

# Draft Environment Impact Assessment Report

For

**Proposed New Project of Common Bio Medical Waste Treatment Facility (CBMWTF) Consisting of Incineration System having Capacity (1 No. x 250 kg/hr. Static + 1 No. x 300 kg/hr. Rotary), Autoclave having Capacity (2 Nos. x 1000 lit./batch) and Shredder having Capacity (1 No. x 250 kg/hr. + 1 No. x 100 kg/hr.)**

At

**S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110, India.**



|                                                                                     |                                                                                                                                                                             |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant:</b>                                                                   |                                                                                                                                                                             |
|  | <b>M/s. Navabuddha Agencies Private Limited</b><br><b>Address:</b> S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110, India. |
| <b>Project:</b>                                                                     |                                                                                                                                                                             |
| <b>Total Plot Area:</b>                                                             | <b>47,696.91 m<sup>2</sup></b>                                                                                                                                              |
| <b>Project or Activity:</b>                                                         | As per EIA Notification 2006: 7(da) Common Bio-Medical Waste Treatment Facilities                                                                                           |
| <b>Sector number:</b>                                                               | As per NABET Scheme: 32(A)                                                                                                                                                  |
| <b>Category:</b>                                                                    | "B1"                                                                                                                                                                        |
| <b>TORs:</b>                                                                        | File No: 12188 dated 14/07/2025                                                                                                                                             |
| <b>Baseline Monitoring:</b>                                                         |                                                                                                                                                                             |
| <b>Name of Laboratory</b>                                                           | PolluCare Engineering India Private Limited (Environmental Testing Laboratory)                                                                                              |
| <b>NABL Accreditation.:</b>                                                         | Certificate No : TC-7446 (valid till 21/06/2026)                                                                                                                            |
| <b>Baseline Monitoring:</b>                                                         | 1 <sup>st</sup> July, 2025 to 17 <sup>th</sup> September, 2025                                                                                                              |

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| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
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| 3.10           | AMBIENT AIR MONITORING RESULTS AT AA 7                                   | 3.37            |
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| 3.12           | DAY TIME NOISE LEVEL DB(A) LEQ                                           | 3.45            |
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| 3.15           | AREA- SPECIES GRAPH                                                      | 3.62            |
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|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | INDEX                                    | Date | 08/06/2026 |

### LIST OF ABBREVIATIONS USED

| <b>ABBREVIATIONS</b> | <b>FULL FORM</b>                            |
|----------------------|---------------------------------------------|
| AAQ                  | AMBIENT AIR QUALITY                         |
| APHA                 | AMERICAN PUBLIC HEALTH ASSOCIATION          |
| BDL                  | BELOW DETECTABLE LIMIT                      |
| BMW                  | BIO MEDICAL WASTE                           |
| BOD                  | BIOCHEMICAL OXYGEN DEMAND                   |
| CBWTF                | COMMON BIO-MEDICAL WASTE TREATMENT FACILITY |
| CPCB                 | CENTRAL POLLUTION CONTROL BOARD             |
| COD                  | CHEMICAL OXYGEN DEMAND                      |
| CCA                  | CONSOLIDATED CONSENT AND AUTHORIZATION      |
| CEC                  | CATION EXCHANGE CAPACITY                    |
| CER                  | CORPORATE ENVIRONMENTAL RESPONSIBILITY      |
| CRZ                  | COASTAL REGULATORY ZONE                     |
| COD                  | CHEMICAL OXYGEN DEMAND                      |
| CTE                  | CONSENT TO ESTABLISH                        |
| DMP                  | DISASTER MANAGEMENT PLAN                    |
| DO                   | DISSOLVED OXYGEN                            |
| EC                   | ENVIRONMENT CLEARANCE                       |
| ECBA                 | ENVIRONMENTAL COST BENEFIT ANALYSIS         |
| EHS                  | ENVIRONMENT, HEALTH & SAFETY                |
| EIA                  | ENVIRONMENTAL IMPACT ASSESSMENT             |
| EMP                  | ENVIRONMENT MANAGEMENT PLAN                 |
| ENPRO                | ENPRO ENVIRO TECH AND ENGINEERS PVT. LTD.   |
| GLC                  | GROUND LEVEL CONCENTRATION                  |
| GPS                  | GLOBAL POSITIONING SYSTEM                   |
| HSD                  | HIGH SPEED DIESEL                           |
| LDO                  | LIGHT DIESEL OIL                            |
| LU                   | LAND USE                                    |
| MP                   | MELTING POINT                               |
| MOEF                 | MINISTRY OF ENVIRONMENT AND FOREST          |
| KLD                  | KILO LITRE PER DAY                          |
| NAAQS                | NATIONAL AMBIENT AIR QUALITY SYSTEM         |
| PM                   | PARTICULATE MATTER                          |
| PPE                  | PERSONNEL PROTECTIVE EQUIPMENT              |
| R & D                | RESEARCH AND DEVELOPMENT                    |
| SEAC                 | STATE EXPERT APPRAISAL COMMITTEE            |
| SIA                  | SOCIAL IMPACT ASSESSMENT                    |
| TOR                  | TERM OF REFERENCE                           |
| TSDF                 | TREATMENT STORAGE AND DISPOSAL FACILITY     |
| TDS                  | TOTAL DISSOLVED SOLIDS                      |
| TSS                  | TOTAL SUSPENDED SOLIDS                      |
| VOC                  | VOLATILE ORGANIC COMPOUND                   |
| WHC                  | WATER HOLDING CAPACITY                      |

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | INDEX                                    | Date | 08/06/2026 |

### LIST OF SYMBOLS / NOTATIONS USED

| <b>SYMBOLS / NOTATIONS</b> | <b>DESCRIPTION</b>          |
|----------------------------|-----------------------------|
| dB(A)                      | DECIBEL                     |
| $\mu\text{g}/\text{m}^3$   | MICROGRAM PER CUBIC METER   |
| $\text{mg}/\text{m}^3$     | MILLIGRAM PER CUBIC METER   |
| $\text{NO}_x$              | OXIDES OF NITROGEN          |
| ppm                        | PARTS PER MILLION           |
| Km/h                       | KILOMETER PER HOUR          |
| m/sec                      | METER PER SECOND            |
| $\text{Nm}^3/\text{hr}$    | NORMAL CUBIC METER PER HOUR |
| kVA                        | KILO VOLT AMPERE            |
| m/s                        | METER PER SECOND            |
| $\text{NO}_x$              | OXIDES OF NITROGEN          |
| PM                         | PARTICULATE MATTER          |
| ppm                        | PARTS PER MILLION           |
| CO                         | CARBON MONOXIDE             |

## **ToR Letter**

File No: 12188 on dated 14<sup>th</sup> July, 2025  
from SEIAA, TAMIL NADU





**File No: 12188**  
**Government of India**  
**Ministry of Environment, Forest and Climate Change**  
**(Issued by the State Environment Impact Assessment Authority(SEIAA),**  
**TAMIL NADU)**

\*\*\*



Dated 14/07/2025



To,

Dr Pradipta Kumar Rath  
M/s. Nava Buddha Agencies Private Limited  
No.19A, 2nd Floor, Puthur High Road, Puthur, Tiruchirapalli, Tamil Nadu, 620017  
navabuddhabmw@gmail.com

**Subject:** Grant of Terms of Reference along with public hearing under the provision of the EIA Notification 2006 as amended-regarding.

**Sir/Madam,**

**Sub:** SEIAA, TN – Proposed New project of Common Bio-Medical waste Treatment Facility (CBMWTF) at S.F. Nos. 248/1 & 246/3A, of Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu by M/s. Nava Buddha Agencies Private Limited – Category “B1” & Schedule Item No. 7(d)(a) - “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/INFRA2/529267/2025 Dated: 18/03/2025.

2. Your application for Terms of Reference dated: 16.05.2025.

3. Minutes of the 577th SEAC meeting held on 12.06.2025.

4. Minutes of the 848th SEIAA meeting held on 09.07.2025.

2. The particulars of the proposal are as below :

|                                             |                                              |
|---------------------------------------------|----------------------------------------------|
| (i) TOR Identification No.                  | TO25B3301TN5932198N                          |
| (ii) File No.                               | 12188                                        |
| (iii) Clearance Type                        | TOR                                          |
| (iv) Category                               | B1                                           |
| (v) Project/Activity Included Schedule No.  | 7(da) Bio-Medical Waste Treatment Facilities |
| (vii) Name of Project                       | M/s. NAVABUDHHA AGENCIES PVT. LTD.           |
| (viii) Name of Company/Organization         | NAVABUDDHA AGENCIES PRIVATE LIMITED          |
| (ix) Location of Project (District, State)  | KARUR, TAMIL NADU                            |
| (x) Issuing Authority                       | SEIAA                                        |
| (xi) 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 in the meeting held on 09.07.2025. 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 with public hearing 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 with public hearing for instant proposal M/s. Nava Buddha Agencies Private Limited 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 with public hearing 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 with public hearing prescribed shall be valid for a period of three years from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.

#### **Copy To**

1. The Additional Chief Secretary to Government, Environment, Climate Change and Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
2. The Additional Chief Secretary to Government, Industries, Investment Promotion & Commerce Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
3. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi - 110 032.
4. The Chairman, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.
5. The APCCF (C), Regional Office, MoEF & CC (SZ), 34, HEPC Building, 1st & 2nd Floor, Cathedral Garden Road, Nungambakkam, Chennai - 34.
6. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC, Paryavaran Bhavan, CGO Complex, New Delhi - 110 003.
7. The District Collector, Karur District.
8. 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>   | <ol style="list-style-type: none"> <li>1. A site suitability report for the proposed site must be obtained from TNPCB. If the site is found unsuitable, the project proponent (PP) shall propose an alternative site in consultation with TNPCB. Details of the same, along with a detailed alternative site study report, shall be included in the EIA report.</li> <li>2. Gap Analysis for this area required from TNPCB, incorporating the latest BMW report details (preferably 2025) details of any newly established Common Bio-Medical Waste Treatment Facility</li> </ol> |

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | <p>(CBMWTF).</p> <ol style="list-style-type: none"> <li>3. The PP shall submit Photograph and video of other Bio-medical waste treatment facilities owned by the PP in Tamil Nadu along with EIA Report.</li> <li>4. The entire land ownership details shall be included in the EIA report.</li> <li>5. Permanent Commitment letter from competent authority for supply of water shall be furnished.</li> <li>6. The PP shall furnish compliance details with the "Revised Guidelines for Common Bio-Medical Waste Treatment and Disposal Facilities" dated December 21, 2016, issued by CPCB — especially regarding location criteria, land requirements, treatment equipment, and infrastructure setup.</li> <li>7. The details of the Encapsulation treatment shall be included in the EIA report.</li> <li>8. Since the PP has proposed to dispose the Metal sharps after Autoclave &amp; shredding to iron foundries, the details of proposed Iron foundry unit for handling &amp; its valid consent from the Board shall be included in the EIA report.</li> <li>9. The water consumption of fresh water and treated waste shall be incorporated separately. The revised water balance chart shall be included in the EIA report.</li> <li>10. The PP shall furnish the latest KML and enumerate the structures including schools, colleges, primary health centres should be submitted along with the EIA report.</li> <li>11. Enumerate the details of agriculture, type of crops, harvesting period and the implication of the proposal shall be included in the EIA report.</li> <li>12. The implication on agriculture, nearby water bodies i.e., tank &amp; reservoir, water table shall be included in the EIA report.</li> <li>13. The implication on flora &amp; fauna shall be included in the EIA report.</li> <li>14. Detailed design specification of incinerator shall be included.</li> <li>15. Details of various state of art of technology available for this filed and justification for selection of a particular technology.</li> <li>16. Land requirement for the facility including its break up for various purposes, its availability and optimization.</li> <li>17. 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.</li> <li>18. Details on collection and transportation of Bio Medical Waste from health care establishment. No. of vehicles and feature of vehicles, etc.</li> <li>19. Details of waste storage facilities/rooms.</li> <li>20. Details of the treatment equipment's capacity.</li> <li>21. 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.</li> <li>22. Details on fuel requirement for incineration.</li> <li>23. Details on flue gas emissions discharge through stack and proposed pollution control technologies.</li> <li>24. Details on residue/ash generation and management.</li> <li>25. Details of waste heat utilization, if any.</li> <li>26. Details on wastewater management.</li> <li>27. Details of the proposed overall safety and health protection measures.</li> <li>28. Details on source of water and power to the facility.</li> <li>29. Details of the existing access road(s)/walkways to the designed operations in the site and its layout.</li> <li>30. Location of the incineration facility and nearest habitats with distances from the facility to be demarcated on a toposheet (1: 50000 scale).</li> <li>31. Land use map based on satellite imagery including location specific sensitivities such as national parks / wildlife sanctuary, villages, industries, etc.</li> <li>32. Topography details.</li> </ol> |

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | <p>33. Surface water quality of nearby water bodies.</p> <p>34. Details on proposed groundwater monitoring wells with locations, frequency of monitoring, parameters, etc.</p> <p>35. Action plan for the greenbelt development in accordance with CPCB guidelines.</p> <p>36. Details on pollution control technologies and online monitoring equipment in accordance with CPCB/TNPCB guidelines.</p> <p>37. 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>38. Stack and fugitive emissions may be monitored for SPM, HCL &amp; NO2 as per Bio Medial Waste (Management &amp; Handling) Rules 2016.</p> <p>39. Specific programme to monitor safety and health protection of workers.</p> <p>40. Details of administrative and technical organizational structure.</p> <p>41. 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>42. The EIA/EMP shall be prepared in accordance with the 'Revised Guidelines for Common Bio-Medical Waste Treatment and Disposal Facilities' issued by the Central Pollution Control Board (CPCB).</p> <p>43. PP shall strive to generate a minimum of 25% of energy consumption by way of solar energy.</p> <p>44. 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>45. 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>1. The PP shall furnish the quantity details of target Bio-Medical waste to be collected in the proposed treatment facility along with the EIA report.</p> <p>2. The PP shall furnish the details of waste water disposal method proposed for the treatment facility along with the EIA report.</p> <p>3. The PP shall furnish the details of ZLD treatment method along with the EIA report, if there is any.</p> |

## 3. Seiaa Standard Conditions :

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.1   | <p>1. Impacts on Energy requirement.</p> <p>2. Impacts on living System (air, water ,soil &amp; micro-organisms).</p> <p>3. Impacts on terrestrial &amp; aquatic within and surrounding areas.</p> <p>4. 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 furnish the detailed EMP mentioning all the CER activities as committed with the action plan.</p> <p>5. The proponent shall provide details on the adequate parking facility provided including vehicles of all the workers &amp; visitors and a clean traffic plan.</p> <p>6. The project proponent shall furnish the action taken to improve water usage efficiency in the</p> |

| S. No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | <p>building.</p> <p>7. The project proponent shall conduct detailed study of biodiversity flora &amp; fauna including invasives /endemic vulnerable species.</p> <p>8. The project proponent shall furnish NOC obtained from competent authority that there is no encroachment of water bodies (including canals).</p> <p>9. The project proponent shall conduct detailed soil investigation including microflora/fauna.</p> <p>10. The project proponent shall study impact on livelihoods of locals.</p> <p>11. The project proponent shall furnish List of trees available in the project area.</p> <p>12. The project proponent shall study impact of activities on water bodies/wetlands.</p> <p>13. The proponent shall furnish details on the measures taken to make the Buildings energy efficient confirming to green building norms.</p> <p>14. The disaster management and disaster mitigation plan shall be furnished and should be seriously adhered to avoid of calamities.</p> <p>15. The project proponent shall conduct studies on the presence of invasive and alien species around the project the area and shall furnish mitigate measures to prevent their spread.</p> <p>16. The proponent shall furnish details on the actions taken to reduce anthropogenic GHGs such as CO2, CH4, nitrous oxide, etc., resulting from human activities.</p> <p>17. The proponent shall furnish details on the strategies adopted to decarbonize the building.</p> <p>18. The proponent shall furnish measures taken to mitigate the impact on critically endangered species, biodiversity, etc., due to the modification of the habitat.</p> <p>19. The proponent shall develop emergency response plan in addition to the disaster management plan.</p> <p>20. The proponent shall furnish details on building-friendly pest control strategies developed using non chemical measures so as to control the pest population thereby not losing beneficial organisms.</p> <p>21. The proponent shall furnish details on strategies developed to ensure the buildings in blocks don't trap heat and become local urban heat islands.</p> <p>22. The proponent shall develop detailed evacuation plan for disabled people and safety evacuation plan during emergencies.</p> <p>23. The proponent shall explain the methodology adopted to control thermal Environment and other shocks in the building.</p> <p>24. The proponent shall provide details on the provisions for controlled ventilation and lighting systems.</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.                                                                                                                                                                                                                                                                                                                |

| S. No | Terms of Reference                                                                                                                                                                                            |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 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-                           |

| S. No | Terms of Reference                                                                                                                                                                                                                                                              |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | 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. |

| S. No | Terms of Reference                                                |
|-------|-------------------------------------------------------------------|
| 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.                                                                                                                                                                                                                                                                            |
| 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 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> |

**STANDARD TERMS OF REFERENCE (ToR) FOR EIA/EMP REPORT FOR  
PROJECTS/ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE**

**7(d): STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT  
IMPACT ASSESSMENT STUDY**

- 1) 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.
- 2) Submit the details of the road/rail connectivity along with the likely impacts and mitigative measures
- 3) Submit the present land use and permission required for any conversion such as forest, agriculture etc.,
- 4) Examine the details of transportation of Hazardous wastes, and its safety in handling.
- 5) Examine and submit the details of on line pollutant monitoring.
- 6) Examine the details of monitoring of Dioxin and Furon.
- 7) MoU for disposal of ash through the TSDF.
- 8) MoU for disposal of scrubbing waste water through CETP.
- 9) Examine and submit details of monitoring of water quality around the landfill site.
- 10) Examine and submit details of the odour control measures.
- 11) Examine and submit details of impact on water body and mitigative measures during rainy season.
- 12) 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.
- 13) Water quality around the landfill site shall be monitored regularly to examine the impact on the ground water.
- 14) The storage and handling of hazardous wastes shall be as per the Hazardous Waste Management Rules.
- 15) Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural and man-made disaster.
- 16) 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.

- 17) 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.
- 18) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 19) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 20) 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 "<http://moef.nic.in/Manual/Incinerator>"

**The Executive summary of the EIA/EMP report in about 8-10 pages should be prepared incorporating the information on following points:**

1. Project name and location (Village, District, State, and industrial Estate (If applicable)).
2. Products and capacities. If expansion proposal then existing products with capacities and reference to earlier EC.
3. Requirement of land, raw material, water, power, fuel, with source of supply (Quantitative)
4. Process description in brief specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
5. Measures for mitigating the impact on the environment and mode of discharge or disposal.
6. Capital cost of the project, estimated time of completion.
7. Site selected for the project- Nature of land-Agricultural (Single/double crop), barren, Govt/Private land, status of its acquisition, nearby (in 2-3 km), water body, population, within 10km other industries, forest, eco-sensitive zones, accessibility, (note-I case of industrial estate this information may not be necessary)
8. Baseline environmental data-air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
9. Identification of hazards in handling, processing and storage of hazardous material and safety system provided to mitigate the risk.

10. Likely impact of the project, on air, water, land, flora-fauna and nearby population
11. Emergency preparedness plan in case of natural or in plant emergencies.
12. Issues raised during public hearing (If applicable) and response given
13. CSR plan with proposed expenditure.
14. Occupational Health Measures.
15. Post project monitoring plan.

**Besides the above, the below mentioned general points should also be followed:**

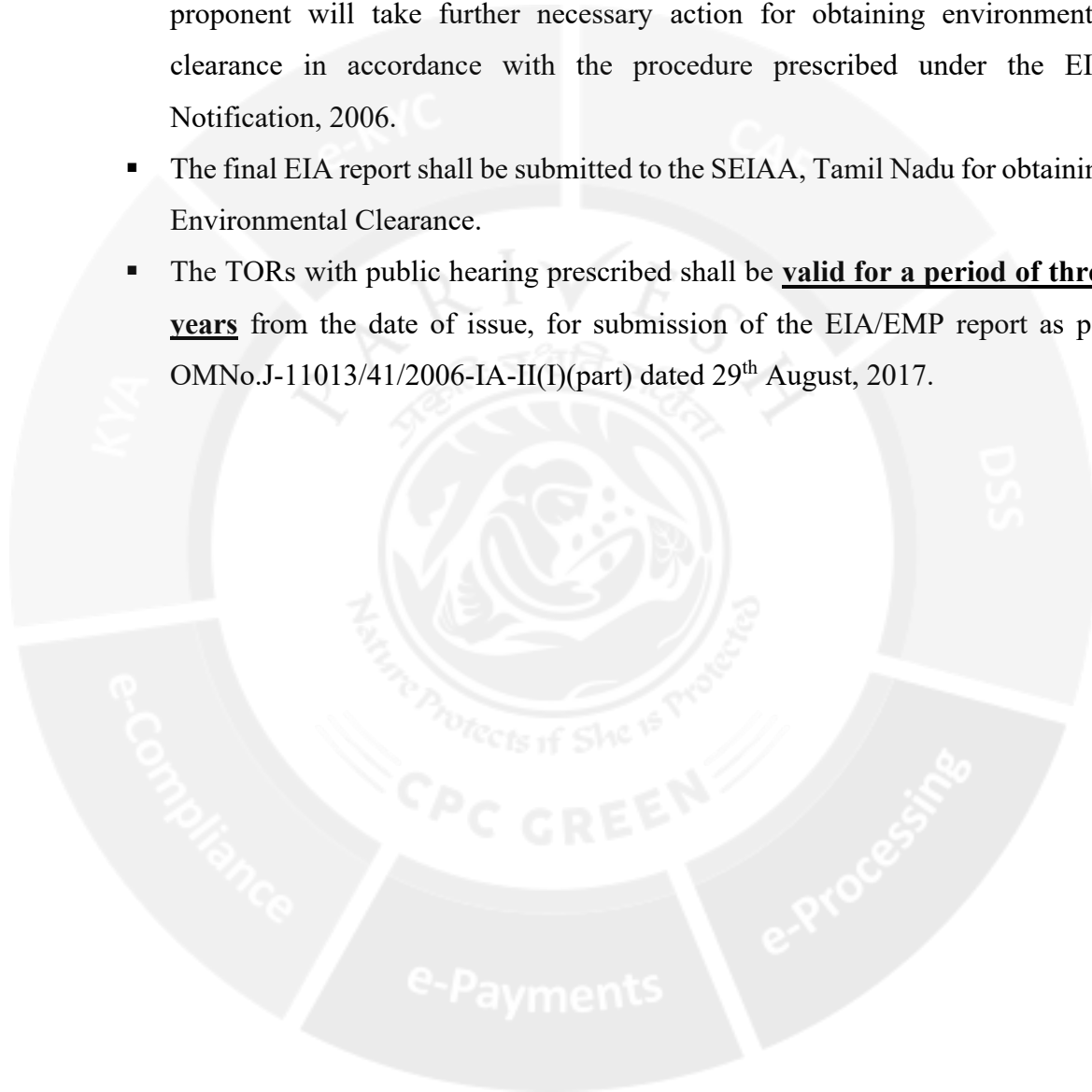
1. The EIA document shall be printed on both sides, as far as possible.
2. All documents should be properly indexed, page numbered.
3. Period/date of data collection should be clearly indicated.
4. Authenticated English translation of all material provided in regional languages.
5. The letter/application for EC should quote the MoEF & CC File No. and also attach a copy of the letter prescribing the ToR.
6. The copy of the letter received from the Ministry on the ToR prescribed for the project should be attached as an annexure to the final EIA-EMP Report.
7. The final EIA-EMP report submitted to the Ministry must incorporate the issues mentioned in ToR. The index of the final EIA-EMP report, must indicate the specific chapter and page no. of the EIA-EMP Report where the specific ToR prescribed by the Ministry have been incorporated. Questionnaire related to the project (posted on MoEF&CC website) with all sections duly filled in shall also be submitted at the time of applying for EC.
8. Grant of ToR does not mean grant of EC.
9. The status of accreditation of the EIA consultant with NABET/QCI shall be specifically mentioned. The consultant shall certify that his accreditation is for the sector for which this EIA is prepared.
10. On the front page of EIA/EMP reports, the name of the consultant/consultancy firm along with their complete details including their accreditation, if any shall be indicated. The consultant while submitting the EIA/EMP report shall give an undertaking to the effect that the prescribed ToRs (ToR proposed by the project proponent and additional ToR given by the MoEF & CC) have been complied with and the data submitted is factually correct (Refer MoEF & CC Office memorandum dated 4<sup>th</sup> August, 2009).
11. While submitting the EIA/EMP reports, the name of the experts associated with/involvement in the preparation of these reports and the laboratories through which the

samples have been got analysed should be stated in the report. It shall clearly be indicated whether these laboratories are approved under the Environment (Protection) Act, 1986 and the rules made there under (Please refer MoEF&CC Office Memorandum dated 4<sup>th</sup> August, 2009). The project leader of the EIA study shall also be mentioned.

12. All the ToR points as presented before the State Expert Appraisal Committee (SEAC) shall be covered.
13. The project proponent shall submit the detailed final EIA/EMP prepared as per ToR to the Ministry for considering the proposal for environmental clearance within 3 years as per the MoEF & CC O.M. No.J-11013/41/2006-IA-11(1) (P) dated 08.10.2014.
14. The consultants involved in preparation of EIA/EMP report after accreditation with Quality Council of India/National Accreditation Board of Education and Training (QCI/NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other Organization(s)/ Laboratories including their status of approvals etc. vide Notification of the MoEF & CC dated 19.07.2013.
15. The prescribed ToR would be valid for a period of three years for submission of the EIA/EMP Reports.
16. A note confirming compliance of the ToR, with cross referencing of the relevant section/ pages of the EIA report should be provided.
17. All documents may be properly referenced with index, page numbers and continuous page numbering.
18. Copy of permission related to Port facility, Desalination plant, wind mill/solar power plant from competent Authority.
19. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
20. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF & CC vide O.M. J-11013/41/2006-IA.II(I) dated 4<sup>th</sup> August, 2009, which are available on the website of the Ministry should also be followed.
21. The consultants involved in the preparation of EIA/EMP report after accreditations with quality Council of India (QC1)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories

including their status of approvals etc. In this regard circular no. F.No. J-/11013/77/2004-IA-II(I) dated 2<sup>nd</sup> December, 2009, 18<sup>th</sup> March 2010, 28<sup>th</sup> May 2010, 28<sup>th</sup> June 2010, 31<sup>st</sup> December 2010 & 30<sup>th</sup> September 2011 posted on the Ministry's website <http://www.moef.nic.in/> may be referred

- After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above-mentioned points, the proponent will take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.
- The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.
- The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29<sup>th</sup> August, 2017.



|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | ToR Compliance                           | Date | 08/06/2026 |

**Terms of References and Its Compliance  
(File No.: 12188 dated 14/07/2025)**

| <b>Sr. No.</b>                      | <b>ToRs</b>                                                                                                                                                                                                                                                                                                             | <b>Compliances</b>                                                                                                                                                                                                                         |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Specific Terms of References</b> |                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                            |
| <b>1</b>                            | <b>Seac Conditions - Site Specific</b>                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                            |
| 1.1 (1)                             | A site suitability report for the proposed site must be obtained from TNPCCB. If the site is found unsuitable, the project proponent (PP) shall propose an alternative site in consultation with TNPCCB. Details of the same, along with a detailed alternative site study report, shall be included in the EIA report. | The site suitability report for the proposed site will be obtained from TNPCCB. The project Proponent hasn't choose an alternative site.                                                                                                   |
| 1.1 (2)                             | Gap Analysis for this area required from TNPCCB, incorporating the latest BMW report details (preferably 2025) details of any newly established Common Bio-Medical Waste Treatment Facility (CBMWTF).                                                                                                                   | There is no GAP Analysis Report conducted by TNPCCB. However, Based on Annual Report of TNPCCB Application to obtain TOR/EC has been made.                                                                                                 |
| 1.1 (3)                             | The PP shall submit Photograph and video of other Bio-medical waste treatment facilities owned by the PP in Tamil Nadu along with EIA Report.                                                                                                                                                                           | The photographs of Project site is included in Chapter 2 of the Draft EIA Report                                                                                                                                                           |
| 1.1 (4)                             | The entire land ownership details shall be included in the EIA report.                                                                                                                                                                                                                                                  | The entire land ownership details are provided in Section 2.4.4 on page no. 2.8 of the Draft EIA Report.                                                                                                                                   |
| 1.1 (5)                             | Permanent Commitment letter from competent authority for supply of water shall be furnished.                                                                                                                                                                                                                            | This is draft EIA report prepared to conduct Public Hearing, however assurance letter or permission will be submitted at the time of appraisal before respected committee.                                                                 |
| 1.1 (6)                             | The PP shall furnish compliance details with the "Revised Guidelines for Common Bio-Medical Waste Treatment and Disposal Facilities" dated December 21, 2016, issued by CPCB — especially regarding location criteria, land requirements, treatment equipment, and infrastructure setup.                                | <p>The facility proposed will be installed as per CPCB guidelines only.</p> <p>Compliance report of Bio-Medical Waste Management Rules, 2016 ", notified by the MoEF&amp;CC on 28th March, 2016 is attached here as <b>Annexure 7</b>.</p> |

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | ToR Compliance                           | Date | 08/06/2026 |

| <b>Sr. No.</b> | <b>ToRs</b>                                                                                                                                                                                                                         | <b>Compliances</b>                                                                                                                        |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1 (7)        | The details of the Encapsulation treatment shall be included in the EIA report.                                                                                                                                                     | As per the Proposed New Project of CBMWTF there is no Encapsulation Treatment facility proposed by the unit.                              |
| 1.1 (8)        | Since the PP has proposed to dispose the Metal sharps after Autoclave & shredding to iron foundries, the details of proposed Iron foundry unit for handling & its valid consent from the Board shall be included in the EIA report. | The MoU or Membership of Iron foundries will be obtained after getting Environmental Clearances.                                          |
| 1.1 (9)        | The water consumption of fresh water and treated waste shall be incorporated separately. The revised water balance chart shall be included in the EIA report.                                                                       | The details regarding Water consumption and Waste water generation is provided in Section 2.9.2 on page no. 2.49 of the Draft EIA Report. |
| 1.1 (10)       | The PP shall furnish the latest KML and enumerate the structures including schools, colleges, primary health centres should be submitted along with the EIA report.                                                                 | The kml file is uploaded and submitted in the online proposal Form-1 on Parivesh Portal 2.0.                                              |
| 1.1 (11)       | Enumerate the details of agriculture, type of crops, harvesting period and the implication of the proposal shall be included in the EIA report.                                                                                     | The details regarding same is provided in Chapter 3 of the Draft EIA Report.                                                              |
| 1.1 (12)       | The implication on agriculture, nearby water bodies i.e., tank & reservoir, water table shall be included in the EIA report.                                                                                                        | The details regarding same is provided in Chapter 3 of the Draft EIA Report.                                                              |
| 1.1 (13)       | The implication on flora & fauna shall be included in the EIA report.                                                                                                                                                               | The details regarding same is provided in Chapter 3 of the Draft EIA Report.                                                              |
| 1.1 (14)       | Detailed design specification of incinerator shall be included.                                                                                                                                                                     | The details regarding same is provided in Table 2.15 in Chapter 2 of the Draft EIA Report.                                                |
| 1.1 (15)       | Details of various state of art of technology available for this filed and justification for selection of a particular technology.                                                                                                  | The details regarding Best available technology and other details are provided in Chapter 5 of the Draft EIA Report.                      |
| 1.1 (16)       | Land requirement for the facility including its break up for various purposes, its availability and optimization.                                                                                                                   | The Plant Layout and Detailed Area Breakup of the proposed facility is provide in Section 2.8.1 on page 2.41 of the Draft EIA Report.     |



| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | ToR Compliance                           | Date | 08/06/2026 |

| <b>Sr. No.</b> | <b>ToRs</b>                                                                                                                                                                                                                                                                                                                                              | <b>Compliances</b>                                                                                                                                                         |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1 (17)       | 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. | Detailed Plant Layout and Detailed Area Breakup of the proposed facility is provide in Section 2.8.1 on page 2.41 of the Draft EIA Report.                                 |
| 1.1 (18)       | Details on collection and transportation of Bio Medical Waste from health care establishment. No. of vehicles and feature of vehicles, etc.                                                                                                                                                                                                              | Details regarding Collection, Storage and Transportation of Bio-Medical Waste from HCFs to CBMWTF is provided in Section 2.7.1.2 on page no. 2.12 of the Draft EIA Report. |
| 1.1 (19)       | Details of waste storage facilities/rooms.                                                                                                                                                                                                                                                                                                               | Details of waste storage facilities/rooms is provided in Section 2.7.1.2 on page 2.17 of the Draft EIA Report.                                                             |
| 1.1 (20)       | Details of the treatment equipment's capacity.                                                                                                                                                                                                                                                                                                           | Details regarding the capacity of treatment equipments is provided in Section 2.5 on Page no. 2.10 of the Draft EIA Report.                                                |
| 1.1 (21)       | 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.                                                                                                    | Details regarding the same is provided in Chapter 2 of the Draft EIA Report.                                                                                               |
| 1.1 (22)       | Details on fuel requirement for incineration.                                                                                                                                                                                                                                                                                                            | The details regarding the total requirement of fuel for incineration is provided in Chapter 2 of the Draft EIA Report.                                                     |
| 1.1 (23)       | Details on flue gas emissions discharge through stack and proposed pollution control technologies.                                                                                                                                                                                                                                                       | The details regarding the Flue gas and Process gas emission is provided in Section 2.9.1 on Page no. 2.45 of the Draft EIA Report.                                         |
| 1.1 (24)       | Details on residue/ash generation and management.                                                                                                                                                                                                                                                                                                        | The details regarding the Incineration Ash generation and its management is provided in Section 2.9.3 on page no. 2.56 of the Draft EIA Report.                            |

| ENPRO Enviro Tech and Engineers Pvt. Ltd. |                                          |      |            |
|-------------------------------------------|------------------------------------------|------|------------|
| Client                                    | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                   | Draft EIA Report                         |      |            |
| Report No                                 | EP/EIA/76                                | Rev. | 00         |
| Title                                     | ToR Compliance                           | Date | 08/06/2026 |

| Sr. No.  | ToRs                                                                                                                                                      | Compliances                                                                                                                                                                                                                    |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1 (25) | Details of waste heat utilization, if any.                                                                                                                | Not Applicable.                                                                                                                                                                                                                |
| 1.1 (26) | Details on wastewater management                                                                                                                          | The details regarding the wastewater management is provided in Section 2.9.2 on page no. 2.49 of the Draft EIA Report.                                                                                                         |
| 1.1 (27) | Details of the proposed overall safety and health protection measures.                                                                                    | Details regarding Occupational Health & Safety Program is provided in Section 7.5 on page no. 7.61 of the Draft EIA Report.                                                                                                    |
| 1.1 (28) | Details on source of water and power to the facility.                                                                                                     | Details regarding the same are provide in Section 2.8 on page 2.44 of the Draft EIA Report.                                                                                                                                    |
| 1.1 (29) | Details of the existing access road(s)/walkways to the designed operations in the site and its layout.                                                    | Detailed Plant Layout and Detailed Area Breakup of the proposed facility is provided in Section 2.8.1 on page 2.41 of the Draft EIA Report.                                                                                    |
| 1.1 (30) | Location of the incineration facility and nearest habitats with distances from the facility to be demarcated on a toposheet (1: 50000 scale).             | Nearest habitants is located at around 1.09 Km (i.e. Kallai village) and toposheet (1: 50000 scale) is referred as Map 3.8, Section 3.4.4 on page no. 3.57 of the Draft EIA Report.                                            |
| 1.1 (31) | Land use map based on satellite imagery including location specific sensitivities such as national parks / wildlife sanctuary, villages, industries, etc. | All the Land Use and Other Maps are with Topography details are provided in Chapter 3 of the Draft EIA report.                                                                                                                 |
| 1.1 (32) | Topography details.                                                                                                                                       |                                                                                                                                                                                                                                |
| 1.1 (33) | Surface water quality of nearby water bodies.                                                                                                             | There were 8 locations selected for monitoring of ground water and 8 locations selected for surface water monitoring within 10 km radius of the project site.                                                                  |
| 1.1 (34) | Details on proposed groundwater monitoring wells with locations, frequency of monitoring, parameters, etc.                                                | Baseline Monitoring period was during 1 <sup>st</sup> July 2025 to 17 <sup>th</sup> September 2025.<br><br>Ground and surface water quality status of the study area is presented in Section 3.3.1, Page No. 3.2 of Chapter 3. |
| 1.1 (35) | Action plan for the greenbelt development in accordance with CPCB guidelines.                                                                             | The total land area for proposed project is 47967.91 m <sup>2</sup> . About 15923.67 m <sup>2</sup> (33.4%) will be allocated for green belt development.                                                                      |

