was carried out near site. It was found that the highest peak (worst case) was observed 3600 PCU/hr during 08:00 to 09:00 AM near pisanathur toll road. It is observed that the existing level of service of site access road is good as per the IRC; 106-1990 (PCU's per hour) and implies that traffic will not have a major impact due to the proposed project.

## **Soil quality**

Soil quality was monitored at 8 locations within the study area of project site. Locations were selected to assess existing soil conditions representing various land use and geological features. The important physical, chemical parameters concentrations were determined from all samples. Soil samples collected from various locations within the study area were analysed to assess their physical and chemical characteristics. From the analysis reports it has been observed that

- **pH** of the soil samples ranged from 4.36 to 6.80
- **Electrical Conductivity (EC)** was found to range between 20 and 780 $\mu$ S/cm, suggesting moderate/minimal salinity levels.
- **Organic Matter Content** varied between 0.12% and 1.0%, indicating the fertility status of the soil.
- **Total Nitrogen, Phosphorus (P), and Potassium (K)** contents were observed in the range of 134 Kg/ha – 352.7 Kg/ha, 10.4 Kg/ha – 28.1 Kg/ha, and 280 mg/kg- 426 mg/Kg respectively, showing the nutrient availability for plant growth.
- **Heavy metals** such as lead, cadmium, chromium, and arsenic were either absent or detected below permissible limits, indicating minimal contamination risk.



- The **Soil texture** analysis for the study area has been given as Ferruginous Lateritic soil.

The nutrient levels and pH are within acceptable limits for agricultural and no significant presence of hazardous element elements was observed.

### **Ecological Environment**

The study of biological environment in the study area near the projects site of the proposed CBWTF in Pisanathur Village was conducted in compliance to ToR. The data of the flora and fauna in the study area is collected by conducting field survey in the area, examination of floral and faunal records in published reports in Government websites, standard books, research publications etc. The data was analyzed to comprehend the probable impact of the establishment of the proposed facility in the surrounding environment with specific reference to ecology. In Pudukkottai District, four major rivers namely, Vellar, Agniyar, Pambar and Kundar are flowing.

**In the study area of 10 km radius, there are no reported rare or endangered species of birds and animals have been reported from the industry area and also, there are no National Parks, Wildlife Sanctuary etc found within 10 km radius of the project site.**

Pudukkottai District is predominantly an agricultural district. Paddy, groundnut, sugarcane, maize and cashewnuts are the major crops grown in this district. Gandarvakottai taluk in the Pudukkottai district primarily has red ferruginous lateritic soils. The soil is mostly fertile and has soil seed banks. The soil microflora is generally, bacteria, fungi, algae, protozoa and the soil micro fauna are nematodes and protozoa from the soil organic matter. There is a diverse range of plant species, including those found in vegetable fields. Fauna diversity includes a variety of insect species, ants, and other invertebrates, along with birds, reptiles, and mammals. The principal crops of Pudukkottai district are Paddy (Rice), Chola (Jowar), Maize, Black gram, Gingelly, Groundnut, Coconut, Sugarcane, Mango, Banana, Cashewnut etc

### **Socio-Economic Environment**

The assessment of socio-economic environment forms an integral part of an EIA study. Socio-Economic status of the population is an indicator for the development of the region. Any developmental project of any magnitude will have a bearing on the living conditions and on the economic base of population in particular and the region as a whole. Similarly, the proposed project site will have its share of socioeconomic influence in the study area. The section delineates the overall appraisal of society relevant attributes. The data collection for evaluation of impact of proposed project site on socio-economic aspects

in in the study area has been done through primary household survey and through the analysis of secondary data available for study area. Anticipated environmental impacts and mitigation measures

The proposed project may cause impact on the environment in two phases:

1. During Construction phase
2. During Operation phase

**a. Impacts during construction phase:**

Construction phase works include site clearance, site formation, building works, infrastructure provision and any other infrastructure activities. The impacts due to construction activities are short term and are limited to the construction phase.

**b. Impacts during operation phase:**

**Impact on Air Quality**

The potential dust sources associated with operation activities are loading and unloading of the materials, travel over unpaved roads and wind erosion etc. The construction works associated with the proposed development are given below.

- The main air pollutant expected from line sources are dust generation from the movement incoming & outgoing vehicle.
- Point source emissions from Incinerator, DG set
- Dust generation due to the movement of vehicles on unpaved roads
- Unloading of raw materials and removal of unwanted waste material

The anticipated air emissions from incinerator, DG set and Stacks are estimated and emission rates were calculated based on the outlet emission standards provided for PM, SO<sub>2</sub> and NO<sub>X</sub> (50 mg/m<sup>3</sup>, 200 mg/Nm<sup>3</sup> and 400 mg/ Nm<sup>3</sup> respectively)

**The AERMOD view 12.0.0 model results shows very negligible incremental rise in all these air quality parameters with an overall air quality scenario in worst case for PM (5 µg/m<sup>3</sup>), SO<sub>2</sub> (0.60 µg/m<sup>3</sup>) and NO<sub>X</sub> (3.0 µg/m<sup>3</sup>) respectively.**

**Mitigation Measures - Air Quality**

- To minimize the impact from line source, black carpeted road will be maintained properly to reduce the dust generation.
- Regular water sprinkling on main haul roads in the project area, this activity will be carried out at least twice a day.
- Greenbelt will be provided along the boundary and along the road and DG set will be used only

during power failure for emergency requirements.

- The duration of stockpiling will be as short as possible as most of the material will be used as backfill material for the open cut trenches for road development.
- Temporary tin sheets of sufficient height (3m) will be erected around the site of dust generation or all around the project site as barrier for dust control.

### **Impact on Water quality**

The operation of a Common Biomedical Waste Treatment Facility (CBWTF) may pose potential risks to the water environment through wastewater generation, accidental spills, and surface runoff from the site. The primary sources of water pollution include effluents from waste treatment processes, washing of vehicles, and leachate from waste storage areas. If not managed properly, these discharges can lead to contamination of groundwater and nearby water bodies, affecting both water quality and aquatic ecosystems.

### **Mitigations Measures - Water quality**

During site development necessary precautions will be taken, so that the runoff water from the site gets collected to working pit and if any over flow is, will be diverted to nearby greenbelt/ plantation area. Wastewater including vehicle and container washing, floor washing, domestic water shall be treated in ETP for safe guard of water environment. The treated waste water shall be used for greenbelt, floor/vehicle washing etc.

### **Impact on Noise Levels**

The major source of noise in proposed project will be from unloading of bio-medical waste and use of Incinerator, DG set, pumps, motors etc.

### **Mitigation measures – Noise Levels**

- Providing suitable enclosures (adequate insulation) to minimize the impact of high noise generating sources.
- Employees will be provided with PPE like earplugs, helmets, safety shoes, etc.
- Development of greenbelt all along the boundary and along the roads within the project

## **4. Environmental Monitoring Program**

Environmental monitoring program describes the processes and activities that need to take place to characterize and monitor the quality of environment. Different activities involved in proposed project and their impact on various environmental attributes have been taken into account while designing a detailed environmental monitoring program.

Environmental monitoring program has been prepared for the proposed project for assessing the efficiency of implementation of Environment Management Plan and to take corrective measures in case of any degradation in the surrounding environment. Results of monitoring will be reviewed, analyzed statistically and submitted to concerned authorities.

Environmental Monitoring Program includes:

- Continuous online monitoring of the incinerators stack emission for flue gas parameters
- Incinerators stack emission monitoring to ensure compliance with emission standards
- Ambient air quality monitoring
- Analysis of treated wastewater, especially in case of discharge
- Periodic monitoring of incineration ash and ETP sludge

## **5. Risk analysis**

Risk assessment was carried out to identify and quantify major hazards and risk associated with various operations of proposed project that may lead to an emergency situation which affect public safety and health. A systematic analysis of chemicals and their quantities of storage have been carried out to determine threshold quantities as notified in MSIHC Rules, 1989 and amended in 2000.

All necessary measures to minimize the risk due to the proposed project will be taken during design stage and operation period viz., fire and safety control measures, emergency preparedness plan, disaster management plan etc.

## **6. Project Benefits**

The contribution of proposed facility to health care establishments in their BMW Management is expected to be significant. Expected project benefits include:

- (i) Better management of bio-medical waste
- (ii) Reduction of pollution load on environment
- (iii) Ensure compliance with applicable rules (Bio-Medical Waste Management Rules, 2016),
- (iv) Reduced environmental liability for health care establishments
- (v) Employment opportunities etc.

## **7. Environmental management plan**

The Environmental Management Plan (EMP) is designed to ensure the sustainable development of the proposed plant and its surrounding environment. The primary objective of the EMP is to minimize pollution at the source using best available and affordable technologies, followed by appropriate treatment methods prior to discharge or disposal, in compliance with regulatory standards.

The Environmental Management Plan (EMP) is required to ensure sustainable development of the plant

area and the surroundings. The EMP aims to control pollution at the source level to the possible extent with the available and affordable technology followed by the standard treatments before getting discharged. The capital cost for the proposed project is estimated to be around Rs.2.83 Crores. The capital cost allocated for EMP is around Rs.142 Lakhs with a recurring cost of Rs.8 Lakhs per annum. The fund allocation for the CER Greenfield Project is 2.0% of Capital investment for industries having capital amount  $\leq 100$  crores. The details of planned CER activities for Rs.5.66 lakhs.

The proposed incinerators shall be equipped with all necessary Air Pollution Control Devices (APCDs) to comply with prescribed emission norms. Necessary precautions shall be taken to minimize odour and noise. Wastewater generated from the floor washing/vehicle and container washing shall be treated in Effluent Treatment Plant (ETP). Treated wastewater shall be reused for floor/vehicle washing, greenbelt etc.

The 4R strategy—Reduce, Reuse, Recycle, and Recover—forms the foundation of an effective solid waste management approach. It aims to minimize waste generation and reduce the burden on landfills through sustainable practices.

In the proposed CBWTF, biomedical waste generated from Health Care Facilities (HCFs), which includes hazardous waste, will be treated primarily through incineration. The incineration ash and Effluent Treatment Plant (ETP) sludge will be collected separately and disposed of at an authorized TSDF in compliance with regulatory norms.

Recyclable biomedical waste such as plastics and glass will undergo autoclaving for sterilization, followed by shredding to ensure safe handling and prevent reuse. It is emphasized that recyclable waste must never be mixed with general dry waste and shall be disposed of exclusively through authorized or registered recyclers, in accordance with the Biomedical Waste Management Rules, 2016.

To manage storm water and promote groundwater recharge, 8 rainwater harvesting pits of size 1 m  $\times$  1 m  $\times$  2 m depth will be constructed across the plot area. The excess rainwater will be directed Rainwater harvesting pond, ensuring no waterlogging or flooding within the site. The water collected in the pits will facilitate groundwater recharge.

In the initial phase of operation, solar panels will be installed to meet 25% of the facility's energy demand, remaining demand will be meet out on subsequent phase

To mitigate environmental impacts and enhance the ecological and aesthetic value of the proposed CBWTF, a thick greenbelt will be developed along the periphery of the site. Native tree species that are well-suited to the local climatic and soil conditions will be selected, with a preference for evergreen



varieties with dense canopies to maximize attenuation of dust and noise arising from plant operations and vehicular movement.

The greenbelt will act as an effective buffer zone, helping to reduce airborne particulates, absorb gaseous pollutants, and minimize vehicular noise. The species selection is based on CPCB recommendations and includes trees known for their dust-trapping efficiency, high foliage density, and resilience to industrial environments.

## **8. Conclusion**

Baseline data was collected for various environmental components and an overall assessment was made on the potential environmental impacts likely to arise from the CBWTF. Necessary pollution control measures (along with monitoring plan) were proposed to ensure minimal impact on the environment. The facility offers huge advantage to HCEs through efficient treatment and disposal of BMW at a lower cost and minimizes adverse impacts on environment.

The CBWTF also reduces the stress of individual HCEs to have their captive treatment facilities to comply with regulatory norms. The facility also improves prevailing environmental conditions of all HCEs avoiding any kind of long-term storage of BMW within their premises as the scope of common facility includes daily waste collection mechanism to avoid unwanted storage and reduce its effects on the human population as well as surrounding environment.

## 1. அறிமுகம்

தமிழ்நாடு, புதுக்கோட்டை மாவட்டம், கந்தர்வக்கோட்டை தாலுக்கா, பிசானத்தூர் கிராமத்தில், சர்வே எண்: 17/7 இல், பொது உயிரி மருத்துவக் கழிவு சுத்திகரிப்பு வசதியை (CBWTF) அமைக்க M/s. பையோடெக் இன்ஜினியரிங் இண்டஸ்ட்ரீஸ் முன்மொழிந்துள்ளது. புதுக்கோட்டை, திருச்சிராப்பள்ளி, தஞ்சாவூர், சிவகங்கை, திருவாரூர், நாகப்பட்டினம், பெரம்பலூர் மாவட்டம் மற்றும் அதைச் சுற்றியுள்ள பகுதிகளில் இருந்து மருத்துவமனைகள், மருத்துவ ஆராய்ச்சி மையங்கள், ஆரம்ப சுகாதார மையம், கால்நடை நிறுவனங்கள், நோயியல் ஆய்வகம், இரத்த வங்கி போன்ற சுகாதாரப் பிரிவுகளிலிருந்து உருவாகும் உயிரி மருத்துவக் கழிவுகள் பொருத்தமான முறையில் சேகரிக்கப்பட்டு, சாத்தியமான பாதகமான விளைவுகளைக் குறைக்க சுத்திகரிக்கப்படும்.

பொதுவான உயிரி-மருத்துவக் கழிவு சுத்திகரிப்பு மற்றும் அகற்றல் வசதியை நிறுவுவதற்கான முன்மொழியப்பட்ட திட்டம், செப்டம்பர் 14, 2006 தேதியிட்ட EIA அறிவிப்பு மற்றும் திருத்த எண். S.O 1142 (E) தேதியிட்ட 17 ஏப்ரல் 2015 இன் படி, செயல்பாடு 7 [d (a)] மற்றும் “உயிரி-மருத்துவக் கழிவு சுத்திகரிப்பு வசதிகள்” பிரிவு B1 இன் கீழ் வருகிறது. முன்மொழியப்பட்ட திட்டத்திற்கு தமிழ்நாட்டின் SEIAA இலிருந்து முன் சுற்றுச்சூழல் அனுமதி தேவை.