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | ToR Compliance                           | Date | 08/06/2026 |

| Sr. No.  | ToRs                                                                                                                                                                                                                                                                                                            | Compliances                                                                                                                                                                                                                                                   |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          |                                                                                                                                                                                                                                                                                                                 | <p>Unit will plant around 3981 nos. of trees for development of green belt area and additional 796 nos. considering 80% survival rate.</p> <p>Detail regarding Green belt development plan is provided in Section 10.6.1 on Page no. 10.13 of Chapter 10.</p> |
| 1.1 (36) | Details on pollution control technologies and online monitoring equipment in accordance with CPCB/ TNPCB guidelines.                                                                                                                                                                                            | Online Continuous Emission Monitoring System (OCEMS) will be installed at stack of the proposed incinerators and which will be connected to CPCB / SPCB server.                                                                                               |
| 1.1 (37) | 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 & Handling) Rules 1998. | Details of monitoring plan is presented in Table 6.2, Section 6.2, on Page no. 6.3, of Chapter 6.<br>Details                                                                                                                                                  |
| 1.1 (38) | Stack and fugitive emissions may be monitored for SPM, HCL & NO2 as per Bio Medial Waste (Management & Handling) Rules 2016.                                                                                                                                                                                    |                                                                                                                                                                                                                                                               |
| 1.1 (39) | Specific programme to monitor safety and health protection of workers.                                                                                                                                                                                                                                          | Details regarding Occupational Health & Safety Program is provided in Section 7.5 on page no. 7.61 of the Draft EIA Report.                                                                                                                                   |
| 1.1 (40) | Details of administrative and technical organizational structure.                                                                                                                                                                                                                                               | The Details regarding the Environment Management Cell (EMC) and Technical Organizational Structure is provided in Section 10.3 on page 10.3 of the Draft EIA Report.                                                                                          |
| 1.1 (41) | Details of the 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.                                                                                     | Disaster Management Plan is presented in Section 7.4, on Page no. 7.52 of Chapter 7.                                                                                                                                                                          |

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | ToR Compliance                           | Date | 08/06/2026 |

| <b>Sr. No.</b> | <b>ToRs</b>                                                                                                                                                                                     | <b>Compliances</b>                                                                                                                                                                                                                                                             |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1 (42)       | The EIA/EMP shall be prepared in accordance with the 'Revised Guidelines for Common Bio- Medical Waste Treatment and Disposal Facilities' issued by the Central Pollution Control Board (CPCB). | The facility proposed will be installed as per CPCB guidelines only.<br><br>Compliance report of Bio-Medical Waste Management Rules, 2016 ", notified by the MoEF&CC on 28th March, 2016.is attached here as <b>Annexure 7.</b>                                                |
| 1.1 (43)       | PP shall strive to generate a minimum of 25% of energy consumption by way of solar energy.                                                                                                      | Unit is hereby undertake that, 'Unit will utilize at least 25 % of solar energy of the total power requirement.'                                                                                                                                                               |
| 1.1 (44)       | Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project will be given.                                                  | Not Applicable as the Project is new.                                                                                                                                                                                                                                          |
| 1.1 (45)       | 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 total cost of the proposed project is Rs. 7.0 Crore. It is estimated to allocate Rs. 210.3 Lakhs as Capital cost and Rs. 273.2 Lakhs/Year as recurring cost for EMP.<br><br>Details for the same is presented in Table 10.9, Section 10.8 on Page no. 10.22 of Chapter 10. |
| 1.1 (46)       | One season Site-specific micro-meteorological data using temperature, relative humidity, hourly wind speed and direction and rainfall should be incorporated.                                   | The Details regarding the same is provided in Section 3.3.2 on page no. 3.18 of the Draft EIA Report.                                                                                                                                                                          |
| <b>2.</b>      | <b>Seiaa Specific Conditions</b>                                                                                                                                                                |                                                                                                                                                                                                                                                                                |
| 1              | The PP shall furnish the quantity details of target Bio-Medical waste to be collected in the proposed treatment facility along with the EIA report.                                             | Details regarding the same is provided in Section 2.3 on page no. 2.1 of the Draft EIA Report.                                                                                                                                                                                 |
| 2              | The PP shall furnish the details of waste water disposal method proposed for the treatment facility along with the EIA report.                                                                  | The details regarding Wastewater treatment and its disposal method is provided in Section 2.9.2 on page 2.49 of the Draft EIA Report.                                                                                                                                          |
| 3              | The PP shall furnish the details of ZLD treatment method along with the EIA report, if there is any.                                                                                            |                                                                                                                                                                                                                                                                                |

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| Sr. No. | ToRs                                                                                                                                                                                                            | Compliances                                                                                                                                                                                                                                                                                                         |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.      | <b>SEIAA Standard Conditions</b>                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                     |
| 1       | Impacts on Energy requirement                                                                                                                                                                                   | Details regarding the same is provided in Chapter 4 of the Draft EIA Report.                                                                                                                                                                                                                                        |
| 2       | Impacts on living System (air, water, soil & micro-organisms).                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                     |
| 3       | Impacts on terrestrial & aquatic within and surrounding areas.                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                     |
| 4       | 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 furnish the detailed EMP mentioning all the CER activities as committed with the action plan. | <p>The facility proposes to spend <b>₹14,00,000/-</b> (2 % of the Total Project cost Rs. 7.0 Crores) for social development programs under Corporate Environment Responsibility (CER) activities.</p> <p>Details are presented in Table 8.1, Section 8.2.1 on Page no. 8.2 of Chapter 8.</p>                        |
| 5       | The proponent shall provide details on the adequate parking facility provided including vehicles of all the workers & visitors and a clean traffic plan.                                                        | <p>Details regarding adequate parking facility is provided in Plant Layout and Area Breakup details provided in Section 2.8.1 of the Draft EIA Report.</p> <p>The details Traffic Survey with vehicular modelling for existing and additional vehicular study is provided in Chapter 4 of the Draft EIA Report.</p> |
| 6       | The project proponent shall furnish the action taken to improve water usage efficiency in the building.                                                                                                         | The details regarding the Treatment, Recycling and reuse of the Waste water to decrease the fresh water requirement is provided in Section 2.9.2 on page 2.49 of the Draft EIA Report.                                                                                                                              |
| 7       | The project proponent shall conduct detailed study of biodiversity flora & fauna including invasives /endemic vulnerable species.                                                                               | The detailed study of biodiversity flora & fauna including invasives /endemic vulnerable species is provided in Chapter 3 of the Draft EIA Report.                                                                                                                                                                  |
| 8       | The project proponent shall furnish NOC obtained from competent authority that there is no encroachment of water bodies (including canals).                                                                     | The water requirement will be sourced through Local Panchayat Water Supply; no ground water extraction will be carried out. The necessary permission for water supply will be obtained after getting Environmental Clearance.                                                                                       |

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| <b>Sr. No.</b> | <b>ToRs</b>                                                                                                                                                                             | <b>Compliances</b>                                                                                                                                        |
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| 9              | The project proponent shall conduct detailed soil investigation including microflora/fauna.                                                                                             | The detailed Soil investigation with results are provided in Section 3.3.5 on page no. 3.49 of the Draft EIA Report.                                      |
| 10             | The project proponent shall study impact on livelihoods of locals.                                                                                                                      | The details regarding impacts on local peoples and its mitigation measures proposed is provided in Chapter 4 of the Draft EIA Report.                     |
| 11             | The project proponent shall furnish List of trees available in the project area.                                                                                                        | The details regarding List of trees available in the project area are provided in Section 3.5 on page 3.67 of the Draft EIA Report.                       |
| 12             | The project proponent shall study impact of activities on water bodies/wetlands.                                                                                                        | The Facility will be operated on ZLD system so there will be no waste water disposal outside the plant premises.                                          |
| 13             | The proponent shall furnish details on the measures taken to make the Buildings energy efficient confirming to green building norms.                                                    | Proponent will take necessary steps to make Building energy efficient.                                                                                    |
| 14             | The disaster management and disaster mitigation plan shall be furnished and should be seriously adhered to avoid of calamities.                                                         | Disaster Management Plan is presented in Section 7.4, on Page no. 7.52 of Chapter 7.                                                                      |
| 15             | The project proponent shall conduct studies on the presence of invasive and alien species around the project the area and shall furnish mitigate measures to prevent their spread.      | The details regarding the same is provided in Section 3.5 on page 3.64 of the Draft EIA Report.                                                           |
| 16             | The proponent shall furnish details on the actions taken to reduce anthropogenic GHGs such as CO <sub>2</sub> , CH <sub>4</sub> , nitrous oxide, etc., resulting from human activities. | The details regarding the Carbon footprint, Carbon Sequestration and Water Footprint is provided in Section 4.9 on page no. 4.56 of the Draft EIA Report. |
| 17             | The proponent shall furnish details on the strategies adopted to decarbonize the building.                                                                                              |                                                                                                                                                           |
| 18             | The proponent shall furnish measures taken to mitigate the impact on critically endangered species, biodiversity, etc., due to the modification of the habitat.                         | The details regarding the same is provided in Chapter 4 of the Draft EIA Report.                                                                          |

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| <b>Sr. No.</b> | <b>ToRs</b>                                                                                                                                                                                          | <b>Compliances</b>                                                                                                                                                                                                     |
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| 19             | The proponent shall develop emergency response plan in addition to the disaster management plan.                                                                                                     | Disaster Management Plan is presented in Section 7.4, on Page no. 7.52 of Chapter 7.                                                                                                                                   |
| 20             | The proponent shall furnish details on building-friendly pest control strategies developed using non chemical measures so as to control the pest population thereby not losing beneficial organisms. | Noted                                                                                                                                                                                                                  |
| 21             | The proponent shall furnish details on strategies developed to ensure the buildings in blocks don't trap heat and become local urban heat islands.                                                   | Entire facility will be developed in such a way that it will be ensured that the buildings in blocks don't trap heat and become local urban heat islands                                                               |
| 22             | The proponent shall develop detailed evacuation plan for disabled people and safety evacuation plan during emergencies.                                                                              | Details regarding Occupational Health & Safety Program is provided in Section 7.5 on page no. 7.61 of the Draft EIA Report.                                                                                            |
| 23             | The proponent shall explain the methodology adopted to control thermal Environment and other shocks in the building.                                                                                 | It will be ensured that the entire facility is equipped with an adequate ventilation system to control the thermal environment. Furthermore, shockproof electrical fittings will be installed throughout the premises. |
| 24             | The proponent shall provide details on the provisions for controlled ventilation and lighting systems.                                                                                               |                                                                                                                                                                                                                        |

#### **Standard Terms of References**

| <b>Sr. No.</b> | <b>ToRs</b>                             | <b>Compliances</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | <b>Project Details</b>                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1.1            | Importance and benefits of the project. | M/s. Navabuddha Agencies Private Limited proposes to set up a new Common Bio Medical Waste Treatment Facility (CBMWTF) Consisting of Incineration System having Capacity (1 No. x 250 kg/hr. Static + 1 No. x 300 kg/hr. Rotary), Autoclave having Capacity (2 Nos. x 1000 lit./batch) and Shredder having Capacity (1 No. x 250 kg/hr. + 1 No. x 100 kg/hr.) at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110, India. |

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| Sr. No. | ToRs                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Compliances                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>Due to population growth, development in infrastructure, medical facilities and government medical colleges, quantum of BMW generation is expected to increase in upcoming years. As per Bio-Medical Waste Management Rule, it is required to collect and dispose of this waste in a scientific manner with proper guidelines. Non treatment and unscientific disposal of these wastes will lead to unhygienic condition and result into unwanted diseases.</p> <p>Moreover, this facility will generate direct and indirect employment during construction and operation phase in surrounding villages.</p> <p>The facility proposes to spend <b>₹14,00,000/-</b> (2 % of the Total Project cost Rs. 7.0 Crores) for social development programs under Corporate Environment Responsibility (CER) activities.</p> <p>Details are presented in Table 8.1, Section 8.2.1 on Page no. 8.2 of Chapter 8.</p> |
| 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. | In past an agricultural land was converted into Non-Agricultural (NA) land. Later on, this land is handed over to Mr. Pradipta kumar Rath Group CEO of <b>M/s. Navabuddha Agencies Private Limited</b> on dated 21/09/2023. Documents related to the same are provided in <b>Annexure 2</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 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.                                                                                                                                                                                                                                                                                                                | <p>The total cost of the proposed project is Rs. 7.0 Crore. It is estimated to allocate Rs. 210.3 Lakhs as Capital cost and Rs. 273.2 Lakhs/Year as recurring cost for EMP.</p> <p>Details for the same is presented in Table 10.9, Section 10.8 on Page no. 10.22 of Chapter 10.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |



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| Sr. No. | ToRs                                                                                                                                                  | Compliances                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| 1.4     | Details of various waste management units with capacities for the proposed project. Details of utilities indicating size and capacity to be provided. | <p>Incineration System having Capacity (1 No. x 250 kg/hr. Static + 1 No. x 300 kg/hr. Rotary), Autoclave having Capacity (2 Nos. x 1000 lit./batch) and Shredder having Capacity (1 No. x 250 kg/hr. + 1 No. x 100 kg/hr.)</p> <p>Details of utilities indicating size and capacity are provided in Section 2.5 on page 2.10 of Chapter 2.</p>                                                                                                                                                                                                                            |
| 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.        | <p>Unit will handle bio medical waste (Yellow, Red, White, Blue Category waste)</p> <p>Details of waste to be handled and their characteristic are provided in Table 2.9, in Section 2.7.1.2 on Page no. 2.14. in Chapter 2.</p> <p>Unit has proposed to provide separate collection and segregation area, red waste room, yellow waste room and other waste room.</p> <p>Detailed plant area breakup indicated dedicated area for storage of wastes, is provided in Table 2.11 on Page no 2.19 in Chapter 2.</p> <p>Plant layout of is attached as <b>Annexure 1</b>.</p> |
| 1.6     | Other chemicals and materials required with quantities and storage capacities.                                                                        | Unit will use Poly Aluminium Chloride (PAC), HCl, Caustic Lye, Polyelectrolyte (PE), Urea/DAP and Sodium Hypo Chlorite for treatment of waste water.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1.7     | Detailed design of pre-treatment and waste stabilization facility of Biomedical waste.                                                                | <p>The waste shall be segregated as per rules described in Bio- Medical waste (Management &amp; Handling) Rules,2016.</p> <p>The BMW collected in coloured containers will be transported to the facility in a fully covered dedicated vehicle for transportation of BMW only. After that, bio medical waste will treat in incineration, autoclave and shredder based on its characteristics and then it will be disposed based on Hazardous and Other Waste (Management and</p>                                                                                           |

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| Sr. No. | ToRs                                                                                                                                                                                                            | Compliances                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|         |                                                                                                                                                                                                                 | <p>Transboundary Movement) Rules, 2016. It will be ensured that the total time taken from generation of BMW to its treatment, including collection, transportation and treatment will not exceed 48 hours.</p> <p>Collection, transportation and Storage details are presented in Section 2.7.1.2 on Page no. 2.12 of Chapter 2 and details for Categorization, Storage and Disposal of Solid Waste is presented in Table 2.26, in Section 2.9.3 on Page no. 2.56 of Chapter 2.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 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. | <p>The facility proposed will be installed as per CPCB guidelines only.</p> <p>Compliance report of Bio-Medical Waste Management Rules, 2016 ", notified by the MoEF&amp;CC on 28th March, 2016 is attached here as <b>Annexure 7</b>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1.9     | Process description along with major equipment and machineries, process flow sheet (quantitative) from Bio-Medical waste material to disposal to be provided.                                                   | <p>The waste shall be segregated as per rules described in Bio- Medical waste (Management &amp; Handling) Rules, 2016.</p> <p>The BMW collected in coloured containers will be transported to the facility in a fully covered dedicated vehicle for transportation of BMW only. After that, bio medical waste will treat in incineration, autoclave and shredder based on its characteristics and then it will be disposed based on Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016. It will be ensured that the total time taken from generation of BMW to its treatment, including collection, transportation and treatment will not exceed 48 hours.</p> <p>Collection, transportation and Storage details are presented in Section 2.7.1.2 on Page no. 2.12 of Chapter 2 and details for Categorization, Storage and Disposal of Solid Waste is presented in Table 2.26, in Section 2.9.3 on Page no. 2.56 of Chapter 2.</p> <p>Incineration System having Capacity (1 No. x 250 kg/hr. Static + 1 No. x 300 kg/hr.</p> |

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| Sr. No.  | ToRs                                                                                                    | Compliances                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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|          |                                                                                                         | <p>Rotary), Autoclave having Capacity (2 Nos. x 1000 lit./batch) and Shredder having Capacity (1 No. x 250 kg/hr. + 1 No. x 100 kg/hr.)</p> <p>Details of utilities indicating size and capacity are provided in Section 2.7.2 on page 2.14 of Chapter 2.</p> <p>Details of process description of ETP is presented in Section 2.9.2.1 on Page no. 2.52.</p>                                                                                                                                |
| 1.10     | Details of man-power requirement (regular and contract).                                                | <p>Unit will generate direct employment during construction and operation phase. Proposed Project will provide direct employment to 50 people.</p> <p>Details are presented in Section 8.2.2, on Page no. 8.3 of Chapter 8.</p>                                                                                                                                                                                                                                                             |
| 1.11     | A detailed layout of the project site indicating all the project Components.                            | <p>Plant layout is presented in Figure 2.5 and area break up of site is presented in Table 2.18, Section 2.8.1 on Page no. 2.42 in Chapter 2.</p> <p>Plant layout is attached as <b>Annexure 1</b>.</p>                                                                                                                                                                                                                                                                                     |
| <b>2</b> | <b>Road and Traffic</b>                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2.1      | Submit the details of the road/rail connectivity along with the likely impacts and mitigative measures. | <p>Geographical co-ordinates of the project site are:<br/>Latitude: 10°47'50.95"N<br/>Longitude: 78°27'36.29"E</p> <p>Nearest habitat is Village: Kallai village Around 1.09 km (E)</p> <p>Nearest connecting Highway is SH 71 Around 7.0 km (W)</p> <p>Nearest Railway station is Pettaivayatalai Railway station Around 11.75 km (NNE)</p> <p>Nearest Airport is Tiruchirappalli International Airport Around 27 (E)</p> <p>Mitigation Measures are given in Chapter 4 in EIA Report.</p> |

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| Sr. No.  | ToRs                                                                                                                                                            | Compliances                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| 2.2      | Examine the details of transportation of Bio-Medical wastes, and its safety in handling.                                                                        | <p>The waste shall be segregated as per rules described in Bio- Medical waste (Management &amp; Handling) Rules,2016.</p> <p>The BMW collected in coloured containers will be transported to the facility in a fully covered dedicated vehicle for transportation of BMW only. After that, bio medical waste will treat in incineration, autoclave and shredder based on its characteristics and then it will be disposed based on Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016.It will be ensured that the total time taken from generation of BMW to its treatment, including collection, transportation and treatment will not exceed 48 hours.</p> <p>Collection, transportation and Storage details are presented in Section 2.7.1.2 on Page on. 2.12 of Chapter 2 and details for Categorization, Storage and Disposal of Solid Waste is presented in Table 2.26, in Section 2.9.3 on Page no. 2.56 of Chapter 2.</p> |
| <b>3</b> | <b>Land Environment</b>                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3.1      | Detailed soil analysis of the site including its permeability, water holding capacity be included.                                                              | <p>Soil sampling was carried out at 8 different locations within study area to check chemical and physical characterisation.</p> <p>Baseline Monitoring period was during 1<sup>st</sup> July 2025 to 17<sup>th</sup> September 2025. Baseline monitoring data for soil is provided in Section 3.3.5.1, on Page no. 3.47 of Chapter 3.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3.2      | Submit the present land use and permission required for any conversion such as forest, agriculture etc.                                                         | In past an agricultural land was converted into Non-Agricultural (NA) land. Later on, this land is handed over to Mr. Pradipta kumar Rath Group CEO of M/s. Navabuddha Agencies Private Limited on dated 21/09/2023. Documents related to the same are provided in <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 | The total land area for Proposed project site is 10817 m <sup>2</sup> . About 3580.4 m <sup>2</sup> (33.1%) will be allocated for green belt development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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| Sr. No.  | ToRs                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Compliances                                                                                                                                                                                                                                                                    |
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|          | CPCB guidelines for the specified activity.                                                                                                                                                                                                                                                                                                                                                                                                                      | Plant layout is presented in Figure 2.5 and area break up of site is presented in Table 2.18, Section 2.8.1 on Page no. 2.42 of Chapter 2.<br><br>Plant layout is attached as <b>Annexure 1</b> .                                                                              |
| 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.                                                                                                                                                                                                                                                                            | Land is allotted to <b>M/s. Navabuddha Agencies Private Limited, Land Document for the same</b> has been attached as <b>Annexure 2</b> .                                                                                                                                       |
| 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. | The facility proposed will be installed as per CPCB guidelines only.<br><br>Compliance report of Bio-Medical Waste Management Rules, 2016 ", notified by the MoEF&CC on 28th March, 2016.is attached here as <b>Annexure 1</b> .                                               |
| 3.6      | Post project reclamation management program with financial allocation.                                                                                                                                                                                                                                                                                                                                                                                           | The total cost of the proposed project is Rs. 7.0 Crore. It is estimated to allocate Rs. 210.3 Lakhs as Capital cost and Rs. 273.2 Lakhs/Year as recurring cost for EMP.<br><br>Details for the same is presented in Table 10.9, Section 10.8 on Page no. 10.22 of Chapter 10. |
| <b>4</b> | <b>Environmental Monitoring and Management</b>                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                |
| 4.1      | Examine and submit the details of on-line pollutant monitoring.                                                                                                                                                                                                                                                                                                                                                                                                  | Online Continuous Emission Monitoring System (OCEMS) will be installed at stack of the proposed incinerators and which will be connected to CPCB / SPCB server.<br><br>Details of monitoring plan is presented in Table 6.2, Section 6.2, on Page no. 6.3, of Chapter 6.       |
| 4.2      | Project proponent must ensure Good Combustion Practice (GCP) to reduce the possibilities of formation of 'Total dioxins and furans. In addition, GCP                                                                                                                                                                                                                                                                                                             | Incineration furnace will be operated as per CPCB guideline for bio medical waste incineration. Primary Combustion Chamber will be pirated at 800 +/- 50 deg C and                                                                                                             |

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|         | 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'. | <p>Secondary Combustion Chamber will be operated at 1050+/-50 deg C to ensure complete destruction of organic and toxic compounds to basic elements. Secondary combustion chamber shall be provided with minimum 2 second flue gas retention time to achieve minimum 99% destruction efficiency. Reformation of Dioxin and Furan is prevented by immediate quenching of flue gas to less than 200 deg C in high pressure drop venturi scrubber. This will eliminate temperature zone of 500 deg C to 200 deg C where there are chances of reformation.</p> <p>Details are presented in Section 4.6.2, on Page no. 4.31, in Chapter 4.</p> <p>Dioxin &amp; Furan will be monitored Once in a year by NABL/MoEFCC approved Laboratory.</p> <p>Details of monitoring plan is presented in Table 6.2, Section 6.2 on Page no. 6.3, of Chapter 6.</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                                                                                                             | <p>The total cost of the proposed project is Rs. 7.0 Crore. It is estimated to allocate Rs. 210.3 Lakhs as Capital cost and Rs. 273.2 Lakhs/Year as recurring cost for EMP.</p> <p>Details for the same is presented in Table 10.9, Section 10.8 on Page no. 10.22 of Chapter 10.</p> <p>Post Project environmental monitoring plan for Ambient Air, Stack Emission, Workplace Monitoring, Ground Water, Wastewater, Noise, Soil, Hazardous Waste, Greenbelt and Employee Medical is mentioned in Table 6.2, Section 6.2 on Page no. 6.3 of Chapter 6.</p> <p>Odour control measures are provide in section 4.6.2, on page no. 4.32, chapter 4.</p> <p>Environmental Cost Benefit Analysis is provided in Chapter 9.</p>                                                                                                                         |

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | ToR Compliance                           | Date | 08/06/2026 |

| <b>Sr. No.</b> | <b>ToRs</b>                                                                                                                                                                 | <b>Compliances</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.4            | Water quality around the landfill site shall be monitored regularly to examine the impact on the ground water.                                                              | Not Applicable as landfill is not proposed for project.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 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. | Final EIA Report is prepared in accordance to TOR points and submitted.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 4.6            | Air Quality Index shall be calculated for base level air quality.                                                                                                           | <p>There were 8 locations selected for monitoring of ambient air 10 km radius of project site and air quality index for same location is presented in Table 3.17, Section 3.3.3 on Page No. 3.43 of Chapter 3</p> <p>The Overall AQI is Satisfactory at the locations selected for Ambient Air Quality monitoring.</p>                                                                                                                                                                             |
| 4.7            | Baseline data on Ground water quality is required.                                                                                                                          | <p>There were 8 locations selected for monitoring of ground water within 10 km radius of project site.</p> <p>Baseline Monitoring period was during 1<sup>st</sup> July 2025 to 17<sup>th</sup> September 2025 by NABL approved and MoEFCC recognized laboratory, M/s. PolluCare Engineering India Private Limited (Environmental Testing Laboratory) is provided as <b>Annexure 4</b>.</p> <p>Baseline data on Ground water quality is presented in Section 3.3.1, Page No. 3.3 of Chapter 3.</p> |
| 4.8            | Possible carbon footprint contribution from each activities and mitigation measures proposed shall be included as part of Environment Management Plan.                      | Details of Carbon footprint and Carbon Sequestration is presented in Section 4.9, on Page no. 4.56 in Chapter 4.                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>5</b>       | <b>Waste Management</b>                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 5.1            | Examine and submit details of the proposed odour control measures.                                                                                                          | The proposed facility will receive and store the waste in an enclosed area with a negative pressure with the airflow being routed through the incinerator which prevents unpleasant odours from escaping into the atmosphere.                                                                                                                                                                                                                                                                      |

|                                                  |                                          |      |            |
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| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | ToR Compliance                           | Date | 08/06/2026 |

| Sr. No.  | ToRs                                                                                                                                                                                                                       | Compliances                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          |                                                                                                                                                                                                                            | <p>The general site smell and offensive odours which could lead to complaints from the local community, site users and site staff should be reduced by adopting good practice includes, i.e., adequate compaction; speedy disposal of medical wastes; effective medical waste management and consideration of prevailing wind direction when planning treatment plants, and gas flares, and direction of tipping.</p> <p>More details of proposed odour and control measures are presented in Chapter 4.</p> |
| 5.2      | The storage and handling of Bio-Medical wastes shall be as per the Bio-Medical Waste Management Rules, 2016.                                                                                                               | List of solid waste and Hazardous Waste generated from facility, their storage and disposal plan is provided in Table 2.26, on Page no. 2.56 of Chapter 2.                                                                                                                                                                                                                                                                                                                                                   |
| 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. | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 5.4      | Details of hazardous/solid waste generation and their management.                                                                                                                                                          | List of solid waste and Hazardous Waste generated from facility, their storage and disposal plan is provided in Table 2.26, on Page no. 2.56 of Chapter 2.                                                                                                                                                                                                                                                                                                                                                   |
| <b>6</b> | <b>Water Environment</b>                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 6.1      | Detailed hydro-geological studies and possible impact if any accidental contamination occurs shall be included.                                                                                                            | <p>Unit has proposed ZLD based ETP treatment, so there will be no liquid discharge outside the plant premises.</p> <p>In case of accidental contamination of water, unit will store the effluent in buffer storage until achievement of desired efficiency.</p> <p>Mitigation measure are provided in Section 4.10 on page no.4.67, chapter 4.</p>                                                                                                                                                           |
| 6.2      | Examine and submit details of monitoring of water quality around the landfill site.                                                                                                                                        | Not Applicable as landfill is not proposed for project.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



|                                                  |                                          |      |            |
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| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | ToR Compliance                           | Date | 08/06/2026 |

| Sr. No.  | ToRs                                                                                                                                                                                                                                                                                                                                                           | Compliances                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          |                                                                                                                                                                                                                                                                                                                                                                | <p>There were 8 locations selected for monitoring of ground water and 8 locations selected for surface water monitoring within 10 km radius of the project site.</p> <p>Baseline Monitoring period was during 1<sup>st</sup> July 2025 to 17<sup>th</sup> September 2025.</p> <p>Ground and surface water quality status of the study area is presented in Section 3.3.1, Page No. 3.2 of Chapter 3.</p>                                                                                                                |
| 6.3      | Examine and submit details of impact on water body and mitigative measures during rainy season.                                                                                                                                                                                                                                                                | <p>Fresh water will be sourced through Local Panchayat Water Supply network, so there will be no ground water extraction.</p> <p>Rain water harvesting facility will be provided to collect, store, treat and reuse of treated water within premises.</p> <p>Details regarding mitigative measures for water body in rainy season are given in Chapter 4 of EIA Report.</p>                                                                                                                                             |
| 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. | The details regarding the same is provided in the Hydrology section in Chapter 3 Section 3.6.4 on page No. 3.95 of the EIA report.                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>7</b> | <b>Water Management</b>                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 7.1      | Details of effluent treatment and recycling process.                                                                                                                                                                                                                                                                                                           | <p>Unit has proposed 1 no. of ETP having 40 KLD capacity for treatment of waste water. Unit will recycle and reused 37.7 KLD treated water from ETP within plant premises.</p> <p>Details of process description of ETP is presented in Figure 2.9, Section 2.9.2.1 on Page no. 2.52 and list of effluent treatment plant unit is presented in Table 2.25, on Page no. 2.54 of Chapter 2.</p> <p>Water balance diagram is presented in Figure 2.6 on Page no. 2.50 and Water consumption and waste water generation</p> |

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| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | ToR Compliance                           | Date | 08/06/2026 |

| <b>Sr. No.</b> | <b>ToRs</b>                                                                                                                                                                                                                                                                                                                                                                                              | <b>Compliances</b>                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |                                                                                                                                                                                                                                                                                                                                                                                                          | details are presented in Table 2.3 on Page no. 2.49 of Chapter 2.                                                                                                                                                                                                                                                                                                                                                           |
| 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. This should be specified separately for ground water and surface water sources, ensuring that there is no impact on other users. | Fresh water will be sourced through Local Panchayat Water Supply network, so there will be no ground water extraction. Necessary permission will be obtained from the competent authority.                                                                                                                                                                                                                                  |
| <b>8</b>       | <b>Energy Management</b>                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 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 for project will be 500 KVA and it will be sourced from Tamil Nadu Electricity Board (TNEB). DG Set having capacity 2 Nos. x 250 KVA will be installed as backup power supply and used only during emergency power backup.                                                                                                                                                                            |
| <b>9</b>       | <b>Disaster Management Plan</b>                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 9.1            | Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural and man-made disaster.                                                                                                                                                                                                                                                                          | Disaster Management Plan is presented in Section 7.4, on Page no. 7.52 of Chapter 7.                                                                                                                                                                                                                                                                                                                                        |
| 9.2            | Hazard identification and proposed mitigation measures.                                                                                                                                                                                                                                                                                                                                                  | Hazard identification and proposed mitigation measures are presented in Section 7.2, on Page no. 7.4 in Chapter 7.                                                                                                                                                                                                                                                                                                          |
| <b>10</b>      | <b>Green Belt</b>                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 10.1           | A detailed Plan for green belt development.                                                                                                                                                                                                                                                                                                                                                              | <p>The total land area for proposed project is 47967.91 m<sup>2</sup>. About 15923.67 m<sup>2</sup> (33.4%) will be allocated for green belt development.</p> <p>Unit will plant around 3981 nos. of trees for development of green belt area and additional 796 nos. considering 80% survival rate.</p> <p>Detail regarding Green belt development plan is provided in Section 10.6.1 on Page no. 10.13 of Chapter 10.</p> |
| <b>11</b>      | <b>Socioeconomic Environment</b>                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 11.1           | Public hearing to be conducted for the project in accordance with provisions of Environmental Impact Assessment Notification, 2006 and the issues raised                                                                                                                                                                                                                                                 | Presently the Draft EIA Report is being submitted. However, unit will provide the details asked in the Final Rapid EIA Report.                                                                                                                                                                                                                                                                                              |

|                                                  |                                          |      |            |
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| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | ToR Compliance                           | Date | 08/06/2026 |

| Sr. No.   | ToRs                                                                                                                                                                                                                                                                                                          | Compliances                                                                                                 |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
|           | 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.                                                                       |                                                                                                             |
| 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>12</b> | <b>Court Cases</b>                                                                                                                                                                                                                                                                                            |                                                                                                             |
| 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.                                                                                                                                                              | There are no litigation pending against the project as proposed project is new project.                     |
| <b>13</b> | <b>Miscellaneous</b>                                                                                                                                                                                                                                                                                          |                                                                                                             |
| 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.<br><a href="http://moef.nic.in/Manual/Incinerator">http://moef.nic.in/Manual/Incinerator</a> | Details regarding anticipated impacts due to the project and mitigation measure are presented in Chapter 4. |

# Executive Summary

For

**Proposed New Project of Common Bio Medical Waste Treatment Facility (CBMWTF) Consisting of Incineration System having Capacity (1 No. x 250 kg/hr. Static + 1 No. x 300 kg/hr. Rotary), Autoclave having Capacity (2 Nos. x 1000 lit./batch) and Shredder having Capacity (1 No. x 250 kg/hr. + 1 No. x 100 kg/hr.)**

At

**S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110, India.**



|                                                                                     |                                                                                                                                                                             |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant:</b>                                                                   |                                                                                                                                                                             |
|  | <b>M/s. Navabuddha Agencies Private Limited</b><br><b>Address:</b> S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110, India. |
| <b>Project:</b>                                                                     |                                                                                                                                                                             |
| <b>Total Plot Area:</b>                                                             | <b>47,696.91 m<sup>2</sup></b>                                                                                                                                              |
| <b>Project or Activity:</b>                                                         | As per EIA Notification 2006: 7(da) Common Bio-Medical Waste Treatment Facilities                                                                                           |
| <b>Sector number:</b>                                                               | As per NABET Scheme: 32(A)                                                                                                                                                  |
| <b>Category:</b>                                                                    | "B1"                                                                                                                                                                        |
| <b>TORs:</b>                                                                        | File No: 12188 dated 14/07/2025                                                                                                                                             |
| <b>Baseline Monitoring:</b>                                                         |                                                                                                                                                                             |
| <b>Name of Laboratory</b>                                                           | PolluCare Engineering India Private Limited (Environmental Testing Laboratory)                                                                                              |
| <b>NABL Accreditation.:</b>                                                         | Certificate No : TC-7446 (valid till 21/06/2026)                                                                                                                            |
| <b>Baseline Monitoring:</b>                                                         | 1 <sup>st</sup> July, 2025 to 17 <sup>th</sup> September, 2025                                                                                                              |

## **INTRODUCTION**

M/s. Navabuddha Agencies Private Limited is proposing to establish a Common Bio-Medical Waste Treatment Facility (CBMWTF) for the safe collection, transportation, treatment and disposal of bio-medical waste in accordance with applicable environmental regulations. The project will be located at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. The company will establish advanced medical waste treatment facilities to ensure safe disposal and regulatory compliance. It will provide integrated waste management services tailored for industries, institutions and municipalities. Navabuddha Agencies Private Limited will operate state-of-the-art recycling facilities that will promote circular economy practices and resource recovery. With innovative technologies, the company will minimize ecological impact and maximize sustainability outcomes. All operations will comply with CPCB and MoEFCC guidelines for safe waste handling and treatment. Customized solutions will be designed for hospitals, industries, municipalities, and corporate clients. Sustainability, safety, and compliance will remain the guiding principles of its approach. A skilled team will ensure reliable, efficient, and eco-friendly waste and recycling management services. Navabuddha Agencies Private Limited will be driven by the mission to create a cleaner, greener, and healthier future. The company is promoted by Mr. Pradipta Kumar Rath.

The proposed facility will be equipped with Incineration System having Capacity (1 No. x 250 kg/hr. Static + 1 No. x 300 kg/hr. Rotary), Autoclave having Capacity (2 Nos. x 1000 lit./batch) and Shredder having Capacity (1 No. x 250 kg/hr. + 1 No. x 100 kg/hr.) at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. The facility will be installed and operated as per Bio-Medical Waste Management Rules, 2016 by MoEFCC.

The proposed new project falls under category “B” as per EIA notification, 2006 and subsequent amendments. The proposed project activities fall under 7(da) Common Bio-Medical Waste Treatment Facilities.

Total Power requirement for project will be 500 KVA sourced from Tamil Nadu Electricity Board (TNEB). 2 no. of 250 KVA capacity D.G. set will be installed as back up supply and used only during emergency power backup. HSD/LDO (~55 Liters/Hr each) will be used in D.G. set.

Proposed Project will generate direct and indirect employment during construction and operation phase. It is estimated to generate nearly 50 employments on temporary basis during construction phase and 50 employments on permanent basis during operation phase.

The estimated cost for the proposed project will be Rs. 7.0 Crores.

## **AIR ENVIRONMENT**

Ambient air quality has been monitored for the proposed project during the study period starting from 1<sup>st</sup> July 2025 to 17<sup>th</sup> September 2025 at 8 locations within study area of 10 km.

Design of network for AAQ monitoring locations were decided on meteorology & available infrastructure facilities.

The baseline AAQ of the study area was monitored for the air quality data with respect to the PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, O<sub>3</sub> and NH<sub>3</sub>. The results of the same are provided below.

| Pollutant         | Concentration (98 Percentile) at AAQ Monitoring Stations |       |       |       |       |       |       |       | NAAQS Standards       |
|-------------------|----------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-----------------------|
|                   | AA1                                                      | AA2   | AA3   | AA4   | AA5   | AA6   | AA7   | AA8   |                       |
| PM <sub>10</sub>  | 66.73                                                    | 63.53 | 60.93 | 62.35 | 71.93 | 70.51 | 72.88 | 60.22 | 100 µg/m <sup>3</sup> |
| PM <sub>2.5</sub> | 33.72                                                    | 33.95 | 42.36 | 37.38 | 30.29 | 35.85 | 45.43 | 41.89 | 60 µg/m <sup>3</sup>  |
| SO <sub>2</sub>   | 13.49                                                    | 14.44 | 17.39 | 12.43 | 15.14 | 16.21 | 19.53 | 15.26 | 80 µg/m <sup>3</sup>  |
| NO <sub>x</sub>   | 22.84                                                    | 33.60 | 28.99 | 22.01 | 24.73 | 26.85 | 32.54 | 20.00 | 80 µg/m <sup>3</sup>  |
| O <sub>3</sub>    | 17.63                                                    | 16.21 | 13.61 | 17.15 | 16.45 | 14.43 | 17.98 | 19.88 | 180 µg/m <sup>3</sup> |
| NH <sub>3</sub>   | 6.21                                                     | 6.84  | 7.48  | 9.56  | 6.21  | 8.38  | 7.00  | 5.39  | 400 µg/m <sup>3</sup> |

The average PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, O<sub>3</sub> and NH<sub>3</sub> concentrations at each location were observed below the stipulated standards of NAAQS [24 hr.].

## NOISE ENVIRONMENT

The noise levels have been measured at total of 8 Locations within study area and they were found within permissible limit as per CPCB.

## WATER ENVIRONMENT

Surface water sampling has been carried out at eight locations and for ground water sampling, samples from eight locations were collected during the baseline monitoring period. The surface water quality results across all eight monitoring locations (SW1–SW8) indicate generally good water quality in the study area. The pH values ranged from 6.49 to 8.07, indicating neutral to slightly alkaline conditions suitable for aquatic life. Electrical conductivity (153–690 µS/cm), TDS (96.3–446 mg/L), alkalinity (15.8–135 mg/L), and total hardness (48–180 mg/L) were found to be within acceptable ranges, reflecting low to moderate mineral content in the water bodies. Dissolved oxygen concentrations ranged from 3.8 to 5.8 mg/L, indicating moderate to good oxygen availability for sustaining aquatic ecosystems. BOD (2.19–20.70 mg/L) and COD (8.22–82.20 mg/L) values suggest the presence of some organic load at a few locations, likely due to domestic runoff, agricultural activities, and natural decomposition of organic matter. Concentrations of major ions such as calcium, magnesium, chlorides, sulphates, and nitrates were within normal limits. Heavy metals and toxic contaminants including copper, zinc, cadmium, lead, mercury, nickel, arsenic, chromium, cyanide, phenolic compounds, and pesticides were below detectable limits at all monitoring locations, indicating the absence of significant industrial contamination. The presence of fecal and total coliforms at low to moderate levels suggests localized microbial contamination from anthropogenic and natural sources. Overall, the surface water quality in the study area is satisfactory and does not indicate any significant pollution concerns.

## Water Requirement and Wastewater Generation and its Treatment Scheme

For the proposed project, total water requirement will be 132.4 KLD (74.4 KLD industrial + 2.25 KLD domestic + 55.8 KLD gardening) and wastewater generation will be 37.7 KLD (35.7 KLD industrial + 2 KLD domestic). Out of 132.4 KLD total water requirement, 94.7 KLD water will be fresh water and the rest 37.7 KLD water will be recycled water. Industrial effluent (i.e. 35.7 KLD) will be treated into in-house ETP consisting of Primary, Secondary and Tertiary treatment units and recycled back into plant premises for different activities. Domestic sewage (i.e. 2.0 KLD) will be treated into packaged STP plant and recycled back into gardening/flushing activity within premises. So, the entire plant will be designed based on Zero Liquid Discharge (ZLD) technology and no effluent will be discharged outside plant premises or any of the surface bodies.

Required fresh water will be sourced through Local Panchayat Water Supply network. No ground water will be extracted for any of the project activities.

## **LAND/SOIL ENVIRONMENT**

The concentrations of micronutrients and trace metals such as manganese, copper, boron, and zinc were found to be within normal ranges, supporting soil productivity. Heavy metals including cadmium, lead, chromium, arsenic, nickel, and selenium were detected only at very low concentrations and were well within commonly reported background levels for soils, indicating the absence of significant contamination from industrial or anthropogenic sources.

Overall, the soil quality in the study area is satisfactory, with good physicochemical characteristics and no evidence of heavy metal contamination. The baseline soil conditions are suitable for supporting vegetation growth and do not indicate any significant environmental concerns.

## **ECOLOGY AND BIODIVERSITY**

The activities associated with the Proposed Project of new Common Bio Medical Waste Treatment Facility (CBMWTF) will have very less impacts on terrestrial flora and fauna of study area. There are no migratory corridors, nesting and breeding sites within the core zone. There are no REET species present within the proposed site. No wildlife population is present in the study area except the common type of birds. No significant long-term residual impacts on fauna due to project.

## **SOCIO – ECONOMIC ENVIRONMENT**

The study area, covering a 10 km radius around the proposed project site, comprises predominantly rural settlements located in the Kulithalai Taluka of Karur District and adjoining areas of Tiruchirappalli District. The villages identified within the study area include Kallai, Kanur, Gudalur, Thalinji, Alathur, Kalladai, Inungur, Sivayam (North & South), Neidalur (North & South), Pappakappatti, Hiranyamangalam, Puthur, and several surrounding habitations. The social structure of the area reflects the typical rural characteristics of Tamil Nadu, with agriculture being the primary occupation. The study area population is characterized by a predominantly rural social structure with moderate growth trends. Average household size in the region ranges between 4 and 5 persons per family.

The population within the study area mainly consists of Hindu communities, along with smaller populations of Muslims and Christians living in social harmony. Scheduled Castes (SCs) are present in most villages, whereas the Scheduled Tribe (ST) population is comparatively negligible. Both joint and nuclear family systems exist in the area; however, nuclear families are gradually increasing due to socio-economic changes and migration for employment and education.

Proposed project activity will generate direct and indirect employment to skilled, semi-skilled and unskilled workers from nearby area. From the proposed project 50 people will get the employment on direct basis.

Moreover, unit has proposed to allocate Rs. 14 Lakh, which is 2% of the total capital cost i.e., Rs. 7Crores to develop social as well as environmental; structure around the project site within 5 years.

## **ENVIRONMENTAL MANAGEMENT PLAN**

An Environmental Management Plan has been prepared for mitigation of the adverse impacts. The Environmental Management Plan describes in brief, the management plan for and for maintaining the environment. It also includes management cell, development of greenbelt, proper safety of workers, cleaner production, fire safety etc.

## **ENVIRONMENT MONITORING PLAN**

The adverse environmental impacts identified during the Environmental Impact Assessment process of the proposed project may increase during the construction as well as operation phase. Monitoring of environmental factors and constrains will enable us to identify the changes in the environmental impacts at various locations and their mitigative measures. To ensure the effective implementation of the EMP, monitoring of ambient air quality, stack emissions, analysis and monitoring of water environment and noise level will be carried out as required / specified by statutory authority.

## **GREENBELT DEVELOPMENT**

For the proposed project activities, total allocated land area will be 47967.91 m<sup>2</sup>. Out of which, 15923.67 m<sup>2</sup> area (33.4%) will be allocated for greenbelt development. There are 3981 trees to be grown in the greenbelt area. The planned greenbelt aims to achieve 80% canopy coverage using wide-canopy trees such as Mango, Sapota, Gulmohar, Palm, Ashoka, and Pongamia. Some areas will also include ornamental hedges and shrubs.

As per guidelines, 3981 trees need to be planted in the first year and shall be maintained till their survival. To optimize space and improve pollution mitigation (dust and noise reduction), it is recommended to plant tall, slender canopy species like *Polyalthia longifolia* and *Leucaena leucocephala*. Additionally, medium and small trees, including species with aromatic properties, will be planted to enhance biodiversity and aesthetic value. Native species will be prioritized, adhering to CPCB (Central Pollution Control Board) guidelines for greenbelt development. The layout will consider plant spacing, survival rate, and overall aesthetics. Species and quantity will be finalized based on budget and available space.

## **CONCLUSION**

- Construction phase will not impart appreciable impact, as indicated mitigation measures will be followed.
- Negligible impacts will occur on air quality during operation phase. However, all the necessary air pollution control measures will be provided.
- No adverse impact on soil and land use will occur.
- No adverse impacts will occur on water environment and Hydro-Geology.
- No Biological damage will occur due to proposed project.
- Economic status of the local population will be improved.
- Environmental Management Plan has been formulated to control all the pollution control measures and Environmental Management Cell will be set-up to follow the formulated environmental plan.
- Onsite/Offsite emergency plan will be prepared to prevent the occurrence of any disaster.



|                                                  |                                          |      |            |
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# CHAPTER 1: INTRODUCTION

## 1.1 PURPOSE OF THE REPORT

'Environmental Impact Assessment (EIA)' is the process of evaluating likely environmental impacts, both positive and negative, of proposed new project by taking into consideration of natural, social and economic aspects. It also comprises of suggesting mitigation measures, for the possible negative impacts, before implementation of the project. Its purpose is to inform decision makers and the public about environmental consequences of implementing a proposed new project.

Ministry of Environment, Forest and Climate Change (MoEFCC) notified an amendment to the EIA Notification, 2006 vide S.O.1142(E) dated 17/04/2015 to include Bio-Medical waste treatment facility as Item 7(da) - Category B in the Schedule as a project/activity requiring prior environmental clearance.

In accordance with the provisions of the Environmental Impact Assessment (EIA) Notification, 2006 and its subsequent amendments, a public hearing is mandatory for projects located outside notified industrial estates. Accordingly, Draft Environmental Impact Assessment (EIA) report must be submitted to the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing as part of the Environmental Clearance process.

M/s. Navabuddha Agencies Pvt. Ltd. is proposing a new Common Bio-Medical Waste Treatment Facility (CBMWTF) at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. Since the project activity attracts EIA notification, 2006 and its further amendments; it is required to carry out EIA studies to identify the environmental aspects, impacts due to project activities and to provide mitigation measures with detailed Environment Management Plan (EMP). With the purpose to identify positive and negative impacts due to proposed project activities and to provide necessary measures, Environmental Impact Assessment (EIA) has been prepared in line with Terms of References (ToR) issued by State Environment Impact Assessment Authority (SEIAA), Tamil Nadu vide File No. 12188 dated 14/07/2025 and in accordance to Generic Structure given in Appendix III and IIIA of the EIA Notification dated 14/09/2006 for obtaining Environmental Clearance.

### 1.1.1 Objectives of the EIA Report

The overall objective of EIA study is to identify and evaluate the positive as well as adverse impacts during initial/planning stages of the project itself, to prepare an effective environment management plan to provide necessary mitigation measures and to minimize the overall negative impacts on environment. In view of this, the specific objectives of this EIA are –

- **Baseline Data Collection and Interpretation:** To gather and analyze baseline environmental data on air environment, water environment, soil environment, noise environment, socio-economic environment and biodiversity to establish the existing environmental conditions within study area of 10 km radius from the project site. For the proposed new project, baseline monitoring of water, soil, air and noise samples have been collected and analysis has been carried out by in-house laboratory of M/s. Pollucare India Pvt. Ltd. (Environmental Testing Laboratory) for period of **1<sup>st</sup> July 2025 to 17<sup>th</sup> September**

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**2025.** However, collection of primary data for Ecology and Biodiversity, Socio-Economic, Hydrology & Geology, Land-use etc. has been carried out in May, 2026. Further details regarding baseline data are provided in chapter 3 of this report.

- **Impact Prediction and Evaluation:** To predict and assess the potential positive and negative impacts of the proposed expansion project on the environment, including direct, indirect, cumulative and long-term effects.
- **Mitigation and Management:** To develop strategies and action plans to mitigate or eliminate adverse environmental impacts and enhance positive outcomes during the project's construction and operational phases. Further details regarding anticipated impacts and respective mitigation measures are provided in chapter 4 of this report.
- **Risk Analysis:** To identify, analyze and evaluate potential environmental risks, such as chemical spills, waste management issues or accidental releases and suggest management strategies to reduce these risks.
- **Legal and Regulatory Compliance:** To ensure the proposed new project aligns with national and local environmental laws, regulations and policies, including obtaining necessary clearances and approvals.
- **Environmental Monitoring Framework:** To establish a framework for monitoring and auditing environmental parameters during the project's life cycle to ensure compliance with environmental standards and the effectiveness of mitigation measures.

## 1.2 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

### 1.2.1 Identification of Project

According to Bio-Medical Waste Management Rules, 2016, Bio-Medical Waste (BMW) means "any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps".

Improper management of waste generated in health care facilities causes a direct health impact on the community, the health care workers and on the environment. Indiscriminate disposal of Bio-Medical waste and exposure to such waste possess serious threat to environment and to human health and thus, Bio-Medical waste requires specific treatment and management prior to its final disposal. All such generators of Bio-Medical waste are required to treat and dispose Bio-Medical waste as per Bio-Medical Waste Management Rules 2016.

M/s. Navabuddha Agencies Pvt. Ltd. is proposing a new Common Bio-Medical Waste Treatment Facility (CBMWTF) at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110 within a total plot area of 47,696.91 m<sup>2</sup>.

### 1.2.2 Identification of Project Proponent

M/s. Navabuddha Agencies Pvt. Ltd. is a Partnership firm by Mr. Pradipta Kumar Rath and Mr. G. Govindaraj Vardhanan. M/s. Nava Buddha Agencies Pvt. Ltd. is proposing new a Common Bio-medical

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Waste Treatment Facility which located at S at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110.

This proposal outlines to implement advanced waste management technologies, including Incineration having capacity of 1 No. x 250 kg/hr. (Stationary) and 1 No. x 300 kg/hr. (Rotary Kiln), Autoclaving having capacity of 1 No. x 1000 liter/batch and Shredder having capacity of 1 No. x 250 kg/hr. and 1 No. x 100 kg/hr. By leveraging the success of these facilities, this initiative aims to contribute to the environmental sustainability of Karur district.

This Proposed Common Bio-Medical Waste Treatment Facility (CBMWTF) will cater the Bio Medical waste from Healthcare facilities of Karur district and nearby districts of Tamil Nadu for treatment of all categories of Biomedical Waste.

### **1.3 BRIEF DESCRIPTION OF NATURE, SIZE, LOCATION OF THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY & REGION**

#### **1.3.1 Details of the Project**

M/s. Navabuddha Agencies Pvt. Ltd. is proposing new CBMWTF at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. The facility will contain following components as given below:

**TABLE 1.1 – COMPONENTS FOR THE PROPOSED NEW PROJECT**

| <b>Sr. No.</b> | <b>Equipment</b>          | <b>Individual Capacity</b> | <b>Quantity (Nos.)</b> | <b>Total Treatment Capacity per Day</b> |
|----------------|---------------------------|----------------------------|------------------------|-----------------------------------------|
| 1              | Incinerator (Stationary)  | 250 kg/h                   | 1                      | 13.2                                    |
| 2              | Incinerator (Rotary Kiln) | 300 kg/h                   | 1                      |                                         |
| 3              | Autoclave                 | 1000 L/batch               | 2                      | 32                                      |
| 4              | Shredder                  | 250 kg/h                   | 1                      | 8.4                                     |
| 5              | Shredder                  | 100 kg/h                   | 1                      |                                         |
| 6              | Effluent Treatment Plant  | 40 KLD                     | 1                      | 40 KLD                                  |
| 7              | Sewage Treatment Plant    | 5 KLD                      | 1                      | 5 KLD                                   |

Total land area proposed for facility is 47,696.91 m<sup>2</sup> out of which greenbelt will be developed in area of 15923.61 m<sup>2</sup> (which is 33.4 % of total area). Incineration area will be located in 1110 m<sup>2</sup> area, Autoclave and Shredder area will be located in 1380 m<sup>2</sup>. 536 m<sup>2</sup> area and 465 m<sup>2</sup> area will be provided for Water treatment along with ETP and Haz. Waste Storage respectively. There will be separate areas for storage of red category waste, yellow category waste, other category waste and treated waste.

For the proposed project, total water requirement will be 132.4 KLD (74.4 KLD industrial + 2.25 KLD domestic + 55.8 KLD gardening) and wastewater generation will be 37.7 KLD (35.7 KLD industrial + 2 KLD domestic). Out of 132.4 KLD total water requirement, 94.7 KLD water will be fresh water and the rest 37.7 KLD water will be recycled water. Industrial effluent (i.e. 35.7 KLD) will be treated into in-house ETP consisting of Primary, Secondary and Tertiary treatment units and recycled back into plant premises for different activities. Domestic sewage (i.e. 2.0 KLD) will be treated into packaged STP plant and recycled back into gardening/flushing activity within premises. So, the entire plant will

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be designed based on Zero Liquid Discharge (ZLD) technology and no effluent will be discharged outside plant premises or any of the surface bodies.

Required fresh water will be sourced through Local Panchayat Water Supply network. No ground water will be extracted for any of the project activities.

The power requirement for project will be 500 KVA and it will be sourced from Tamil Nadu Electricity Board (TNEB). DG set having capacity of 250 KVA x 2 nos. will be installed as backup power supply and will be used only during emergency power backup. With comparison to coal low Sulphur fuel like Light Diesel Oil (LDO)/High Strength Diesel (HSD) (~110 L/h) will be used in DG set and (~ 55 L/h) for Incinerator.

During plant operation, facility will generate hazardous wastes such as Ash (from Incineration operation), ETP sludge, Plastic waste (after autoclave & shredding), Glass and metallic body implants (after autoclave), Metal sharps (after autoclave & shredding) and waste oil. Ash and ETP sludge will be sent to approved nearest TSDF site for landfilling. Plastic Waste (after Autoclave & shredding) and Glass and metallic body implants (after Autoclave) will be sent to authorized recycler. Metal Sharps (after Autoclave & Shredding) will be either sent to foundry for metal recovery or Treatment, Storage, and Disposal Facility (TSDF) site. All the Hazardous Wastes will be managed as per Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2016.

Proposed project will generate direct as well as indirect employment, during construction and operation phase it will need skilled, semi-skilled and unskilled workers which will be sourced from the local area on maximum basis, based on merit. It is estimated that about 50 people will get employment opportunities during the operation phase of the plant. The total estimated cost of the project is Rs. 7 Crores.

### **1.3.2 Location of the Project**

New Common Bio-Medical Waste Treatment facility (CBMWTF) is proposed at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. The proposed site is situated at Latitude: 10°47'50.95"N, Longitude: 78°27'36.29"E. There are no ecologically sensitive areas like national parks, wildlife sanctuaries within 10 km radius of the site.

As the project site is outside the notified industrial area, Public Hearing is required to be carried out as per subsection (i) of section III i.e., Public consultation under clause 7(i) of Paragraph 7 in EIA Notification dated 14<sup>th</sup> September 2006 and subsequent amendments.

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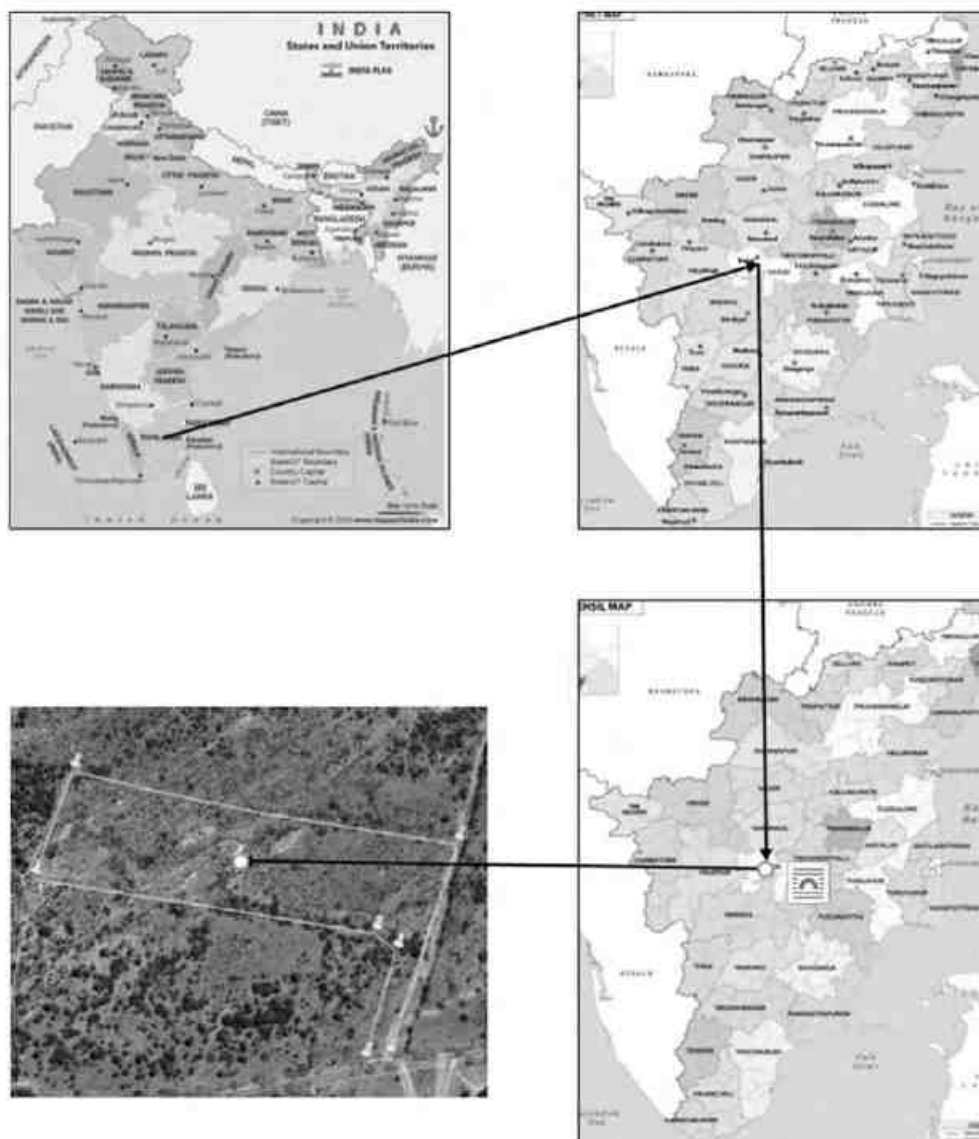


**FIGURE 1.1 – LOCATION OF PROJECT**

### 1.3.3 Importance of Project to the Country and the Region

Exposure to infectious Bio-Medical Waste can result in disease or injury to human health and other living organism. It may contain infectious agents, toxic or hazardous chemicals or pharmaceutical wastes and waste sharps. The infectious wastes may contain any of the great variety of pathogenic microorganisms. Pathogens in infectious wastes may enter the human body through a number of routes like a puncture or cut in the skin, mucous membranes, by inhalation or ingestion. Sharps may not only cause cuts and punctures but also infect the wounds if they are contaminated with pathogens. Because of this dual risk – of injury and disease transmission – sharps are considered as a very hazardous waste.

|                                                  |                                          |      |            |
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## 1.4 SCOPE OF THE STUDY

### 1.4.1 Regulatory Framework

As a part of Environmental Clearance process, M/s. Navabuddha Agencies Pvt. Ltd. has applied and submitted relevant documents, namely Form-I (as per the EIA Notification, 2006 and its subsequent amendments. Based on the documents submitted, ToR is issued by State Environment Impact Assessment Authority (SEIAA), Tamil Nadu vide File No. 12188 dated 14/07/2025.

As the project site is outside the notified industrial area, Public Hearing is required to be carried out as per subsection (i) of section III i.e., Public consultation under clause 7(i) of Paragraph 7 in EIA Notification dated 14<sup>th</sup> September 2006 and subsequent amendments. Accordingly, Draft Environmental Impact Assessment (EIA) report must be submitted to the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing as part of the Environmental Clearance process. Following Rules/Laws will be applicable to the proposed project:

**TABLE 1.2 – APPLICABLE RULES/LAWS**

| Sr. No.                                              | Act/Rules                                                                                                                                  |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Air Environment</b>                               |                                                                                                                                            |
| 1                                                    | The Air (Prevention and Control of Pollution) (Amendment) Rules, 1982                                                                      |
| 2                                                    | The Noise Pollution (Regulation and Control) Rules, 2000 and its amendments                                                                |
| 3                                                    | Ozone Depleting Substances (Regulation and Control) Rules, 2000 and its amendments                                                         |
| <b>Water Environment</b>                             |                                                                                                                                            |
| 4                                                    | The Water (Prevention and Control of Pollution) Rules, 1975 and its amendments                                                             |
| <b>Solid and Hazardous Waste Management</b>          |                                                                                                                                            |
| 5                                                    | Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and amendments                                              |
| 6                                                    | Plastic Waste Management Rules, 2016 and amendments                                                                                        |
| 7                                                    | Solid Waste Management Rules, 2016 and amendments                                                                                          |
| 8                                                    | Construction and Demolition Waste Management Rules, 2016 and amendments                                                                    |
| 9                                                    | E-waste (Management) Rules, 2016 and amendments                                                                                            |
| 10                                                   | Battery Waste Management Rules, 2022                                                                                                       |
| 11                                                   | Bio-Medical Waste Management Rules, 2016                                                                                                   |
| 12                                                   | Fly Ash Notification, 2009 and amendments                                                                                                  |
| <b>Hazardous Chemicals &amp; Occupational Safety</b> |                                                                                                                                            |
| 13                                                   | The Tamil Nadu Factories Rules, 1963 and amendments                                                                                        |
| 14                                                   | Public Liability Insurance Rules, 1991 and amendments                                                                                      |
| 15                                                   | The Petroleum Rules, 2002 and amendment                                                                                                    |
| 16                                                   | The Explosives Rules, 2008                                                                                                                 |
| <b>Other</b>                                         |                                                                                                                                            |
| 17                                                   | EIA Notification 2006 and its amendments                                                                                                   |
| 18                                                   | Guidelines for development and management of Greenbelt issued by MoEFCC vide OM F. No. IA3-22/14/2025-IA.III (E- 275538) dated 29/10/2025. |
| 19                                                   | The Central Motor Vehicle Rules, 1989 and amendments                                                                                       |
| 20                                                   | Guidelines for CER issued by MoEFCC vide OM F.No.22-65/2017-IA.III dated 01/05/2018.                                                       |

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### 1.4.2 Structure of The EIA Report

Entire report has been prepared, in line with the generic structure of the EIA report as per the Appendix III of the EIA Notification, 2006.

- Chapter-1** : Gives brief outline of the project and project proponent, description of the project, project location and regulatory framework. It also includes the scope of the study as per the awarded Terms of Reference.
- Chapter-2** : Provides need for the project, details regarding the project location, layout, process description, required resources and infrastructure and the pollution potential.
- Chapter-3** : Describes the existing baseline status of the study area of 10 km radial periphery from proposed expansion project site.
- Chapter-4** : Deals with the identification, prediction, evaluation of impacts and mitigation of the significant adverse impacts. Chapter 4 has been developed based on Chapter 2 and Chapter 3 by correlating the activities under the proposed expansion project and their impacts on the receiving environmental attributes.
- Chapter-5** : Analysis of alternatives.
- Chapter-6** : Delineates the proposed post-project Environmental Monitoring Plan and the budgetary provisions for EHS components.
- Chapter-7** : Discusses the additional studies viz. Risk assessment study required for the project, details of Public Consultation and details of Resettlement and Rehabilitation (R&R).
- Chapter-8** : Highlights benefits of the project.
- Chapter-9** : Environmental Cost Benefits
- Chapter-10** : Delineates the Environment Management Plan highlighting the mitigation measures and roles and responsibilities of the management.
- Chapter-11** : Attempts to summarize the entire report and conclude the outcome of the study.
- Chapter-12** : Disclosure of Consultant engaged.

|                                                  |                                          |      |            |
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## CHAPTER 2: PROJECT DESCRIPTION

### 2.1 INTRODUCTION

M/s. Navabuddha Agencies Private Limited is proposing to establish a Common Bio-Medical Waste Treatment Facility (CBMWTF) for the safe collection, transportation, treatment and disposal of bio-medical waste in accordance with applicable environmental regulations. The project will be located at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. The company will establish advanced medical waste treatment facilities to ensure safe disposal and regulatory compliance. It will provide integrated waste management services tailored for industries, institutions and municipalities. Navabuddha Agencies Private Limited will operate state-of-the-art recycling facilities that will promote circular economy practices and resource recovery. With innovative technologies, the company will minimize ecological impact and maximize sustainability outcomes. All operations will comply with CPCB and MoEFCC guidelines for safe waste handling and treatment. Customized solutions will be designed for hospitals, industries, municipalities, and corporate clients. Sustainability, safety, and compliance will remain the guiding principles of its approach. A skilled team will ensure reliable, efficient, and eco-friendly waste and recycling management services. Navabuddha Agencies Private Limited will be driven by the mission to create a cleaner, greener, and healthier future. The company is promoted by Mr. Pradipta Kumar Rath.

The proposed facility will be equipped with Incineration System having Capacity (1 No. x 250 kg/hr. Static + 1 No. x 300 kg/hr. Rotary), Autoclave having Capacity (2 Nos. x 1000 lit./batch) and Shredder having Capacity (1 No. x 250 kg/hr. + 1 No. x 100 kg/hr.) at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. The facility will be installed and operated as per Bio-Medical Waste Management Rules, 2016 by MoEFCC.

This chapter provides information of need for the project, details regarding the project location, layout, process description, required resources & infrastructure and the pollution potential from the proposed new project.

### 2.2 TYPE OF THE PROJECT

New Common Bio-Medical Waste Treatment facility (CBMWTF) is proposed at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. The proposed project falls under 7(da), category "B1" (as all CBMWTF projects fall under "B1" category) as per Schedule of EIA Notification dated 14/09/2006 vide S.O.1142(E) dated 17/04/2015 and its amendments till date.

### 2.3 NEED OF THE PROJECT

Ministry of Environment, Forests & Climate Change (MoEFCC), Government of India, issued the Bio-Medical Waste Management Rules, 2016 (BMWM Rules, 2016) on March 28, 2016, to effectively manage bio-medical waste across the country. In accordance to the rule, every occupier of a Health Care Establishment (HCE) shall either set up requisite bio-medical waste treatment facilities on site or ensure requisite treatment of the bio-medical waste at an approved Common Biomedical Waste Treatment Facility. No untreated bio-medical waste shall be kept stored beyond a period of 48 hours.



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As per the BMW Annual Report 2023 published by Tamil Nadu Pollution Control Board (TNPCB), there is only one existing facility i.e. M/s. Medicare Enviro System exists within the 75 km radius which covers around 31153 beds from Thanjavur, Trichy, Pudukottai, Sivagangai, Ariyalur, Perambalur, Nagapatinam & Tiruvarur districts. Additionally, two more facilities of M/s. Resustainability Healthcare Solutions Ltd. (Formally known as Ramky Energy & Environment Ltd.) is located outside the radius of 75 km and covers around 52620 beds from Karur, Namakkal, Erode, Salaem, Madurai, Dindigul, Virudhunagar, Theni & Govt. Hospitals of Ramnad districts.

Thus, within 75 km radius of proposed project site, the existing facilities are covering more than 80,000 beds.

As per the Revised Guidelines for Common Bio-Medical Waste Treatment and Disposal Facilities – 2016, 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 in compliance to various provisions notified under the Environment (Protection) Act, 1986, to cater services only to such additional bed strength of the HCFs located.

**TABLE 2.1 – DETAILS OF EXISTING TWO FACILITIES NEAR TO THE PROPOSED NEW CBMWTF PROJECT SITE**

| <b>Sr. No.</b> | <b>Details of the Existing Facility</b>                                                             | <b>Districts covered by the Facility</b>                                                    | <b>Total Number of beds covered</b> |
|----------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------|
| 1              | M/s. Medicare Enviro System                                                                         | Thanjavur, Trichy, Pudukottai, Sivagangai, Nagapatinam, Thiruvarur, Ariyalur and Perambalur | 31153                               |
| 2              | M/s. Resustainability Healthcare Solutions Ltd. (Formally known as Ramky Energy & Environment Ltd.) | Salem, Namakkal, Karur and Erode                                                            | 25810                               |
| 3              | M/s. Resustainability Healthcare Solutions Ltd. (Formally known as Ramky Energy & Environment Ltd.) | Madurai, Dindigul, Virudhunagar, Theni & Govt. Hospitals of Ramnad districts                | 26810                               |
| <b>Total</b>   |                                                                                                     |                                                                                             | <b>83773</b>                        |

**Source:** TNPCB Annual BMW Report, 2023

In view to above, there are sufficient number of beds available in the region. And to comply the condition of BMW Rules, 2016 it is proposed to establish a new Common Bio-Medical Waste Treatment Facility in that region.

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**TABLE 2.2 – GAP ANALYSIS: AVERAGE INCREMENT IN BEDS OF EXISTING FACILITY**

| Sr.No                                               | Existing Facility                               | Year | Beds covered by existing facility as per TNPCB | Increment in beds | Average Increment in beds |
|-----------------------------------------------------|-------------------------------------------------|------|------------------------------------------------|-------------------|---------------------------|
| 1                                                   | M/s. Medicare Enviro System                     | 2019 | 26101                                          | -                 | 7%                        |
|                                                     |                                                 | 2020 | 19044                                          | -27%              |                           |
|                                                     |                                                 | 2021 | 23560                                          | 24%               |                           |
|                                                     |                                                 | 2022 | 29038                                          | 23%               |                           |
|                                                     |                                                 | 2023 | 31153                                          | 7%                |                           |
| 2                                                   | M/s. Resustainability Healthcare Solutions Ltd. | 2019 | 24686                                          | -                 | 4%                        |
|                                                     |                                                 | 2020 | 20839                                          | -16%              |                           |
|                                                     |                                                 | 2021 | 21143                                          | 1%                |                           |
|                                                     |                                                 | 2022 | 30392                                          | 44%               |                           |
|                                                     |                                                 | 2023 | 25810                                          | -15%              |                           |
| 3                                                   | M/s. Resustainability Healthcare Solutions Ltd. | 2019 | 20457                                          | -                 | 19%                       |
|                                                     |                                                 | 2020 | 11650                                          | -43%              |                           |
|                                                     |                                                 | 2021 | 11802                                          | 1%                |                           |
|                                                     |                                                 | 2022 | 24210                                          | 105%              |                           |
|                                                     |                                                 | 2023 | 26810                                          | 11%               |                           |
| Average Incremental Growth in all existing Facility |                                                 |      |                                                |                   | 10%                       |

Source: TNPCB Annual BMW Reports

Considering projection for next 10-12 years and considering development in infrastructure and HCFs, it is expected to increase the number of **Beds by 10 %** each year. In view of 0.277 kg/bed/day as per Revised CBMWTF Guideline, 2025, Waste quantum will also increase by 10 % each year. Waste projection is presented in next slides.