முன்மொழிவு எண். SIA/TN/INFRA2/494961/2024 மற்றும் கோப்பு எண். 11227 மூலம் தமிழ்நாடு SEIAA-க்கு படிவம் 1 மற்றும் முன்-சாத்தியக்கூறு அறிக்கையுடன் ToR கோரும் விண்ணப்பம் செய்யப்பட்டது. செப்டம்பர் 27, 2024 அன்று நடைபெற்ற அதன் 501வது கூட்டத்தில் SEAC இந்த திட்டத்தை மதிப்பிட்டது. EIA அறிக்கையை ஆய்வு செய்து தயாரிப்பதற்கான குறிப்பு விதிமுறைகள் (ToR), அடையாள எண். TO24B3301TN5162069N உடன் 22.10.2024 அன்று SEIAA-TN ஆல் வெளியிடப்பட்டது.

## 2. திட்ட விவரங்கள்

### அட்டவணை 1 - திட்டத்தின் விவரங்கள்

|                             |                                                                                                  |
|-----------------------------|--------------------------------------------------------------------------------------------------|
| திட்டப் பெயர்               | பொதுவான உயிரி மருத்துவக் கழிவு சுத்திகரிப்பு வசதி                                                |
| கொள்ளளவு                    | 10 TPD                                                                                           |
| திட்ட தளம்                  | சர்வே எண்: 17/7, பிசானத்தூர் கிராமம், கந்தர்வக்கோட்டை தாலுக்கா, புதுக்கோட்டை மாவட்டம், தமிழ்நாடு |
| முன்மொழிவு எண்              | SIA/TN/INFRA2/494961/2024 (from Parivesh Portal)                                                 |
| தளத்தின் புவி ஆயத்தொலைவுகள் | 10° 35' 28.64" N 79° 02' 08.45" E                                                                |
| திட்ட நிலப் பகுதி           | மொத்த நிலப் பரப்பளவு - 1.55 ஏக்கர் (6250 சதுர மீட்டர்)                                           |
| திட்ட செலவு                 | ரூ.2.83 கோடி                                                                                     |

### அட்டவணை 2 - திட்டத்தின் சுற்றுச்சூழல் அமைப்பு

| Feature                              | Details                                                                         |
|--------------------------------------|---------------------------------------------------------------------------------|
| கிராமம், தாலுக்கா, மாவட்டம், மாநிலம் | பிசானத்தூர் கிராமம், கந்தர்வக்கோட்டை தாலுக்கா, புதுக்கோட்டை மாவட்டம், தமிழ்நாடு |
| மாவட்ட தலைமையகம்                     | புதுக்கோட்டை - 30.3 கி.மீ - தென்மேற்கு                                          |
| அதிகபட்சம்/குறைந்தபட்ச வெப்பநிலை     | 39.70°C / 17.80°C                                                               |
| ஈரப்பதம்                             | 59-85%                                                                          |
| வருடாந்திர மழைப்பொழிவு               | 857.80 mm                                                                       |
| நிலப்பரப்பு/மண் வகை                  | Ferruginous Lateritic soil                                                      |

|                                          |                                                                    |         |             |
|------------------------------------------|--------------------------------------------------------------------|---------|-------------|
| நிலப்பரப்பு, MSL உடன் ஒப்பிடும்போது நிலை | Flat terrain and lies at an altitude of 100 m MSL                  |         |             |
| அருகிலுள்ள வாழ்விடம்                     | பிசானத்தூர்                                                        | 0.77 Km | தெற்கு      |
|                                          | புதுநகர்                                                           | 2.76 Km | வடக்கு      |
|                                          | வீராடிப்பட்டி                                                      | 4.14 Km | தென்கிழக்கு |
|                                          | பழைய கந்தர்வகோட்டை                                                 | 1.34 Km | மேற்கு      |
| அருகிலுள்ள பெரிய நகரம்                   | தஞ்சாவூர்                                                          | 20 km   | வடகிழக்கு   |
| அருகிலுள்ள விமான நிலையம்                 | திருச்சிராப்பள்ளி சர்வதேச விமான நிலையம்                            | 59 km   | வடமேற்கு    |
| அருகிலுள்ள கடல் துறைமுகம்                | வ.உ. சிதம்பரனார் துறைமுகம்                                         | 223 km  | தெற்கு      |
| அருகிலுள்ள ரயில் நிலையம்                 | தஞ்சாவூர் ரயில் நிலையம்                                            | 24 km   | வடமேற்கு    |
| அருகிலுள்ள நெடுஞ்சாலை                    | (SH - 99) துருக்காட்டுப்பள்ளி - செங்கிப்பட்டி - பட்டுக்கோட்டை சாலை | 2.45 km | தெற்கு      |
|                                          | (NH- 36) புதுக்கோட்டை - தஞ்சை சாலை                                 | 1.28 km | வடக்கு      |
| அருகிலுள்ள நீர்நிலைகள்                   | பிசானத்தூர் கிராம குளம்                                            | 0.65 Km | தெற்கு      |
|                                          | சிவன் கோயில் குளம்                                                 | 2.53 km | தென்மேற்கு  |
|                                          | வீராடிப்பட்டி வடக்கு குளம்                                         | 4 km    | கிழக்கு     |
|                                          | புதுநகர் குளம்                                                     | 2.5 km  | வடக்கு      |
|                                          | மட்டங்கல் குளம்                                                    | 2 km    | தெற்கு      |
|                                          | கோவிலூர் குளம்                                                     | 2.5 km  | தெற்கு      |
|                                          | கந்தர்வகோட்டை ஏரி                                                  | 2.8 km  | மேற்கு      |
| அருகிலுள்ள காடு                          | இல்லை                                                              |         |             |
| வரலாற்று இடங்கள்                         | 10 கி. மீ சுற்றளவில் எதுவும் இல்லை                                 |         |             |
| மாநிலங்களுக்கு இடையேயான எல்லை            | இல்லை                                                              |         |             |
| Source: *DCHB Pudukkottai 2011           |                                                                    |         |             |

**அட்டவணை 3 - பயன்படுத்தப்படும் உபகரணங்களின் பட்டியல்**

| வ.எண் | உபகரணங்கள்                                                                                                                          | நிறுவப்பட்ட கொள்ளளவு | எண்ணிக்கை |
|-------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------|
| 1     | நிலையான எரியூட்டி                                                                                                                   | 200 Kg Per Hour      | 1         |
| 2     | நிலையான எரியூட்டி                                                                                                                   | 100 Kg Per Hour      | 1         |
| 3     | ஆட்டோகிளேவ்                                                                                                                         | 1220 litre Per Hour  | 1         |
| 4     | ஷ்ரெட்டர்                                                                                                                           | 200 Kg Per Hour      | 1         |
| 5     | கழிவுநீர் சுத்திகரிப்பு நிலையம்                                                                                                     | 25 KLD               | 1         |
| 6     | காற்று மாசு கட்டுப்பாட்டு சாதனங்கள் – Quencher (Spray cooler), Venturi Scrubber Flue Gas Wet Scrubber, Droplet Separator and stack. |                      |           |
| 7     | தொடர்ச்சியான உமிழ்வு கண்காணிப்பு அமைப்பு (CEMS)                                                                                     |                      |           |

மொத்த நீர் தேவை 19 KLD என மதிப்பிடப்பட்டுள்ளது, இதில் 8 KLD உள்ளூர் அமைப்புகளால் பெறப்படும், மீதமுள்ள 11 KLD முன்மொழியப்பட்ட கழிவுநீர் சுத்திகரிப்பு நிலையத்திலிருந்து (ETP) சுத்திகரிக்கப்பட்ட நீர் மூலம் பூர்த்தி செய்யப்படும். தொழில்துறை நீர் தேவை 15 KLD, மற்றும் ஆவியாதல் இழப்பு 3.75 KLD என மதிப்பிடப்பட்டுள்ளது.



உருவாக்கப்படும் கழிவு நீர் முன்மொழியப்பட்ட ETP-யில் சுத்திகரிக்கப்படும், மேலும் சுத்திகரிக்கப்பட்ட நீர் வசதிக்குள் தொழில்துறை நோக்கங்களுக்காக மீண்டும் பயன்படுத்தப்படும். வீட்டு கழிவு நீர் உற்பத்தி 1.5 KLD என மதிப்பிடப்பட்டுள்ளது, இது மேலும் சாம்பல் நீர் மற்றும் கருப்பு நீர் என வகைப்படுத்தப்பட்டுள்ளது. 1.2 KLD அளவிலான சாம்பல் நீர், சாம்பல் நீர் சுத்திகரிப்பு நிலையத்தில் (GWTP) சுத்திகரிக்கப்படும், மேலும் சுத்திகரிக்கப்பட்ட நீர் தோட்டக்கலைக்கு மீண்டும் பயன்படுத்தப்படும். 0.3 KLD என மதிப்பிடப்பட்ட கருப்பு நீர், ஒரு செப்டிக் தொட்டிக்கு அனுப்பப்படும், அதைத் தொடர்ந்து ஒரு சோக் பிட் அமைக்கப்படும்.

இந்த வசதிக்குத் தேவையான மொத்த மின்சாரம் சுமார் 120 KW என மதிப்பிடப்பட்டுள்ளது, இது TANGEDCO-விலிருந்து பெறப்படும் மற்றும் 1 X 120 kVA DG தொகுப்பு மின்சார காப்புப்பிரதிக்கு பயன்படுத்தப்படும்.

**அட்டவணை 4 - செயல்பாட்டிற்குத் தேவையான எரிபொருள் கீழே உள்ள அட்டவணையில்  
கொடுக்கப்பட்டுள்ளது.**

| வருசை எண் | கூறுகள்                   | எரிபொருள் தேவை |
|-----------|---------------------------|----------------|
| 1         | எரியூட்டி-200 Kg Per Hour | 35-37 Lt/hr    |
| 2         | எரியூட்டி-100 Kg Per Hour | 25-27 Lt /hr   |
| 3         | டீசல் ஜெனரேட்டர்- 120 KVA | 16 Lt /hr      |

முன்மொழியப்பட்ட திட்டத்தில், கழிவு நீர் சுத்திகரிப்பு மற்றும் பொதுவான உயிரி மருத்துவக் கழிவுகளை சுத்திகரிக்கும் போது உருவாகும் திட மற்றும் அபாயகரமான கழிவுகள் TSDF-க்கு அப்புறப்படுத்தப்படும். சேகரிக்கப்பட்ட BMW எரிக்கக்கூடிய கழிவுகளில் 60% மற்றும் கிருமி நீக்கம் செய்யப்பட்ட கழிவுகளில் 40% (ஆட்டோகிளேவ் மற்றும் ஆலைகளில் உள்ள ஷார்ப்ஸ்/மெட்டாலிக் பாடி உட்பட) என மதிப்பிடப்பட்டுள்ளது. சுமார் 250 கிலோ/நாள் எரிப்பு சாம்பல் மற்றும் ETP கசடு பாதுகாப்பான அகற்றலுக்காக TSDF-க்கு அனுப்பப்படும். தளத்தில் உருவாக்கப்படும் நகராட்சி திடக்கழிவுகள் அருகிலுள்ள நகராட்சி தொட்டிகளில் தினமும் அப்புறப்படுத்தப்படும், அதே நேரத்தில் DG தொகுப்பிலிருந்து கழிவு எண்ணெய் அங்கீகரிக்கப்பட்ட எண்ணெய் மீட்டி வசதிக்கு அனுப்பப்படும்.

முன்மொழியப்பட்ட வசதியில் சுமார் 30 பேருக்கு வேலைவாய்ப்பு அளிக்கும். திறமையான மற்றும் திறமை அல்லாத இருப்பவருக்கும் நேரடி மற்றும் மறைமுக வேலைவாய்ப்பு எதிர்பார்க்கப்படுகிறது.

### 3. அடிப்படை சுற்றுச்சூழல் நிலை

அடிப்படை தரவு ஆய்வு ஜனவரி 13, 2025 முதல் ஏப்ரல் 03, 2025 (கோடை காலம்) வரை மேற்கொள்ளப்பட்டது. சுற்றுப்புற காற்றின் தரம், நீரின் தரம், இரைச்சல் அளவுகள், மண்ணின் தரம், சூழலியல் & பல்லுயிர் மற்றும் சமூக-பொருளாதாரம் குறித்த அடிப்படை தகவல்கள் கீழே கொடுக்கப்பட்டுள்ளன.

#### காற்றின் தரம்

திட்ட தளத்தின் ஆய்வுப் பகுதிக்குள் 8 இடங்களில் சுற்றுப்புற காற்றின் தரம் கண்காணிக்கப்பட்டது. காற்று கீழ்நோக்கி, குறுக்கு காற்று மற்றும் மேல்நோக்கி வீசும் திசைகளில் இடங்கள் அடையாளம் காணப்பட்டன. நிலையான MoEF&CC வழிகாட்டுதல்களின்படி, கண்காணிக்கப்பட்ட காற்று மாசுபாடுகள் துகள் பொருள் (PM), சல்பர் டை ஆக்சைடு (SO<sub>2</sub>), நைட்ரஜன் ஆக்சைடுகள் (NO<sub>x</sub>), கார்பன் மோனாக்சைடு (CO) மற்றும் ஒசோன் (O<sub>3</sub>) ஆகும், மேலும் முடிவுகள் CPCB இன் நிர்ணயிக்கப்பட்ட தரநிலைகளுடன் ஒப்பிடப்பட்டன.

**அட்டவணை 5 - காற்று மாசுபடுத்திகளின் கண்காணிப்பு மதிப்புகள்**

| வருசை என் | Parameters        | Range                       | NAAQS படி அளவுருக்கள் வரம்பு |
|-----------|-------------------|-----------------------------|------------------------------|
| 1         | PM <sub>10</sub>  | 40.85 – 56.55               | 100                          |
| 2         | PM <sub>2.5</sub> | 21.33 – 56.55               | 60                           |
| 3         | SO <sub>x</sub>   | 0.00 – 14.97                | 80                           |
| 4         | NO <sub>x</sub>   | 3.50 – 16.17                | 80                           |
| 5         | CO                | கண்டறிதல் வரம்புக்குக் கீழே | 4.0                          |
| 6         | O <sub>3</sub>    | கண்டறிதல் வரம்புக்குக் கீழே | 180                          |

**நீர் தர கண்காணிப்பு**

ஆய்வுப் பகுதிக்குள் உள்ள பல்வேறு மூலங்களிலிருந்து நிலத்தடி மற்றும் மேற்பரப்பு நீர் மாதிரிகள் சேகரிக்கப்பட்டு, திட்டச் சூழலில் நிலவும் நீரின் தரத்தை நிறுவ அனைத்து முக்கியமான இயற்பியல்-வேதியியல் மற்றும் உயிரியல் அளவுருக்களுக்காக பகுப்பாய்வு செய்யப்பட்டன.

சுமார் 5 நிலத்தடி நீர் மற்றும் 5 மேற்பரப்பு நீர் மாதிரிகள் சேகரிக்கப்பட்டன. பிசானத்தூர், சுண்டம்பட்டி, கந்தர்வக்கோட்டை, துருசப்பட்டி மற்றும் கல்லுக்காரன்பட்டி ஆகிய இடங்களில் இருந்து நிலத்தடி நீர் சேகரிக்கப்படுகிறது.

ஆய்வுப் பகுதிக்குள் உள்ள பல்வேறு இடங்களில் இருந்து சேகரிக்கப்பட்ட நிலத்தடி நீர் மாதிரிகளின் பகுப்பாய்வு, PH மதிப்புகள் CPCB வழிகாட்டுதல்களால் குறிப்பிடப்பட்ட ஏற்றுக்கொள்ளக்கூடிய வரம்பிற்குள் இருப்பதைக் குறிக்கிறது.

**அட்டவணை 6 - நிலத்தடி நீர் கண்காணிப்பு மதிப்புகள்**

| வருசை என் | Parameters                  | Range (mg/L) | IS 10500-2012 திருத்தம் 2018 இன் படி அனுமதிக்கப்பட்ட வரம்பு |
|-----------|-----------------------------|--------------|-------------------------------------------------------------|
| 1         | மொத்த கடினத்தன்மை           | 26 -220      | 600                                                         |
| 2         | மொத்த கரைந்த திடப்பொருள்கள் | 172 -530     | 2000                                                        |
| 3         | குளோரைடுகள்                 | 21.2 -75.2   | 1000                                                        |
| 4         | நைட்ரேட்டுகள்               | 3.5 – 12.2   | 45                                                          |
| 5         | மெக்னீசியம்                 | 2.4 – 25.2   | குறிப்பிடப்படவில்லை                                         |
| 6         | பொட்டாசியம்                 | 3.0 - 172    | குறிப்பிடப்படவில்லை                                         |

பிசானத்தூர் குளம், சுண்டம்பட்டி, விராலிப்பட்டி, புதுநகர் குளம் மற்றும் கந்தர்வக்கோட்டை ஏரி ஆகியவற்றிலிருந்து மேற்பரப்பு நீர் சேகரிக்கப்பட்டது.

ஆய்வுப் பகுதிக்குள் தேர்ந்தெடுக்கப்பட்ட இடங்களிலிருந்து சேகரிக்கப்பட்ட மேற்பரப்பு நீர் மாதிரிகள் பல்வேறு இயற்பியல்-வேதியியல் மற்றும் உயிரியல் அளவுருக்களுக்காக பகுப்பாய்வு செய்யப்பட்டன. மாதிரிகளின் pH மதிப்புகள் CPCB வழிகாட்டுதல்களின்படி ஏற்றுக்கொள்ளக்கூடிய வரம்பிற்குள் இருப்பது கண்டறியப்பட்டது. இது நடுநிலையிலிருந்து சுற்று காரத்தன்மையைக் குறிக்கிறது.

#### அட்டவணை 7 - மேற்பரப்பு நீர் கண்காணிப்பு மதிப்புகள்

| வருசை எண் | Parameters                         | Range (mg/L) | IS 10500-2012 திருத்தம் 2018 இன் படி அனுமதிக்கப்பட்ட வரம்பு |
|-----------|------------------------------------|--------------|-------------------------------------------------------------|
| 1         | மொத்த கடினத்தன்மை                  | 56 - 210     | 600                                                         |
| 2         | மொத்த கரைந்த திடப்பொருள்கள் (TDS)  | 90 - 364     | 2000                                                        |
| 3         | குளோரைடுகள்                        | 40 - 104.9   | 1000                                                        |
| 4         | நைட்ரேட்டுகள்                      | 2.32 - 12.2  | 45                                                          |
| 5         | மெக்னீசியம்                        | 22 - 102     | குறிப்பிடப்படவில்லை                                         |
| 6         | பொட்டாசியம்                        | 02 - 172     | குறிப்பிடப்படவில்லை                                         |
| 7         | வேதியியல் ஆக்ஸிஜன் தேவை            | 2.9 - 6.9    | 250                                                         |
| 8         | உயிர்வேதியியல் ஆக்ஸிஜன் தேவை (BOD) | BDL          | 30                                                          |

முடிவில், மேற்பரப்பு நீர் மாதிரி மற்றும் நிலத்தடி நீர் மாதிரிகளின் அனைத்து சோதனை அளவுருக்களும் மத்திய மாசு கட்டுப்பாட்டு வாரியம் (CPCB) நிர்ணயித்த அனுமதிக்கப்பட்ட வரம்புகளுக்குள் இருப்பது கண்டறியப்பட்டது. இது அந்தப் பகுதியில் உள்ள நீர் நல்ல தரம் வாய்ந்ததாகவும் பல்வேறு பயன்பாடுகளுக்கு ஏற்றதாகவும் இருப்பதைக் குறிக்கிறது.

#### இரைச்சல் நிலைகள்

திட்ட தளத்தின் ஆய்வுப் பகுதிக்குள் 8 இடங்களில் இரைச்சல் அளவு கண்காணிக்கப்பட்டது. நில பயன்பாட்டு முறை, கிராமங்களில் உள்ள குடியிருப்புப் பகுதிகள், அருகிலுள்ள மருத்துவமனைகள், பேருந்து நிலையங்கள் போன்றவற்றைக் கருத்தில் கொண்டு, தற்போதைய இரைச்சல் நிலை நிலையை அடிப்படையாகக் கொண்டு இடங்கள் அடையாளம் காணப்பட்டன.

ஆய்வுப் பகுதியில், பகல் நேரத்தில் இரைச்சல் அளவுகள் 45.8 dB(A) முதல் 56.3 dB(A) வரை இருந்தன, அதே நேரத்தில் இரவு நேர அளவுகள் 40.6 dB(A) முதல் 48.8 dB(A) வரை வேறுபடுகின்றன. இந்த அளவீடுகள் மத்திய மாசு கட்டுப்பாட்டு வாரியத்தால் (CPCB) பரிந்துரைக்கப்பட்ட அனுமதிக்கப்பட்ட வரம்புகளுக்குள் உள்ளன, அவை குடியிருப்புப் பகுதிகளில் பகல் நேரத்தில் 55 dB(A) மற்றும் இரவு நேரத்தில் 45 dB(A) மற்றும் தொழில்துறை

பகுதிகளில் பகல் நேரத்தில் 75 dB(A) மற்றும் இரவு நேரத்தில் 70 dB(A) ஆகும். கூடுதலாக, ஆய்வுப் பகுதி முழுவதும் பல்வேறு கண்காணிப்பு இடங்களில் பதிவுசெய்யப்பட்ட மணிநேரத்திற்கு சமமான தொடர்ச்சியான இரைச்சல் அளவுகள் (Leq) கால அளவுகள் மற்றும் நில பயன்பாட்டு வகைகளுக்கு பொருந்தக்கூடிய CPCB தரநிலைகளுக்கு இணங்கின.

போக்குவரத்து கணக்கெடுப்பு தளத்திற்கு அருகில் மேற்கொள்ளப்பட்டது. பிசானத்தூர் சுங்கச்சாலைக்கு அருகில் காலை 08:00 மணி முதல் 09:00 மணி வரை மிக உயர்ந்த சிகரம் (மோசமான நிலை) 3600 PCU/மணிக்கு காணப்பட்டது கண்டறியப்பட்டது. IRC இன் படி தள அணுகல் சாலையின் தற்போதைய சேவை நிலை நன்றாக உள்ளது; 106-1990 (ஒரு மணி நேரத்திற்கு PCU) மற்றும் முன்மொழியப்பட்ட திட்டத்தின் காரணமாக போக்குவரத்து பெரிய தாக்கத்தை ஏற்படுத்தாது என்பதைக் குறிக்கிறது.

#### மண்ணின் தரம்

திட்ட இடத்தின் ஆய்வுப் பகுதிக்குள் 8 இடங்களில் மண்ணின் தரம் கண்காணிக்கப்பட்டது. பல்வேறு நில பயன்பாடு மற்றும் புவியியல் அம்சங்களைக் குறிக்கும் தற்போதைய மண் நிலைமைகளை மதிப்பிடுவதற்கு இடங்கள் தேர்ந்தெடுக்கப்பட்டன. அனைத்து மாதிரிகளிலிருந்தும் முக்கியமான இயற்பியல், வேதியியல் அளவுருக்கள் செறிவுகள் தீர்மானிக்கப்பட்டன. ஆய்வுப் பகுதிக்குள் பல்வேறு இடங்களிலிருந்து சேகரிக்கப்பட்ட மண் மாதிரிகள் அவற்றின் இயற்பியல் மற்றும் வேதியியல் பண்புகளை மதிப்பிடுவதற்காக பகுப்பாய்வு செய்யப்பட்டன. பகுப்பாய்வு அறிக்கைகளிலிருந்து இது கவனிக்கப்பட்டுள்ளது

- மண் மாதிரிகளின் pH 4.36 முதல் 6.80 வரை இருந்தது
- மின் கடத்துத்திறன் (EC) 20 முதல் 780  $\mu\text{S}/\text{cm}$  வரை இருப்பது கண்டறியப்பட்டது, இது மிதமான/குறைந்தபட்ச உப்புத்தன்மை அளவைக் குறிக்கிறது.
- கரிமப் பொருட்களின் உள்ளடக்கம் 0.12% முதல் 1.0% வரை வேறுபடுகிறது, இது மண்ணின் வள நிலையைக் குறிக்கிறது.
- மொத்த நைட்ரஜன், பாஸ்பரஸ் (P), மற்றும் பொட்டாசியம் (K) உள்ளடக்கங்கள் முறையே 134 கிலோ/எக்டர் – 352.7 கிலோ/எக்டர், 10.4 கிலோ/எக்டர் – 28.1 கிலோ/எக்டர், மற்றும் 280 மி.கி/கி.கி- 426 மி.கி/கி.கி வரம்பில் காணப்பட்டன, இது தாவர வளர்ச்சிக்கு ஊட்டச்சத்து கிடைப்பதைக் காட்டுகிறது.
- ஈயம், காட்மியம், குரோமியம் மற்றும் ஆர்சனிக் போன்ற கன உலோகங்கள் அனுமதிக்கப்பட்ட வரம்புகளுக்குக் கீழே இல்லை அல்லது கண்டறியப்பட்டன, இது குறைந்தபட்ச மாசுபாட்டின் அபாயத்தைக் குறிக்கிறது.
- ஆய்வுப் பகுதிக்கான மண் அமைப்பு பகுப்பாய்வு ஃபெரூஜினஸ் லேட்டரிடிக் மண்ணாக வழங்கப்பட்டுள்ளது.

ஊட்டச்சத்து அளவுகள் மற்றும் pH ஆகியவை விவசாயத்திற்கு ஏற்றுக்கொள்ளக்கூடிய வரம்புகளுக்குள் உள்ளன, மேலும் அபாயகரமான தனிம கூறுகளின் குறிப்பிடத்தக்க இருப்பு காணப்படவில்லை.

#### சுற்றுச்சூழல் சூழல்

பிசானத்தூர் கிராமத்தில் முன்மொழியப்பட்ட CBWTF திட்ட இடத்திற்கு அருகிலுள்ள ஆய்வுப் பகுதியில் உயிரியல் சூழல் பற்றிய ஆய்வு, ToR-க்கு இணங்காமல் நடத்தப்பட்டது. ஆய்வுப் பகுதியில் உள்ள தாவரங்கள் மற்றும் விலங்கினங்களின் தரவு, அப்பகுதியில் கள ஆய்வு, அரசாங்க வலைத்தளங்களில் வெளியிடப்பட்ட அறிக்கைகளில் உள்ள மலர் மற்றும் விலங்கின பதிவுகளை ஆய்வு செய்தல், தரநிலை புத்தகங்கள், ஆராய்ச்சி வெளியீடுகள் போன்றவற்றின் மூலம் சேகரிக்கப்படுகிறது. சுற்றுச்சூழலுடன் குறிப்பிட்ட குறிப்புடன், சுற்றியுள்ள சூழலில் முன்மொழியப்பட்ட வசதியை நிறுவுவதன் சாத்தியமான தாக்கத்தைப் புரிந்துகொள்ள தரவு பகுப்பாய்வு

செய்யப்பட்டது. புதுக்கோட்டை மாவட்டத்தில், வெள்ளார், அக்னியார், பாம்பார் மற்றும் குந்தர் ஆகிய நான்கு பெரிய ஆறுகள் பாய்கின்றன.

10 கி.மீ சுற்றளவு கொண்ட ஆய்வுப் பகுதியில், தொழில்துறை பகுதியில் இருந்து அரிய அல்லது அழிந்து வரும் பறவைகள் மற்றும் விலங்குகள் எதுவும் பதிவாகவில்லை, மேலும், திட்ட தளத்திலிருந்து 10 கி.மீ சுற்றளவில் தேசிய பூங்காக்கள், வனவிலங்கு சரணாலயம் போன்றவை எதுவும் காணப்படவில்லை.