**TABLE 2.3 – PROJECTION OF BIO-MEDICAL WASTE GENERATION DURING NEXT 12 YEARS**

| Year | Prediction at 10 % increment in Beds | Waste quantum considering 0.277 kg/day/bed as per Revised CBMWTF Guideline |
|------|--------------------------------------|----------------------------------------------------------------------------|
| 2023 | 83773                                | 23205                                                                      |
| 2024 | 92150                                | 25526                                                                      |
| 2025 | 101365                               | 28078                                                                      |
| 2026 | 111502                               | 30886                                                                      |
| 2027 | 122652                               | 33975                                                                      |
| 2028 | 134917                               | 37372                                                                      |
| 2029 | 148409                               | 41109                                                                      |
| 2030 | 163250                               | 45220                                                                      |
| 2031 | 179575                               | 49742                                                                      |
| 2032 | 197532                               | 54716                                                                      |
| 2033 | 217286                               | 60188                                                                      |

| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
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| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | Chapter 2: Project Description           | Date | 08/06/2026 |

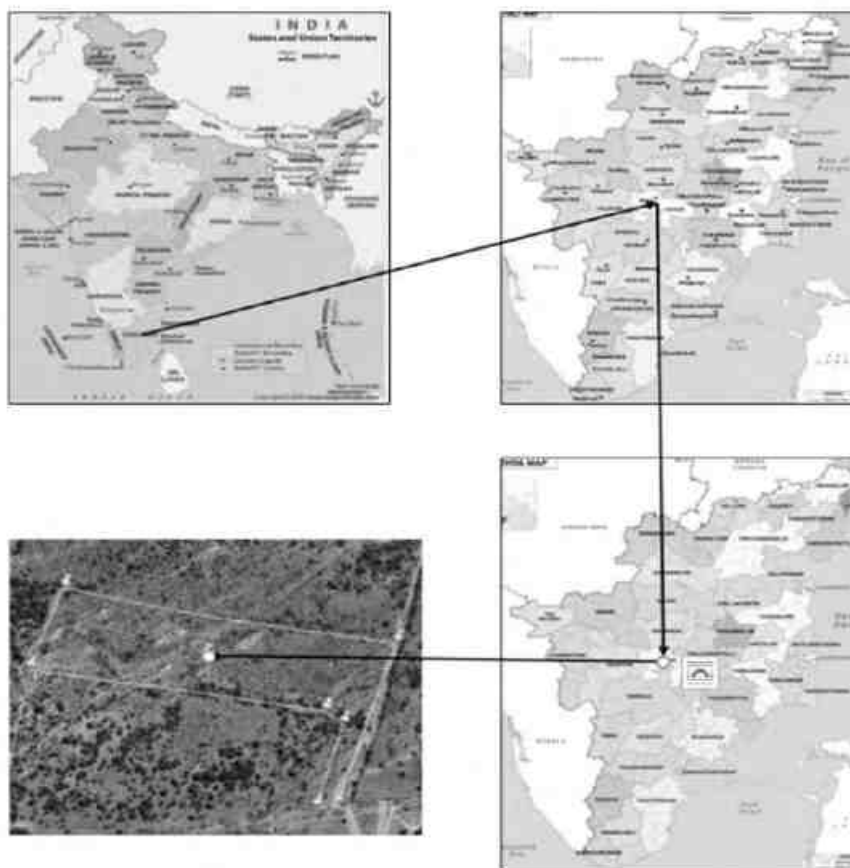
| <b>Year</b> | <b>Prediction at 10 % increment in Beds</b> | <b>Waste quantum considering 0.277 kg/day/bed as per Revised CBMWTF Guideline</b> |
|-------------|---------------------------------------------|-----------------------------------------------------------------------------------|
| 2034        | 239014                                      | 66207                                                                             |
| 2035        | 262916                                      | 72828                                                                             |

A new CBMWTF would strengthen Bio-Medical Waste management infrastructure, ensuring that waste is treated promptly and effectively. This would help mitigate risks to public health and the environment. Karur's central location and proximity to other nearby developing areas with significant healthcare facilities makes it ideal for a proposed CBMWTF.

## 2.4 LOCATION

### 2.4.1 General Location of the Site

New project is proposed at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. Geographical co-ordinates of the project site are Latitude: 10°47'50.95"N Longitude: 78°27'36.29"E. There are no ecologically sensitive areas like national parks, sanctuaries within 10 km radius of the site.

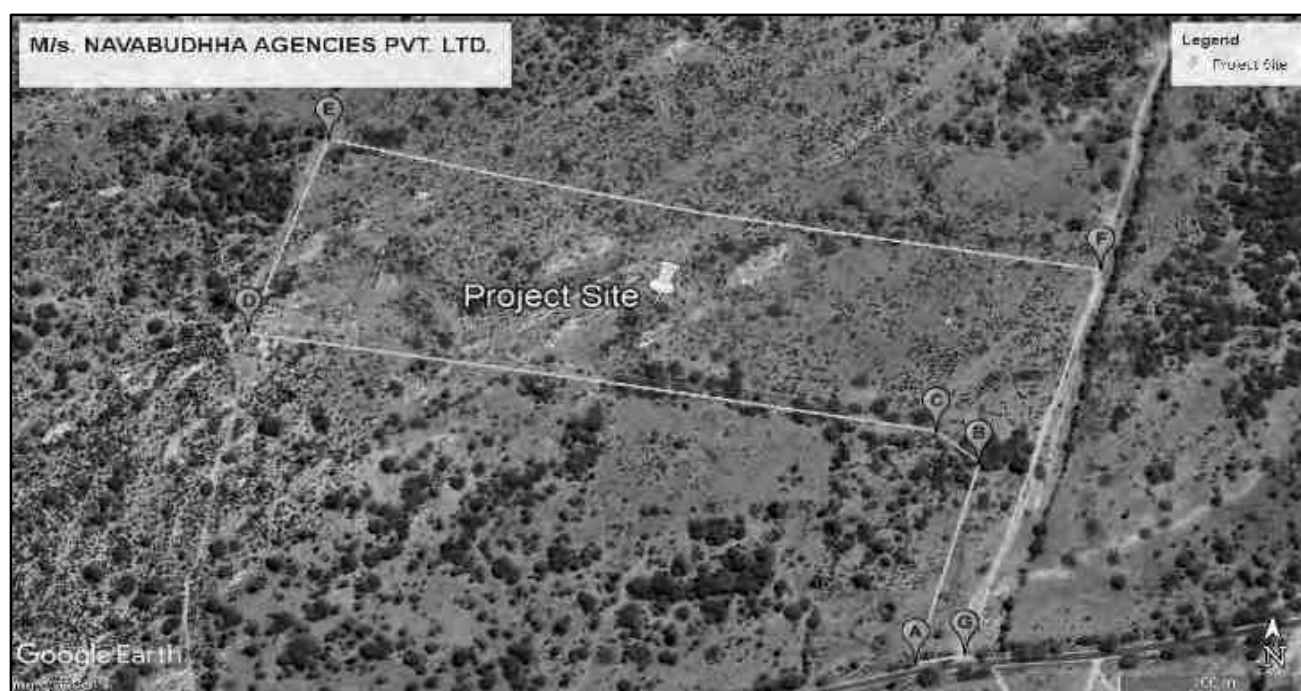


**MAP 2.1 – GENERAL LOCATION MAP OF THE PROJECT SITE**

| ENPRO Enviro Tech and Engineers Pvt. Ltd. |                                          |      |            |
|-------------------------------------------|------------------------------------------|------|------------|
| Client                                    | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                   | Draft EIA Report                         |      |            |
| Report No                                 | EP/EIA/76                                | Rev. | 00         |
| Title                                     | Chapter 2: Project Description           | Date | 08/06/2026 |

#### 2.4.2 Specific Location of the Site with Project Boundary

The site is geographically situated at Latitude: 10°47'50.95"N and Longitude: 78°27'36.29"E. Exact location of the project with boundary coordinates is provided as **MAP 2.2** and Project site boundary coordinates are provided in below **TABLE 2.4**.



**MAP 2.2 – SPECIFIC LOCATION MAP WITH PROJECT BOUNDARY OF PROJECT SITE**

**TABLE 2.4 – BOUNDARY COORDINATES OF THE PROJECT SITE**

| Points | Latitude      | Longitude     |
|--------|---------------|---------------|
| A      | 10°47'44.17"N | 78°27'40.75"E |
| B      | 10°47'47.91"N | 78°27'41.85"E |
| C      | 10°47'48.52"N | 78°27'41.13"E |
| D      | 10°47'50.41"N | 78°27'29.26"E |
| E      | 10°47'54.06"N | 78°27'30.63"E |
| F      | 10°47'51.59"N | 78°27'43.99"E |
| G      | 10°47'44.33"N | 78°27'41.60"E |

#### 2.4.3 Approach to the Site

The proposed new project will be located at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. Salient features of the project site within study area are given in below **TABLE 2.5**.

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | Chapter 2: Project Description           | Date | 08/06/2026 |

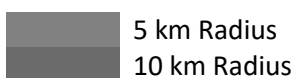
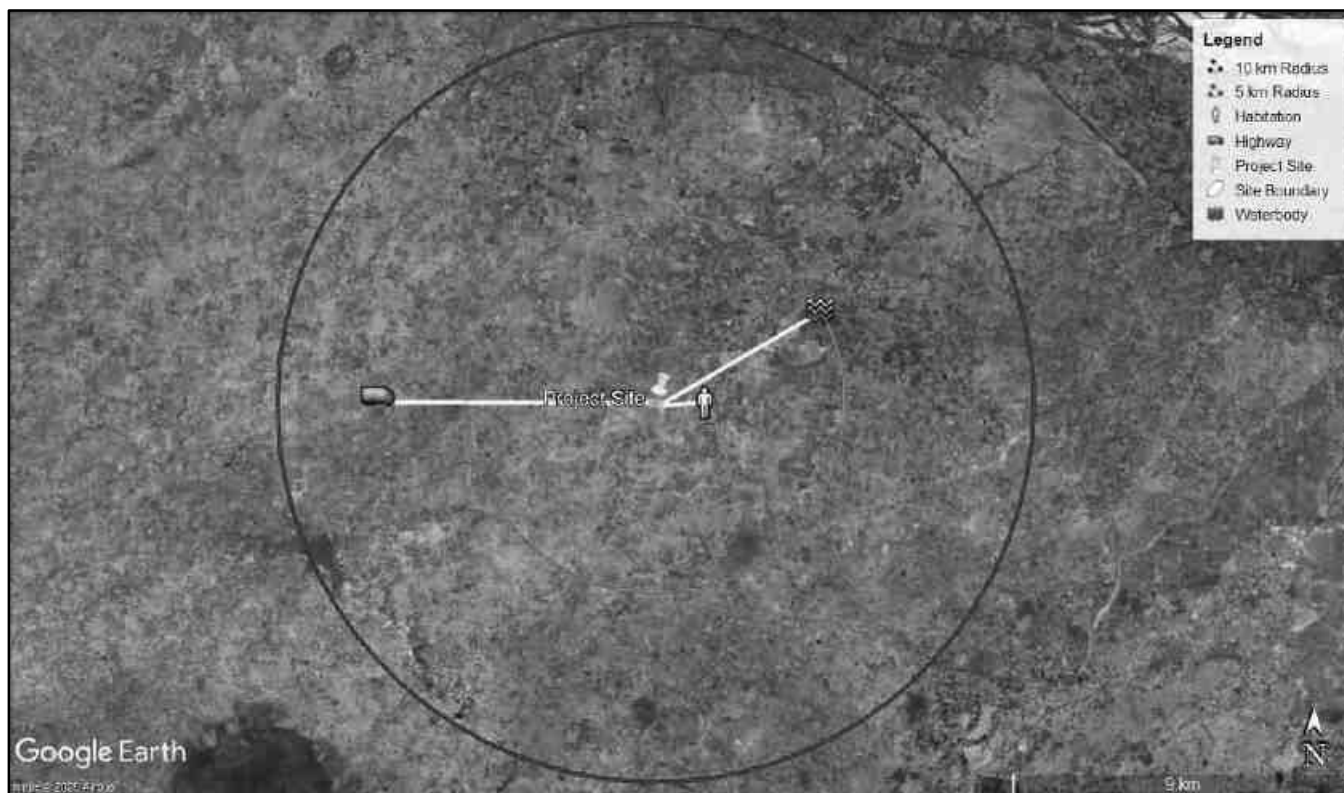
**TABLE 2.5 – SALIENT FEATURES OF THE PROJECT SITE**

| <b>Sr. No.</b>                                            | <b>Feature</b>                   | <b>Details</b>                                      | <b>Approx. Distance from the project site</b> |
|-----------------------------------------------------------|----------------------------------|-----------------------------------------------------|-----------------------------------------------|
| 1.                                                        | Geographical Location            | Latitude: 10°47'50.95"N<br>Longitude: 78°27'36.29"E | --                                            |
| 2.                                                        | Village /City / Industrial Area  | Village: Kallai village                             | Around 1.09 km (E)                            |
|                                                           |                                  | City: Tiruchirappalli                               | Around 22 km (E)                              |
|                                                           |                                  | Industrial Area: --                                 | --                                            |
| 3.                                                        | Nearest Habitant                 | Kallai village                                      | Around 1.09 km (E)                            |
| 4.                                                        | Nearest Water Body               | Mayanur Barrage Right Canal                         | Around 4.78 km (NE)                           |
| 5.                                                        | Nearest Fire Station             | Tiruchirappalli Fire and Rescue Service Station     | Around 24.3 km (E)                            |
| 6.                                                        | Nearest Hospital/HCF             | G.H Hospital at Wawshuna Village                    | Around 4.94 km (NE)                           |
| 8.                                                        | Nearby Forest Area               | Veeramalai Reserved Forest                          | Around 12.50 km (SW)                          |
| 9.                                                        | CRZ applicability                | Not Applicable                                      | --                                            |
| 10.                                                       | Nearest Highway/ Road            | SH 71                                               | Around 7.0 km (W)                             |
| 11.                                                       | Nearest Railway station          | Pettaivayatalai Railway station                     | Around 11.75 km (NNE)                         |
| 12.                                                       | Nearest Airport                  | Tiruchirappalli International Airport               | Around 27 (E)                                 |
| 13.                                                       | Seismic Zone                     | Zone-III                                            | --                                            |
| <b>Applicability of General Condition: Not applicable</b> |                                  |                                                     |                                               |
| 14.                                                       | Nearest Critically Polluted Area | Tiruppur                                            | Around 125 km (WNW)                           |
| 15.                                                       | Nearest Interstate Boundary      | Tamil Nadu - Kerela                                 | Around 144 km (SW)                            |

**Note:** All the above-mentioned distances are aerial distances from the project site.

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
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| Title                                            | Chapter 2: Project Description           | Date | 08/06/2026 |

Maps showing nearest highway, human habitation, Water body etc. are provided below as **MAP 2.3**.



### MAP 2.3 – SALIENT FEATURES OF THE PROJECT SITE

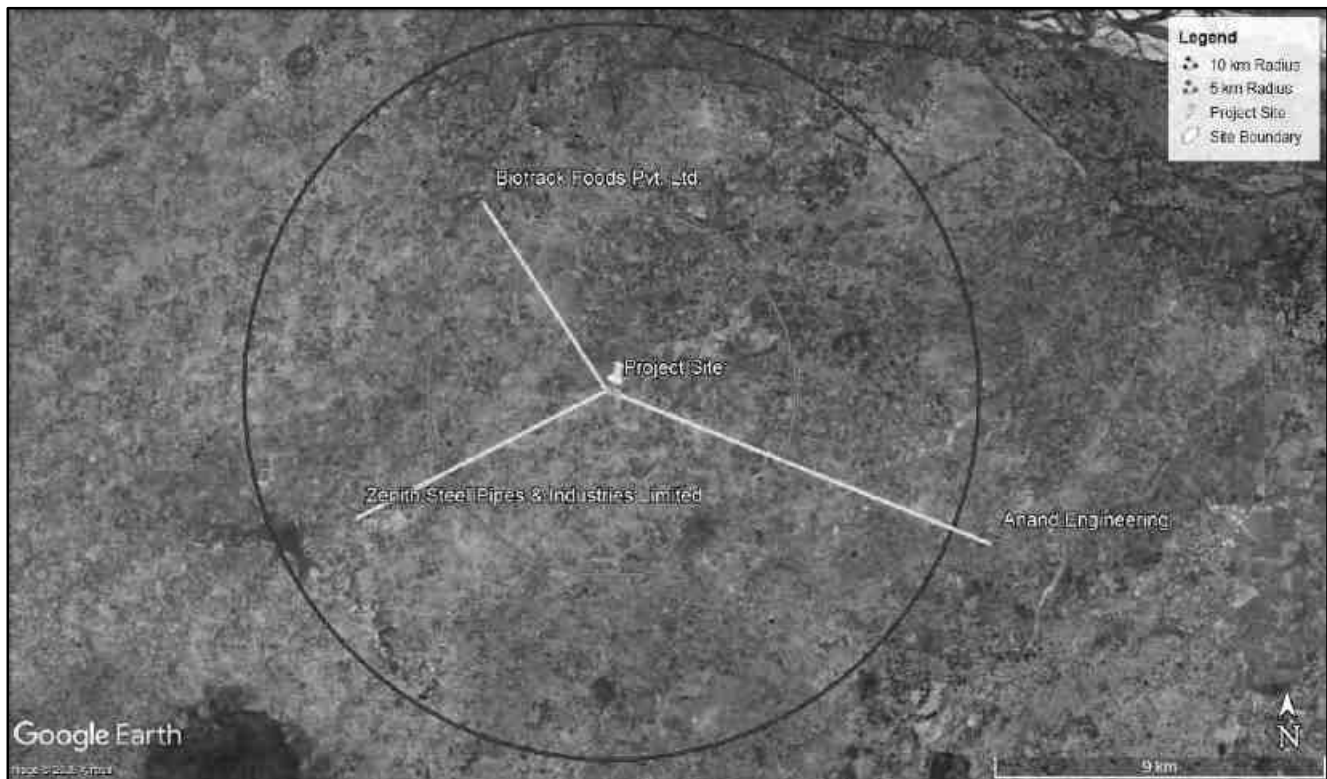
**TABLE 2.6 – MAJOR INDUSTRIES FROM THE PROJECT SITE**

| Sr. No. | Name of Industry                        | Approximately Aerial Distance from Project site (in km) | Direction from Project site |
|---------|-----------------------------------------|---------------------------------------------------------|-----------------------------|
| 1       | Biotrack Foods Pvt. Ltd.                | 6                                                       | NNW                         |
| 2       | Zenith Steel Pipes & Industries Limited | 7.62                                                    | SSW                         |
| 3       | Annand Engineering                      | 10.9                                                    | SSE                         |

**Note:** All the above-mentioned distances are aerial distances from the project site.

Map showing nearby major industries is provided below as **MAP 2.4**.

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | Chapter 2: Project Description           | Date | 08/06/2026 |

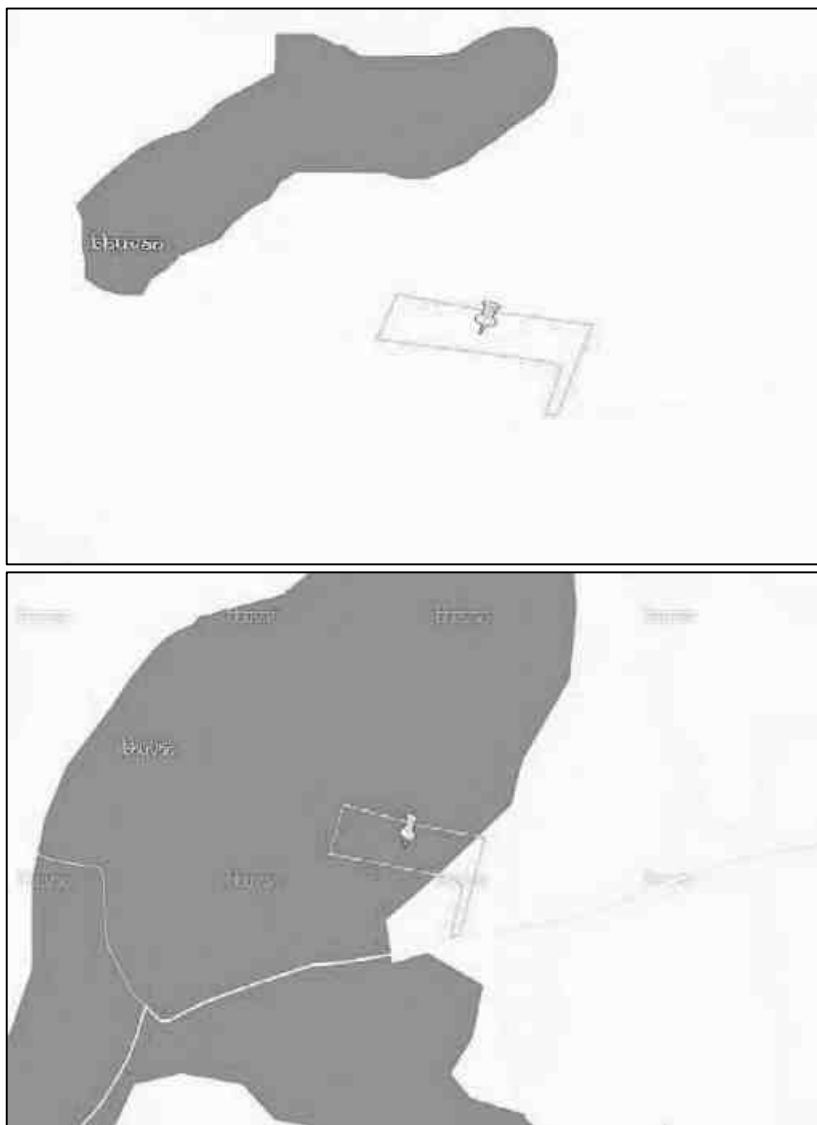


**MAP 2.4 – MAJOR INDUSTRIES SURROUNDING PROPOSED PROJECT SITE**

#### **2.4.4 Site History**

New project is proposed at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. within plot area of 47,696.91 m<sup>2</sup>. In past an agricultural land was converted into Non-Agricultural (NA) land. Later on, this land is handed over to Mr. Pradipta kumar Rath Group CEO of **M/s. Navabuddha Agencies Private Limited** on dated 21/09/2023. Documents related to the same are provided in **Annexure 4**.

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | Chapter 2: Project Description           | Date | 08/06/2026 |



**MAP 2.5 – LAND USE PATTERN FOR YEAR 2005-2006 AND 2015-2016**

## **2.5 SIZE OR MAGNITUDE OF THE OPERATION**

M/s. Navabuddha Agencies Private Limited proposes to set up a new Common Bio-Medical Waste Treatment Facility (CBMWTF) with treatment units of capacity as shown in **TABLE 2.7.**



|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | Chapter 2: Project Description           | Date | 08/06/2026 |

**TABLE 2.7 – COMPONENTS FOR PROPOSED NEW PROJECT**

| <b>Sr. No.</b> | <b>Equipment</b>          | <b>Units</b> | <b>Capacity</b> | <b>Total Capacity</b> |
|----------------|---------------------------|--------------|-----------------|-----------------------|
| 1              | Incinerator (Stationary)  | 1            | 250 kg/hr.      | 550 kg/hr.            |
| 2              | Incinerator (Rotary Kiln) | 1            | 300 kg/hr.      |                       |
| 3              | Autoclave                 | 2            | 1000 lit./batch | 2000 lit./batch       |
| 4              | Shredder                  | 1            | 250 kg/hr.      | 350 kg/hr.            |
| 5              | Shredder                  | 1            | 100 kg/hr.      |                       |
| 6              | Effluent Treatment Plant  | 1            | 40 KL/Day       | 40 KL/Day             |
| 7              | Sewage Treatment Plant    | 1            | 5 KL/Day        | 5 KL/Day              |

| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | Chapter 2: Project Description           | Date | 08/06/2026 |

## 2.6 PROPOSED SCHEDULE FOR APPROVAL AND IMPLEMENTATION

M/s. Navabuddha Agencies Private Limited has uploaded and submitted relevant documents, namely Form-I (as per the EIA Notification, 2006, and its amendments), along with a Pre-Feasibility report for approval of Terms of Reference (ToR) on dated 18/03/2025 and the terms of reference for the environmental impact assessment studies was obtained from State Environment Impact Assessment Authority (SEIAA), Tamil Nadu vide file no. 12188 dated 14/07/2025.

The proposed project falls under Category B1 and project activity 7(da) as per EIA notification 2006, as amended time to time.

**TABLE 2.8 – PROJECT IMPLEMENTATION SCHEDULE**

| Sr. No. | Activity                                                       | Time   | Months |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|---------|----------------------------------------------------------------|--------|--------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|         |                                                                | Months | 1      | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 1       | Application of TOR and Receipt of TOR                          | 5      |        |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 2       | EIA Preparation and submission of Draft EIA for Public Hearing | 11     |        |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 4       | Public Hearing                                                 | 2      |        |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 5       | EIA Preparation and submission of Final EIA                    | 2      |        |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 6       | Appraisal, Presentation and Receipt of EC                      | 3      |        |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 7       | Engineering                                                    | 2      |        |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 8       | Procurement                                                    | 2      |        |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 9       | Supply, Installation and Erection with Civil                   | 2      |        |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 10      | Commissioning and Stabilization                                | 2      |        |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

**Note:** Above schedule is subjected to change as per actual circumstances.

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | Chapter 2: Project Description           | Date | 08/06/2026 |

## 2.7 PROPOSED TECHNOLOGY/PROCESS DESCRIPTION

Bio-Medical wastes are defined as wastes "generated during diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps, including the categories mentioned in the Schedule I of Bio-Medical Waste Management Rules, 2016".

### 2.7.1 Raw Material, Storage and Mode of Transport

#### 2.7.1.1 Waste Classification

Wastes generated by the hospitals, nursing houses, medical colleges, laboratory and other medical facilities can primarily be classified into 3 groups:

- I. Conventional waste / Municipal solid waste: General refuse similar to the domestic/ municipal solid wastes and includes artificial linens, paper, food, cans, diapers, and plastic cups. This waste is non-infectious if it is not brought in contact with the infectious wastes and properly managed.
- II. Hazardous waste: Laboratory and Pharmaceutical Chemicals and containers including off-specification and other chemicals, alcohols, disinfectants, anti-neoplastic agents, heavy metals (e.g. Mercury), etc. These wastes are hazardous in nature and if properly segregated and managed can be transported to hazardous waste management facility for treatment/ storage/ disposal.
- III. Bio-Medical waste: Commonly referred to as Clinical and pathological Wastes and include: isolation wastes (refuse associated with infectious patients), cultures and stocks of infectious agents and associated biological, human blood and blood products, pathological wastes, contaminated sharps, amputated body parts, placenta and others.

The Bio-Medical waste management rules, 2016 provides schedule of wastes their colour coding, storage, treatment and disposal practice.

#### 2.7.1.2 Collection, Transport and Storage

##### I. Collection:

The wastes shall be segregated as per the provisions of the Bio-Medical Waste (Management & Handling) Rules, 2016. Non-segregated waste shall not be accepted and such incident shall be reported to the prescribed authority. Temporary storage at healthcare unit shall be designated and the coloured bags handed over by the healthcare units shall be collected in similar coloured containers with cover. Each bag shall be labeled as per the column (3) of Schedule I Bio-Medical Waste (Management & Handling) Rules, 2016 so that at any time, the healthcare units can be traced back that are not segregating the Bio-Medical wastes as per the rules. Barcoding system shall be implemented as per CPCB Guidelines.

The coloured containers will be labeled as per Schedule IV of the rules. Sharps shall be collected in puncture proof, leak proof and tamper proof containers.

| ENPRO Enviro Tech and Engineers Pvt. Ltd. |                                          |      |            |
|-------------------------------------------|------------------------------------------|------|------------|
| Client                                    | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                   | Draft EIA Report                         |      |            |
| Report No                                 | EP/EIA/76                                | Rev. | 00         |
| Title                                     | Chapter 2: Project Description           | Date | 08/06/2026 |

The person responsible for collection of Bio-Medical wastes will also carry a register with him to maintain the records such as name of the healthcare unit, the type and quantity of waste received, signature of the authorized person from the healthcare unit, date and time of collection etc. The colour coding for Bio-Medical waste (BMW) and segregation of Bio-Medical waste (BMW) is presented in **TABLE 2.10**.

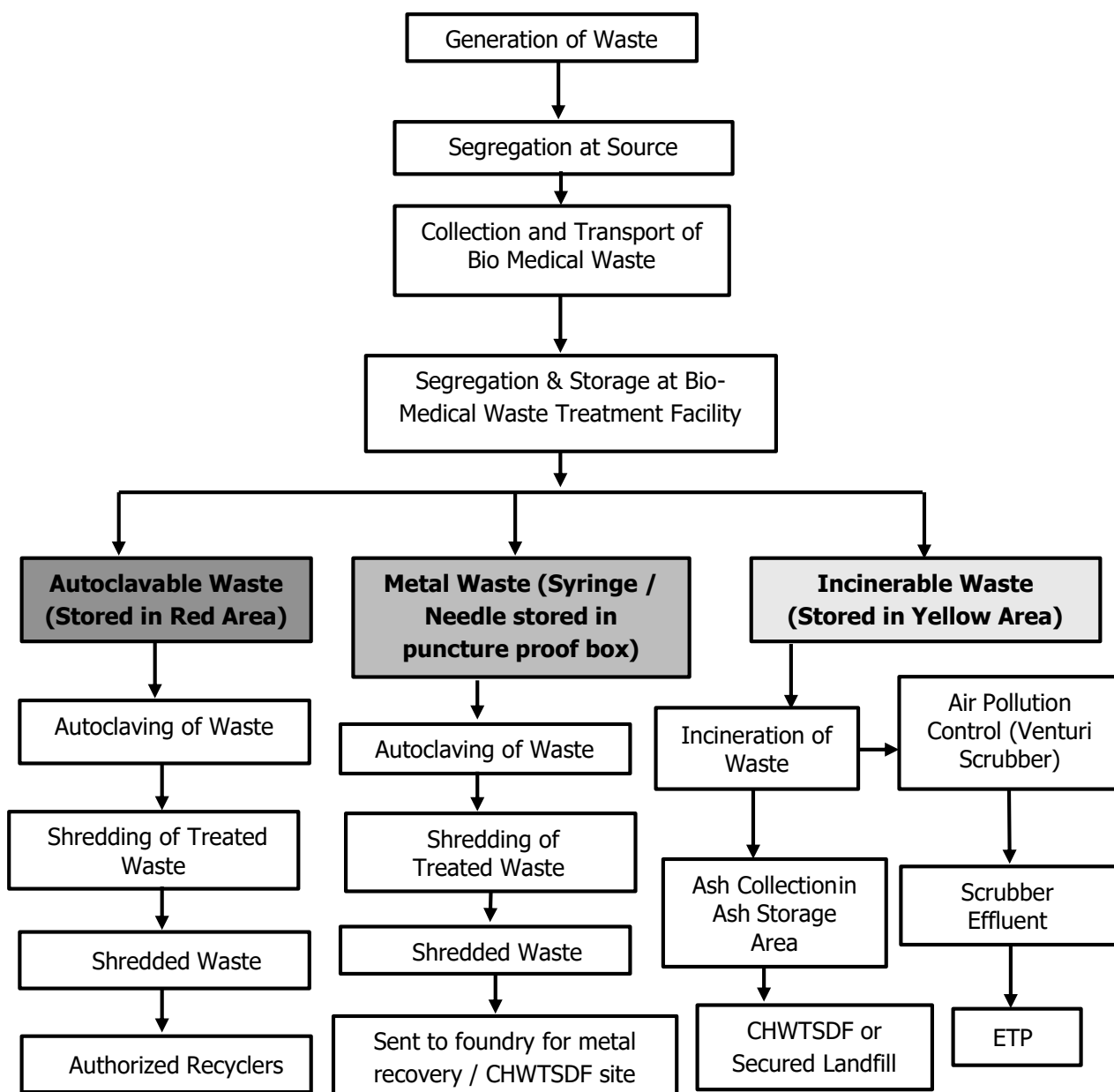


**FIGURE 2.1 – SCHEMATIC DIAGRAM OF MATERIAL FLOW AT CBMWTF**

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | Chapter 2: Project Description           | Date | 08/06/2026 |

**TABLE 2.9 – COLOUR CODING AND SEGREGATION OF WASTE**

| Sr. No. | Category            | Type of waste                                                               | Collection method                                    |
|---------|---------------------|-----------------------------------------------------------------------------|------------------------------------------------------|
| 1       | Yellow              | a Human Anatomical Waste                                                    | Yellow coloured non-chlorinated plastic bags         |
|         |                     | b Animal Anatomical Waste                                                   |                                                      |
|         |                     | c Soiled Waste                                                              |                                                      |
|         |                     | d Expired Discarded Medicines                                               |                                                      |
|         |                     | e Chemical Waste                                                            |                                                      |
|         |                     | f Chemical Liquid Waste                                                     |                                                      |
|         |                     | g Discarded Linen Mattresses, Bedding Contaminated with Blood or Body Fluid |                                                      |
|         |                     | h Microbiology, Biotechnology and Other Clinical Laboratory Waste.          |                                                      |
| 2       | Red                 | Contaminated Waste (Recyclable)                                             | Red coloured non-chlorinated plastic bags            |
| 3       | White (Translucent) | Waste Sharps                                                                | Puncture proof, leak proof, temper proof containers. |
| 4       | Blue                | a) Glass Wares<br>b) Metallic Body Implants                                 | Card board boxes with blue coloured marking.         |

- Bar Code Labelling**

There are two types of bar code labelling:

1. Bar code or QR code label is pre-printed directly on the designated colour coded bags /containers, which may be procured by HCF through the Operator of a CBMWTF or through any vendor, fulfilling the specifications stipulated under CPCB guidelines; or
2. Bar code or QR code labels are pasted on the designated colour coded bags/ containers, which can be procured by the HCF either through the Operator of a CBMWTF or through Vendor.

The charges for bar code labels or pre-printed bar-coded label or QR code label are levied by the Operator of a CBMWTF or a Vendor as per the prevailing rates to the Occupier or as per the agreement between the Occupier and Operator of CBMWTF/Vendor. Vendors consult the CBMWTF and the Software Provider so as to ensure compatibility with software system being adopted by Operator of CBMWTF.

- Specifications of Bar Code or QR Code label:**

The bar code label for use on colour coded bags or containers for handling Bio-Medical Waste will have following specifications.

**Colour mark on the label:** A colour 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 colour coded bag or container. The bar code has a colour mark (in Yellow/Red/White/Blue) in the form of block of size at least 7 mm X 7 mm or Text of font size 12 specifying the colour of the Bio-Medical Waste (BMW) in the bags or containers. The colour mark or Text is placed at the top left corner of the bar code label.

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
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| Project                                          | Draft EIA Report                         |      |            |
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| Title                                            | Chapter 2: Project Description           | Date | 08/06/2026 |

|  |    |  |    |  |    |  |    |   |
|--|----|--|----|--|----|--|----|---|
|  | OR |  | OR |  | OR |  | OR | C |
|--|----|--|----|--|----|--|----|---|

In case of cytotoxic drugs, the alphabet 'C' is printed on yellow colour block. In case of B/W label, Colour mark can be specified in the form of 'Text' specifying the colour of BMW as "YELLOW" / "RED" / "WHITE" / "BLUE" printed on top left side of the bar code label.

|        |    |     |    |       |    |      |    |          |
|--------|----|-----|----|-------|----|------|----|----------|
| YELLOW | OR | RED | OR | WHITE | OR | BLUE | OR | YELLOW C |
|--------|----|-----|----|-------|----|------|----|----------|

**Unique Number of the HCF and its specification:** Unique number to each HCF will be developed and provide by concerned State Pollution Control Board (SPCB)/ Pollution Control Committee (PCC)/ Directorate General of Armed Forces Medical Services (DGAFMS). Unique number can be produced based on following criteria: -

- i. Name of the Health Care Facility (HCF): The name of the HCF is indicated by first five alphabets in the name of the by the HCF. In case the name of HCF is less than 5 letters, the rest of spaces may be filled with \*. (E.g., All India Institute of Medical Sciences-ALLIN). Followed by;
- ii. Name of the Place where HCF is located: Name of the place where HCF is located which is indicated by 6 digits local Pin code provided by Postal department. Followed by;
- iii. Name of the State/UT: Name of the State/UT is in the form of two digits' alphabetical number (as given at Annexure-I of CPCB Guidelines for Bar Code System for Effective Management of Bio-medical Waste). Followed by;
- iv. Type of HCF: Type of HCF is in the form of alphabetical number in capital but not more than two letter i.e., first two letters of a type of HCF/first letter in two words of a HCF) as given below:

**BH - Bedded Hospital**

**CL - Clinic**

**DI - Dispensary**

**HO - Homeopathy**

**MH - Mobile Hospital**

**SI - Siddha**

**UN - Unani**

**VH - Veterinary Hospital**

**YO - Yoga**

**AH - Animal House**

**BB - Blood Bank,**

**DH - Dental Hospital**

**NH - Nursing Home,**

**PL - Pathological Laboratory**

**FA - Institutions/Schools/Companies etc. with First Aid facilities**

**HC - Health Camp**

and followed by;

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
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**Numerical Number of the HCF:** Numerical number of the health care facility shall not be more than five numerical numbers to be assigned to the HCF in between i.e., 00001 to 99999.