புதுக்கோட்டை மாவட்டம் பெரும்பாலும் விவசாய மாவட்டமாகும். நெல், நிலக்கடலை, கரும்பு, மக்காச்சோளம் மற்றும் முந்திரி ஆகியவை இந்த மாவட்டத்தில் பயிரிடப்படும் முக்கிய பயிர்கள். புதுக்கோட்டை மாவட்டத்தில் உள்ள கந்தர்வக்கோட்டை தாலுகா முதன்மையாக சிவப்பு ஃபெருஜினஸ் லேட்டரிடிக் மண் கொண்டது. மண் பெரும்பாலும் வளமானது மற்றும் மண் விதை வங்கிகளைக் கொண்டுள்ளது. மண்ணின் மைக்ரோஃப்ளோரா பொதுவாக, பாக்கிரியா, பூஞ்சை, பாசி, புரோட்டோசோவா மற்றும் மண்ணின் நுண்ணுயிரிகள் நூற்புழுக்கள் மற்றும் புரோட்டோசோவா ஆகியவை மண்ணின் கரிமப் பொருளை உருவாக்குகின்றன. காய்கறி வயல்களில் காணப்படும் தாவர இனங்கள் உட்பட பல்வேறு வகையான தாவர இனங்கள் உள்ளன. விலங்கின பன்முகத்தன்மையில் பல்வேறு வகையான பூச்சி இனங்கள், எறும்புகள் மற்றும் பிற முதுகெலும்பில்லாதவை, பறவைகள், ஊர்வன மற்றும் பாலூட்டிகள் அடங்கும். புதுக்கோட்டை மாவட்டத்தின் முக்கிய பயிர்கள் நெல் (அரிசி), சோளம் (சோளம்), மக்காச்சோளம், உளுந்து, எஞ்சி, நிலக்கடலை, தேங்காய், கரும்பு, மா, வாழை, முந்திரி போன்றவை.

#### சமூக-பொருளாதார சூழல்

சமூக-பொருளாதார சூழலை மதிப்பிடுவது EIA ஆய்வின் ஒருங்கிணைந்த பகுதியாகும். மக்கள்தொகையின் சமூக-பொருளாதார நிலை பிராந்தியத்தின் வளர்ச்சிக்கான ஒரு குறிகாட்டியாகும். எந்தவொரு அளவிலான வளர்ச்சித் திட்டமும் வாழ்க்கை நிலைமைகள் மற்றும் குறிப்பாக மக்கள்தொகையின் பொருளாதார அடித்தளம் மற்றும் ஒட்டுமொத்த பிராந்தியத்தின் மீது தாக்கத்தை ஏற்படுத்தும். இதேபோல், முன்மொழியப்பட்ட திட்ட தளம் ஆய்வுப் பகுதியில் சமூக-பொருளாதார செல்வாக்கின் பங்கைக் கொண்டிருக்கும். சமூகம் தொடர்பான பண்புகளின் ஒட்டுமொத்த மதிப்பீட்டை இந்தப் பிரிவு வரையறுக்கிறது. ஆய்வுப் பகுதியில் சமூக-பொருளாதார அம்சங்களில் முன்மொழியப்பட்ட திட்ட தளத்தின் தாக்கத்தை மதிப்பிடுவதற்கான தரவு சேகரிப்பு முதன்மை வீட்டு கணக்கெடுப்பு மற்றும் ஆய்வுப் பகுதிக்குக் கிடைக்கும் இரண்டாம் நிலை தரவுகளின் பகுப்பாய்வு மூலம் செய்யப்பட்டுள்ளது. எதிர்பார்க்கப்படும் சுற்றுச்சூழல் தாக்கங்கள் மற்றும் தணிப்பு நடவடிக்கைகள்

முன்மொழியப்பட்ட திட்டம் இரண்டு கட்டங்களில் சுற்றுச்சூழலில் தாக்கத்தை ஏற்படுத்தக்கூடும்:

1. கட்டுமான கட்டத்தின் போது
2. செயல்பாட்டு கட்டத்தின் போது

#### **அ. கட்டுமான கட்டத்தின் போது ஏற்படும் பாதிப்புகள்:**

கட்டுமான கட்டப் பணிகளில் தள அனுமதி, தள உருவாக்கம், கட்டிடப் பணிகள், உள்கட்டமைப்பு வழங்கல் மற்றும் பிற உள்கட்டமைப்பு நடவடிக்கைகள் ஆகியவை அடங்கும். கட்டுமான நடவடிக்கைகளால் ஏற்படும் பாதிப்புகள் குறுகிய கால மற்றும் கட்டுமான கட்டத்திற்கு மட்டுமே.

#### **b. செயல்பாட்டு கட்டத்தின் போது ஏற்படும் தாக்கங்கள்:**

காற்றின் தரத்தில் ஏற்படும் தாக்கம்

செயல்பாட்டு நடவடிக்கைகளுடன் தொடர்புடைய சாத்தியமான தூசி மூலங்கள் பொருட்களை ஏற்றுதல் மற்றும் இறக்குதல், செப்பனிடப்படாத சாலைகளில் பயணம் மற்றும் காற்று அரிப்பு போன்றவை. முன்மொழியப்பட்ட மேம்பாட்டோடு தொடர்புடைய கட்டுமானப் பணிகள் கீழே கொடுக்கப்பட்டுள்ளன.

- லைன் மூலங்களிலிருந்து எதிர்பார்க்கப்படும் முக்கிய காற்று மாசுபாடு, உள்வரும் மற்றும் வெளிச்செல்லும் வாகன இயக்கத்திலிருந்து தூசி உருவாக்கம் ஆகும்.

- எரியூட்டி, DG தொகுப்பிலிருந்து புள்ளி மூல உமிழ்வுகள்

- செப்பனிடப்படாத சாலைகளில் வாகனங்களின் இயக்கம் காரணமாக தூசி உருவாக்கம்

- மூலப்பொருட்களை இறக்குதல் மற்றும் தேவையற்ற கழிவுப் பொருட்களை அகற்றுதல்

எரியூட்டி, DG தொகுப்பு மற்றும் அடுக்குகளிலிருந்து எதிர்பார்க்கப்படும் காற்று உமிழ்வுகள் மதிப்பிடப்பட்டு, PM, SO<sub>2</sub> மற்றும் NO<sub>X</sub> (முறையே 50 mg/m<sup>3</sup>, 200 mg/Nm<sup>3</sup> மற்றும் 400 mg/Nm<sup>3</sup>) ஆகியவற்றுக்கு வழங்கப்பட்ட வெளியீட்டு உமிழ்வு தரநிலைகளின் அடிப்படையில் உமிழ்வு விகிதங்கள் கணக்கிடப்பட்டன.

AERMOD வியூ 12.0.0 மாதிரி முடிவுகள், இந்த அனைத்து காற்றின் தர அளவுருக்களிலும் மிகக் குறைவான அதிகரிப்பைக் காட்டுகின்றன, ஒட்டுமொத்த காற்றின் தர சூழ்நிலை முறையே PM (5 µg/m<sup>3</sup>), SO<sub>2</sub> (0.60 µg/m<sup>3</sup>) மற்றும் NO<sub>X</sub> (3.0 µg/m<sup>3</sup>) ஆகியவற்றுக்கு மோசமான நிலையில் உள்ளது.

#### **தணிப்பு நடவடிக்கைகள் - காற்றின் தரம்**

- வரி மூலத்திலிருந்து ஏற்படும் பாதிப்பைக் குறைக்க, தூசி உற்பத்தியைக் குறைக்க கருப்பு கம்பள சாலை முறையாகப் பராமரிக்கப்படும்.

- திட்டப் பகுதியில் உள்ள பிரதான சாலைகளில் வழக்கமாக தண்ணீர் தெளிக்கப்படும், இந்த செயல்பாடு ஒரு நாளைக்கு குறைந்தது இரண்டு முறையாவது மேற்கொள்ளப்படும்.

- எல்லையிலும் சாலையிலும் பசுமைப் பட்டை வழங்கப்படும், மேலும் அவசரத் தேவைகளுக்கு மின்சாரம் தடைபடும் போது மட்டுமே DG செட் பயன்படுத்தப்படும்.

- பெரும்பாலான பொருட்கள் சாலை மேம்பாட்டிற்காக திறந்த அகழிகளுக்கு பின் நிரப்பும் பொருளாகப் பயன்படுத்தப்படுவதால், கையிருப்பு நேரம் முடிந்தவரை குறைவாக இருக்கும்.

- போதுமான உயரம் (3 மீ) கொண்ட தற்காலிக தகரத் தாள்கள் தூசி உற்பத்தி செய்யும் இடத்தைச் சுற்றி அல்லது திட்ட இடத்தைச் சுற்றி தூசி கட்டுப்பாட்டுக்கான தடையாக அமைக்கப்படும்.

#### **நீர் தரத்தில் தாக்கம்**

பொதுவான உயிரி மருத்துவ கழிவு சுத்திகரிப்பு நிலையத்தின் (CBWTF) செயல்பாடு, கழிவு நீர் உற்பத்தி, தற்செயலான கசிவுகள் மற்றும் தளத்திலிருந்து மேற்பரப்பு ஓட்டம் மூலம் நீர் சூழலுக்கு சாத்தியமான அபாயங்களை ஏற்படுத்தக்கூடும். நீர் மாசுபாட்டின் முதன்மை ஆதாரங்களில் கழிவு சுத்திகரிப்பு செயல்முறைகளில் இருந்து வெளியேறும் கழிவுகள், வாகனங்களை கழுவுதல் மற்றும் கழிவு சேமிப்பு பகுதிகளிலிருந்து வெளியேறும் கசிவு ஆகியவை அடங்கும். முறையாக நிர்வகிக்கப்படாவிட்டால், இந்த வெளியேற்றங்கள் நிலத்தடி நீர் மற்றும் அருகிலுள்ள நீர்நிலைகளை மாசுபடுத்த வழிவகுக்கும், இது நீர் தரம் மற்றும் நீர்வாழ் சுற்றுச்சூழல் அமைப்புகளை பாதிக்கும்.

#### **தணிப்பு நடவடிக்கைகள் - நீரின் தரம்**

தள மேம்பாட்டின் போது தேவையான முன்னெச்சரிக்கைகள் எடுக்கப்படும், இதனால் தளத்திலிருந்து வெளியேறும் நீர் வேலை செய்யும் குழியில் சேகரிக்கப்பட்டு, அதிகப்படியான ஓட்டம் இருந்தால், அருகிலுள்ள பசுமைப் பட்டறை/தோட்டப் பகுதிக்கு திருப்பி விடப்படும். வாகனம் மற்றும் கொள்கலன் கழுவுதல், தரை கழுவுதல், வீட்டு நீர் உள்ளிட்ட கழிவுநீர் நீர் சூழலைப் பாதுகாப்பாகப் பாதுகாக்க ETP இல் சுத்திகரிக்கப்பட வேண்டும். சுத்திகரிக்கப்பட்ட கழிவு நீர் பசுமைப் பட்டறை, தரை/வாகன கழுவுதல் போன்றவற்றுக்குப் பயன்படுத்தப்பட வேண்டும்.

#### **இரைச்சல் அளவுகளில் தாக்கம்**

முன்மொழியப்பட்ட திட்டத்தில் சத்தத்திற்கான முக்கிய ஆதாரம் உயிரி மருத்துவக் கழிவுகளை இறக்குதல் மற்றும் எரியூட்டி, டிஜி செட், பம்புகள், மோட்டார்கள் போன்றவற்றின் பயன்பாடு ஆகும்

#### **குறைப்பு நடவடிக்கைகள் - சத்த அளவுகள்**

- அதிக சத்தத்தை உருவாக்கும் மூலங்களின் தாக்கத்தைக் குறைக்க பொருத்தமான உறைகளை (போதுமான காப்பு) வழங்குதல்.
- ஊழியர்களுக்கு காது பிளக்குகள், தலைக்கவசங்கள், பாதுகாப்பு காலணிகள் போன்ற PPE வழங்கப்படும்.
- திட்டத்தின் எல்லை முழுவதும் மற்றும் சாலைகளில் பசுமைப் பட்டையை உருவாக்குதல்

#### **4. சுற்றுச்சூழல் கண்காணிப்பு திட்டம்**

சுற்றுச்சூழலின் தரத்தை வகைப்படுத்தவும் கண்காணிக்கவும் மேற்கொள்ள வேண்டிய செயல்முறைகள் மற்றும் செயல்பாடுகளை சுற்றுச்சூழல் கண்காணிப்பு திட்டம் விவரிக்கிறது. விரிவான சுற்றுச்சூழல் கண்காணிப்பு திட்டத்தை வடிவமைக்கும்போது முன்மொழியப்பட்ட திட்டத்தில் ஈடுபட்டுள்ள பல்வேறு செயல்பாடுகள் மற்றும் பல்வேறு சுற்றுச்சூழல் பண்புகளில் அவற்றின் தாக்கம் கணக்கில் எடுத்துக்கொள்ளப்பட்டுள்ளன.

சுற்றுச்சூழல் மேலாண்மைத் திட்டத்தை செயல்படுத்துவதன் செயல்திறனை மதிப்பிடுவதற்கும், சுற்றியுள்ள சூழலில் ஏதேனும் சீரழிவு ஏற்பட்டால் சரியான நடவடிக்கைகளை எடுப்பதற்கும் முன்மொழியப்பட்ட திட்டத்திற்காக சுற்றுச்சூழல் கண்காணிப்பு திட்டம் தயாரிக்கப்பட்டுள்ளது. கண்காணிப்பின் முடிவுகள் மதிப்பாய்வு செய்யப்பட்டு, புள்ளிவிவர ரீதியாக பகுப்பாய்வு செய்யப்பட்டு, சம்பந்தப்பட்ட அதிகாரிகளிடம் சமர்ப்பிக்கப்படும்.

சுற்றுச்சூழல் கண்காணிப்பு திட்டத்தில் பின்வருவன அடங்கும்:

- புகை வாயு அளவுருக்களுக்கான எரியூட்டிகள் அடுக்கு உமிழ்வை தொடர்ந்து ஆன்லைன் மூலம் கண்காணித்தல்
- உமிழ்வு தரநிலைகளுக்கு இணங்குவதை உறுதி செய்வதற்காக எரியூட்டிகள் அடுக்கு உமிழ்வு கண்காணிப்பு
- சுற்றுப்புற காற்றின் தர கண்காணிப்பு
- சுத்திகரிக்கப்பட்ட கழிவுநீரின் பகுப்பாய்வு, குறிப்பாக வெளியேற்றத்தின் போது
- எரியூட்டிகள் சாம்பல் மற்றும் ETP கசடுகளை அவ்வப்போது கண்காணித்தல்

#### **5. இடர் பகுப்பாய்வு**

பொது பாதுகாப்பு மற்றும் ஆரோக்கியத்தை பாதிக்கும் அவசரகால சூழ்நிலைக்கு வழிவகுக்கும் முன்மொழியப்பட்ட திட்டத்தின் பல்வேறு செயல்பாடுகளுடன் தொடர்புடைய முக்கிய ஆபத்துகள் மற்றும்

ஆபத்தை அடையாளம் காணவும் அளவிடவும் இடர் மதிப்பீடு மேற்கொள்ளப்பட்டது. MSIHC விதிகள், 1989 இல் அறிவிக்கப்பட்டு 2000 இல் திருத்தப்பட்டபடி வரம்பு அளவுகளை தீர்மானிக்க ரசாயனங்கள் மற்றும் அவற்றின் சேமிப்பு அளவுகள் பற்றிய முறையான பகுப்பாய்வு மேற்கொள்ளப்பட்டுள்ளது.

முன்மொழியப்பட்ட திட்டத்தின் காரணமாக ஏற்படும் ஆபத்தை குறைக்க தேவையான அனைத்து நடவடிக்கைகளும் வடிவமைப்பு நிலை மற்றும் செயல்பாட்டு காலத்தில் எடுக்கப்படும், அதாவது தீ மற்றும் பாதுகாப்பு கட்டுப்பாட்டு நடவடிக்கைகள், அவசரகால தயார்நிலை திட்டம், பேரிடர் மேலாண்மை திட்டம் போன்றவை.

#### 6. திட்ட நன்மைகள்

முன்மொழியப்பட்ட வசதிகள் சுகாதார நிறுவனங்களுக்கு அவற்றின் BMW மேலாண்மையில் குறிப்பிடத்தக்க பங்களிப்பை வழங்கும் என்று எதிர்பார்க்கப்படுகிறது. எதிர்பார்க்கப்படும் திட்ட நன்மைகளில் பின்வருவன அடங்கும்:

- (i) உயிரி மருத்துவக் கழிவுகளை சிறப்பாக நிர்வகித்தல்
- (ii) சுற்றுச்சூழலில் மாசு சுமையைக் குறைத்தல்
- (iii) பொருந்தக்கூடிய விதிகளுக்கு இணங்குவதை உறுதி செய்தல் (உயிரி மருத்துவக் கழிவு மேலாண்மை விதிகள், 2016),
- (iv) சுகாதார நிறுவனங்களுக்கான சுற்றுச்சூழல் பொறுப்பு குறைக்கப்பட்டது
- (v) வேலை வாய்ப்புகள் போன்றவை.

#### 7. சுற்றுச்சூழல் மேலாண்மைத் திட்டம்

சுற்றுச்சூழல் மேலாண்மைத் திட்டம் (EMP), முன்மொழியப்பட்ட ஆலை மற்றும் அதன் சுற்றியுள்ள சூழலின் நிலையான வளர்ச்சியை உறுதி செய்வதற்காக வடிவமைக்கப்பட்டுள்ளது. EMP இன் முதன்மை நோக்கம், கிடைக்கக்கூடிய சிறந்த மற்றும் மலிவு தொழில்நுட்பங்களைப் பயன்படுத்தி மூலத்தில் மாசுபாட்டைக் குறைப்பதாகும், மேலும் வெளியேற்றம் அல்லது அகற்றுவதற்கு முன் பொருத்தமான சிகிச்சை முறைகளைப் பின்பற்றி, ஒழுங்குமுறை தரநிலைகளுக்கு இணங்க வேண்டும்.

சுற்றுச்சூழல் மேலாண்மைத் திட்டம் (EMP) ஆலைப் பகுதி மற்றும் சுற்றுப்புறங்களின் நிலையான வளர்ச்சியை உறுதி செய்ய வேண்டும். வெளியேற்றப்படுவதற்கு முன் நிலையான சிகிச்சைகளைப் பின்பற்றி கிடைக்கக்கூடிய மற்றும் மலிவு தொழில்நுட்பத்துடன் மூல மட்டத்தில் மாசுபாட்டைக் கட்டுப்படுத்துவதை EMP நோக்கமாகக் கொண்டுள்ளது. முன்மொழியப்பட்ட திட்டத்திற்கான மூலதனச் செலவு சுமார் ரூ.2.83 கோடி என மதிப்பிடப்பட்டுள்ளது. EMP க்காக ஒதுக்கப்பட்ட மூலதனச் செலவு சுமார் ரூ.142 லட்சம் ஆகும், இது ஆண்டுக்கு ரூ.8 லட்சம் தொடர்ச்சியான செலவாகும். CER பசுமைக் களத் திட்டத்திற்கான நிதி ஒதுக்கீடு,  $\leq 100$  கோடி மூலதனத் தொகையைக் கொண்ட தொழில்களுக்கான மூலதன முதலீட்டில் 2.0% ஆகும். ரூ.5.66 லட்சத்திற்கான திட்டமிடப்பட்ட CER செயல்பாடுகளின் விவரங்கள்

முன்மொழியப்பட்ட எரியூட்டிகள் பரிந்துரைக்கப்பட்ட உமிழ்வு விதிமுறைகளுக்கு இணங்க தேவையான அனைத்து காற்று மாசு கட்டுப்பாட்டு சாதனங்களையும் (APCDs) கொண்டிருக்க வேண்டும். துர்நாற்றம் மற்றும் சத்தத்தைக் குறைக்க தேவையான முன்னெச்சரிக்கைகள் எடுக்கப்பட வேண்டும். தரை கழுவதல்/வாகனம்



மற்றும் கொள்கலன் கழுவதல் ஆகியவற்றிலிருந்து உருவாகும் கழிவுநீரை கழிவுநீர் சுத்திகரிப்பு நிலையத்தில் (ETP) சுத்திகரிக்க வேண்டும். சுத்திகரிக்கப்பட்ட கழிவுநீரை தரை/வாகன கழுவதல், பசுமைப் பட்டை போன்றவற்றுக்கு மீண்டும் பயன்படுத்த வேண்டும்.

4R உத்தி - குறைத்தல், மறுபயன்பாடு, மறுசுழற்சி செய்தல் மற்றும் மீட்டெடுத்தல் - ஒரு பயனுள்ள திடக்கழிவு மேலாண்மை அணுகுமுறையின் அடித்தளத்தை உருவாக்குகிறது. இது நிலையான நடைமுறைகள் மூலம் கழிவு உற்பத்தியைக் குறைத்து, நிலப்பரப்புகளின் சுமையைக் குறைப்பதை நோக்கமாகக் கொண்டுள்ளது.

முன்மொழியப்பட்ட CBWTF இல், அபாயகரமான கழிவுகளை உள்ளடக்கிய சுகாதாரப் பராமரிப்பு வசதிகளிலிருந்து (HCFs) உருவாக்கப்படும் உயிரி மருத்துவக் கழிவுகள் முதன்மையாக எரித்தல் மூலம் சுத்திகரிக்கப்படும். எரித்தல் சாம்பல் மற்றும் கழிவுநீர் சுத்திகரிப்பு நிலையம் (ETP) கசடு தனித்தனியாக சேகரிக்கப்பட்டு ஒழுங்குமுறை விதிமுறைகளுக்கு இணங்க அங்கீகரிக்கப்பட்ட TSDF இல் அகற்றப்படும்.

மறுசுழற்சி செய்யக்கூடிய உயிரி மருத்துவக் கழிவுகளான பிளாஸ்டிக் மற்றும் கண்ணாடி ஆகியவை கிருமி நீக்கம் செய்வதற்காக ஆட்டோகிளேவ் செய்யப்படும், அதைத் தொடர்ந்து துண்டாக்கப்படும், இதனால் பாதுகாப்பான கையாளுதலை உறுதிசெய்து மீண்டும் பயன்படுத்துவதைத் தடுக்கப்படும். மறுசுழற்சி செய்யக்கூடிய கழிவுகளை ஒருபோதும் பொதுவான உலர்ந்த கழிவுகளுடன் கலக்கக்கூடாது என்றும், உயிரி மருத்துவக் கழிவு மேலாண்மை விதிகள், 2016 இன் படி அங்கீகரிக்கப்பட்ட அல்லது பதிவுசெய்யப்பட்ட மறுசுழற்சி செய்பவர்கள் மூலம் மட்டுமே அப்புறப்படுத்தப்பட வேண்டும் என்றும் வலியுறுத்தப்படுகிறது.

புயல் நீரை நிர்வகிக்கவும் நிலத்தடி நீர் மறுசுழற்சியை ஊக்குவிக்கவும், 1 மீ × 1 மீ × 2 மீ ஆழம் கொண்ட 8 மழைநீர் சேகரிப்பு குழிகள் நிலப் பகுதி முழுவதும் கட்டப்படும். அதிகப்படியான மழைநீர் மழைநீர் சேகரிப்பு குளமாக மாற்றப்படும், இதனால் தளத்தில் நீர் தேங்குதல் அல்லது வெள்ளம் ஏற்படாது. குழிகளில் சேகரிக்கப்படும் நீர் நிலத்தடி நீர் மறுசுழற்சிக்கு உதவும்.

செயல்பாட்டின் ஆரம்ப கட்டத்தில், வசதியின் 25% ஆற்றல் தேவையை பூர்த்தி செய்ய சூரிய மின் தகடுகள் நிறுவப்படும், மீதமுள்ள தேவை அடுத்த கட்டத்தில் பூர்த்தி செய்யப்படும்

சுற்றுச்சூழல் தாக்கங்களைக் குறைப்பதற்கும் முன்மொழியப்பட்ட CBWTF இன் சுற்றுச்சூழல் மற்றும் அழகியல் மதிப்பை மேம்படுத்துவதற்கும், தளத்தின் சுற்றளவில் ஒரு அடர்ந்த பசுமைப் பட்டை உருவாக்கப்படும். உள்ளூர் காலநிலை மற்றும் மண் நிலைமைகளுக்கு நன்கு பொருந்தக்கூடிய பூர்வீக மர இனங்கள் தேர்ந்தெடுக்கப்படும், தாவர செயல்பாடுகள் மற்றும் வாகன இயக்கத்திலிருந்து எழும் தூசி மற்றும் சத்தத்தை அதிகப்படுத்த அடர்த்தியான விதானங்களைக் கொண்ட பசுமையான வகைகளுக்கு முன்னுரிமை அளிக்கப்படும்.

பசுமைப் பட்டை ஒரு பயனுள்ள இடையக மண்டலமாகச் செயல்படும், காற்றில் பரவும் துகள்களைக் குறைக்கவும், வாயு மாசுபடுத்திகளை உறிஞ்சவும், வாகன சத்தத்தைக் குறைக்கவும் உதவும். இனங்கள் தேர்வு CPCB பரிந்துரைகளை அடிப்படையாகக் கொண்டது மற்றும் தூசி-பிடிக்கும் திறன், அதிக இலை அடர்த்தி மற்றும் தொழில்துறை சூழல்களுக்கு மீள்தன்மை ஆகியவற்றிற்கு பெயர் பெற்ற மரங்களை உள்ளடக்கியது.

## 8. முடிவுரை

பல்வேறு சுற்றுச்சூழல் கூறுகளுக்கான அடிப்படைத் தரவு சேகரிக்கப்பட்டு, CBWTF இலிருந்து எழக்கூடிய சாத்தியமான சுற்றுச்சூழல் பாதிப்புகள் குறித்து ஒட்டுமொத்த மதிப்பீடு செய்யப்பட்டது. சுற்றுச்சூழலில் குறைந்தபட்ச தாக்கத்தை உறுதி செய்வதற்கு தேவையான மாசு கட்டுப்பாட்டு நடவடிக்கைகள் (கண்காணிப்புத்

திட்டத்துடன்) முன்மொழியப்பட்டன. குறைந்த செலவில் BMW ஐ திறம்பட சுத்திகரித்து அகற்றுவதன் மூலம் HCE களுக்கு இந்த வசதி மிகப்பெரிய நன்மையை வழங்குகிறது மற்றும் சுற்றுச்சூழலில் பாதகமான தாக்கங்களைக் குறைக்கிறது.

CBWTF, ஒழுங்குமுறை விதிமுறைகளுக்கு இணங்க தங்கள் கேப்டிவ் சுத்திகரிப்பு வசதிகளைக் கொண்டிருக்க தனிப்பட்ட HCE களின் மன அழுத்தத்தையும் குறைக்கிறது. இந்த வசதி அனைத்து HCE களின் தற்போதைய சுற்றுச்சூழல் நிலைமைகளையும் மேம்படுத்துகிறது, ஏனெனில் பொதுவான வசதியின் நோக்கத்தில் தேவையற்ற சேமிப்பைத் தவிர்க்கவும், மனித மக்கள் தொகை மற்றும் சுற்றுச்சூழலில் அதன் விளைவுகளைக் குறைக்கவும் தினசரி கழிவு சேகரிப்பு வழிமுறை அடங்கும்.

# **ANNEXURE – 21**

## **Technical Specification of CEMS**

AEI/OESPL/1013/QTN/0546/MAR27/24-25

Dated: 27<sup>th</sup> March, 2025.

To

Sakthi Dhasan K  
Environmental Engineer  
Consultancy Division  
Olympia Eco Solutions Pvt Ltd  
Ambattur, Chennai - 600 098

Dear Sir,

**Ref:** - Your mail dated on 25<sup>th</sup> February, 2025.

**Sub:** - Offer for supply, Installation and Commissioning of Stack Emission Monitoring System (SEMS) and CPCB/TNPCB Data Logging Software (DLS) - Reg.

We are manufacture of flue Gas Analyzer, continuous emission monitoring, and dust/opacity monitor SPM continuous ambient air quality monitoring Systems etc.