Concerned SPCB/PCC shall upload a list of HCFs along with their unique number of HCF at their website. In case of long list, SPCBs may provide search option on their website for retrieving unique code vis-à-vis name of HCF.

**Label sequence Number:** The proposed expansion facility will use central software to generate unique label sequential number. The operator of proposed expansion facility will provide range of such sequence numbers to label vendors to produce labels or produce labels by themselves. The records of label sequence numbers and to whom allotted is maintained for verification of SPCBs/PCCs.

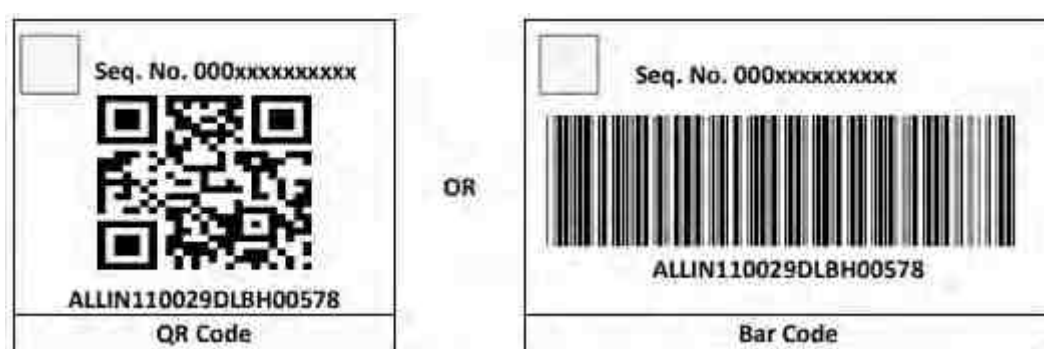


**FIGURE 2.2 – TYPICAL BAR CODE OR QR CODE LABEL**

**Specifications for the bar code label:** In addition to the specification of bar code, the bar code label will have following specifications as detailed below:

1. The bar code label should be pasted only at the center or close to center of the colour coded bag or container prescribed under the Bio-Medical Waste Management Rules, 2016 and further amendments made thereof.
2. Size of bar code label should be such that it will be able to accommodate desired information specified in this section.
3. The bar code / QR code should be black in colour and its back ground will be white colour and it should be clearly legible on the label.
4. The bar code label should be tamper proof, water proof and its colour will not be faded in due course of more than 48 hours after its use.
5. The bar code label will be able to resist the prevailing atmospheric temperatures and will not fade its colour till its end of life.
6. Bar code labels will not have any traces of heavy metals or any other objectionable chemical constituent.
7. All bar code labels will be of good quality preferably a very chromo paper label having specifications prescribed under these guidelines.
8. The adhesive used for bar code label should be pressure sensitive, tear resistance and should be of acrylic based adhesive and after use of labels on the colour coded bag (s) or container (s), the label will not peel off on its own or by normal abrasion during Collection, Transportation, Handling & Storage.

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## II. Transportation:

The Bio-Medical waste collected in colored containers will be transported to the facility in a fully covered dedicated vehicle only. It will be ensured that the total time taken from generation of Bio-Medical waste to its treatment, including collection, transportation and treatment will not exceed 48 hours. Vehicles used for collection of Bio-Medical Waste from member units will be registered with Gujarat Pollution Control Board (GPCB). The vehicles will be provided with;

- Separate cabins for driver/staff and the Bio-Medical waste containers.
- The base of the waste cabin is leak proof to avoid pilferage of liquid during transportation.
- The waste cabin is well designed that it is easy to wash and disinfect.
- The vehicle is labeled with the Bio-Medical waste symbol (as per the Schedule III of the rules) and is display the name, address and telephone number of the CBMWTF.
- Each vehicle is provided with GPS system for tracking and recording of vehicle movement centrally from facility.
- Each Vehicle will be PUC certified.
- Provision of additional vehicle will be provided for the emergency purpose.
- Unit will provide Route map for collection and transportation of Bio-Medical Waste.

Type and List of transport vehicle proposed for the proposed new project is provided as under in **TABLE 2.10.**

**TABLE 2.10 – LIST AND TYPE OF TRANSPORT VEHICLE PROPOSED FOR BIO-MEDICAL WASTE TRANSPORTATION**

| Sr. No. | Type of Vehicle                                          | Qty                          | Capacity of Individual Vehicle |
|---------|----------------------------------------------------------|------------------------------|--------------------------------|
| 1       | Small Tempo for collection of Bio-Medical waste from HCF | 13<br>(11 + 2 for Emergency) | 2 Tons                         |

## III. Storage:

Bio-Medical Waste (BMW) received through designated vehicle will be stored in designated Bio-Medical Waste storage area as per category. Bio-Medical waste will be first unloaded in front portion of the storage area from vehicle. From this area waste as per category will be shifted to respective Bio-Medical wastestorage room. For Bio-Medical Waste storage, three separate storage room / area are proposed to provided.



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1. Storage Area for Red Category Waste (To be subjected to Autoclaving)
2. Storage Area of Yellow Category Waste (To be subjected to Incineration)
3. Storage Area of Waste Sharps and Other Waste (To be subjected for Autoclave and Shredding)

Each of above storage area is separated by wall between them. Entire Bio-Medical Waste storage area will have impervious floor, covered by wall from top and covered with roof from top. storage area shall be provided with spill collection drain and sump, so that any spill or floor wash in the respective area can be collected and transferred to ETP / Incinerator for treatment/Disposal.

In addition to these storages following storage room / area shall also be provided at the facility

1. Treated waste storage area (Recyclable plastic and glass)
2. Hazardous waste storage area

Overall dimensions of storage area are provided below in **FIGURE 2.3** and listed in **TABLE 2.12** as under.

#### ❖ **Material Flow:**

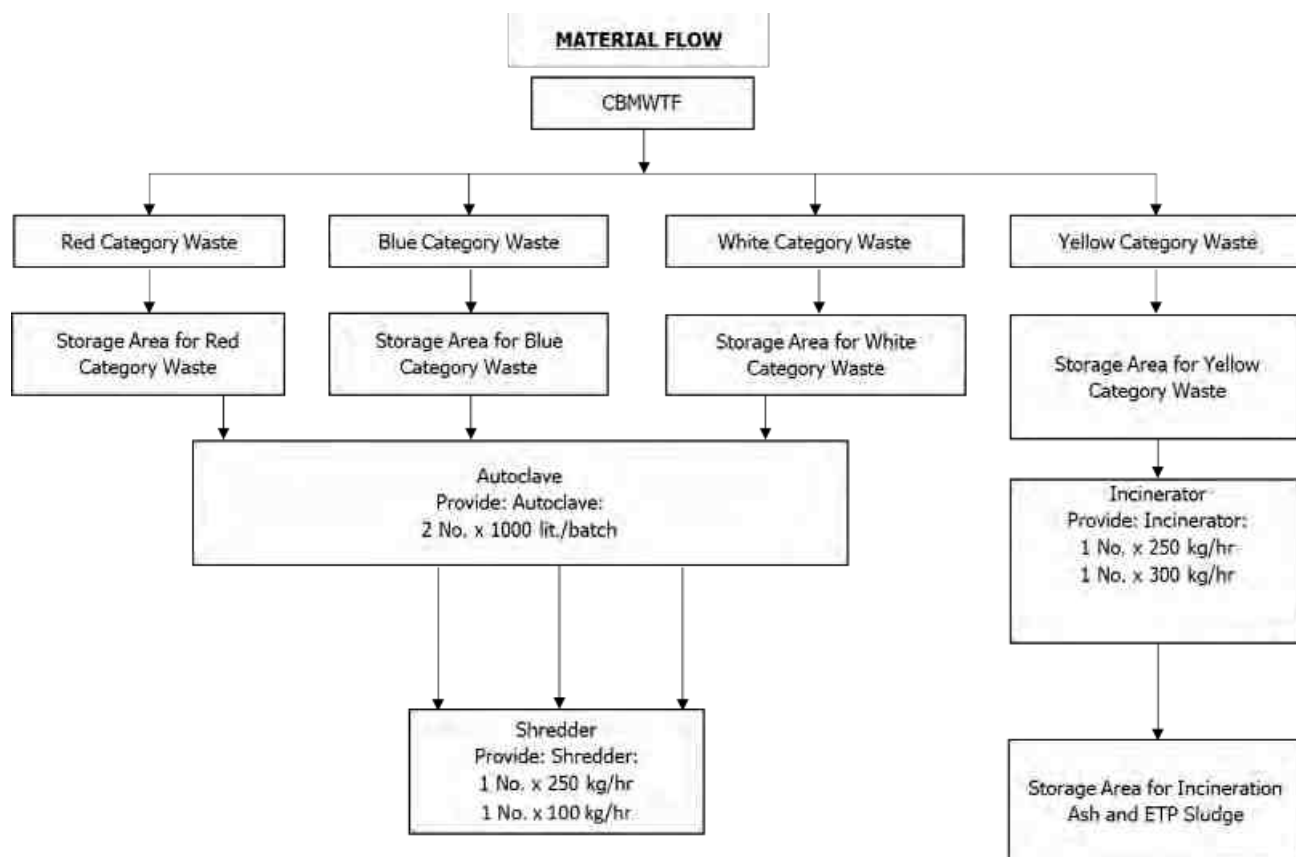


**FIGURE 2.3 – CAPACITY AND SIZE OF MAJOR COMPONENT AND DEDICATED STORAGE AREA OF CBMWTF**

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
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**TABLE 2.11 – CAPACITY OF STORAGE AREA OF CBMWTF**

| <b>Sr. No.</b> | <b>Description</b>                                    | <b>Storage Area</b>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | Storage Area for Red Category Waste                   | <p>Type: Storage Room Provided with Bottom RCC, Impervious Floor, Side Wall and Top Roof / Shed /Slab.</p> <p>Dimension: 18 m x 9 m x 3.5 m</p> <p>Storage Room will be provided with</p> <ol style="list-style-type: none"> <li>1. Spill collection drain connecting to sump and transfer pump.</li> <li>2. Ventilation and exhaust system</li> <li>3. Fire detection, Alarm and auto sprinkler system</li> <li>4. Disinfection Sprinkling System</li> </ol> |
| 2              | Storage Area for Other (Blue and White) CategoryWaste | <p>Type: Storage Room Provided with Bottom RCC, Impervious Floor, Side Wall and Top Roof / Shed /Slab.</p> <p>Dimension: 18 m x 9 m x 3.5 m</p> <p>Storage Room to be provided with</p> <ol style="list-style-type: none"> <li>1. Spill collection drain connecting to sump andtransfer pump.</li> <li>2. Ventilation and exhaust system</li> <li>3. Fire detection, Alarm and auto sprinklersystem</li> <li>4. Disinfection Sprinkling System</li> </ol>     |
| 3              | Storage Area for Yellow Category Waste                | <p>Type: Storage Room Provided with Bottom RCC, Impervious Floor, Side Wall and Top Roof / Shed /Slab.</p> <p>Dimension: 18 m x 12 m x 3.5 m</p> <p>Storage Room to be provided with</p> <ol style="list-style-type: none"> <li>1. Spill collection drain connecting to sump and transfer pump.</li> <li>2. Ventilation and exhaust system</li> <li>3. Fire detection, Alarm and auto sprinkler system</li> <li>4. Disinfection Sprinkling System</li> </ol>  |
| 4              | Storage Area for Treated Waste Storage                | <p>Type: Storage Room Provided with Bottom RCC, Impervious Floor, Side Wall and Top Roof / Shed /Slab.</p> <p>Dimension: 31 m x 15 m x 3.5 m</p> <p>Storage Room to be provided with Spill collection drain connecting to sump and transfer pump.</p> <ol style="list-style-type: none"> <li>1. Ventilation and exhaust system</li> <li>2. Fire detection, Alarm and auto sprinkler system</li> <li>3. Disinfection Sprinkling System</li> </ol>              |

|                                                  |                                          |      |            |
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| <b>Sr. No.</b> | <b>Description</b>               | <b>Storage Area</b>                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5              | Storage Area for Hazardous Waste | <p>Type: Storage Room Provided with Bottom RCC, Impervious Floor, Side Wall and Top Roof / Shed /Slab.</p> <p>Dimension: 31 m x 15 m x 3.5 m</p> <p>Storage Room to be provided with Spill collection drain connecting to sump and transfer pump.</p> <ol style="list-style-type: none"> <li>1. Ventilation and exhaust system</li> <li>2. Fire detection, Alarm and auto sprinkler system</li> <li>3. Disinfection Sprinkling System</li> </ol> |

List and specification of other equipment to be provided in storage area is listed as under in **TABLE 2.12.**

**TABLE 2.12 – LIST AND SPECIFICATION OF OTHER EQUIPMENT TO BE PROVIDED IN STORAGE AREA**

| <b>Sr. No.</b> | <b>Description</b>            | <b>Storage Area</b>                                                                                                                                                                                                                                                                               |
|----------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | Spill Collection Tank (T-101) | <p>Qty: 1 No</p> <p>Type: Underground RCC Tank, open from top.</p> <p>Duty: To collect floor spill and wash water from all the storage area floor.</p> <p>Capacity: 5000 Litre</p> <p>Dimension: 1.6 m x 1.25 m x 2.5 m SWD (+0.5 m Free Board)</p> <p>MOC: RCC with Epoxy Lining from Inside</p> |
| 2              | Spill Transfer Pump (P-101)   | <p>Qty: 1 No</p> <p>Duty: To transfer floor wash water to Effluent Treatment Plant</p> <p>Type: Horizontal, Centrifugal, Self-Priming</p> <p>Capacity: 8 m<sup>3</sup>/hr., 20 MLC</p> <p>Motor: 1.0-1.25 HP</p> <p>MOC: CI Casing, SS316 Impeller</p>                                            |

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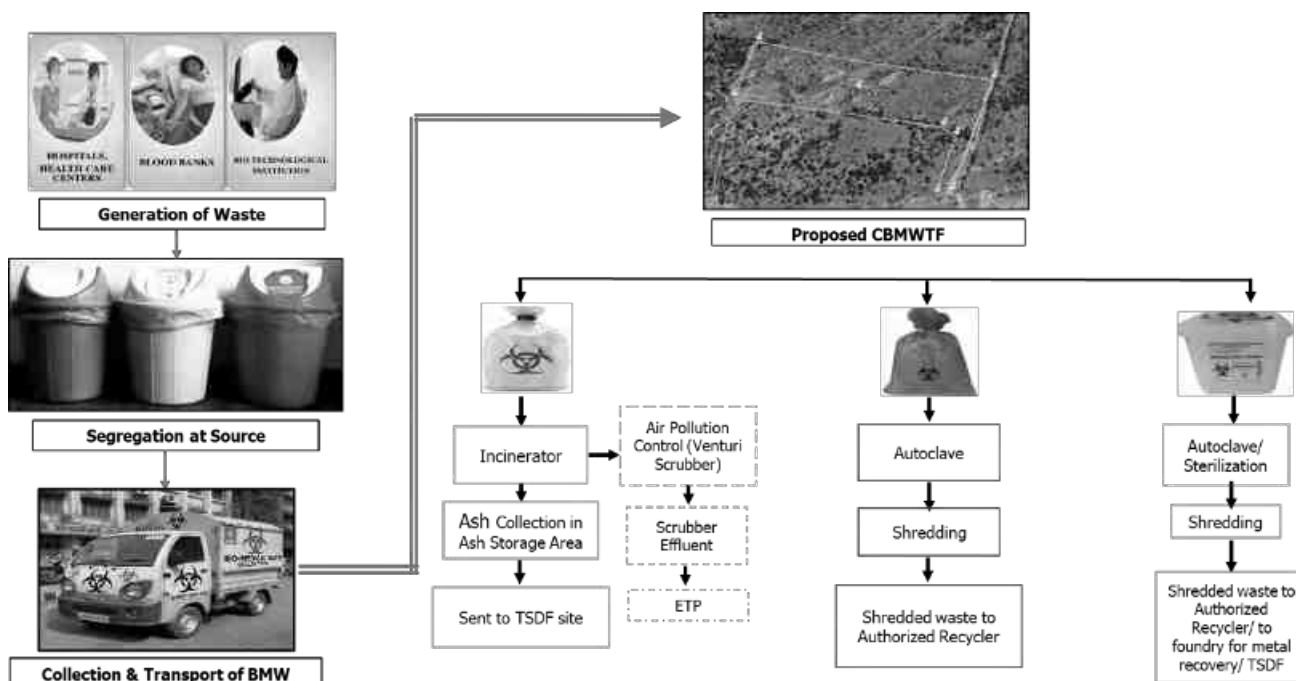


**FIGURE 2.4 – SCHEMATIC DIAGRAM OF BIO-MEDICAL WASTE TREATMENT & PROCESS FLOW**

### 2.7.2 Treatment of Bio-Medical Waste

Treatment units of the proposed expansion project will consist of

1. Bio-Medical Waste Incinerator for Yellow category waste
2. Autoclave unit for Red / Blue / White category waste
3. Shredder & Grinder for Red / Blue / White category waste.

Design basis, process description and specification of each of these units are provided separately in following section of the report.

#### 2.7.2.1 Bio-Medical Waste Incinerator

Bio-Medical waste incineration involves the high temperature combustion of wastes produced by hospitals, veterinary facilities, and medical research facilities including discarded medicines. The waste, which requires incineration, is stored in yellow non-chlorinated HDPE bags in storage area.

Bio-Medical waste incinerators shall be provided as per CPCB guideline of Bio-Medical waste incinerator.

#### ❖ Design Basis:

| Capacity                     |                       |
|------------------------------|-----------------------|
| Total Incineration Capacity: | 250 kg/h              |
|                              | No of Streams: 1 Nos. |

|                                                  |                                          |      |            |
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|                          |                                                                                                                                                                                                              |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          | Total Capacity: 250 kg/h                                                                                                                                                                                     |
|                          | Total Daily Capacity: 5000 kg                                                                                                                                                                                |
| Stationary Incinerator:  | Single Stream of 250 kg/h                                                                                                                                                                                    |
| Design Calorific Value:  | Design: 3000 Kcal/kg                                                                                                                                                                                         |
| Design Feed Capacity:    | Design: 250 kg/h                                                                                                                                                                                             |
| Design Thermal Capacity: | At Design Condition of 250 kg/h at 3000 Kcal/kg, design waste input thermal capacity will be 7,50,000 Kcal/h                                                                                                 |
| Operating Hours:         | 20 Hours per Day<br>365 Days per year<br>7300 Hours per year                                                                                                                                                 |
| Treatment Capacity:      | 1825 Tons/Annum                                                                                                                                                                                              |
| Peak Gas Condition:      | Combustion chamber, air pollution control System and gas ducts shall be designed to handle gas flow at 30% Peak value which is generated during batch feeding of solid waste, drums into combustion chamber. |

#### ❖ **Specification of Major Equipment: Incinerator Plant**

| <b>Sr. No.</b> | <b>Name</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Qty</b> |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>1</b>       | <b>Feed Section</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |            |
| 1.01           | Waste Conveyor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1          |
|                | Type: Slat / Belt type waste conveyor<br>Capacity: 35-50 Bags / hour, each bag of 5-7 kg weight<br>Bag overall dimension: 450 x 600 x 250 mm<br>Slat conveyor is part of solid waste feed system and will be provided with interlocks and limit switches with counter in synchronization with waste feed system.<br>Power: 3 HP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |
| 1.02           | Waste charging hopper with double door arrangement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1          |
|                | Type: Rectangular Waste Charging Hopper<br>Operation: Two hoppers operating in alternative sequence<br>Capacity: Hold and transfer 4 bags at a time<br>Dimension: 1 m x 1 m x 2 m each<br>MOC: MS 6 mm thick<br>Attachment: 2 Nos of Hydraulically operated door in each hopper<br>Operation: This is part of waste feed system. Slat conveyor will load waste into waste feed hopper. Upper part of waste feed hopper Transfers bag into lower part of waste feed hopper. Once it is transferred to lower part it, upper part door will close. After closing of upper part door, lower part door will open and thus waste will enter to charging duct. In similar sequence second hopper will also operate. Feeding and transfer to feed duct will be in sequential manner through interlock system.<br><br>The system will consist of hydraulic power pack unit with hydraulic cylinder for doors, limit switches, solenoid valve. Hydraulic power pack system will consist of oil pump with motor rating of 5 HP |            |
| 1.03           | Furnace Feed Duct with Furnace Door                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1          |
|                | Type and Description:<br>Waste bags from waste charging hopper will be connected to feed duct. Feed duct shall be directly connected to primary furnace and shall convey bags directly into incinerator.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |

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| Sr. No. | Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Qty |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|         | <p>Diameter: 450 mm<br/>MOC: CS with refractory lining / SS304</p> <p>Cooling: Air cooling in Jacket. Jacket air is directly injected into Furnace Door<br/>Primary Furnace is provided with Refractory lined slide Door, operated by hydraulic system. Door will remain in open condition in normal operating condition. Feed system can be isolated by closing this door.</p> <p>Dimension: 600 mm x 600 mm<br/>MOC: MS with refractory lined on one side<br/>Operation: Through Hydraulic System</p> |     |

| Sr. No.                  | Name                                                                                                                                                | Qty   |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>2</b>                 | <b>Incineration Section</b>                                                                                                                         |       |
| 2.1                      | Primary Combustion Furnace                                                                                                                          | 1     |
| Type:                    | Vertical Stationary Type provided with grating at bottom for waste combustion, ash door at bottom for removal of ash after incineration of waste    |       |
| Duty:                    | To incinerate hazardous solid waste at temperature of 800+°C. Furnace is designed to withstand 1500 °C Temperature (Not for continuous operation)   |       |
| Dimensions:              | Furnace Part                                                                                                                                        |       |
|                          | Shell ID                                                                                                                                            | 2 m   |
|                          | Clear ID                                                                                                                                            | 1.5 m |
|                          | Shell Clear Length                                                                                                                                  | 2.5 m |
|                          | Shell Length                                                                                                                                        | 3.0 m |
| Gas Flow Rate            | Design Gas Flow Rate: 7280 m <sup>3</sup> /h at 948 °C (refer, heat and mass balance for design condition)                                          |       |
| Volume for Combustion    | Furnace Volume: 4.41 m <sup>3</sup>                                                                                                                 |       |
| Flue Gas Retention Time: | 2 seconds at design flow                                                                                                                            |       |
| Ash Removal System       | Ash shall be discharged through bottom portion of the furnace through ash door                                                                      |       |
| MOC:                     | Shell: MS 6 mm thick<br>Protection Lining: 225 mm thick total.<br>Top layer shall be fire brick and shall be able to withstand 1100 °C temperature. |       |

|                       |                                                                                                                                                                                                                                                                                  |                 |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 2.2                   | Post Combustion Chamber (Secondary Furnace)                                                                                                                                                                                                                                      | 1               |
| Type:                 | Stationary Vertical type.                                                                                                                                                                                                                                                        |                 |
| Duty:                 | To provide post combustion for the incineration gas from the furnace to achieve complete combustion/destruction of organics at 1050 °C and also to provide minimum 2 sec retention time to the flue gas. Lining should be capable of withstanding 1500 °C operating temperature. |                 |
| Dimensions            | Diameter Shell / Clear                                                                                                                                                                                                                                                           | 2.00 m / 1.50 m |
|                       | Length Shell / Clear                                                                                                                                                                                                                                                             | 3.7 m / 3.2 m   |
| Gas Flow Rate         | Design Flow Rate: 9560 m <sup>3</sup> /h at 1100 °C                                                                                                                                                                                                                              |                 |
| Volume for Combustion | Effective volume: 5.66 m <sup>3</sup>                                                                                                                                                                                                                                            |                 |

|                                                  |                                          |      |            |
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|                         |                                                                                                                                                    |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Flue Gas Retention Time | 2 seconds.                                                                                                                                         |
| MOC:                    | Shell: MS 6 mm thick<br>Protection Lining: 225 mm thick total. Top layer shall be Fire Brick and shall be able to withstand temperature of 1500 °C |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 2.3                      | Oil Burner 1 for Primary Furnace                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1 + (1 Spare) |
| Type                     | Pressure atomized type fuel oil burner with complete with burner management system.                                                                                                                                                                                                                                                                                                                                                                                                    |               |
| Duty                     | To carry out combustion in Primary Combustion Furnace to maintain desired temperature.                                                                                                                                                                                                                                                                                                                                                                                                 |               |
| Description of Operation | In primary combustion furnace incineration of waste is carried out at 800 °C. Since the waste is having its own calorific value, it also provides heat required for maintaining temperature in the furnace. Fuel oil burners shall be used for initial heat of furnace and also to provide back up support to maintain temperature in the furnace. Burner shall be two stage step control type and it will operate automatically using temperature indicator and burner control panel. |               |
| Fuel                     | LDO, GCV of Fuel Considered 11000 kcal/kg.                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |
| Burner Capacity          | Design 30 kg/h                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |
| Primary Air              | For Startup and operation: Air Temperature 35 °C<br>Burner nozzles should be suitable for 1200 °C furnace temperature.                                                                                                                                                                                                                                                                                                                                                                 |               |
| Actual Consumption       | Operating NIL based on high GCV waste                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               |
| Burner Management System | Burner should be provided with<br>Fuel Oil Pump (1 working and 1 standby)<br>Burner Fan<br>Air to fuel ratio controller<br>Flame failure device and temperature controller.<br>Interlock with Ram Feed Device<br>Safety Interlocks<br>Electrical Panel<br>Electrical Heating System for Oil Day Tank and Oil Piping considering LDO                                                                                                                                                    |               |

|                          |                                                                                                                                                                                                                                                                                            |               |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 2.4                      | Oil Burner 2 for Post Combustion Chamber                                                                                                                                                                                                                                                   | 1 + (1 Spare) |
| Type                     | Pressure Atomized type fuel oil burner with complete with burner management system.                                                                                                                                                                                                        |               |
| Duty                     | To carry out combustion in Secondary Furnace to maintain 1100 °C temperature.                                                                                                                                                                                                              |               |
| Description of Operation | Flue gas from primary combustion furnace shall be of 800 °C. These gases are required to heat up to 1100 °C in secondary furnace with the help of fuel oil burner. Burner shall be modulating type and it will operate automatically using temperature indicator and burner control panel. |               |
| Fuel                     | LDO, GCV of Fuel Considered 11000 kcal/kg                                                                                                                                                                                                                                                  |               |
| Burner Capacity          | Design 30 kg/hr.                                                                                                                                                                                                                                                                           |               |
| Primary Air              | For Startup and operation: Air Temperature 35 °C<br>Burner nozzles should be suitable for 1200 °C furnace temperature.                                                                                                                                                                     |               |

|                                                  |                                          |      |            |
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|                          |                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Actual Consumption       | As per heat and mass balance based 20 kg/h                                                                                                                                                                                                                                                                                                                   |
| Burner Management System | Burner should be provided with<br>Fuel Oil Pump (common for both burners, 1 working and 1 standby)<br>Burner Fan<br>Air to fuel ratio controller<br>Flame failure device and temperature controller.<br>Interlock with Ram Feed Device<br>Safety Interlocks<br>Electrical Panel<br>Electrical Heating System for Oil Day Tank and Oil Piping considering LDO |

|     |                                                                                                                                                                                                                                                                                                                           |   |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 2.5 | Emergency Vent valve and Stack                                                                                                                                                                                                                                                                                            | 1 |
|     | Emergency Vent Valve will be provided on top of post combustion chamber adequate to handle load of pressurized gases.<br>Type: Pneumatically actuated butterfly valve<br>Action: Open and close through feedback from pressure transmitter(Air Fail to open)<br>Dimension: 100 mm Dia, 1 Nos<br>MOC: Body CI, Disc: SS316 |   |

|                   |                                                                        |   |
|-------------------|------------------------------------------------------------------------|---|
| 2.6               | FD Fan                                                                 | 1 |
| Type              | Horizontal, Centrifugal                                                |   |
| Qty               | 2 Nos (1 Operating + 1 Standby)                                        |   |
| Duty              | To provide secondary air for combustion in primary combustion chamber. |   |
| Capacity          | Design: 2500 kg/h (2000 Nm <sup>3</sup> /h)                            |   |
| Suction Head      | Ambient                                                                |   |
| Discharge Head    | 350 mmwcg                                                              |   |
| Fluid             | Air at 40 °C and 80 % RH                                               |   |
| MOC:              | Casing: MS<br>Impeller: MS<br>Shaft: EN8                               |   |
| Drive:            | Direct drive attached with VFD.                                        |   |
| Blower Efficiency | 70%                                                                    |   |
| Motor Rating      | 7.5 HP                                                                 |   |

|                     |                                                                                                                                                                                                                      |          |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>3</b>            | <b>Air Pollution Control System</b>                                                                                                                                                                                  |          |
| <b>3.1</b>          | <b>Venturi Scrubber (Variable Throat)</b>                                                                                                                                                                            | <b>1</b> |
| Type:               | Variable throat type Venturi scrubber                                                                                                                                                                                |          |
| Duty:               | To quench hot gases from gas quencher to saturation temperature, remove particulate matter and partially scrub HCl gas at high velocity in variable throat.                                                          |          |
| Operating Parameter | Gas Inlet Temperature: 1100 °C<br>Outlet Gas Temperature: 78 °C<br>Liquid to Gas Ratio: 0.003 m <sup>3</sup> /m <sup>3</sup> (Outlet Condition)<br>Throat Velocity: 60 m/s<br>Allowable Pressure Drop: 450 mmwc, Max |          |
| Dimensions:         | Venturi Scrubber Inlet Diameter: 650 mm                                                                                                                                                                              |          |



|                                                  |                                          |      |            |
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|                                   |                                                                                                                                                                        |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | Throat Diameter: 400 mm<br>Throat length: 400 mm<br>Outlet Diameter: 650 mm<br>Top Length: 1250 mm<br>Bottom Length: 1750 mm<br>Total Length: 3000 mm                  |
| Liquid Injection:                 | Liquid Flow rate: 10 m <sup>3</sup> /h<br>Type: Through Peripheral Injection Nozzle, Low Pressure Type<br>MOC: SS316                                                   |
| MOC:                              | Venturi Body: SS316                                                                                                                                                    |
| Venturi Scrubber Circulation Tank | Circulation Tank:<br>Capacity: 5 m <sup>3</sup><br>MOC: MS (6 mm thick) with Epoxy Coating                                                                             |
| Venturi Scrubber Circulation Pump | Type: Horizontal Centrifugal<br>PumpQty: 2 Nos<br>Capacity: 10 m <sup>3</sup> /h<br>Head: 20 MLC<br>Motor: 3 HP<br>MOC: Casing CI, Impeller SS316Seal: Mechanical Seal |

|                                  |                                                                                                                                                          |          |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>3.2</b>                       | <b>Alkali Scrubber</b>                                                                                                                                   | <b>1</b> |
| Type:                            | Counter Current Packed Bed Tower                                                                                                                         |          |
| Duty:                            | To scrub gaseous pollutants in the counter current circulation of alkali solution through packing.                                                       |          |
| Operating Parameter              | Gas inlet flow rate:4800 m <sup>3</sup> /h<br>Gas Inlet Temperature:78 °C<br>Outlet Gas Temperature:78 °C<br>Liquid Inlet flow rate:40 m <sup>3</sup> /h |          |
| Dimensions:                      | Scrubber<br>Diameter:1000 mm<br>Packed Height (Wet):3000 mm<br>Total Height:4500 mm<br>Packing Type:50 mm PP Pall Ring<br>MOC:MS (6 mm thick)            |          |
| Mist Eliminator:                 | Chevron Type<br>MOC: Contact parts in FRP                                                                                                                |          |
| Liquid Distributor:              | Qty:1<br>Type: Header and Lateral Type<br>MOC: FRP / HDPE                                                                                                |          |
| Alkali scrubber Circulation Tank | Circulation Tank:<br>Capacity: 10 m <sup>3</sup><br>Dimension: 2.5 m x 2.5 m x 1.8 m<br>MOC: MS (8 mm thick)                                             |          |
| Alkali scrubber Circulation Pump | Type: Horizontal Centrifugal Pump<br>Qty: 2 Nos<br>Capacity: 40 m <sup>3</sup> /h<br>Head: 20 MLC<br>Motor: 5 HP<br>MOC: Casing CI, Impeller SS316       |          |

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|  |                       |
|--|-----------------------|
|  | Seal: Mechanical Seal |
|--|-----------------------|

|                     |                                                                                         |          |
|---------------------|-----------------------------------------------------------------------------------------|----------|
| <b>3.3</b>          | <b>Activated Carbon Column</b>                                                          | <b>1</b> |
| Type:               | Down flow packed column                                                                 |          |
| Duty:               | To adsorb skipped VOCs or organic compounds in Incinerator flue gas on Activated Carbon |          |
| Operating Parameter | Gas Flow: 2500 Nm <sup>3</sup> /h (3000 m/h)<br>Gas Inlet Temperature: 70 °C            |          |
| Design Criteria     | Approach Velocity: 2 m/s                                                                |          |
| Vessel Dimension    | Diameter: 800 mm, Contact Height: 3000 mm<br>Vessel Height: 4500 mm                     |          |
| Media               | Granular Activated Carbon with Iodine Value 900 min.                                    |          |
| MOC                 | Vessel and Support Plate: MS with Rubber Lining                                         |          |

|                   |                                                                                                                  |                |
|-------------------|------------------------------------------------------------------------------------------------------------------|----------------|
| <b>3.4</b>        | <b>ID Fan</b>                                                                                                    | <b>2 (1+1)</b> |
| Type              | Horizontal, Centrifugal                                                                                          |                |
| Qty               | 2 Nos (1 Operating + 1 Standby)                                                                                  |                |
| Duty              | To overcome system pressure, drop and to pull the gas through the system and to vent to atmosphere through stack |                |
| Inlet Temperature | 75 °C                                                                                                            |                |
| Capacity          | Design: 3000 Nm <sup>3</sup> /h                                                                                  |                |
| Suction Head      | -750 mmwgc                                                                                                       |                |
| Discharge Head    | +50 mmwgc                                                                                                        |                |
| Differential Head | 800 mmwc                                                                                                         |                |
| Fluid             | Wet Gas<br>Operating Temperature 75 °C max.                                                                      |                |
| MOC:              | Casing: MS with Rubber lining<br>Impeller: SS316<br>Shaft: SS                                                    |                |
| Drive:            | 20 HP Motor with VFD drive                                                                                       |                |

|            |                                                                                                                                                                                                                                                                                                                  |          |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>3.5</b> | <b>Alkali Solution Storage and dosing Tank and dosing Pump</b>                                                                                                                                                                                                                                                   | <b>1</b> |
|            | Alkali Solution Storage Tank<br>Qty: 1 No<br>Type: Vertical cylindrical tankCapacity: 2000 Liters<br>MOC: MS with epoxy painted<br><br>Alkali Solution dosing Pump<br>Qty: 2 Nos<br>Type: Mechanical Positive Displacement PumpCapacity: 50 LPH<br>Head: 20 MLC<br>MOC: All contact part in SS316<br>Motor: 1 HP |          |

|            |                                                                                           |  |
|------------|-------------------------------------------------------------------------------------------|--|
| <b>3.6</b> | <b>Stack</b>                                                                              |  |
|            | Type: Self Supported Stack<br>Gas Flow: 2500 Nm <sup>3</sup> /h / 3000 Am <sup>3</sup> /h |  |