Instruments Quality and Design Standards as per Customer requirement. Spares and service support for all our customers. Best prices without compromising quality and reliability.

With reference to the above, we are pleased to submit our revise offer for supply of **Stack Emission Monitoring System (SEMS) and CPCB/TNPCB Data Logging Software (DLS)**.

A. Price Schedule for Stack Emission Monitoring and CPCB/TNPCB Data Logging Software.

B. Commercial Terms & Condition.

C. Technical Specification for Stack Emission Monitoring (SEMS)

Any further clarification confirmation, please free to contact us +91 6385493489.

Thanking you,

Yours faithfully,

For Aniteck Electrical Industries



Prabin K / Marketing Executive

**Aniteck Electrical Industries**

Plot No:39-1/1, F1, North Parade Road,  
St. Thomas Mount, Chennai - 600 016.

**Mob:** +91 63854 93489

**Email:** aniteckadm@gmail.com

**PAN:** ABXFA3292N

**GST:** 33ABXFA3292N1ZR

# ANNEXURE - A

## Price Schedule for Online Stack Emission Monitoring

| Sl. No | Description                                                                                                                                                                                                                     | Qty  | Unit Price in Rs |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|
| 1      | <b>Online Stack SPM Monitoring - SPM</b>                                                                                                                                                                                        |      | 42,85,000/-      |
|        | ANITECK Model AEI DCD 310 BV Cross-Duct Type<br>Make: Aniteck Instruments<br>Principle : Dual Pass / Transmittance measurement (Opacity - Light of loss)<br>Range : 0-1000 mg/Nm <sup>3</sup><br>Parameter : Dust concentration | 1 No |                  |
| 2      | <b>Online Stack gas emission Analyzer - SO2/NO/NO2/CO/CO2/ HCL/HF</b>                                                                                                                                                           |      |                  |
|        | ANITECK Model AEI CEM 7100BV<br>Make: Aniteck Instruments<br>Principle : NDUV<br>Range : 0 to 1000 ppm<br>Parameter : SO2, NO, NO2, CO, CO2, HCL, HF                                                                            | 1 No |                  |
| 3      | <b>Online Oxygen Analyser - O<sub>2</sub></b>                                                                                                                                                                                   |      |                  |
|        | ANITECK Model AEI IN 510 BV<br>Make: Aniteck Instruments<br>Principle : Zirconia<br>Range : 0-25 %<br>Parameter : Oxygen                                                                                                        | 1 No |                  |
| 4      | <b>Online Volatile Organic Compounds -VOCs</b>                                                                                                                                                                                  |      |                  |
|        | ANITECK Model AEI HMA 7200BV<br>Make: Aniteck Instruments<br>Principle : FID/Thermal<br>Range : 0 to 1000 ppm / 0 to 1000 ppm<br>Parameter : VOC, TOC, THC / H2                                                                 | 1 No |                  |
| 5      | <b>Online D&amp;F Analyzer - D&amp;F (PCDD&amp;PCDF),PCB,PAH</b>                                                                                                                                                                |      |                  |
|        | ANITECK Model AEI HMA 8100BV<br>Make: Aniteck Instruments<br>Principle : Chromatography/mass spectrometry combined<br>Range : 0 to 100 ppb<br>Parameter : D&F (PCDD&PCDF),PCB,PAH                                               | 1 No |                  |

| Sl. No | Description                                                                                                                                                 | Qty  | Unit Price in Rs  |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------|
| 6      | <b>Measuring parameters – Temperature/Flow/Velocity/Pressure</b>                                                                                            |      |                   |
|        | Temperature – as per your specification<br>Flow – as per your specification<br>Velocity – as per your specification<br>Pressure – as per your specification | 1 No |                   |
| 7      | <b>CPCB / TNPCB Software and Communication</b>                                                                                                              |      |                   |
|        | TNPCB/CPCB Glens Software<br>WiFi Communication Card<br>Addam card 4017 with accessories                                                                    | 1 No |                   |
| 8      | <b>Local and Main gate Display Unit</b>                                                                                                                     |      |                   |
|        | Local Display Unit (Touch Screen)<br>Main gate Display Unit (LED Display- Multi color)                                                                      | 1 No |                   |
| 9      | <b>Erection and commissioning</b>                                                                                                                           |      |                   |
|        | Installation , Erection and Commissioning charges                                                                                                           | 1 No | <b>1,00,000/-</b> |

#### Scope of work

| Sl.No | Description                                                     | Biotech Engineering Industries | Aniteck Electrical Industries | Qty | Price in INR |
|-------|-----------------------------------------------------------------|--------------------------------|-------------------------------|-----|--------------|
| 1     | UPS -230VAC,2A (Per Unit) with JB, local cable with accessories | Provided                       | -                             | -   | -            |
| 2     | NUPS -230VAC,16A (Per Unit) with JB                             | Provided                       | -                             | -   | -            |
| 3     | Civil work, Cable lying work and any kind of erection work.     | Provided                       | -                             | -   | -            |

#### Aniteck Electrical Industries

Plot No:39-1/1, F1, North Parade Road,  
St. Thomas Mount, Chennai - 600 016.

**Mob:** +91 63854 93489

**Email:** aniteckadm@gmail.com

**PAN:** ABXFA3292N

**GST:** 33ABXFA3292N1ZR

**ANNEXURE - B****Commercial Terms & Conditions**

1. Delivery : 2 - 3 month from date of receipt of techno commercially clear Purchase Order.  
Installation within Two week from the receipt of material and readiness of site.
2. Freight Charge : @ 3.5 % Extra applicable.
3. Packing and forwarding charge : @ 2 % Extra applicable.
4. Sales Taxes GST : @ 18% Extra applicable.
5. Terms of Payment : **100% Advance along with purchase order**
6. Warranty : Three year from date of installation.
7. Validity : Quotation is Valid for 30 day from date of offer.
8. Purchase Order to be issued on : **Aniteck Electrical Industries**  
No.41, Muthumariyamman Koil Street,  
Athipet Kuppam, Chennai - 600 058  
Email: aniteckadm@gmail.com  
Mob: +91 63854 93489
9. Company Account Details : A/C Name - **Aniteck Electrical Industries**  
A/C Number - 2524002100330330  
IFSC - PUNB0252400  
SWIFT Code - PUNBINBBCLC  
Bank - Punjab National Bank  
Branch - Mint Street, Chennai, India.

## ANNEXURE - C

### Technical Specification for Stack Emission Monitoring (SEMS)

#### 1. SPM Analyzer Specification

| SI No | Description                             | Specification                                                                      |
|-------|-----------------------------------------|------------------------------------------------------------------------------------|
| 1     | Make & Model                            | AENITECK (IND) / AEI DCD 310BV                                                     |
| 2     | Measuring principle                     | Dual Pass / Transmittance measurement (opacity – Light of loss )                   |
| 3     | Device type                             | Cross type                                                                         |
| 4     | Measuring transmission                  | 100- 0%                                                                            |
| 5     | Measuring opacity                       | 0- 100%                                                                            |
| 6     | Measuring optical density               | 0- 3%                                                                              |
| 7     | Measuring dust concentration            | 0- 1000mg/ Nm <sup>3</sup>                                                         |
| 8     | Display                                 | Graphical                                                                          |
| 9     | keypad                                  | Touch screen                                                                       |
| 10    | Accuracy                                | ± 0.2% full scale.                                                                 |
| 11    | Response time                           | 1- 600s, in stages from 1s freely Selectable.                                      |
| 12    | Measuring path                          | 0.5- 12 Mtr                                                                        |
| 13    | Meas. Gas temperature                   | Upto 600 degC                                                                      |
| 14    | Ambient temperature                     | -20to+ 90degC                                                                      |
| 15    | Meas. Gas pressure                      | Upto 60 mmWc                                                                       |
| 16    | Reflector probe unit & transmitter unit | Sensor unit, Control unit, Power supply junction box.                              |
| 17    | Power supply                            | 90to260VAc, 48to62 Hz, 200W power consumption.                                     |
| 18    | Dimensions(Wx Hx D)                     | TxU- 230x330x230mm.                                                                |
| 19    | Weight                                  | TxU- 9.8Kg.                                                                        |
| 20    | Purge air blower power supply           | 230V +/-10%, 50Hz, 0.25KW 220V 50Hz.                                               |
| 21    | Test function                           | Auto calibration & Automatic cal check of zero and span value and 100% Full Scale. |
| 22    | Interface                               | RS- 232 Service interface, RS-485, Remote control unit, GPRS.                      |
| 23    | T/C Analog output                       | 1Liner , 0,2,4-20mA, 750W max load electrically isolated.                          |
| 24    | 2Analog outputs                         | 0/2/4-20mA, 750W max load electrically isolated.                                   |
| 25    | 4Relay outputs                          | 48V DC, 1A, 30W max, 48V AC, 1A maintenance, alarm high & low, status              |
| 26    | Construction                            | Corrosion resistance epoxy coated aluminium housing sealed to IP65.                |



## 2. Stack Gas Analyzer Specification:

| Sl.No | Description              | Specification                                                                                                  |
|-------|--------------------------|----------------------------------------------------------------------------------------------------------------|
| 1     | Make & Model             | ANITECK (IND) / AEI CEM 7100BV                                                                                 |
| 2     | Principle                | NDUV/UV absorption                                                                                             |
| 3     | Measuring Parameter      | SO <sub>2</sub> , NO, NO <sub>2</sub> , CO, CO <sub>2</sub> , HCL, HF                                          |
| 4     | Measuring Range          | 0-1,000 ppm, (selectable)                                                                                      |
| 5     | Zero Noise               | 0.02 ppm (60 second averaging time)                                                                            |
| 6     | Ambient Temperature      | +5 to +45 C.                                                                                                   |
| 7     | Gas temperature range    | +0 to +600 C.                                                                                                  |
| 8     | Display                  | Graphical                                                                                                      |
| 9     | Keypad                   | Touch screen                                                                                                   |
| 10    | Lower Detectable Limit   | 0.04 ppm                                                                                                       |
| 11    | Zero Drift (24 hour)     | < 0.1 ppm                                                                                                      |
| 12    | Span Drift (24 hour)     | +/-1% full scale                                                                                               |
| 13    | Response Time            | 60 seconds (30 second average time)                                                                            |
| 14    | Linearity                | +/-1% full scale < 1000 ppm ; +/-2.5% full scale > 1000 ppm                                                    |
| 15    | Rack Mounting Indication | Mountings Suitable for 19" Rack Mounting                                                                       |
| 16    | Operating Temperature    | 20 degC – 45 degC                                                                                              |
| 17    | Power supply             | 220-240 vac +/-10% @ 275W                                                                                      |
| 18    | Inputs 16 digital inputs | Inputs 16 digital inputs                                                                                       |
| 19    | Time constant            | 1 ... 120 s adjustable                                                                                         |
| 20    | Sensitivity drift        | ≤ 2 % / 1/4 year with automatic one point adjustment                                                           |
| 21    | Response Time            | Typically 3 Sec                                                                                                |
| 22    | Analogue Output          | 13 linear, Isolated 0,2, 4-20 mA output, load 500ohm (selectable)                                              |
| 23    | Outputs                  | Voltage, RS232/RS485, 10 Status Relays, lan ,GPRS & Power Fail                                                 |
| 24    | Calibration              | Auto and Manual calibration.                                                                                   |
| 25    | Air pressure influence   | With integrated sample gas pressure compensation:<br>≤ 0.1 % change in measurement with 1% change in pressure. |

### 3. Oxygen Analyzer Specification:

| Sl No | Description                   | Specification                               |
|-------|-------------------------------|---------------------------------------------|
| 1     | Make & Model                  | ANITECK / AEI IN 510 BV                     |
| 2     | Measured flue gas temperature | Lower than 700°C (Low temperature type)     |
| 3     | Technology                    | Zirconia                                    |
| 4     | Range                         | 0 - 25% (O2 Programmable)                   |
| 5     | Process Gas Temperature       | 0 - 900° C                                  |
| 6     | Probe MOC                     | Inconel                                     |
| 7     | O2 Probe Length               | 200 mm                                      |
| 8     | Ambient Temperature           | 0 - 65° C                                   |
| 9     | Diffusion Element             | Unbreakable Ceramic                         |
| 10    | Accuracy                      | ± 0.5% of FS                                |
| 11    | Resolution                    | 0.01%                                       |
| 12    | Repeatability                 | ± 0.5% of FS                                |
| 13    | Response Time                 | T 90 < 3 sec                                |
| 14    | Reference Air                 | Clean & Dry Instrument quality air (3 LPM)  |
| 15    | Calibration                   | Auto & Manual                               |
| 16    | Enclosure Rating              | IP65                                        |
| 17    | Analog Output                 | 4-20 mA Analog Output & 3 Nos. Relay Output |
| 18    | Display                       | Keypad LED Display                          |
| 19    | Digital Communication         | RS 485, Modbus                              |

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**GST:** 33ABXFA3292N1ZR

#### 4. Volatile Organic Compounds Analyser Specification:

| Sl.No | Description              | Specification                                                                                                  |
|-------|--------------------------|----------------------------------------------------------------------------------------------------------------|
| 1     | Make & Model             | ANITECK (IND) / AEI HMA 7200BV                                                                                 |
| 2     | Principle                | FID/Thermal /Zirconia                                                                                          |
| 3     | Measuring Parameter      | VOC, TOC, THC / H <sub>2</sub> / O <sub>2</sub>                                                                |
| 4     | Measuring Range          | 0 to 1,000 ppm/0 to 1000 ppm / 0 to 29%                                                                        |
| 5     | Zero Noise               | 0.02 ppm (60 second averaging time)                                                                            |
| 6     | Ambient Temperature      | +5 to +45 C.                                                                                                   |
| 7     | Gas temperature range    | +0 to +600 C.                                                                                                  |
| 8     | Display                  | Graphical                                                                                                      |
| 9     | Keypad                   | Touch screen                                                                                                   |
| 10    | Lower Detectable Limit   | 0.04 ppm                                                                                                       |
| 11    | Zero Drift (24 hour)     | < 0.1 ppm                                                                                                      |
| 12    | Span Drift (24 hour)     | +/-1% full scale                                                                                               |
| 13    | Response Time            | 60 seconds (30 second average time)                                                                            |
| 14    | Linearity                | +/-1% full scale < 1000 ppm ;+/-2.5% full scale > 1000 ppm                                                     |
| 15    | Rack Mounting Indication | Mountings Suitable for 19" Rack Mounting                                                                       |
| 16    | Operating Temperature    | 20 degC – 45 degC                                                                                              |
| 17    | Power supply             | 220-240 vac +/-10% @ 275W                                                                                      |
| 18    | Inputs 16 digital inputs | Inputs 16 digital inputs                                                                                       |
| 19    | Time constant            | 1 ... 120 s adjustable                                                                                         |
| 20    | Sensitivity drift        | ≤ 2 % / 1/4 year with automatic one point adjustment                                                           |
| 21    | Response Time            | Typically 3 Sec                                                                                                |
| 22    | Analogue Output          | 5 linear, Isolated 0,2, 4-20 mA output, load 500ohm (selectable)                                               |
| 23    | Outputs                  | Voltage, RS232/RS485,10Status Relays, lan ,GPRS & Power Fail                                                   |
| 24    | Calibration              | Auto and Manual calibration.                                                                                   |
| 25    | Air pressure influence   | With integrated sample gas pressure compensation:<br>≤ 0.1 % change in measurement with 1% change in pressure. |

## 5. Dioxins and Furans Analyzer Specification:

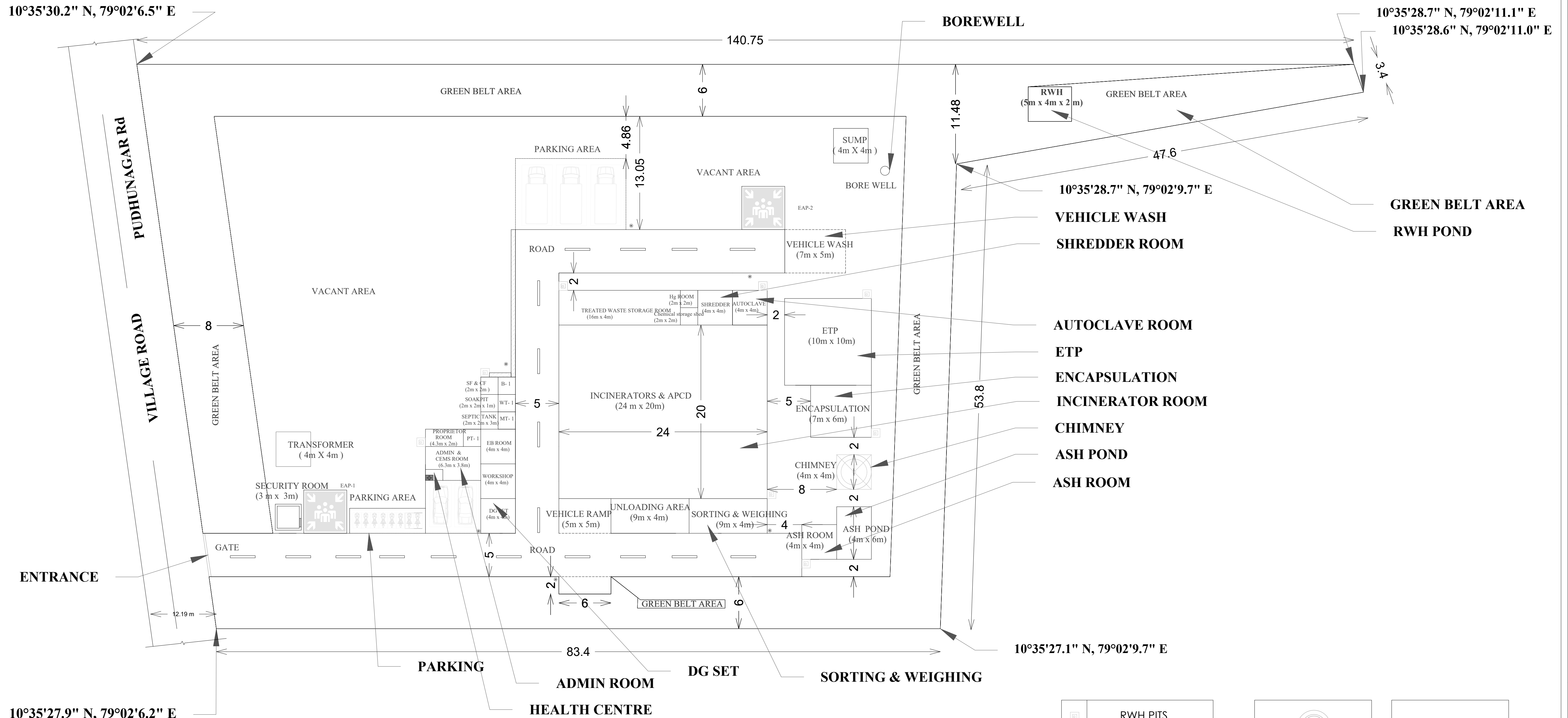
| Sl.No | Description              | Specification                                                                                                  |
|-------|--------------------------|----------------------------------------------------------------------------------------------------------------|
| 1     | Make & Model             | ANITECK (IND) / AEI HMA 8100BV                                                                                 |
| 2     | Principle                | Gas chromatography/mass spectrometry combined with the isotope dilution technique to enable the separation     |
| 3     | Measuring Range          | D&F(PCDD&PCDF), PCB, PAH: 0 to 100ppb                                                                          |
| 4     | Zero Noise               | 0.02 ppm (60 second averaging time)                                                                            |
| 5     | Ambient Temperature      | +5 to +45 C.                                                                                                   |
| 6     | Gas temperature range    | +0 to +600 C.                                                                                                  |
| 7     | Display                  | Graphical                                                                                                      |
| 8     | Keypad                   | Touch screen                                                                                                   |
| 9     | Lower Detectable Limit   | 0.04 ppm                                                                                                       |
| 10    | Zero Drift (24 hour)     | < 0.1 ppm                                                                                                      |
| 11    | Span Drift (24 hour)     | +/-1% full scale                                                                                               |
| 12    | Response Time            | 60 seconds (30 second average time)                                                                            |
| 13    | Linearity                | +/-1% full scale < 1000 ppm ; +/-2.5% full scale > 1000 ppm                                                    |
| 14    | Rack Mounting Indication | Mountings Suitable for 19" Rack Mounting                                                                       |
| 15    | Operating Temperature    | 20 degC – 45 degC                                                                                              |
| 16    | Power supply             | 220-240 vac +/-10% @ 275W                                                                                      |
| 17    | Inputs 16 digital inputs | Inputs 16 digital inputs                                                                                       |
| 18    | Time constant            | 1 ... 120 s adjustable                                                                                         |
| 19    | Sensitivity drift        | ≤ 2 % / 1/4 year with automatic one point adjustment                                                           |
| 20    | Response Time            | Typically 3 Sec                                                                                                |
| 21    | Analogue Output          | 4 linear, Isolated 0,2, 4-20 mA output, load 500ohm (selectable)                                               |
| 22    | Outputs                  | Voltage, RS232/RS485, 10Status Relays, lan ,GPRS & Power Fail                                                  |
| 23    | Calibration              | Automatic and Manual calibration.                                                                              |
| 24    | Air pressure influence   | With integrated sample gas pressure compensation:<br>≤ 0.1 % change in measurement with 1% change in pressure. |

## **ANNEXURE – 22**

### **Fire Fighting layout**

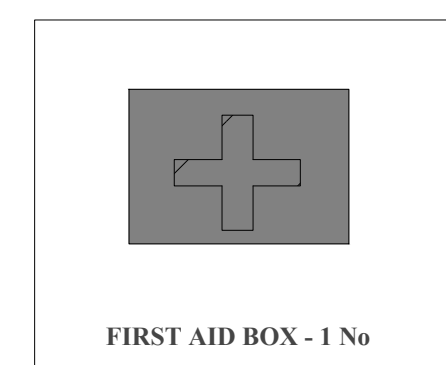
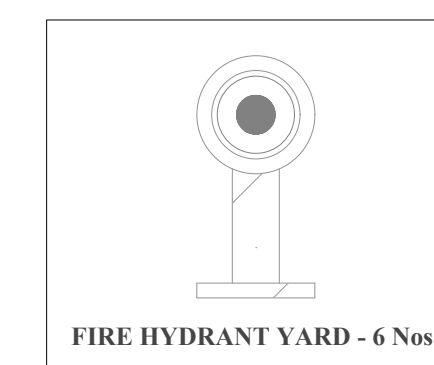


# THE SITE PLAN LAYOUT OF PROPOSED CBWTF M/s. BIOTECH ENGINEERING INDUSTRIES, S.NO: 17/7, Pisanathur Village, Gandarvakottai taluk, Pudukkottai District, TamilNadu



## FIRE FIGHTING LAYOUT PLAN

|  |                 |
|--|-----------------|
|  | RWHPITS         |
|  | FIRE HYDRANT    |
|  | FIRST AID BOX   |
|  | EAP             |
|  | GREEN BELT AREA |



|                            |            |                                                                                                                                                                                        |          |
|----------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| SK                         | SAKTHI D K | SK                                                                                                                                                                                     | SK       |
| DESIGN                     | DRAWN      | CHECKED                                                                                                                                                                                | APPROVED |
| TITLE: PROPOSED_CBWTF      |            | <div><div>OLYMPIA ECO<br/>SOLUTIONS PRIVATE<br/>LIMITED<br/>CHENNAI-600 037<br/>INDIA</div></div> |          |
| PROJECT: 1                 |            |                                                                                                                                                                                        |          |
| CLIENT: 01                 | DRG NO: 01 |                                                                                                                                                                                        |          |
| ALL DIMENSIONS ARE IN Sq.m |            | SCALE : 04                                                                                                                                                                             | SHEET:01 |
|                            |            |                                                                                                                                                                                        | REV: 00  |



## **ANNEXURE – 23**

### **TOPO Survey by CIT**

# **COIMBATORE INSTITUTE OF TECHNOLOGY**

**COIMBATORE – 641014**

*(Government Aided Autonomous Institution Affiliated to Anna University)*

## **DEPARTMENT OF CIVIL ENGINEERING**



## **SURVEY REPORT**

**of**

### **M/s. BIOTECH ENGINEERING INDUSTRIES**

GPS Survey for the existing land with Survey No: 17/7, Pisanathur Village,  
Gandharvakottai taluk, Pudhukottai District- 613301, Tamil Nadu belonging to  
M/s. BIOTECH ENGINEERING INDUSTRIES

Reference: Your Letter Dated: 26.02.2024





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(Govt. Aided Autonomous Institution Affiliated to Anna University, Chennai)

COIMBATORE - 641 014, TAMIL NADU.

Phone : 0422-2574071, 2574072 E-mail : hodcivil@cit.edu.in

www.cit.edu.in

## DEPARTMENT OF CIVIL ENGINEERING

13.03.2024

### CERTIFICATE

Date :

Client: M/s. BIOTECH ENGINEERING INDUSTRIES

Survey No: 17/7, Pisanathur Village,

Gandharvakottai Taluk,

Pudhukottai Dist – 613301, Tamil Nadu.

We hereby certify that we have carried out the site survey to determine the coordinates and distances from the proposed site belonging to M/s. Biotech Engineering Industries to nearby Villages, Lakes, State Highway etc. as per the following details and the results are shown in (A) and (B) below:

Site / Plot No.: Survey No: 17/7, Pisanathur Village

Site address: Survey No: 17/7, Pisanathur Village, Gandharvakottai Taluk,  
Pudhukottai Dist – 613301, Tamil Nadu.

Owner/Lessee of the Plot /Site: M/s. Biotech Engineering Industries

#### (A) Site Coordinates

| Corner No.<br>(Anticlockwise) | Latitude<br>(DD MM SS.s) | Longitude<br>(DD MM SS.s) |
|-------------------------------|--------------------------|---------------------------|
| 1. NW corner                  | 10° 35' 30.2" N          | 79° 02' 6.5" E            |
| 2. West 1                     | 10° 35' 29.6" N          | 79° 02' 6.6" E            |
| 3. West 2                     | 10° 35' 28.8" N          | 79° 02' 6.5" E            |
| 4. SW corner                  | 10° 35' 27.9" N          | 79° 02' 6.2" E            |
| 5. SE corner                  | 10° 35' 27.1" N          | 79° 02' 9.1" E            |
| 6. East 1                     | 10° 35' 28.7" N          | 79° 02' 9.7" E            |
| 7. East 2                     | 10° 35' 28.6" N          | 79° 02' 11.0" E           |
| 8. NE corner                  | 10° 35' 28.7" N          | 79° 02' 11.1" E           |

Dr.C.Shankar

Dr.S.Arulselvan

Dr. S. ARULSELVAN, M.E., Ph.D.,  
Associate Professor,  
Department of Civil Engineering,  
Coimbatore Institute of Technology,  
Coimbatore- 641 014.