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|     |                                                                                                                                                                                                                                                                         |   |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | Stack Diameter: 400 mm at top (Combined for 2 streams)<br>Stack Height: 30 m from ground level Stack MOC: MS with Epoxy Paint                                                                                                                                           |   |
| 4   | Utilities                                                                                                                                                                                                                                                               |   |
| 4.1 | Fuel Oil storage Tank with Tanker unloading and transfer pump                                                                                                                                                                                                           | 1 |
|     | Fuel Oil Storage Tank<br>Qty: 1 No<br>Type: Vertical cylindrical tank Capacity: 5000 Liters<br><br>Tanker Unloading Pump Qty: 1 No.<br>Type: Horizontal Centrifugal PumpCapacity: 5 m³/h<br>Head: 15 MLC<br>Motor: 2 HP<br>MOC: Casing: CS, Impeller: CSSeal: Mech Seal |   |
| 4.2 | Drain Pit                                                                                                                                                                                                                                                               | 1 |
|     | Type: Underground RCC Rectangular Tank with top slabDuty: To Collect Feed Section area floor spillages in tankCapacity: 5 m³<br>MOC: RCC with Epoxy Painted<br>Note: To provide Top slab with adequate ventilation.                                                     |   |
| 4.3 | Drain Pit Pump                                                                                                                                                                                                                                                          | 1 |
|     | Type: Horizontal Centrifugal Pump, Self-Priming, Non-Clog Type Duty: To Transfer Spillages in Feed Section to Liquid waste feed tank.Capacity: 5 m³/h<br>Head: 20 MLC<br>Motor: 2 HP<br>MOC: Casing: CS, Impeller: SS316                                                |   |

| <b>5</b>          | <b>Ducting, Piping and Valve</b> |          |     | 1                                                          |
|-------------------|----------------------------------|----------|-----|------------------------------------------------------------|
| Duct from         | Duct to                          | Type     | MOC | Lining                                                     |
| Primary Furnace   | Secondary Furnace                | Circular | MS  | Refractory lining (Operating Temperature °C) 1100          |
| Secondary Furnace | Venturi Scrubber                 | Circular | MS  | Refractory lining (Operating Temperature °C) 1100          |
| Ventry Scrubber   | ID Fan                           | Circular | MS  | Rubber lining / FRP Lining, Operating Temperature 70-90 °C |
| ID fan            | Stack                            | Circular | MS  | Rubber lining / FRP Lining                                 |
| Process Air       |                                  | Circular | MS  | No Lining                                                  |

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| <b>Fluid</b>    | <b>Temperature</b> | <b>MOC</b>  |
|-----------------|--------------------|-------------|
| Scrubber Liquor | 65-95 °C           | HDPE/PPR    |
| Scrubber Liquor | <65 °C             | HDPE/PPR    |
| Fuel Oil        |                    | MS          |
| Process water   |                    | MS/UPVC     |
| Wastewater      |                    | HDPE / UPVC |
| Caustic Lye     |                    | MS          |

|                                          |                                                                            |                                                                           |                                                                      |       |
|------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------|-------|
| <b>6</b>                                 | <b>Plant Structure, shed, ladder, supports and all civil work</b>          |                                                                           |                                                                      | 1 set |
| <b>Name of CivilWork</b>                 | <b>Purpose</b>                                                             | <b>Overall Dimension</b>                                                  | <b>More Details</b>                                                  |       |
| MCC, PLC Room, Operator Room, UPS Room   | For Housing MCC Panel, PLC Panel, for Incinerator Plant with operator room | 10 m x 5 m x 4.5 m high with suitable isolation wall and Concrete ceiling | -                                                                    |       |
| Civil foundations of plant and machinery | As required for foundation of plant and machinery                          | As required                                                               |                                                                      |       |
| Plant Shed and Roof                      | Complete plantshed and roof for plant and machinery                        | As required, divided into high bay and low bay area                       | Weather protection roof with side louvers / covers shall be provided |       |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |       |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|-------|
| <b>7</b> | <b>Instrumentation inclusive of field instrumentation, PLC based SCADA system, Terminals with computer and printer, Instrumentation panel, automation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |  | 1 set |
|          | <p><b><u>INSTRUMENTATION</u></b></p> <p>Bio-Medical waste incineration plant Incineration Plant shall be provided with instrumentation system consisting of following components.</p> <p>Field Instruments with local indications</p> <p>Field instruments with transmitters and switches attached to PLC based SCADA system for plant controls, monitoring and data recording</p> <p>Instruments will be provided for monitoring of pressure, temperature, flow and levels.</p> <p>For the control of operating parameters logics will be incorporated in PLC based SCADA system and set points of the controlling parameters can be altered from the control room.</p> <p>PLC based SCADA system shall be incorporated with alarms and emergency shutdown features in case of process disturbance.</p> <p>Necessary electrical transducers will be provided to monitor the bus voltage, current, frequency, power and energy as part of electrical distribution system.</p> <p>These transducers will also be connected to the plant control system.</p> <p>Online monitoring system shall be provided as under</p> <p>Flue gas monitoring for PM, O<sub>2</sub>, CO<sub>2</sub> and CO measurement at the outlet of Stack Gas as per CPCB guideline</p> <p>Online pH meter for scrubber solutions.</p> |  |  |       |

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|  | CCTV camera with monitors in control room at critical locations in the plant. |
|--|-------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>8</b> | <b>Electrical with electric motors, cables, PCC Panel, MCC panel, VFD panel, VFDs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1 set |
|          | <p><b><u>ELECTRICAL:</u></b><br/> The voltage levels in the proposed plant will be at 415 V, 50 Hz for 3 phase and 240 V for single phase and 110 V ac for control supply requirement.</p> <p>There will be centralized MCC room for Incineration plant from where power will be fed to all drives of the plant. The MCC shall be fixed type cubicle, vermin proof with standard fuses, relays and indication lamps.</p> <p>Weatherproof start – stop push button stations shall be provided near each motor for local start stop control</p> <p>Necessary power and control cables running from MCC to motors and back shall be provided. The cables shall conform to relevant Indian standards.</p> <p>All motors shall be of standard design, TEFC construction, and Class F insulation.</p> <p>All drives above 50 HP shall be provided with VFDs as power saving option and for better plant control.</p> |       |

#### ❖ Waste Characteristics

Incinerator Feed System, Combustion Chamber and Air Pollution Control system shall be suitable to handle Bio-Medical waste received in packed bag.

**TABLE 2.13 – ULTIMATE ANALYSIS OF WASTE CONSIDERED FOR DESIGN**

| Component                              | Composition (% By weight) |
|----------------------------------------|---------------------------|
| CARBON (C)                             | 35.78                     |
| HYDROGEN (H)                           | 1.27                      |
| OXYGEN (O)                             | 8.92                      |
| NITROGEN (N)                           | 6.98                      |
| CHLORIDE (Cl)                          | 0.98                      |
| SULFUR (S)                             | 1.98                      |
| MOISTURE (H <sub>2</sub> O)            | 32.43                     |
| INORGANIC/INERT (Ash)                  | 11.65                     |
| TOTAL                                  | 100.00                    |
| <b>GROSS CALORIFIC VALUE (Kcal/kg)</b> | <b>3000.00</b>            |

**Source:** ENPRO Enviro Tech and Engineers Pvt. Ltd. (Design Department)

Stationary incineration plant will be provided with gravity type waste feed system with double door system and Ram Pusher Mechanism.

#### ❖ Fuel

Light Diesel Oil (LDO)/HSD will be used as fuel for incineration plant in primary and secondary combustion chamber. Fuel will be stored in Fuel Storage tank and will be transferred to fuel oil tank daily located near to incineration plant.

|                                                  |                                          |      |            |
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### ❖ Operating Condition

Incinerator is designed to comply with operating standards as per CPCB Guidelines, mainly

**TABLE 2.14 – OPERATING CONDITION FOR INCINERATION SYSTEM.**

| <b>Standards</b>                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------|
| Combustion Efficiency (CE) shall be at least 99% and shall be computed as follows:<br>$CE = \% CO_2 \times 100 / (\% CO_2 + \% CO)$      |
| Temperature of primary chamber shall be at least 800 °C ( $\pm 50$ °C)                                                                   |
| Secondary chamber gas residence time shall be at least 2 (two) seconds at 1050 °C ( $\pm 50$ °C) with minimum 3% Oxygen in the stack gas |
| For cytotoxic waste 1200 ( $\pm 50$ °C) in secondary chamber                                                                             |
| TOC content of bottom ash/slag shall be less than 3 % Or LOI content of bottom ash/slag shall be less than 5 % on dry basis.             |
| In general Incinerator will be designed as per CPCB guideline                                                                            |

### ❖ Emission Norms

Bio-Medical Waste Incinerator and its air pollution control system is designed and will be operated to meet following emission norms as per Common BMW Treatment and Disposal Guideline

| <b>Parameter</b>                                                       | <b>Emission limit (mg/Nm<sup>3</sup>)</b> |
|------------------------------------------------------------------------|-------------------------------------------|
| Particulate Matter (PM)                                                | 50                                        |
| HCl                                                                    | 50                                        |
| Total Dioxin and Furan                                                 | 0.1 ng TEQ/Nm <sup>3</sup>                |
| NO <sub>x</sub> (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> ) | 400                                       |

Note: All values above shall be corrected to 11 % oxygen on dry volume basis.

- Incinerator is designed to incinerate cytotoxic drugs at 1200 °C in secondary chamber.
- Dioxin / Furans: While operating at 100 % rated capacity, the system may have an emission of dioxin and furans less than or equal to 0.1 ng TEQ / Nm<sup>3</sup> corrected to 11 % Oxygen. Sampling period shall be minimum 6 hours and maximum 8 hours.

Metals: While operating properly at rated capacity, the system shall have an emission rate from the discharge of stack to atmosphere less than or equal to emission limit provided in CCA & Common BMW Treatment and Disposal Guideline

| <b>Metals</b>           | <b>Emission Limit (mg/Nm<sup>3</sup>)</b> |
|-------------------------|-------------------------------------------|
| Cd+Th (& its compounds) | 0.05                                      |
| Hg (& its compounds)    | 0.05                                      |

Note: All values above shall be corrected to 11% oxygen on dry volume basis.

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### ❖ **Air Pollution Control System**

#### **Incineration Plant will be provided with following air pollution control system**

The emission control system shall be installed for gas cleaning and removal of air pollutants. The system shall comprise of following equipment to meet the emission norms:

1. Gas Quencher with High Pressure Drop, Variable Throat Venturi Scrubber
2. Alkali Scrubber (Counter Current Packed Bed Type)
3. Activated Carbon Adsorption System

Incineration gas after air pollution control system will be exhausted to atmosphere through 30 m high stack.

### ❖ **Incinerator Ash**

Incinerator ash collected from Incinerator furnace will be disposed off into government approved secured land fill of Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF).

### ❖ **Operation Range**

Plant is to be designed to operate between 60% and 100% capacity with respect to thermal capacity of the feed.

### ❖ **Process Description**

Incineration plant is divided into following sections

- Waste Feed Section
- Incineration in Primary Combustion Chamber (PCC), Secondary Chamber and Air Pollution Control System
- Utilities (i.e. DG set)

#### **Waste Feed Section**

Yellow category Bio-Medical Waste (BMW) received will be subjected to Incineration. Waste shall be received at site in packed form in HDPE, non-chlorinated yellow bags. These bags after unloading will be transferred to yellow waste storage area. From yellow waste storage area waste shall be transferred to Incineration Area.

Waste received in yellow bags shall be put directly on waste feed system conveyor arrangement. From here waste will be charged into waste feeding system through gravity double door system. Waste feed system shall consist of following components:

1. Belt/Slat type conveyor to transport waste at top of feed system
2. Waste feed hopper provided with Double door system
3. Waste charging chute to convey waste at the inlet of Primary Combustion Chamber.

|                                                  |                                          |      |            |
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Waste in bags shall be loaded on conveyor manually. Bulk density of Bio-Medical waste is too low, and it is estimated that each bag of Bio-Medical waste will have 5-7 kg of waste only. Thus, to feed 200 kg/hr. waste into incinerator, it is required to feed 29-40 bags every hour into incinerator.

Conveyor will transfer bags into feed hopper. Feed hopper shall have two sections, receiving hopper and charging hopper. Both sections of hopper shall be isolated with hydraulically /pneumatically operated slide gate valves for transfer of bags from receiving section of hopper to charging section of hopper in air-tight mode. There will be continuous feeding of bags to incinerator furnace in air leak proof manner. Incinerator furnace will be provided with refractory castable lined isolation door which will be operated whenever there is need to isolate Furnace from the feed system.

Bio-Medical Waste incineration shall be carried out in dual chamber furnaces. Both, primary and secondary Incineration Chamber shall be of stationary type.

### **Primary Combustion Chamber**

Vertical stationary furnace shall be provided as primary chamber. Here, waste shall be charged to the furnace from the feed section. Incineration of Bio-Medical waste shall be carried out using atmospheric air. Waste to Air ratio shall be maintained so as to ensure complete combustion of waste. Temperature of primary Furnace shall be maintained at min 800 °C. In addition to the Calorific Value available with the waste, fuel oil shall also be used (if required) to maintain the minimum required furnace temperature.

Primary Combustion Chamber shall be a refractory lined furnace having adequate layers of fire bricks and insulation brick at the inside of the shell. Fuel oil burner shall be provided with burner management system. Fuel oil burner shall automatically startup/shutoff based on the furnace temperature. Burner system shall be provided with fuel to air ratio controller and flame failure device.

Outlet hot gas duct from primary combustion chamber is connected with secondary combustion chamber. Ash left out in combustion process remains at the bottom of primary combustion chamber from where it will be discharged through ash door at periodic interval.

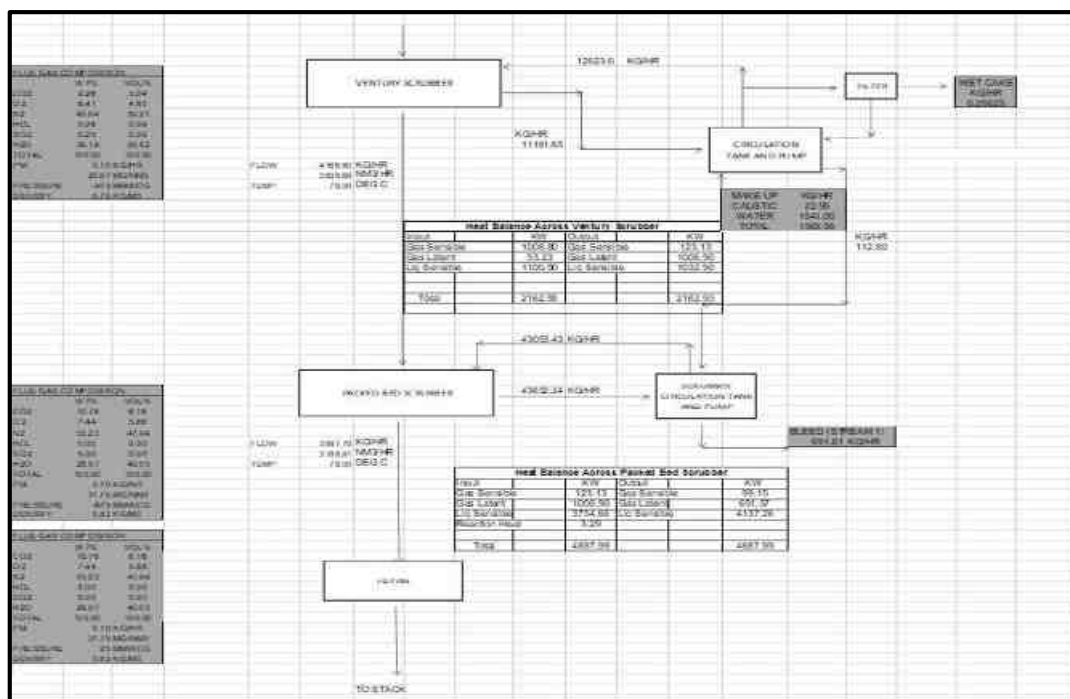
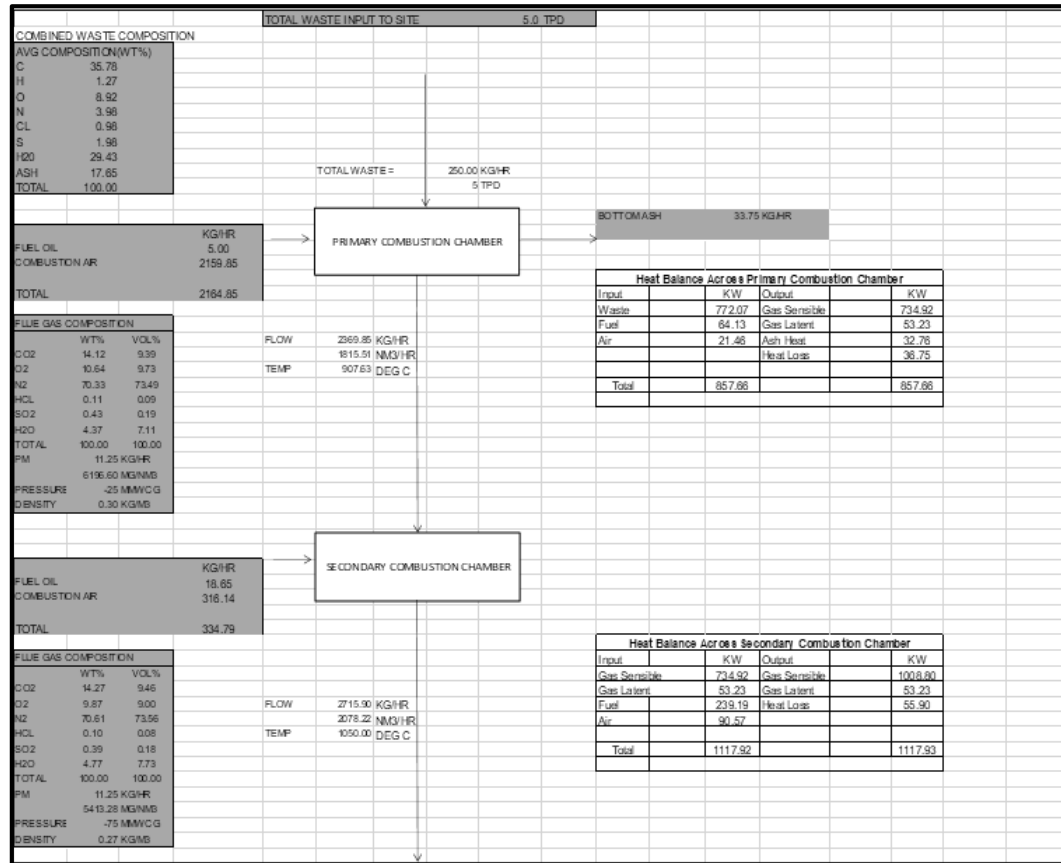
### **Secondary Combustion Chamber**

Hot flue gas from the primary combustion chamber shall be fed to the secondary chamber. Secondary chamber shall be stationary vertical brick lined furnace. Here, flue gas temperature is raised to 1050°C ( $\pm 50$  °C) using an oil burner. Oil burner is also provided with burner management system to control temperature, oil to fuel ratio and flame failure device. Here flue gas is given retention time of more than 2 seconds to ensure complete destruction and removal efficiency of left organic constituents present in flue gas from Primary Combustion Chamber. Secondary combustion chamber shall be provided adequate layer of fire and insulation bricks from inside.



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❖ **Mass Balance of Incineration system is provided as under**



|                                                  |                                          |      |            |
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### ❖ List of Equipment: Incinerator Plant

List of major equipment for Bio-Medical waste incineration system istabulated as under in **Table 2.15**.

**TABLE 2.15 – EQUIPMENT LIST FOR BIO-MEDICAL WASTE INCINERATION SYSTEM**

| Sr. No.  | Name                                                                                                                                                      | Qty           |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <b>1</b> | <b>Feed Section</b>                                                                                                                                       |               |
| 1.01     | Waste Conveyor                                                                                                                                            | 1             |
| 1.02     | Waste charging hopper with Double Door Arrangement                                                                                                        | 1             |
| 1.03     | Furnace door                                                                                                                                              | 1             |
| <b>2</b> | <b>Incineration Section</b>                                                                                                                               |               |
| 2.01     | Primary Combustion Chamber                                                                                                                                | 1             |
| 2.02     | Secondary combustion chamber                                                                                                                              | 1             |
| 2.03     | Oil Burner 1 for Primary Combustion Furnace                                                                                                               | 1 + (1 Spare) |
| 2.04     | Oil Burner 2 for Secondary Combustion Chamber                                                                                                             | 1 + (1 Spare) |
| 2.05     | Bottom Ash Removal System                                                                                                                                 | 1             |
| 2.06     | Emergency Vent Valve                                                                                                                                      | 1             |
| 2.07     | Oil Burner Fan                                                                                                                                            | 1             |
| 2.08     | FD Fan                                                                                                                                                    | 1             |
| <b>3</b> | <b>Air Pollution Control System</b>                                                                                                                       |               |
| 3.01     | Venturi Scrubber                                                                                                                                          | 1             |
| 3.02     | Alkali Scrubber                                                                                                                                           | 1             |
| 3.03     | Activated Carbon Column                                                                                                                                   | 1             |
| 3.04     | Venturi Scrubber circulation tank and Venturi scrubber circulation pump                                                                                   | 2 (1+1)       |
| 3.05     | Alkali Scrubber circulation tank and Alkali scrubber circulation pump                                                                                     | 2 (1+1)       |
| 3.06     | ID Fan                                                                                                                                                    | 2 (1+1)       |
| 3.07     | Alkali solution storage and Dosing Tank and dosing Pump                                                                                                   | 1             |
| 3.08     | Stack                                                                                                                                                     | 1             |
| <b>4</b> | <b>Utilities</b>                                                                                                                                          |               |
| 4.01     | Fuel Oil storage tank with tanker unloading and transfer pump                                                                                             | 1             |
| 4.02     | Drain Pit                                                                                                                                                 | 1             |
| 4.03     | Drain Pit Transfer Pump                                                                                                                                   | 1             |
| <b>5</b> | <b>Ducting, piping and valve</b>                                                                                                                          | 1             |
| <b>6</b> | <b>Plant structures, shed, ladder, platform, supports and all civil work</b>                                                                              | 1             |
| <b>7</b> | <b>Instrumentation inclusive of field instrumentation, PLC based SCADA system, Terminals with computer and printer, Instrumentation panel, automation</b> | 1 set         |
| <b>8</b> | <b>Electrical with electric motors, cables, PCC Panel, MCC panel, VFD panel, VFDs, DG Set and DG set Panel</b>                                            | 1 set         |

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### 2.7.2.2 Autoclave

Autoclaving is a low-heat thermal process where steam is brought into in-direct contact with waste in a controlled manner and for sufficient duration to disinfect the wastes as stipulated under the Bio-medical Waste Management Rules.

#### ❖ Proposed Design Basis:

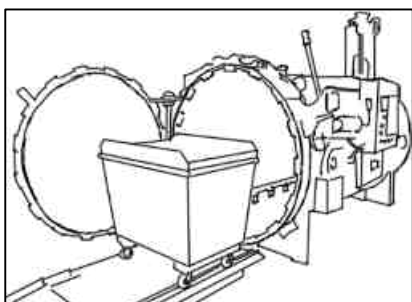
##### Capacity

|                                   |                        |
|-----------------------------------|------------------------|
| No of streams                     | : 2 Nos.               |
| Capacity of each autoclave/stream | : 1000 Lit/Batch       |
| Total Capacity                    | : 2000 Lit/Batch       |
| No. of batches                    | : 16 Nos/Day/Autoclave |
| Time required per batch           | : 1 hr. 30 min         |
| Operating hours considered        | : 24 hrs./Day          |

##### Operating Conditions

|                       |                  |
|-----------------------|------------------|
| Operating Pressure    | : 2 BAR          |
| Operating Temperature | : 121°C to 125°C |

#### ❖ Process Description



Autoclaves are closed chambers that apply heat using steam, over period to sterilize medical equipment. For medical waste that will be disposed of, autoclaves is used as heat treatment processing units to destroy microorganisms before further shredding and recycling or disposal. Autoclaves are a batch process, not a continuous one. Autoclaves are best for wastes that are unlikely to combust or give off substantial off-gas. Autoclaved medical waste is usually compacted after it cools down.

The compaction process may include shredding before the compression. The compaction process reduces the volume of the treated waste significantly. Autoclaves are metal vessels in a cylindrical shape. This shape is better suited to high pressures than rectangular boxes. During operation the pressure inside the vessel is higher than the ambient pressure. There is a door on the end, and the words "auto" and "clave" mean automatic locking due to high pressure, but for safety reasons most are also sealed manually from outside.

Larger autoclaves often operate under vacuum or a steam atmosphere. Pre-vacuum (or high-vacuum) autoclaves have a pump that is used to evacuate air after the chamber is sealed but before heating. Gravity-displacement autoclaves work by injecting steam into the chamber and thereby driving out the air that was present. Operating temperature is typically 120 to 135 °C. Batch time is up to 30 minutes.

The process design of any waste management system must consider the cycle time of the autoclave. Total cycle time includes

- Time for operators to place waste in unit.
- Heat up time - to achieve target temperature
- Cooking time – time spent at target temperature

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- Cool down time
- Removal time for operators to open autoclave once it has cooled sufficiently and to removed waste and put it into packaging for storage until transport.



One cycle of autoclave is approx. 1 hr. 30 min to 2 hrs. The cycle time of an autoclave cannot be modified. Attempts to cut corners will result in safety violations. These include violation of the time-temperature protocol for wastesterilization and opening the autoclave before it has cooled sufficiently, endangering human operators.

Periodically, operators must run tests to ensure disinfection efficacy at regular interval as per CPCB guideline.

For ease and safety in operation, the system should be horizontal type and exclusively designed for treatment of Bio-Medical waste.

For optimum results, pre-vacuum-based system be preferred against the gravity type system. It shall have tamper-proof control panel with efficient display and recording devices for recording critical parameters such as time, temperature, pressure, date and batch number etc. as required under the BMW Rules.

The disinfected waste from autoclave shall be segregated into HDPE, PP, rubber, latex, glass and metal. The segregated materials shall then be shredded completing the process of disinfection and ensuring non-recycling of the waste materials for medical purposes. All the process control conditions will be as per the applicable Bio-Medical rules. It is proposed to install Horizontal rectangular autoclave, single hinge door Autoclave.

**TABLE 2.16 – TECHNICAL SPECIFICATION OF AUTOCLAVE**

| <b>Sr. No.</b>           | <b>Description</b>       | <b>Specification</b>                                                                                                                          |
|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 1                        | Type                     | Single Hinge Door, Horizontal Cylindrical, Automatic Standard Vacuum Pump with Condenser, provided along with long with SS Carriage & Trolley |
| 2                        | Capacity                 | No of Cycle per Day: 16 Nos<br>Total Capacity: 500 kg/batch                                                                                   |
| <b>Working parameter</b> |                          |                                                                                                                                               |
| 1                        | Chamber Working Pressure | 1.06 kg/cm <sup>2</sup> .                                                                                                                     |
| 2                        | Jacket Working Pressure  | 1.5 kg/cm <sup>2</sup> .                                                                                                                      |

|                                                  |                                          |      |            |
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| Sr. No.                         | Description                 | Specification                                                                                                          |
|---------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------|
| 3                               | Chamber Working Temperature | 120 to 135 °C                                                                                                          |
| 4                               | Residence Time              | 60 Min. for Autoclaving                                                                                                |
| <b>Overall Dimensions</b>       |                             |                                                                                                                        |
| 1                               | Type                        | Horizontal Cylindrical                                                                                                 |
| 2                               | Capacity                    | 250 kg/autoclave per batch                                                                                             |
| 3                               | Waste Density Considered    | 250 kg/m <sup>3</sup>                                                                                                  |
| 4                               | Inside Volume of Autoclave  | 1000 Liters                                                                                                            |
| 5                               | Overall Dimensions          | 1.1 m dia x 1.0 m length (Inside clear) (Dim subject to change as per manufacturer standard)                           |
| 6                               | Ground space required       | 2 m x 3 m for each autoclave<br>Front 2 m space for loading and unloading into /from autoclave                         |
| <b>Hydro Test</b>               |                             |                                                                                                                        |
| 1                               | Chamber                     | One & half time the working Pressure                                                                                   |
| 2                               | Jacket                      | Twice the Working Pressure                                                                                             |
| <b>Material of Construction</b> |                             |                                                                                                                        |
| 1                               | Chamber and Back plate      | The Sterilizing Chamber is fabricated from S.S.304 Quality with full argon welding.                                    |
| 2                               | Jacket                      | The jacket is fabricated from M.S Quality                                                                              |
| 3                               | Insulation                  | Resin Bonded Rock wool insulation of 50mm thickness                                                                    |
| <b>Instruments</b>              |                             |                                                                                                                        |
| 1                               | Temperature                 | Thermocouple (0-200°C) range<br>1 No on main chamber<br>1 No on Jacket<br><br>Temperature gauge Local: 1 No on Chamber |

### 2.7.2.3 Shredder

Shredding/De-shaping/Mutilation is a process by which waste are de-shaped or cut into smaller pieces so as to make the wastes unrecognizable. It helps in prevention of reuse of Bio-Medical waste and also acts as identifier that the wastes have been disinfected and are safe to dispose of.

#### ❖ Shredder Details:

##### **Capacity**

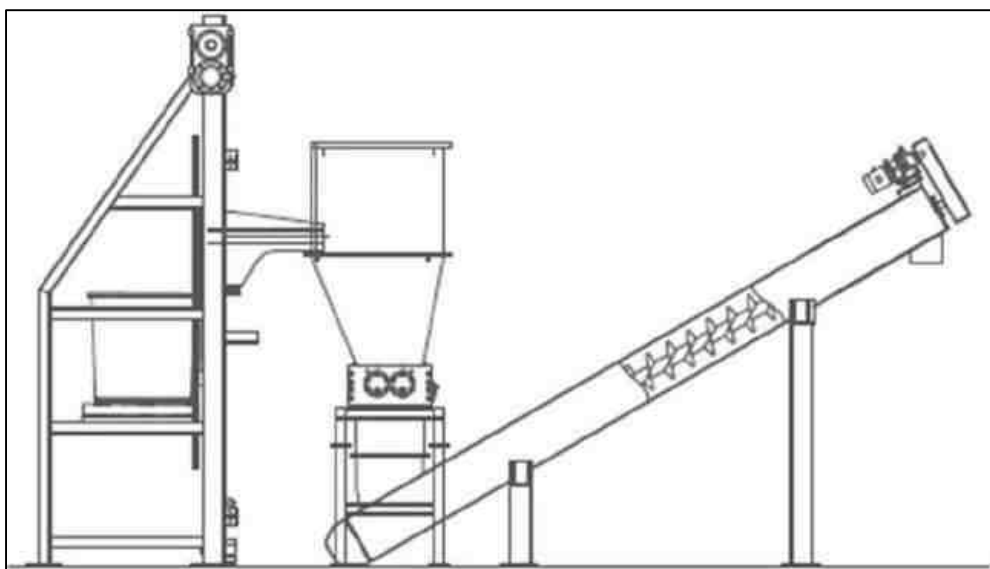
- No of Streams : 2 Nos
- Capacity of each Shredder/stream : 250 kg/hr. x 1 no. and 100 kg/hr.
- Operation : Semi continuous
- Operating hours : 24 hrs. per day

#### ❖ Process Description

Medical waste that is subjected to an autoclave is also subjected to a compaction process, such as shredding/de-shaping, after treatment so that it is no longer recognizable and cannot be re-used for

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other purposes. The compaction process reduces the volume of the treated waste significantly. After treatment and compaction, the treated waste is combined with general waste and sent for recycling (Plastic and glass) or disposed off to secured land fill. Waste that is treated using an autoclave is still recognizable after treatment, and therefore must be shredded after treatment to allow for disposal with general waste.



Each shredder is provided with charging hopper. Waste after autoclaving is taken fed to charging hopper of shredder. Waste is then loaded into charging hopper. Charging hopper is then closed from top. From charging hopper waste is then transferred to shredder part. During operation top door of charging hopper is kept closed. The hopper is well designed to take care of volume and weight of the material. The hopper directs the materials to the cutting chamber. After completion of shredding cycle, machine is stopped and shredded waste from the bottom of machine is collected through conveyor and packed in a black-colored HDPE bag.

**TABLE 2.17 – TECHNICAL SPECIFICATION OF SHREDDER**

| Sr. No                                    | Description        | Specification                               |
|-------------------------------------------|--------------------|---------------------------------------------|
| <b>Shredder Machine for Plastic Waste</b> |                    |                                             |
| 1                                         | <b>General</b>     |                                             |
|                                           | Type of Waste      | Treated Plastic Waste                       |
|                                           | Capacity (Kg/hr)   | 250 kg/hr.                                  |
|                                           | No of Machines     | 1                                           |
|                                           | Feeding Condition  | Batch Feeding of treated Bio-Medical Wastes |
|                                           | Max. working hours | 20 Hrs.                                     |
|                                           | Operating Cycle    | Intermittent                                |
| 2                                         | <b>Shredder</b>    |                                             |
|                                           | Blades             | Shear Type                                  |
|                                           | No. Of Blades      | 5 Moving Blades & 2 Stationary Blades       |
|                                           | Motor Power        | 40HP                                        |
|                                           | MOC of Blades      | Alloy Steel                                 |

|                                                  |                                          |      |            |
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| Sr. No                                  | Description             | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                         | MOC casing              | MS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                         | Feeding Mechanism       | Manual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Shredder Machine for Metal Waste</b> |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 1                                       | <b>General</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                         | Type of Waste           | Bio-Medical Waste like Glass, Syringe, Needles etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                         | Capacity (Kg/hr.)       | 100 Kg/hr.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                         | No of Machines          | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                         | Feeding Condition       | Batch Feeding of treated Bio-Medical Wastes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                         | Max. working hours      | 20 Hrs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                         | Operating Cycle         | Intermittent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2                                       | <b>Shredder</b>         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                         | Cutting Chamber         | Cutting chamber shall have 2 Nos. rotating Shafts. Shafts will be made of High Strength Alloy Steel Designed to avoid frequent damages & failure. Shaft will be fitted with Heat – treated Cutters of Alloy Steel designed for Medical waste.<br>Unit shall be fitted with removable Cleaning Fingers to avoid wrapping of Material around Shaft. It will also have Bearing & Oil Seal Protection from processing Material. It will have a lid at the top of hopper which will be fitted with limit switches to prevent starting of machine when the lid is open |
|                                         | No of Shafts            | 2 Nos., Hexagonal Shaft                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                         | No of Cutter            | 24 Nos. on each shaft                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                         | Motor Power             | 30 HP (15 HP x 2 Nos.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                         | MOC of Shaft and Cutter | High strength Alloy Steel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                         | MOC casing              | MS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                         | Feeding Mechanism       | Manual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

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## 2.8 PROJECT DESCRIPTION

### 2.8.1 Land

Proposed project site will be located at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. Land is in possession of M/s. Navabuddha Agencies Private Limited. Land possession document is attached as **Annexure 1**. Proposed facility will be set up on the land area of 47,696.91 m<sup>2</sup>. Layout plan of the project site is shown in **FIGURE 2.5**. Details of breakup of plot area are covered under following **TABLE 2.21**.



**Source:** M/s. Navabuddha Agencies Private Limited

### PHOTOGRAPH 2.1 – PHOTOGRAPHS OF PROPOSED PROJECT SITE

Layout plan of the project site is shown in **FIGURE 2.5**. Details of breakup of plot area are covered under following **TABLE 2.18**.



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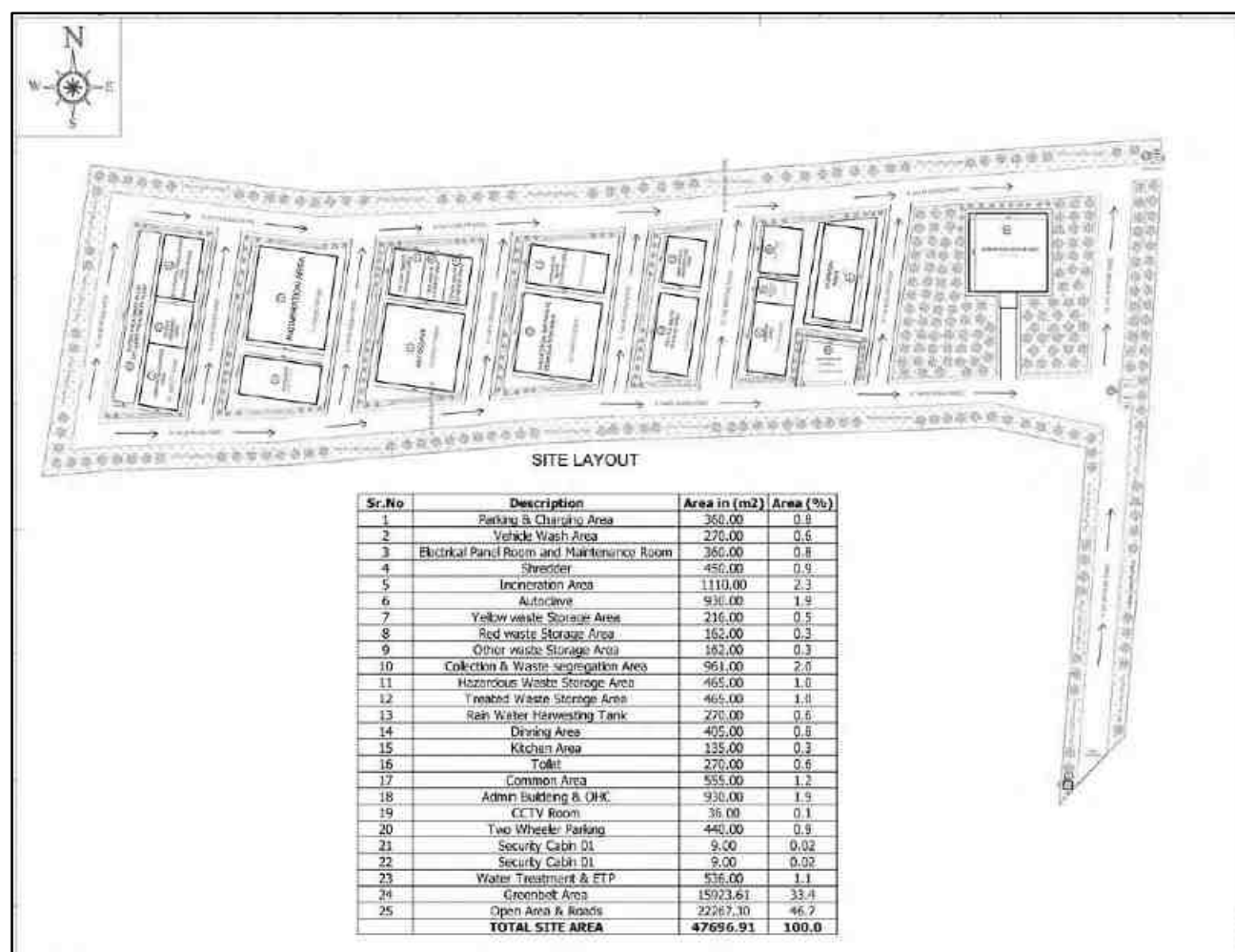


**FIGURE 2.5 – LAYOUT PLAN**

**TABLE 2.18 - AREA BREAKUP OF THE SITE**

| Sr. No. | Particular Area                            | Area (m <sup>2</sup> ) | Area (%) | Description                                                                                              |
|---------|--------------------------------------------|------------------------|----------|----------------------------------------------------------------------------------------------------------|
| 1       | Parking & Charging Area                    | 360                    | 0.8      | Designated area for parking waste collection vehicles and charging electric vehicles/equipment.          |
| 2       | Vehicle Wash Area                          | 270                    | 0.6      | Area provided for cleaning and sanitization of waste transportation vehicles before and after operations |
| 3       | Electrical Panel Room and Maintenance Room | 360                    | 0.8      | Facility housing electrical control panels and maintenance equipment for plant operations and repairs.   |
| 4       | Shredder                                   | 450                    | 0.9      | Area equipped with shredding machines for size reduction of biomedical and other processable waste.      |

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| Sr. No. | Particular Area                     | Area (m <sup>2</sup> ) | Area (%) | Description                                                                                                       |
|---------|-------------------------------------|------------------------|----------|-------------------------------------------------------------------------------------------------------------------|
| 5       | Incineration Area                   | 1110                   | 2.3      | Dedicated zone for high-temperature thermal treatment and disposal of biomedical waste through incineration.      |
| 6       | Autoclave                           | 930                    | 1.9      | Area containing autoclave units used for sterilization and disinfection of infectious biomedical waste.           |
| 7       | Yellow waste Storage Area           | 216                    | 0.5      | Temporary storage area for yellow-category biomedical waste awaiting treatment and disposal.                      |
| 8       | Red waste Storage Area              | 162                    | 0.3      | Designated storage area for red-category recyclable contaminated waste before treatment.                          |
| 9       | Other waste Storage Area            | 162                    | 0.3      | Storage area for general and other segregated waste streams pending processing or disposal.                       |
| 10      | Collection & Waste segregation Area | 961                    | 2.0      | Area for receiving, unloading, inspection, and segregation of incoming biomedical waste.                          |
| 11      | Hazardous Waste Storage Area        | 465                    | 1.0      | Secure storage facility for hazardous waste generated from plant operations before authorized disposal.           |
| 12      | Treated Waste Storage Area          | 465                    | 1.0      | Temporary storage area for waste that has undergone treatment and is ready for final disposal or recycling.       |
| 13      | Rain Water Harvesting Tank          | 270                    | 0.6      | Infrastructure for collection and storage of rainwater to support water conservation and groundwater recharge.    |
| 14      | Dining Area                         | 405                    | 0.8      | Space provided for employees to take meals and refreshments.                                                      |
| 15      | Kitchen Area                        | 135                    | 0.3      | Facility for preparation and serving of food and beverages for staff.                                             |
| 16      | Toilet                              | 270                    | 0.6      | Sanitary facilities provided for employees and visitors                                                           |
| 17      | Common Area                         | 555                    | 1.2      | Shared circulation and utility space including corridors, waiting areas, and access zones.                        |
| 18      | Admin Building & OHC                | 930                    | 1.9      | Administrative offices and Occupational Health Centre for management activities and employee healthcare services. |
| 19      | CCTV Room                           | 36                     | 0.1      | Control room for monitoring surveillance systems and ensuring site security.                                      |

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| Sr. No.                | Particular Area       | Area (m <sup>2</sup> ) | Area (%)     | Description                                                                                                                                      |
|------------------------|-----------------------|------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 20                     | Two Wheeler Parking   | 440                    | 0.9          | Dedicated parking facility for employee and visitor two-wheelers.                                                                                |
| 21                     | Security Cabin 01     | 9                      | 0.02         | Security post for monitoring entry, exit, and visitor management at the site. Additional security post for site surveillance and access control. |
| 22                     | Security Cabin 01     | 9                      | 0.02         | Additional security post for site surveillance and access control.                                                                               |
| 23                     | Water Treatment & ETP | 536                    | 1.1          | Facility for treatment of process water, wastewater, and effluent prior to discharge or reuse.                                                   |
| 24                     | Greenbelt Area        | 15923.61               | 33.4         | Landscaped plantation area developed to improve aesthetics, reduce air pollution, and enhance environmental quality.                             |
| 25                     | Open Area & Roads     | 22267.30               | 46.7         | Internal roads, maneuvering spaces, and open areas facilitating transportation, access, and future operational requirements.                     |
| <b>Total Site Area</b> |                       | <b>47,696.91</b>       | <b>100.0</b> |                                                                                                                                                  |

### 2.8.2 Water

For the proposed project, total water requirement will be 132.4 KLD (74.4 KLD industrial + 2.25 KLD domestic + 55.8 KLD gardening) and wastewater generation will be 37.7 KLD (35.7 KLD industrial + 2 KLD domestic). Out of 132.4 KLD total water requirement, 94.7 KLD water will be fresh water and the rest 37.7 KLD water will be recycled water. Industrial effluent (i.e. 35.7 KLD) will be treated into in-house ETP consisting of Primary, Secondary and Tertiary treatment units and recycled back into plant premises for different activities. Domestic sewage (i.e. 2.0 KLD) will be treated into packaged STP plant and recycled back into gardening/flushing activity within premises. So, the entire plant will be designed based on Zero Liquid Discharge (ZLD) technology and no effluent will be discharged outside plant premises or any of the surface bodies.

Required fresh water will be sourced through Local Panchayat Water Supply network. No ground water will be extracted for any of the project activities. Detailed water balance and breakup of water consumption is provided in **Section 2.9.2**.

### 2.8.3 Energy (Power and Fuel) Requirement

#### ❖ Power Requirement:

The power requirement for project will be 500 KVA and it will be sourced from Tamil Nadu Electricity Board (TNEB). DG Set having capacity 250 KVA x 2 nos. will be installed as backup power supply and will be used only during emergency power backup. Low Sulphur fuel like Light Diesel Oil (~22 L/h) will be used in DG set. Backup for electricity connection load is provided in below table. To reduce overall power consumption.

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## Characteristics of Fuel:

**TABLE 2.19 – CHARACTERISTICS OF FUEL**

| Sr. No. | Parameter                    | Unit    | HSD              | LDO              |
|---------|------------------------------|---------|------------------|------------------|
| 1       | Total Moisture               | % (wt.) | ≤ 0.05           | ≤ 0.20           |
| 2       | Ash Content:                 | % (wt.) | ≤ 0.01           | ≤ 0.02           |
| 3       | Volatile Matters:            | % (wt.) | ~99              | ~98              |
| 4       | Fixed Carbon:                | % (wt.) | Negligible       | Negligible       |
| 5       | Gross Calorific Value (GCV): | kcal/kg | ~10,200 – 10,800 | ~10,000 – 10,500 |
| 6       | Sulfur Content:              | % (wt.) | ≤ 0.001          | ~0.5 – 1.8       |

### 2.8.4 Local and Other Infrastructure

The new project of Common Bio-Medical Waste Treatment facility (CBMWTF) located at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. The project site is well connected by road to nearby city and town. The following are key infrastructure components available:

**Road Connectivity:** The site is well connected through internal roads. It is accessible via State Highway 71 (around 7.0km), enabling smooth transportation of Bio- Medical Waste.

**Power Supply:** The power requirement is met by Tamil Nadu Electricity Board (TNEB), which ensures stable electricity through a well-laid electrical distribution network within the estate. DG sets are also available for emergency backup.

**Water Supply:** sourced through Local Panchayat Water Supply network. No ground water will be extracted for any of the project activities.

**Fuel:** Fuel such as HSD and LDO are available through local suppliers.

**Manpower and Housing:** Adequate skilled and unskilled workforce is available from nearby villages and towns. Housing and rental accommodation are accessible in Kallai Village.

## 2.9 MITIGATION MEASURES INCORPORATED INTO THE PROJECT

### 2.9.1 Gaseous Emission and Its Control

Due to proposed new project various sources of air pollution are identified during operation phase. Identified sources of gaseous emissions are as follows:

During operational phase, gaseous emissions will occur from operation of Incinerators and stand by DG Set. Likely major air pollutants from incineration system for the project is PM, HCl and NO<sub>x</sub> from stacks attached to incinerator and PM, SO<sub>x</sub> and NO<sub>x</sub> from DG set stack.

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Proposed Incinerators with capacity of 250 kg/hr x 1 no. and 300 kg/hr x 1 no will be provided with APC system consisting of Gas Quencher, High Pressure Drop Variable Throat Venturi Scrubber, Alkali Scrubber and Activated Carbon Adsorption System along with stack of 30 m Height each.

Proposed DG set having capacity of 250 KVA x 2 nos. will be provided with adequate stack height of 20 m.

### **2.9.1.1 Air Pollution Control System**

Three stage flue gas cleaning system is provided to meet the final emission limit.

Stage 1: Gas Quencher with High Pressure Drop Variable Throat Venturi Scrubber for Particle Capture

Stage 2: Counter Current Packed Bed Scrubber for Capturing HCl gases in Caustic Solution

Stage 3: Activated Carbon Adsorption Column for capturing any skipped VOCs / Organics.

### **2.9.1.2 Gas Quencher with Variable Throat Venturi Scrubber**

Gas quencher will be installed immediately after secondary combustion chamber. It shall be designed to take gas inlet temperature of 1100 °C. This is a co current gas quencher where hot gas is brought in contact with alkaline water or alkaline aqueous wastewater (high TDS). Flow rate of injection water is controlled such that outlet gas temperature from gas quencher is in range of 350-500 °C. Liquid is injected in form of fine mist created by atomization using compressed air in liquid injector at top of vessel. Gas quencher is a Mild Steel vessel provided with Tile lining on shell. Dry solids from wastewater / water are collected at bottom of gas quencher under sealed condition through valve / screw conveyor. These solids are inorganic salts which are disposed of into Secured land fill facility. Due to presence of free alkalinity in liquid sprayed in gas quencher it will neutralize part of acidity present in incineration flue gas.

From gas quencher incineration flue gas at 350-500 °C is taken at the inlet of variable throat Venturi scrubber. Here incineration flue gas at high velocity contacted with circulating scrubber liquor in Venturi throat to effect intense contact between liquid and gas. High velocity contact in Venturi throat results in high efficiency particulate matter removal in Venturi scrubber. Pressure Drop across Venturi throat is maintain all the time at 450 mmwc using variable throat arrangement to ensure that desired particulate matter removal efficiency of 98-98.5% is attained in Venturi scrubber. At Venturi scrubber incineration flue gas is cooled down to saturation temperature.

Outlet circulating liquor from Venturi scrubber is first taken to circulation tank provided with particle settlement compartment for separation of captured particles under gravity. Overflow from settling compartment is taken at the inlet of scrubber circulation tank. Separate Venturi scrubber circulation pump shall be provided for circulating scrubber liquor through Venturi scrubber.

Venturi Scrubber incinerator gas is taken at the inlet of two stage alkali scrubber. First stage of alkali scrubber is provided with spray section where incoming gases from venturi scrubber is contacted under countercurrent mode with the alkaline scrubber liquor for scrubbing of balance HCl present in flue gas. After spray section, gas is further contacted in packed bed section in top portion of alkali scrubber. Here, gas is contacted with circulating scrubber liquor in presence of packing to ensure that desired removal efficiency of HCl is achieved.

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Scrubber liquor circulation system consists of scrubber liquor circulation tank, scrubber liquor circulation pump (separate for venturi scrubber and alkali scrubber) and scrubber liquor cooler to remove heat absorbed by scrubber liquor in quenching gases from 500 °C to saturation level. Shell and Tube type scrubber liquor cooler is provided to perform this duty. In order to ensure efficiency of scrubbing of HCl gas, free alkalinity in form of free NaOH is always maintained in scrubber liquor. This is controlled by measuring online pH of scrubber liquor and auto make of NaOH solution in the scrubber liquor tank.

Part of scrubber liquor is required to bleed off on continuous basis which is sent to effluent treatment plant. Treated wastewater from effluent treatment plant is used for makeup in scrubber liquor and gas quencher feed tank.

#### **2.9.1.3 Activated Carbon Adsorption**

Incineration is designed for operating at 800+°C in stationary incinerator and 1100+°C in post combustion chamber with min 2.5 sec retention time for flue gas and at this operating condition it will ensure complete destruction of organic component present in Bio-Medical waste. However, in any rarest circumstances' carryover of traces of unburnt organic possibility cannot be denied. There may be rare possibility of reformation of dioxin and furans in air pollution control system. In order to remove such rare possible hydrocarbons and dioxin and furan content from flue gas Activated Carbon Adsorption treatment is incorporated after Alkaliscrubber.

Gases after alkali scrubber will be passed through Activated Carbon Column to adsorb organic constituents if present in the incineration flue gas. These components will get adsorb in on Activated Carbon surface.

#### **2.9.1.4 ID Fan**

A centrifugal fan is provided to maintain negative draft in the system and to overcome pressure drop in the entire system. Negative pressure in incinerator is controlled automatically by controlling speed of the fan through inverter drive.

#### **2.9.1.5 Stack**

Rubber lined stack will be used after the scrubber system with flue gas sampling port, platform, ladder with safety ring.

#### **2.9.1.6 Emergency Stack**

The emergency stack is located on top of the Secondary chamber is provided to vent of gas in case of power failure or over pressure of system due to failure of ID Fan or due to sudden explosion of waste in furnace. Emergency valve is provided perform this task. Emergency valve get signal from pressure transmitter in Primary and Secondary Combustion Chamber.

#### **2.9.1.7 Emergency Overhead Tank**

Though emergency stack vents the gas to atmosphere during power failure, additional safety system consisting of overhead tank is provided to quench the residual flue gas present in the quencher. This

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can cause damage to downstream equipment because of overheating. In order to protect the same, water from emergency overhead tank floods the quencher allowing cooling of flue gas.

#### 2.9.1.8 Details of Flue gas and process gas emissions:

Details of the proposed stacks, fuel to be used and quantity of fuel used, process emissions air pollution control measures (APCM) and expected pollutants are tabulated in below **TABLE 2.23 & TABLE 2.24.**

**TABLE 2.20 – DETAILS OF FLUE GAS EMISSIONS**

| Sr. No. | Stack Attached to           | Stack Height                         | Fuel Consumption          | Pollutants                   | Air pollution control system       |
|---------|-----------------------------|--------------------------------------|---------------------------|------------------------------|------------------------------------|
| 1       | D.G. set<br>(250 KVA*2 No.) | No: 1<br>Height: 20 m<br>Dia: 200 mm | HSD/LDO<br>(50 liter/hr.) | PM<br>SOx<br>NO <sub>2</sub> | Adequate stack with<br>20 m height |

**TABLE 2.21 – DETAILS OF PROCESS GAS EMISSIONS**

| Sr. No. | Stack Attached to                                                  | Stack Height                              | Fuel Consumption                   | Pollutants                                                                               | Air pollution control system                                                                                                                                                                                           |
|---------|--------------------------------------------------------------------|-------------------------------------------|------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Incinerators:<br><br>250 kg/hr x 1 no.<br>and<br>300 kg/hr x 1 no. | No: 1 each<br>Height: 30 m<br>Dia: 400 mm | HSD/LDO<br>(Total 55<br>liter/hr.) | PM<br>NO <sub>2</sub><br>HCl<br>Total<br>Dioxins<br>and Furans<br>Hg & It's<br>Compounds | APC system<br>consisting of Gas<br>Quencher, High<br>Pressure Drop<br>Variable Throat<br>Venturi Scrubber,<br>Alkali Scrubber and<br>Activated Carbon<br>Adsorption System<br>along with stack of<br>30 m Height each. |

**TABLE 2.22 – EMISSION STANDARDS**

| Sr. No. | Parameter                                                              | Standards                                                     |                                                                 |
|---------|------------------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------|
|         |                                                                        | Limiting concentration<br>in mg/Nm <sup>3</sup> unless stated | Sampling Duration in<br>minutes, unless stated                  |
| 1       | Particulate matter                                                     | 50                                                            | 30 or 1 Nm <sup>3</sup> of sample volume,<br>whichever is more. |
| 2       | Nitrogen Oxides NO and<br>NO <sub>2</sub> expressed as NO <sub>2</sub> | 400                                                           | 30 or 1 Nm <sup>3</sup> for online sampling<br>or grab Sample   |
| 3       | HCl                                                                    | 50                                                            | 30 or 1 Nm <sup>3</sup> of sample volume,<br>whichever is more. |

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| Sr. No. | Parameter                | Standards                                                  |                                                                   |
|---------|--------------------------|------------------------------------------------------------|-------------------------------------------------------------------|
|         |                          | Limiting concentration in mg/Nm <sup>3</sup> unless stated | Sampling Duration in minutes, unless stated                       |
| 4       | Total Dioxins and Furans | 0.1 ng 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. |
| 5       | Hg and its compounds     | 0.05                                                       | 2 hours or 1 Nm <sup>3</sup> of sample volume, whichever is more. |

(Reference: Bio-Medical Waste Management Rules, 2016)

### 2.9.2 Water Consumption, Wastewater Generation, Treatment of Wastewater & Disposal Details

For the proposed project, total water requirement will be 132.4 KLD (74.4 KLD industrial + 2.25 KLD domestic + 55.8 KLD gardening) and wastewater generation will be 37.7 KLD (35.7 KLD industrial + 2 KLD domestic). Out of 132.4 KLD total water requirement, 94.7 KLD water will be fresh water and the rest 37.7 KLD water will be recycled water. Industrial effluent (i.e. 35.7 KLD) will be treated into in-house ETP consisting of Primary, Secondary and Tertiary treatment units and recycled back into plant premises for different activities. Domestic sewage (i.e. 2.0 KLD) will be treated into packaged STP plant and recycled back into gardening/flushing activity within premises. So, the entire plant will be designed based on Zero Liquid Discharge (ZLD) technology and no effluent will be discharged outside plant premises or any of the surface bodies.

Required fresh water will be sourced through Local Panchayat Water Supply network. No ground water will be extracted for any of the project activities.

Water consumption and waste water generation for different heads are tabulated in **TABLE 2.26** Water Balance diagram is provided in **FIGURE 2.6**

**TABLE 2.23 – DETAILS OF WATER CONSUMPTION AND WASTE WATER GENERATION**

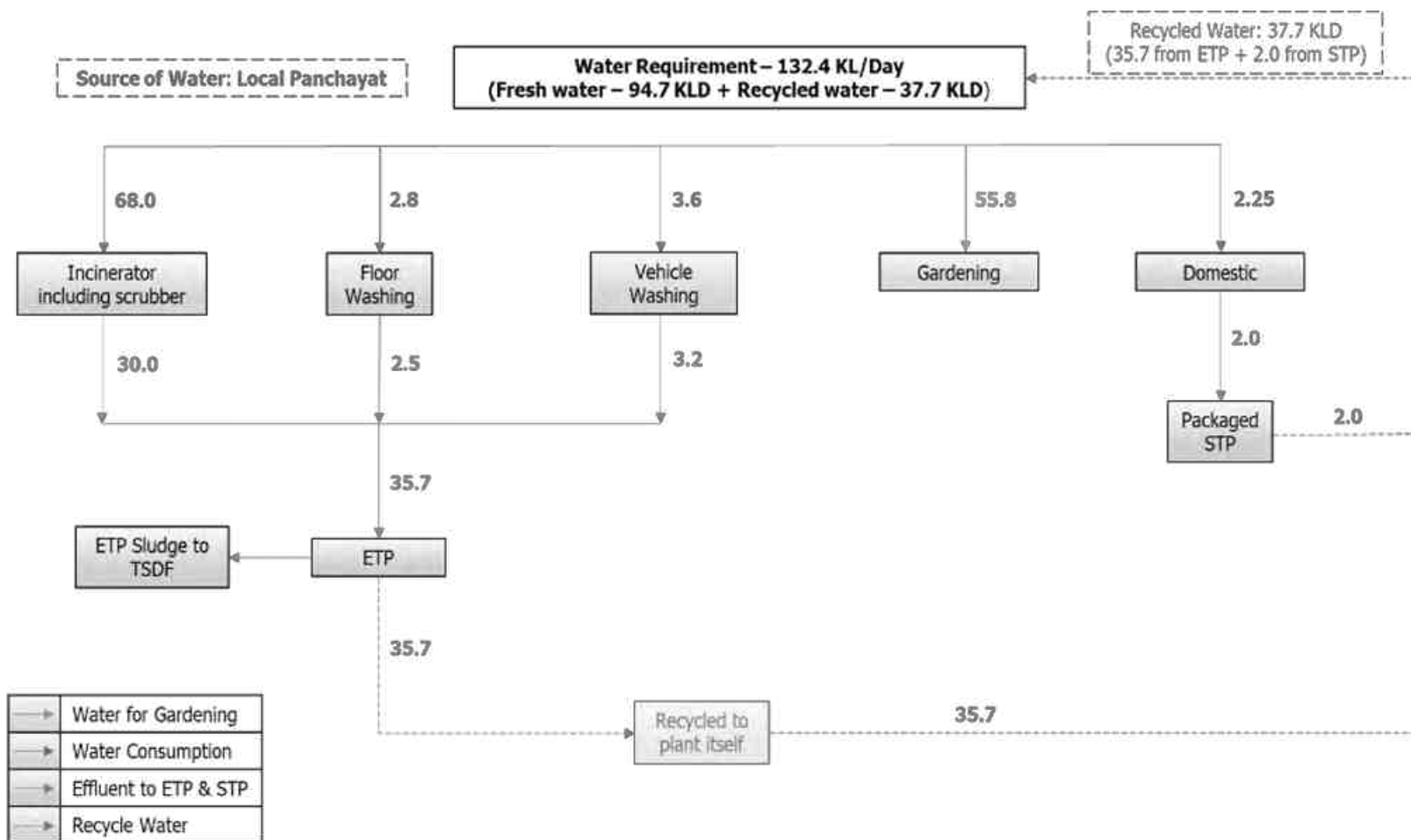
| Sr. No.      | Purpose                                      | WATER CONSUMPTION (KLD) | WASTE WATER GENERATION (KLD) |
|--------------|----------------------------------------------|-------------------------|------------------------------|
| <b>1</b>     | <b>Domestic</b>                              | <b>2.25</b>             | <b>2</b>                     |
| <b>2</b>     | <b>Gardening</b>                             | <b>55.8</b>             | <b>0.0</b>                   |
| <b>3</b>     | <b>Industrial</b>                            | <b>74.4</b>             | <b>35.7</b>                  |
| (A)          | Incinerator, scrubber, cooling tower make up | 68.0                    | 30.0                         |
| (B)          | Floor Washing                                | 2.8                     | 2.5                          |
| (C)          | Vehicle Washing                              | 3.6                     | 3.2                          |
| <b>TOTAL</b> |                                              | <b>132.4</b>            | <b>37.7</b>                  |

Following measures shall be taken to reduce freshwater demand:

- Maximize use of treated wastewater back to plant premises.
- Use of drip irrigation/sprinkling system for green belt development, which will reduce the freshwater demand.



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Note: All the Figures are in KLD

FIGURE 2.6 – WATER BALANCE DIAGRAM

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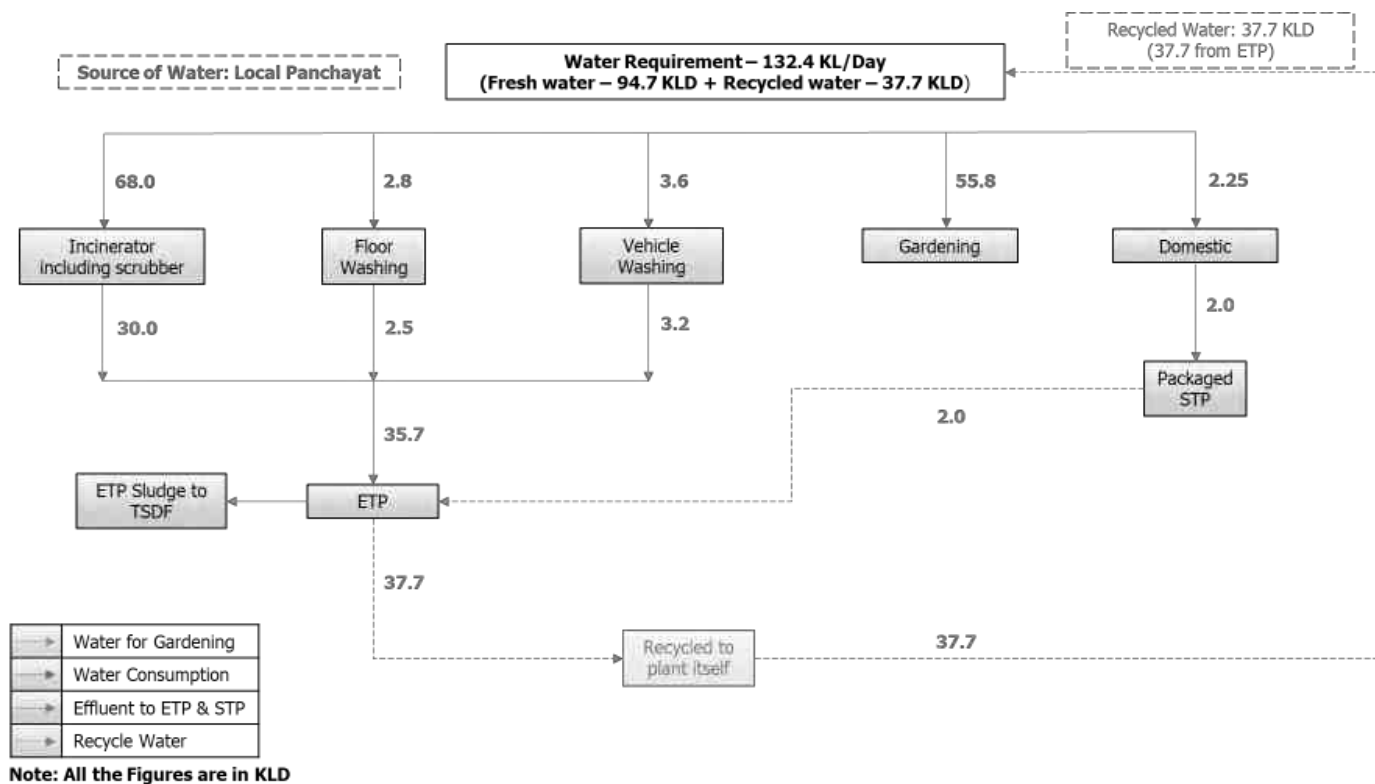


**FIGURE 2.7 – PROPOSED WATER BALANCE DIAGRAM DURING HEAVY RAINFALL**

**Note:** A rainwater harvesting system will be incorporated into the facility design, wherein approximately 39.08 KLD of rainwater is estimated to be collected. For effective storage and utilization, a 50 KLD capacity rainwater collection tank is provided. The system is equipped with multiple filtration units, including screens and filter media, to remove suspended solids, debris, and impurities before storage. This ensures that the harvested rainwater is of suitable quality for reuse in non-potable applications such as for utility purposes, thereby contributing to water conservation and reducing dependence on fresh water sources.

|                                                  |                                          |      |            |
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### 2.9.2.1 Process Description of Effluent Treatment Plant

#### **Description of Effluent Treatment Plant**

The wastewater from the CBMWTF is expected to consist of mainly suspended particles collected from air pollution control system and traces of organic matters contaminated due to vehicle and floor washing. In order to treat effluent generated from facility, primary, secondary and tertiary treatment plant is provided.

Effluent generated from the facility is collected in an underground effluent collection tank cum equalization tank. From here effluent is pumped to primary treatment plant consisting of Oil and Grease Trap, Flash Mixer, Flocculation Channel and Primary Settling Tank.

In oil and grease trap is a baffle wall channel where free floating oil is separated from top. Waste water from oil and grease trap is taken to flash mixer where it is dosed with PAC for flocculation of suspended solids. From flash mixer effluent is taken at the inlet of flocculator where it is dosed with Polyelectrolyte for coagulation and for making large flocs. Flocculator is a baffle wall channel for allowing gentle mixing of waste water stream. From flocculator effluent is taken at the inlet of Primary Settling Tank. Here precipitated solids are settled under gravity. Supernatant from primary settling tank is taken at the inlet of Secondary Treatment Plant consisting of Aeration Tank.

In Aeration Tank, soluble biodegradable component of effluent subjected to biological treatment in presence of Biomass, Nutrient and Oxygen. Air required is supplied through Air Blower and Nutrient required for process is dosed in form of DAP/Urea in Aeration Tank. Mixed liquor from Aeration Tank is taken at the inlet of secondary settling tank. Here suspended biomass is settled at bottom of secondary settling tank and recycled back to aeration tank through sludge recirculation pump. Excess biomass generated is wasted as side stream of the sludge recirculation line on periodic basis. Overflow and supernatant from the secondary settling tank is taken for tertiary treatment.

Tertiary treatment consists of pressure sand filter and activated carbon filter. In pressure sand filter carried over suspended solids are filtered in Multigraded Sand Filter. Traces of organic impurities are adsorbed in Activated Carbon Filter as polishing treatment. Treated waste water from activated carbon is further dosed with 0.5-1 ppm Sodium Hypochlorite solution for disinfection of waste water before it is reused.

Sludge slurry generated from primary settling tank and biological treatment is collected on sludge drying bed. Leachate from sludge drying bed is taken back to equalization tank. Dried sludge will be collected from sludge drying bed on periodic basis, packed in HDPE bags and stored in sludge storage area for disposal to TSDF site.