Dr.M.P.Muthuraj

Dr. M.P. MUTHURAJ, M.E., Ph.D.  
Head of the Department  
Department of Civil Engineering  
Coimbatore Institute of Technology  
Coimbatore-641 014





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## DEPARTMENT OF CIVIL ENGINEERING

### (B) Coordinates at Different Locations

Date :

| Locations                          | Latitude<br>(DD MM SS.s) | Longitude<br>(DD MM SS.s) | Distance (Metres) |
|------------------------------------|--------------------------|---------------------------|-------------------|
| Alunga Muneeswarar Temple          | 10° 36' 15.3" N          | 79° 02' 11.60" E          | 1469.00           |
| Thurusupatti Village Pt.1.         | 10° 35' 58.10" N         | 79° 02' 55.10" E          | 1614.00           |
| Thurusupatti Lake                  | 10° 35' 45.30" N         | 79° 03' 03.70" E          | 1,680.00          |
| Pisanathur Village Lake            | 10° 35' 08.32" N         | 79° 02' 03.38" E          | 650.00            |
| Pisanathur                         | 10° 35' 04.10" N         | 79° 02' 58.80" E          | 776.00            |
| Pisanathur Murugan Temple          | 10° 35' 04.40" N         | 79° 01' 39.40" E          | 1,190.00          |
| Thurusupatti Village Pt.2.         | 10° 35' 40.08" N         | 79° 02' 57.20" E          | 1,450.00          |
| State Highway 36                   | 10° 35' 31.54" N         | 79° 01' 24.98" E          | 1,286.00          |
| Jeeva Jothi Carmelite Spirituality | 10° 35' 36.57" N         | 79° 01' 35.00" E          | 991.00            |
| Pudhu Nagar lake                   | 10° 36' 46.38" N         | 79° 02' 36.16" E          | 2,486.00          |
| Gandharvakottai Lake               | 10° 35' 01.51" N         | 79° 00' 36.25" E          | 2,815.00          |

Further it is certified that the shortest distance from the proposed site belonging to M/s. Biotech Engineering Industries to Pisanathur Village Lake is **650.00 m (Six Hundred and Fifty Metres)** as measured by GPS (Global Positioning System)

Prepared by

Verified by

Authorized by

  
Dr.C.Shankar

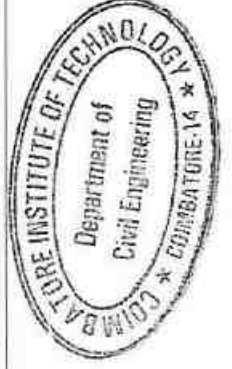
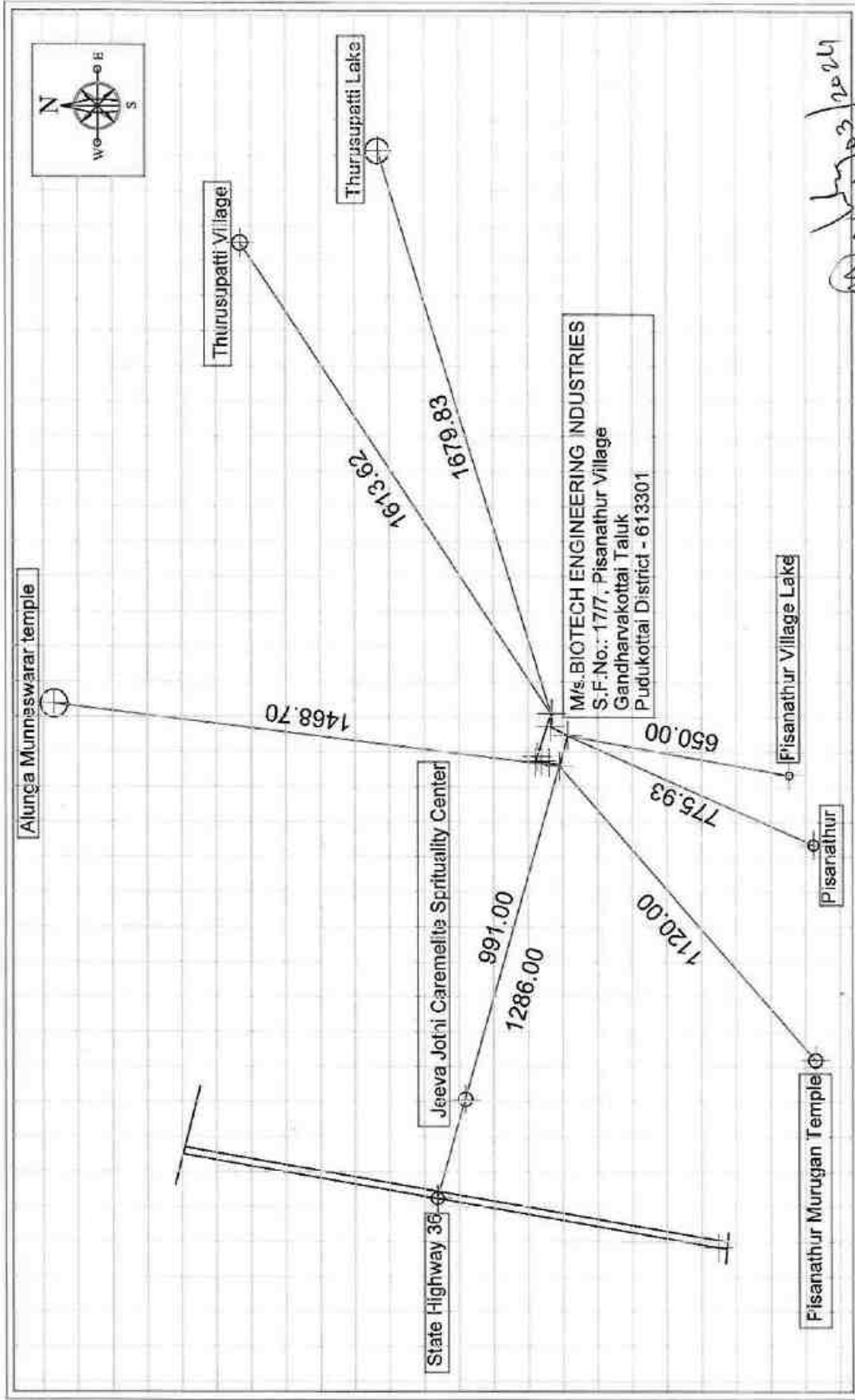
  
14/03/2024  
Dr.S.Arulselvan

Dr. S. ARULSELVAN, M.E., Ph.D.,  
Associate Professor,  
Department of Civil Engineering,  
Coimbatore Institute of Technology,  
Coimbatore-641 014.

  
14/03/2024  
Dr.M.P.Muthuraj  
Dr. M.P. MUTHURAJ, M.E., Ph.D.  
Head of the Department  
Department of Civil Engineering  
Coimbatore Institute of Technology  
Coimbatore-641 014







Dr. S. ARULSELVAN, M.E., Ph.D.,  
Associate Professor,  
Department of Civil Engineering,  
Coimbatore Institute of Technology,  
Coimbatore-641 014.

*Arulselvan*  
10/03/2024





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## DEPARTMENT OF CIVIL ENGINEERING

Dr.M.P.MUTHURAJ, M.E., Ph.D.  
Head of Civil Engineering

Date :

13.03.2024

CIT/CIVIL/Survey/SA/CITL-1039/CE-1429/2024/003

To,

Client:M/s. BIOTECH ENGINEERING INDUSTRIES

Survey No: 17/7, Pisanathur Village,  
Gandharvakottai Taluk,  
Pudhukottai Dist - 613301  
Tamil Nadu

Sir,

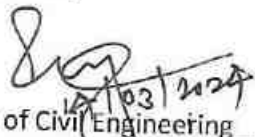
Sub:- Survey at Pisanathur, Gandharvakottai – reg.

Ref:- Your letter dated: 26.02.2024

GPS survey was conducted to determine the, co-ordinates and distances from the proposed location of the site belonging to M/s. BIOTECH ENGINEERING INDUSTRIES, Survey No: 17/7, Pisanathur Village, Gandharvakottai Taluk, Pudhukottai District - 613301, Tamil Nadu by taking observations using GPS, in the presence of Mr.Karnan, on 08.03.2024 .

The certificate and bill are attached herewith.

Yours truly

  
Head of Civil Engineering  
Dr. M.P. MUTHURAJ, M.E., Ph.D.  
Head of the Department  
Department of Civil Engineering  
Coimbatore Institute of Technology  
Coimbatore-641 014





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## DEPARTMENT OF CIVIL ENGINEERING

Dr.M.P.MUTHURAJ, M.E., Ph.D.  
Head of Civil Engineering

Date : 13.03.2024

### SURVEY LABORATORY

### SURVEY REPORT

CIT/CIVIL/Survey/SA/CITL-1039/CE-1429/2024/003

As per the request of the Office of M/s. BIOTECH ENGINEERING INDUSTRIES, GPS survey was conducted to determine Coordinates and Distances from the proposed location. The survey was conducted for the existing land at Survey No: 17/7, Pisanathur Village, Gandharvakottai Taluk, Pudukottai District - 613301, belonging to M/s. BIOTECH ENGINEERING INDUSTRIES. The survey was conducted by taking observations using GPS (Global Positioning System), in the Presence of Mr. Karnan, on 08.03.2024. The details are below:-

1. **Location of survey:** Pisanathur, Gandharvakottai, Pudukottai District
2. **Instrument used:** GPS (Global Positioning System)  
GPS, is a surveying instrument, which is used to measure coordinates and distance of the places.
3. **Type of Survey:** Topo Survey – using GPS (Global Positioning System)
4. **Details of Report:** Based on the survey conducted in the field, detailed report of existing land has been prepared.





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www.cit.edu.in

## DEPARTMENT OF CIVIL ENGINEERING

Date :

### 5. Survey Conducted by:

Dr. S.Arulselvan, Associate Professor/Civil Engineering

Dr.C.Shankar, Assistant Professor/Civil Engineering

Er. D.Jayabal, JDO/Civil Engineering

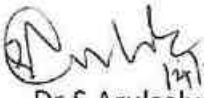
### Attachement:

1. Coordinates report
2. Bill

Prepared by

  
Dr.C.Shankar

Checked and verified by

  
Dr.S.Arulselvan

Authorized by

  
Head of Civil Engineering

**Dr. M.P. MUTHURAJ, M.E., Ph.D.**  
Head of the Department  
Department of Civil Engineering  
Coimbatore Institute of Technology  
Coimbatore-641 014



## **ANNEXURE – 24**

### **NOC from Tahsildar**



ந.க: அ7/5505/2023  
நாள்: 16.12.2023

வட்டாட்சியர் அலுவலகம்,  
கந்தர்வகோட்டை.

**தடையின்மைச் சான்று**

புதுச்சேரி மாவட்டம், கத்தர்வகோட்டை வட்டம், புதுதகர் சரகம், பிசானத்தூர் கிராமம், புல எண்:17/7 புன்செய் நிலம் 0.62.5 ஹெக்டேர் பரப்பளவில் தஞ்சாவூர், திரு. கண்ணன் து/பெ. பேரவையில் எண்பவரின் பயோடெக் இன்ஜினியரிங் இண்டஸ்ட்ரீஸ் சார்பாக Common BioMedical Waste Treatment Facility (CBMWTF) அமைக்க உள்ள இடத்திலிருந்து 500 மீட்டர் சுற்றளவில் இவ்வலுவலக பதிவேடுகளின்படி கிராம குடியிருப்புகள், நகர குடியிருப்புகள், தனிப்பட்ட குடியிருப்புகள், அங்கீகரிக்கப்பட்ட நத்தம் புறம்போக்கு இடங்கள், ஆதிதிராவிட அல்லது பிற இனத்தவர்களுக்கு வீட்டு மனைப்பட்டா வழங்குவதற்காக அரசால் கையகப்படுத்தப்பட்ட இடங்கள், மன்னிகள், மருத்துவமனை, வழிபாட்டுதலங்கள், புராதனச் சின்னங்கள், நெடுஞ்சாலைகள் ஏதும் இல்லை என்று சான்றளிக்கப்படுகிறது. மேலும் மேற்படி இடத்திலிருந்து 1.5 கிலோ மீட்டரில் தேசிய நெடுஞ்சாலை உள்ளது. மேலும் அருகில் உள்ள நத்தம் குடியிருப்புகள் பிசானத்தூர் மற்றும் புதுதகர் ஆகும் மேற்படி குடியிருப்புகள், பயோடெக் இன்ஜினியரிங் இண்டஸ்ட்ரீஸ் சார்பாக Common BioMedical Waste Treatment Facility (CBMWTF) ஆலை அமைக்க உள்ள பகுதியிலிருந்து 500 மீட்டர் தொலைவிற்குமேல் உள்ளது என சான்று வழங்கப்படுகிறது.

வட்டாட்சியர்,  
கந்தர்வகோட்டை.

**பெறுதல்:**

திரு. கண்ணன்,  
Proprietor,  
பயோடெக் இன்ஜினியரிங் இண்டஸ்ட்ரிஸ்,  
எண்: 12, முதல் தெரு,  
அபிராமபுரம்,  
மருத்துவக் கல்லூரி சாலை,  
தஞ்சாவூர் - 613007.



# **ANNEXURE – 25**

## **NOC from Block development Officer**

ந.க.தி3/1744/2024  
நாள்: 22.02.2024.

ஊராட்சி ஒன்றியம்  
கந்தர்வகோட்டை

**தடையின்மைச்சான்று**

புதுக்கோட்டை மாவட்டம், கந்தர்வகோட்டை ஊராட்சி ஒன்றியம், பிசானத்தூர் ஊராட்சி, பிசானத்தூர் கிராம புல எண் 17/7 புஞ்சை நிலம் 0.625 ஹெக்டர் பரப்பளவில் தஞ்சாவூர் திரு.கர்ணன் த/பெ.போலீஸ் என்பவரின் பயோடெக் இன்ஜினியரிங் இண்டஸ்ட்ரீஸ் சார்பாக Common Bio Medical Waste Treatment Facility (CBMWTF) அமைக்கவுள்ள இடத்திலிருந்து 500 மீட்டர் சுற்றளவில் குடியிருப்புகள் இல்லை. ஆதிதிராவிடர் அல்லது பிறஇனத்தவருக்கு வீட்டு மனைப்பட்டா வழங்குவதற்காக அரசால் கையகப்படுத்தப்பட்ட இடங்கள் பள்ளிகள், மருத்துவமனைகள், வழிபாட்டுத் தலங்கள், புரதானச் சின்னங்கள் ஏதும் இல்லை. மேற்படி இடத்திலிருந்து சுமார் 1.5 கிலோ மீட்டரில் தேசிய நெடுஞ்சாலை உள்ளது. மேலும் இந்நிறுவனம் அமையவிருக்கும் இடத்திற்கு அருகில் உள்ள நத்தம் குடியிருப்புக்கள் பிசானத்தூர் மற்றும் புதுநகர் ஊராட்சிகளை சார்ந்ததாகும். மேற்படி குடியிருப்புகள் பயோடெக் இன்ஜினியரிங் இண்டஸ்ட்ரீஸ் சார்பாக Common Bio Medical Waste Treatment Facility (CBMWTF) நிறுவனம் அமைக்க உள்ள பகுதியிலிருந்து 500 மீட்டர் தெலைவிற்குமேல் உள்ளது எனச் சான்றளிக்கப்படுகிறது.

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