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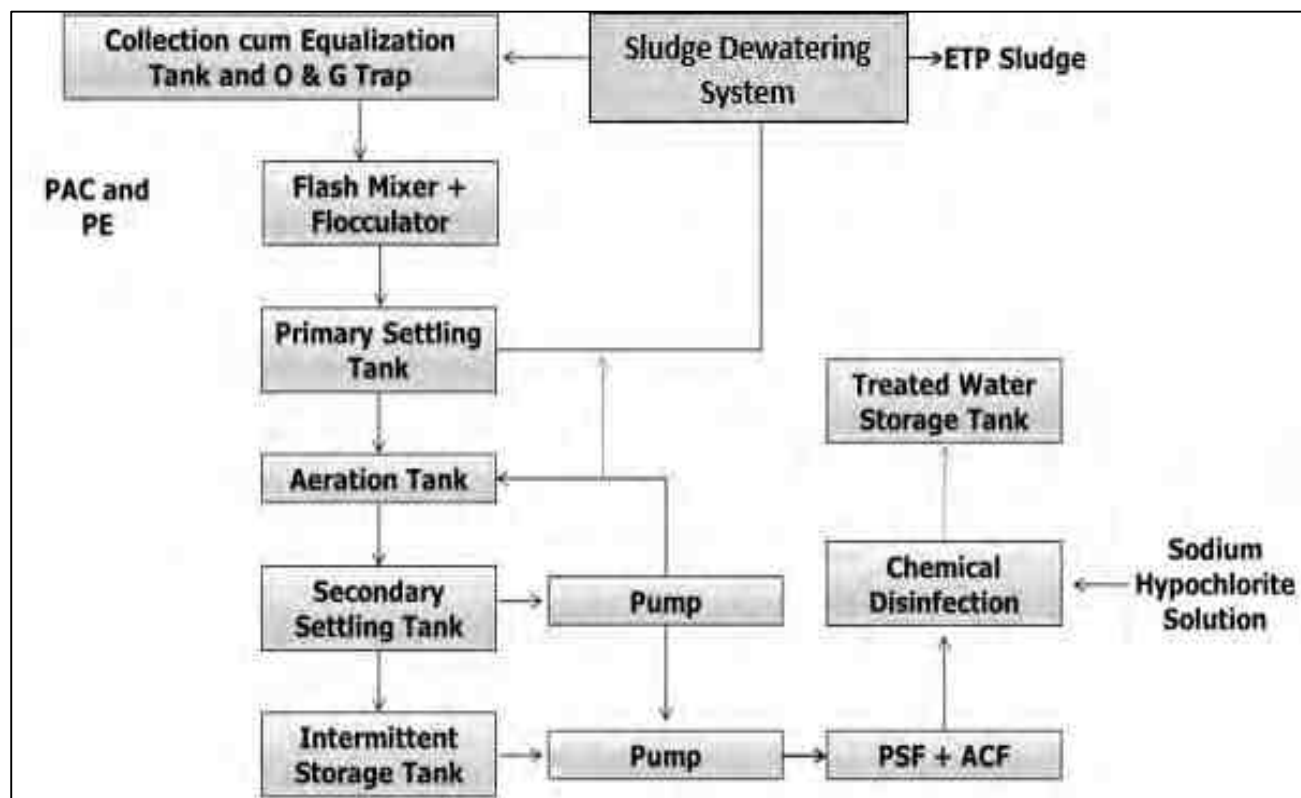


**FIGURE 2.8 – PROCESS DESCRIPTION OF ETP**

**TABLE 2.24 – CHARACTERISTICS OF EFFLUENT**

| Sr. No | Parameter                      | Unit   | Before Treatment | Design Value for ETP | After Treatment                                    |
|--------|--------------------------------|--------|------------------|----------------------|----------------------------------------------------|
| 1      | pH                             | -      | 6.5 to 8.5       | 6.5 to 8.5           | 6.5 to 9.0                                         |
| 2      | Biological Oxygen Demand (BOD) | mg/lit | 100-200          | 250                  | <10                                                |
| 3      | Chemical Oxygen Demand (COD)   | mg/lit | 400-700          | 800                  | <250                                               |
| 4      | Suspended Solids               | mg/lit | 200-400          | 400                  | <100                                               |
| 5      | Oil and Grease                 | mg/lit | 10-20            | 20                   | 10                                                 |
| 6      | Bio-assay test                 | -      | -                |                      | 90% Survival of fish after 96 hrs in 100% effluent |

|                                                  |                                          |      |            |
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**Actual Flow: 37.7 KLD**

**Design Capacity of ETP: 40 KLD**

**TABLE 2.25 – LIST OF EFFLUENT TREATMENT PLANT UNITS**

| Sr. No. | Name of equipment                                               | No. of Unit | Specification                                                                                                                                                                        |
|---------|-----------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Wastewater Collection cum Equalization Tank & Oil & Grease Trap | 01          | Capacity considered: 40 m <sup>3</sup> /Day<br>HRT: 12 hrs<br>Dimensions: 2.75 x 2.75 x (2.65 + 0.5 FB) m<br>Volume: 20 m <sup>3</sup><br>MOC: RCC/MSEP                              |
| 2       | Wastewater feed pump                                            | 02          | Flow: 35.7 m <sup>3</sup> /Day<br>Capacity considered: 40 m <sup>3</sup> /Day<br>Operating Hours: 24<br>Capacity of pump: 1.7 m <sup>3</sup> /hr<br>No: 2 (1 W + 1 SB) MOC: CI/SS316 |
| 3       | Flash Mixer 1 and 2                                             | 01          | HRT: 10-15 mins<br>Dimensions: 1 x 1 x 0.5 m<br>Volume: 0.5 m <sup>3</sup><br>MOC: MSEP/HDPE                                                                                         |
| 4       | Flocculator                                                     | 01          | Flow: 35.7 m <sup>3</sup> /Day<br>Capacity: 40 m <sup>3</sup> /Day<br>HRT: 30-45 mins<br>Size: 1.25 x 1 x 1 m<br>Volume: 1.25 m <sup>3</sup>                                         |
| 5       | Primary Settling Tank                                           | 01          | Flow: 35.7 m <sup>3</sup> /Day<br>Capacity: 40 m <sup>3</sup> /Day<br>HRT: 4 hrs<br>Size: 2 x 1.65 x (2 + 0.5 FB) m<br>Volume: 6.7 m <sup>3</sup>                                    |
| 6       | Aeration Tank                                                   | 01          | FF/M: 0.12<br>MLSS: 3000 mg/lit<br>HRT: 20 hrs<br>Size: 3.5 x 3.5 x (2.75 + 0.5 FB) m<br>Volume: 33.6 m <sup>3</sup><br>MOC: RCC                                                     |
| 7       | Secondary Clarifier                                             | 01          | Flow: 35.7 m <sup>3</sup> /Day<br>Capacity: 40 m <sup>3</sup> /Day<br>HRT: 4 hrs<br>Size: 2 x 1.65 x (2 + 0.5 FB) m<br>Volume: 6.7 m <sup>3</sup>                                    |
| 8       | Intermittent Storage Tank                                       | 01          | HRT: 8 hrs<br>Flow: 35.7 m <sup>3</sup> /Day<br>Capacity: 40 m <sup>3</sup> /Day<br>Size: 2.5 x 1.77 x (3 + 0.5 FB) m<br>Volume: 13.3 m <sup>3</sup>                                 |

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| <b>Sr. No.</b> | <b>Name of equipment</b>      | <b>No. of Unit</b> | <b>Specification</b>                                                                                                                                                                                   |
|----------------|-------------------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9              | Pressure Sand Filter (PSF)    | 02                 | Flow: 35.7 m <sup>3</sup> /Day, Capacity: 40 m <sup>3</sup> /Day<br>Working Hours: 20, Flow: 1 m <sup>3</sup> /hr<br>Filtration velocity: 12 m/hr<br>Nos: 2<br>Diameter: 0.4 m, Straight height: 1.8 m |
| 10             | Activated Carbon filter (ACF) | 02                 | Flow: 35.7 m <sup>3</sup> /Day, Capacity: 40 m <sup>3</sup> /Day<br>Working Hours: 20, Flow: 1 m <sup>3</sup> /hr<br>Filtration velocity: 12 m/hr<br>Nos: 2<br>Diameter: 0.4 m, Straight height: 1.8 m |
| 11             | Treated Tank                  | 01                 | Capacity considered: 40 m <sup>3</sup> /Day<br>HRT: 12 hrs<br>Dimensions: 2.75 x 2.75 x (2.65 + 0.5 FB) m<br>Volume: 20 m <sup>3</sup><br>MOC: RCC/MSEP                                                |

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### 2.9.3 Waste Management (Hazardous and Non-Hazardous Waste)

List of waste generated from facility, their storage and disposal plan is provided as under in **TABLE 2.26**.

**TABLE 2.26 – CATEGORIZATION, STORAGE AND DISPOSAL OF SOLID WASTE**

| Sr. No.                    | Name of Hazardous Waste                          | Source                   | Haz. Waste Category* | QUANTITY GENERATED (Kg/Day) | Method of Disposal/Treatment                               |
|----------------------------|--------------------------------------------------|--------------------------|----------------------|-----------------------------|------------------------------------------------------------|
| 1                          | Incineration ash                                 | Incinerator              | 37.2                 | 1320                        | Sent to secured landfill site                              |
| 2                          | ETP Sludge                                       | ETP area                 | 35.3                 | 60                          | Sent to secured landfill site                              |
| 3                          | Plastic Waste after Autoclave and shredding      | Shredder                 | --                   | 2600                        | Sent to Authorized Recyclers                               |
| 4                          | Glass and metallic body implants After Autoclave | Autoclave                | --                   | 5700                        | Sent to Authorized Recyclers                               |
| 5                          | Metal Sharps after Autoclave and Shredding       | Shredding                | --                   | 440                         | Sent to foundry for metal recovery / secured landfill site |
| 6                          | Waste oil                                        | From Plant & Machineries | 5.1                  | As generated                | Sent to Authorized Recyclers                               |
| 7                          | Used batteries                                   | --                       | --                   | As generated                | Sent to Authorized Recyclers                               |
| <b>Non-Hazardous Waste</b> |                                                  |                          |                      |                             |                                                            |
| 1                          | STP Sludge                                       | From STP                 | --                   | 2.3                         | Used as Manure in Gardening                                |

|                                                  |                                          |  |  |      |            |
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| Sr. No. | Name of Hazardous Waste                                                                    | Source                           | Haz. Waste Category* | QUANTITY GENERATED (Kg/Day) | Method of Disposal/Treatment                                                                                                               |
|---------|--------------------------------------------------------------------------------------------|----------------------------------|----------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 2       | C&D Waste                                                                                  | Construction Activity            | --                   | 570360 Kg                   | Recyclable waste will be reused within plant premises for construction purpose and nonrecyclable waste will be send for MSW landfill site. |
| 3       | Municipal Solid Waste - Wet Waste (kitchen waste, food leftovers, fruit & vegetable peels) | From Canteen                     | --                   | 8                           | Segregation, Collection, Storage and used as manure for gardening.                                                                         |
| 4       | Municipal Solid Waste - Dry Waste (plastic, paper, metal, glass)                           | From Stationary, Admin Area etc. | --                   | 6                           | Segregation, Collection, Storage, transportation and sent to authorized recyclers.                                                         |
|         | Sanitary Waste (diapers, sanitary napkins)                                                 |                                  |                      |                             | Segregation, Collection, Storage, Transportation and sent to authorized municipal agency / incineration facility (CBWTF where applicable). |
|         | Special Care waste (bulbs, batteries, medicines)                                           |                                  |                      |                             | Segregation, Collection, Storage, transportation and sent to authorized recyclers.                                                         |

**Note\*:** Category as per Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016

Proper collection, storage and management of hazardous waste are essential to prevent environmental contamination and ensure worker safety. The unit will adopt the following measures for safe and compliant handling of hazardous waste:



|                                                  |                                          |      |            |
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❖ **Collection:**

- 1) Hazardous waste generated from various processes (ETP sludge, used oil, etc.) will be collected at designated collection points.
- 2) Waste shall be segregated at source to avoid mixing of incompatible wastes.
- 3) Waste will be stored in designated tightly closed HDPE bags/drums are labelled as "**Hazardous Waste**".
- 4) Proper labelling and color-coded containers will be used for easy identification.
- 5) The collected waste will be transferred through trolley to the storage area.

❖ **Storage:**

- 6) A dedicated **Hazardous Waste Storage Area** will be developed as per the CPCB/GPCB guidelines.
- 7) The area will be **impermeable**, covered with a roof and equipped with proper drainage and containment measures (e.g., bund walls) to prevent leakage or spillage.
- 8) Containers will be kept on pallets and all containers will be labelled with details like name of waste, category, quantity, date of generation and disposal route.

❖ **Management:**

- 9) Hazardous waste will be temporarily stored onsite and then sent to **authorized recyclers, co-processors, or TSDF (Treatment, Storage, and Disposal Facility)** as per the Hazardous & Other Wastes (Management and Transboundary Movement) Rules, 2016.
- 10) Records of generation, storage and disposal will be maintained in **Form 3** and annual returns will be submitted in **Form 4** to the concerned SPCB.
- 11) Waste manifest system (Form 10) will be followed for transportation.

#### 2.9.4 Noise Generation

The source of noise from the project is from following activities

- ID and FD Fan of Incinerator
- Shredder
- Air Blower of ETP
- DG Set (When Operated during power failure)
- Other Rotating Machinery Such as Pump and Conveyor

#### 2.9.5 Rainwater Harvesting System

Rain Water Harvesting (RWH) is the process of capturing and storing rain water for its efficient utilization and conservation. In roof top rain water harvesting the rain water is collected from roof of the buildings and stored in water tank or pond for beneficial use in future. It is an effective tool to utilize a large quantity of fresh water which otherwise goes as runoff. Rain water collection and reuse. To collect water from the RCC rooftop drainpipes are required. These drainpipes are proposed to connect to the main rainwater collection pipes, provided with collection chambers.

|                                                  |                                          |      |            |
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## Rain water harvesting & Storm Water Calculations

Taking the Central Ground Water Board (CGWB) recommendations in to consideration, the storm water calculations were taken up by utilizing the land use details available for the construction site. The results derived are as follows:

### ❖ Storm Water:

#### Primary Data:

|                                                                                 |                                                        |
|---------------------------------------------------------------------------------|--------------------------------------------------------|
| Rainfall (dependable):                                                          | 625.4 mm (or) 0.6254 m                                 |
| Run off co-efficient is taken as per CGWB guidelines in the range of 0.2 to 0.9 |                                                        |
| Note: One hectare:                                                              | 10,000 m <sup>2</sup>                                  |
| Total Plot Area:                                                                | 47,696.91 m <sup>2</sup> (i.e. total of the following) |
| Built up area:                                                                  | 6250 m <sup>2</sup> (suitable for roof top)            |
| Green Belt Area (33.4%):                                                        | 15,923.61 m <sup>2</sup>                               |
| Remaining open plot area:                                                       | 25523.3 m <sup>2</sup>                                 |

#### I. Storm Water calculation around the Project Site Area:

|                                                                 |                                                                   |
|-----------------------------------------------------------------|-------------------------------------------------------------------|
| Area: 500 m around the proposed site:                           | using formula $\pi r^2 = 3.14 * (500 * 500)$                      |
|                                                                 | = 785000 m <sup>2</sup> or 0.785 km <sup>2</sup> or 78.5 hectares |
| Runoff co-efficient:                                            | 0.5                                                               |
| Net Storm water available for storm water around plant premise: | = 785000 * 0.5 * 0.6254<br>= 2,45,469.5 m <sup>3</sup>            |

#### II. Storm Water calculation within Project Site:

|                                                            |                                                              |
|------------------------------------------------------------|--------------------------------------------------------------|
| A. Green Belt Area (33.4%)                                 | 15,923.61 m <sup>2</sup>                                     |
| Runoff co-efficient:                                       | 0.5                                                          |
| Net storm water available from green belt area:            | = 15,923.61 * 0.5 * 0.6254<br>= 4979.31 m <sup>3</sup>       |
| B. Remaining open plot area & road area:                   | 25523.3 m <sup>2</sup>                                       |
| Runoff co-efficient:                                       | 0.2                                                          |
| Net storm water available from open plot area & road area: | = 25523.3 * 0.2 * 0.6254<br>= 3192.45 m <sup>3</sup>         |
| Total storm water:                                         | = A + B<br>= 4979.31 m <sup>3</sup> + 3192.45 m <sup>3</sup> |
| <b>Total Storm Water</b>                                   | <b>= 8171.76 m<sup>3</sup></b>                               |

### Rain Water

#### Rain Water Collection Calculations for the Project Site Area:

|                                        |                       |
|----------------------------------------|-----------------------|
| A. Built up area suitable for Roof top | = 6250 m <sup>2</sup> |
| Runoff co-efficient:                   | = 0.9                 |

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
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|                                                     |                                                             |
|-----------------------------------------------------|-------------------------------------------------------------|
| Net storm water available from Gardening belt area: | = 6250 * 0.9 * 0.6254<br>= 3517.9 m <sup>3</sup> (Annually) |
|                                                     |                                                             |
| <b>Water available for collection:</b>              | <b>39.08 m<sup>3</sup></b>                                  |

It is around 39.08 KLD considering 3 months of monsoon season. Against which unit has proposed to provide rain water collection tank having capacity of 50 m<sup>3</sup> (10 m x 5 m x 1 m).

|                                                  |                                           |                                                                                    |            |
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## CHAPTER 3: DESCRIPTION OF THE ENVIRONMENT

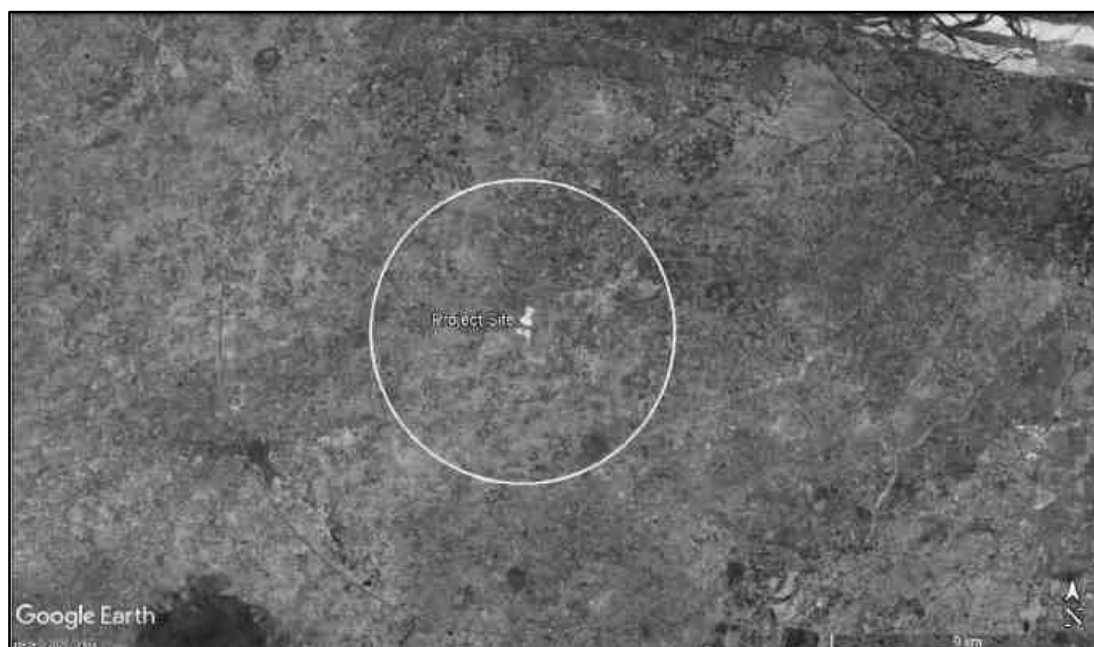
### 3.1 INTRODUCTION

This chapter presents the baseline environmental status of the study area surrounding the project site, which forms the foundation for the identification, prediction, and evaluation of potential environmental impacts. The baseline environmental quality has been assessed through systematic field studies conducted within the defined impact zone, covering key environmental components such as air quality, noise levels, water quality, land characteristics, geo-hydrology, ecology, and socio-economic conditions.

The information on baseline environmental status is essential for conducting a comprehensive Environmental Impact Assessment (EIA). The EIA process involves the identification and prediction of environmental consequences arising from proposed project activities. These consequences include potential direct and indirect adverse impacts on environmental attributes such as flora and fauna, human health, socio-economic conditions, land use patterns, natural resources, and physical as well as cultural heritage features within the study area.

### 3.2 STUDY AREA, PERIOD, COMPONENTS AND METHODOLOGY

The baseline environmental quality has been assessed during **1<sup>st</sup> July, 2025 to 17<sup>th</sup> September, 2025** in a study area of 10 km radial distance from the project site. The map showing location of the project site with 5 km & 10 km radius of the study area is given in **MAP 3.1**.



-  5 km Radius
-  10 km Radius

**MAP 3.1 – STUDY AREA MAP – 5 KM & 10 KM FROM PROJECT SITE**

|                                                  |                                           |                                                                                    |            |
|--------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|------------|
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Key environmental components studied include meteorology, ambient air quality, noise levels, water (surface and groundwater), soil, land use, ecology (flora and fauna) and socio-economic conditions. Data was collected through a combination of primary monitoring and secondary sources.

Monitoring and analysis were conducted using standard methods prescribed by CPCB/ MoEFCC. Site selection for sampling was based on prevailing wind direction, topography and proximity to sensitive receptors to ensure a representative environmental profile for impact assessment. Baseline monitoring has been carried out by M/s. PolluCare Engineering India Private Limited (Environmental Testing Laboratory), which is recognized under EPA by MoEFCC and also Accredited by NABL. The methodology of data collection and analysis adopted is given in **TABLE 3.1**.

**TABLE 3.1 – METHODOLOGY OF DATA COLLECTION**

| Environmental Attributes                  | Methods                                                                                                                                                                   |                                                                                                 |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
|                                           | Sampling / Preservation                                                                                                                                                   | Analysis                                                                                        |
| <b>A. Water</b>                           |                                                                                                                                                                           |                                                                                                 |
| Ground Water                              | Standard Methods for Sampling of Water and Wastewater                                                                                                                     | IS 3025, APHA 24 <sup>th</sup> Edition Standard Methods for Examination of Water and Wastewater |
| Surface Water                             |                                                                                                                                                                           |                                                                                                 |
| <b>B. Climate &amp; Meteorology</b>       | Site-specific meteorological data for the project site have been collected using Weather Station for period from 1 <sup>st</sup> March 2025 to 31 <sup>st</sup> May 2025. | NA                                                                                              |
| <b>C. Ambient Air Quality</b>             | As per IS: 5182                                                                                                                                                           | As per IS: 5182                                                                                 |
| <b>D. Noise</b>                           | Sound level meter                                                                                                                                                         | Survey carried out as per EPA 1986                                                              |
| <b>E. Land Use &amp; Land Cover</b>       | Land use map prepared by Functional Area Expert by visual image interpretation using data of IRS-P6 LISS III, NRSC Satellite image, Hyderabad                             |                                                                                                 |
| <b>F. Ecology &amp; Biodiversity Data</b> | Primary data collection by site visit and Secondary data verification                                                                                                     |                                                                                                 |
| <b>G. Socio-economic Data</b>             | Primary data collection by site visit and Secondary data verification                                                                                                     |                                                                                                 |
| <b>H. Hydrology &amp; Geology</b>         | Primary data collection by site visit and Secondary data verification                                                                                                     |                                                                                                 |

|                                                  |                                           |                                                                                    |            |
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### 3.3 BASELINE DETAILS

#### 3.3.1 Water

##### 3.3.1.1 Introduction

Describing the existing water environment helps in evaluating the existing health of water body and suggesting appropriate mitigation measures to minimize the potential impact from development projects. Water environment is widely divided into following two categories:

**Surface water:** River, Ponds/Lakes, etc.

**Ground water:** Accumulation in deeper strata of ground / aquifers.

##### 3.3.1.2 Location of Water Monitoring Stations

The sampling locations for the water bodies were finalized after reconnaissance survey and consultation with the functional area experts. For the sampling and monitoring purpose, following criteria were considered in below **TABLE 3.2**.

**TABLE 3. 2 – SITE SELECTION CRITERIA**

| <b>Site Selection Criteria for Surface Water Analysis</b>                                                                                                                                                                                                                                                              | <b>Site Selection Criteria for Ground Water Analysis</b>                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1) The sampling locations were selected based on upstream and downstream sides of the water body.</li> <li>2) Drainage pattern.</li> <li>3) Lakes and canal in the study area.</li> <li>4) Water bodies which may get affected due to the proposed project activity.</li> </ol> | <ol style="list-style-type: none"> <li>1) Drainage pattern.</li> <li>2) Areas which may get affected due to the proposed expansion project activity.</li> <li>3) Any probable locations with open discharge of sewage or wastewater.</li> </ol> |

Considering above criteria, surface water sampling has been carried out at eight locations and for ground water sampling, samples from eight locations (i.e., bore-well water) were collected during the baseline monitoring period. The sampling locations for surface water and ground water are marked in **MAP 3.2 & MAP 3.3** respectively, and the same is presented in **TABLE 3.3**. These results are compared with the drinking water standards provided by IS 10500:2012.

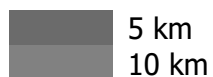
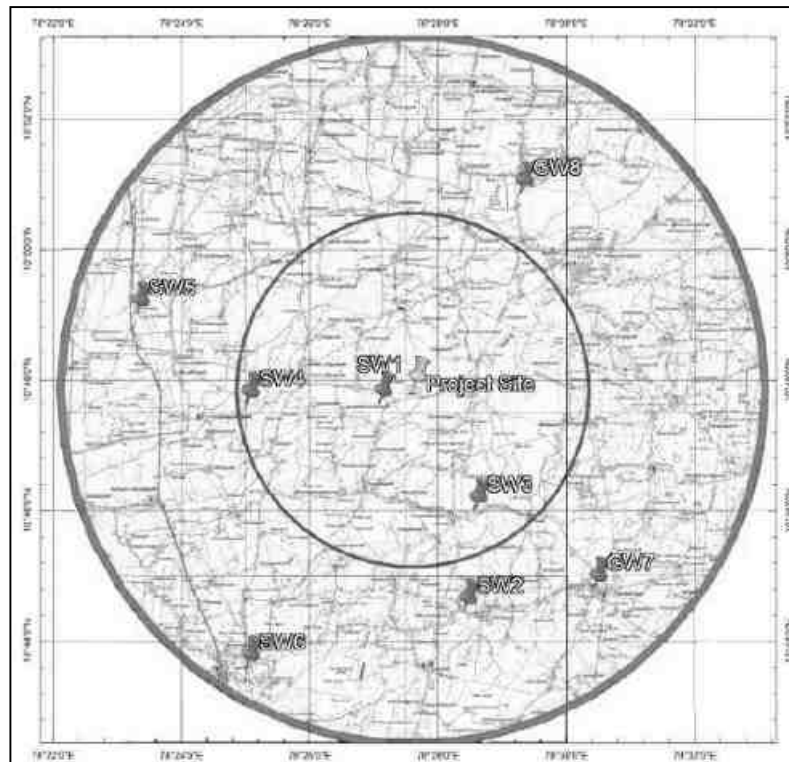
|                                                         |                                           |  |                                                                                    |            |
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**TABLE 3.3 – DETAILS OF WATER SAMPLING LOCATIONS**

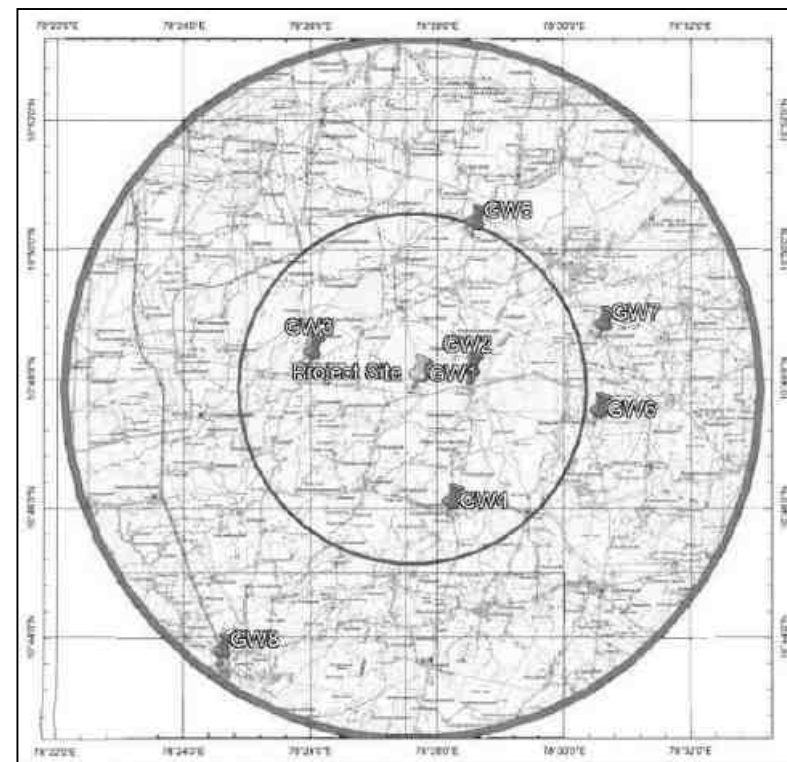
| Station code         | Location                    | Latitude      | Longitude     | Elevation (in m) | Aerial Dist. from Project Site (in km) |
|----------------------|-----------------------------|---------------|---------------|------------------|----------------------------------------|
| <b>Surface Water</b> |                             |               |               |                  |                                        |
| SW-1                 | Project Site                | 10°47'37.71"N | 78°27'4.05"E  | 141              | 1.10 (WSW)                             |
| SW-2                 | Perur Udayappatti Pond      | 10°44'26.26"N | 78°28'23.41"E | 142              | 6.44 (SSE)                             |
| SW-3                 | Puthur Pond                 | 10°45'59.42"N | 78°28'32.89"E | 132              | 3.78 (SSE)                             |
| SW-4                 | Mayanur Barrier Right Canal | 10°47'36.72"N | 78°24'59.88"E | 143              | 4.83 (W)                               |
| SW-5                 | Keelaveliyur Lake           | 10°49'0.39"N  | 78°23'16.75"E | 140              | 8.22 (WNW)                             |
| SW-6                 | Kavalkaranpatti             | 10°43'34.09"N | 78°24'59.98"E | 172              | 9.24 (SSW)                             |
| SW-7                 | Sivayam South Pond          | 10°44'47.19"N | 78°30'25.11"E | 140              | 7.59 (SE)                              |
| SW-8                 | Meghamalai Pond             | 10°50'51.28"N | 78°29'16.15"E | 114              | 6.32 (NE)                              |
| <b>Ground Water</b>  |                             |               |               |                  |                                        |
| GW-1                 | Project Site                | 10°47'49.42"N | 78°27'38.59"E | 133              | --                                     |
| GW-2                 | Kallai                      | 10°47'54.75"N | 78°28'26.99"E | 124              | 1.55 (E)                               |
| GW-3                 | Perur Udayappatti           | 10°48'10.99"N | 78°25'56.59"E | 140              | 3.10 (WNW)                             |
| GW-4                 | Vengatampatti               | 10°45'51.58"N | 78°28'8.12"E  | 135              | 3.80 (SSE)                             |
| GW-5                 | Bullpatti                   | 10°50'11.68"N | 78°28'31.06"E | 119              | 4.65 (NNE)                             |
| GW-6                 | Thalinji                    | 10°47'16.33"N | 78°30'27.98"E | 124              | 5.30 (ESE)                             |
| GW-7                 | Purasampatti                | 10°48'36.95"N | 78°30'32.01"E | 118              | 5.50 (ENE)                             |
| GW-8                 | Thogaimalai                 | 10°43'32.52"N | 78°24'30.80"E | 169              | 9.74 (SW)                              |

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The Topomap showing the location of Surface water & Ground water Monitoring locations is mentioned below:



**MAP 3.2 – SURFACE WATER MONITORING LOCATIONS**



**MAP 3.3 – GROUND WATER MONITORING LOCATIONS**



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|-------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|------------|
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Photographs of the surface water monitoring and ground water monitoring are provided below:

The Topomap showing the location of Surface water & Ground water Monitoring locations is mentioned below:

### 3.3.1.3 Methodology for Sampling, Preservation and Transportation

Water samples were collected by trained personnel with relevant field experience, ensuring adherence to standard protocols during collection, preservation, transportation and storage. Strict compliance with these procedures is essential to maintain the integrity and representativeness of the samples. Care was taken to prevent any physical or chemical changes during handling, ensuring that the samples remained in a suitable condition for accurate laboratory analysis.

The key aspects which were taken care of during transport and storage are highlighted as under:

- Samples were collected in HDPE containers and packed to avoid breakage and cross contamination.
- Sample degradation was reduced through appropriate preservation and 1ml 1N HNO<sub>3</sub> per litre of sample was added for analysis of selected metals.
- Sample containers were sealed, labelled and carefully packed with an appropriate packing material and stored in chilled containers (around 4 °C). The chain of custody records was also maintained as per standard protocol.
- Microbiology samples were collected in sterile glass bottles.
- The pH was monitored at the time of collection and the DO was fixed on site.

**TABLE 3.4 – METHODOLOGY FOR SAMPLING, PRESERVATION AND TRANSPORTATION**

| Sr.No. | Parameters                                              | Test Method                      |
|--------|---------------------------------------------------------|----------------------------------|
| 1      | Colour                                                  | IS 3025 (Part 4) 2021            |
| 2      | Odour                                                   | IS 3025 (Part 5) 1983 (RA 2018)  |
| 3      | Turbidity                                               | IS 3025 (Part 10) 1984 (RA 2017) |
| 4      | pH Value @ 25 °C                                        | IS 3025 (Part 11) 1983 (RA 2019) |
| 5      | Temperature                                             | IS 3025 (Part 9) 1984 (RA 2017)  |
| 6      | Total Dissolved Solids @ 180°C                          | IS 3025 (Part 16) 1984 (RA 2017) |
| 7      | Bio chemical Oxygen Demand (27°C for 3 days)            | IS 3025 (Part 44) 1993 (RA 2019) |
| 8      | Chemical Oxygen Demand (COD)                            | IS 3025 (Part 58) 2006 (RA 2017) |
| 9      | Dissolved Oxygen (DO)                                   | IS 3025 (Part 38) 1989 (RA 2019) |
| 10     | Calcium (as Ca)                                         | IS 3025 (Part 40) 1991 (RA 2019) |
| 11     | Chlorides (as Cl )                                      | IS 3025 (Part 32) 1988 (RA 2019) |
| 12     | Copper (as Cu)                                          | IS 3025 (Part 2) 2004            |
| 13     | Iron (as Fe)                                            | IS 3025 (Part 2) 2004            |
| 14     | Magnesium (as Mg)                                       | IS 3025 (Part 46) 1994 (RA 2019) |
| 15     | Potassium (as K)                                        | IS 3025 (Part 45) 1993 (RA 2019) |
| 16     | Nitrate (as NO <sub>3</sub> )                           | IS 3025 (Part 34) 1988 (RA 2019) |
| 17     | Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH) | IS 3025 (Part 43) 1992 (RA 2019) |
| 18     | Sulphates (as SO <sub>4</sub> <sup>-2</sup> )           | IS 3025 (Part 24) 1986 (RA 2019) |
| 19     | Pesticides                                              | PCEI/SOP/W/075                   |

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| Sr.No. | Parameters                               | Test Method                         |
|--------|------------------------------------------|-------------------------------------|
| 20     | Total Alkalinity (as CaCO <sub>3</sub> ) | IS 3025 (Part 23) 1986 (RA 2019)    |
| 21     | Total Hardness (as CaCO <sub>3</sub> )   | IS 3025 (Part 21) 2009 (RA 2019)    |
| 22     | Zinc (as Zn)                             | IS 3025 (Part 2) 2004               |
| 23     | Cadmium (as Cd)                          | IS 3025 (Part 2) 2004               |
| 24     | Cyanide (as CN)                          | APHA 23rd Edition, 4500 CN-B,E:2017 |
| 25     | Lead (as Pb)                             | IS 3025 (Part 2) 2004               |
| 26     | Mercury (as Hg)                          | IS 3025 (Part 2) 2004               |
| 27     | Nickel (as Ni)                           | IS 3025 (Part 2) 2004               |
| 28     | Total Arsenic (as As)                    | IS 3025 (Part 2) 2004               |
| 29     | Total Chromium (as Cr)                   | IS 3025 (Part 2) 2004               |
| 30     | Faecal Coliform                          | IS 1622:1981                        |
| 31     | Total Coliform                           | IS 1622:1981                        |

#### 3.3.1.4 Results

The results of the water quality analysis for both surface and groundwater samples collected from the study area are presented below in **TABLE 3.5** and **TABLE 3.6**. The analytical findings have been compared with relevant national standards to assess the suitability of water for various uses, such as drinking, domestic and irrigation purposes. This evaluation helps in understanding the existing status of water resources and identifying any potential environmental concerns.

|                                                  |                                           |                                                                                    |            |
|--------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|------------|
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| Title                                            | Chapter 3: Description of the Environment | Date                                                                               | 08/06/2026 |

**TABLE 3.5 – SURFACE WATER QUALITY OF STUDY AREA**

| Sr.No. | PARAMETER                                    | UNIT  | SW1          | SW2         | SW3          | SW4          | SW5 -        | SW6          | SW7          | SW8          |
|--------|----------------------------------------------|-------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1      | Colour                                       | Hazen | 60.0         | 50.0        | 50.0         | 60.0         | 60.0         | 70.0         | 60.0         | 60.0         |
| 2      | Odour                                        | -     | Disagreeable |             |              |              |              |              |              |              |
| 3      | Turbidity                                    | NTU   | 3.60         | 4.20        | 3.80         | 3.40         | 4.90         | 5.20         | 3.80         | 3.70         |
| 4      | pH @ 25 °C                                   | -     | 7.14         | 7.33        | 6.49         | 6.88         | 8.07         | 7.44         | 7.62         | 7.45         |
|        | Electrical Conductivity                      | µs/cm | 349.00       | 185.00      | 153.00       | 580.00       | 272.00       | 690.00       | 582.00       | 491.00       |
| 5      | Temperature                                  | oC    | 28.10        | 27.60       | 27.30        | 27.60        | 27.30        | 27.30        | 28.10        | 27.80        |
| 6      | Total Dissolved Solids @ 180°C               | mg/L  | 234.00       | 114.00      | 96.30        | 377.00       | 177.00       | 446.00       | 384.00       | 314.00       |
| 7      | Bio chemical Oxygen Demand (27°C for 3 days) | mg/L  | 11.30        | 8.24        | 20.70        | 6.12         | 2.28         | 15.20        | 10.13        | 2.19         |
| 8      | Chemical Oxygen Demand (COD)                 | mg/L  | 43.50        | 32.80       | 82.20        | 28.80        | 8.22         | 57.60        | 38.10        | 8.22         |
| 9      | Dissolved Oxygen (DO)                        | mg/L  | 4.60         | 5.10        | 3.80         | 5.50         | 5.70         | 5.10         | 5.30         | 5.80         |
| 10     | Calcium (as Ca)                              | mg/L  | 48.30        | 24.00       | 17.63        | 57.70        | 44.80        | 30.50        | 46.70        | 58.50        |
| 11     | Chlorides (as Cl )                           | mg/L  | 56.00        | 26.00       | 30.00        | 40.00        | 19.00        | 60.00        | 51.00        | 39.00        |
| 12     | Copper (as Cu)                               | mg/L  | BDL(DL:0.1)  | BDL(DL:0.1) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) |

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| Sr.No. | PARAMETER                                               | UNIT | SW1            | SW2            | SW3            | SW4            | SW5 -          | SW6            | SW7            | SW8            |
|--------|---------------------------------------------------------|------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 13     | Iron (as Fe)                                            | mg/L | 1.12           | 0.96           | 0.83           | 1.24           | 1.26           | 0.79           | 0.85           | 1.06           |
| 14     | Magnesium (as Mg)                                       | mg/L | 5.68           | 4.86           | 0.97           | 8.74           | 4.37           | 13.60          | 4.12           | 6.31           |
| 15     | Potassium (as K)                                        | mg/L | 2.36           | 1.47           | 2.54           | 2.13           | 1.98           | 1.37           | 2.54           | 2.37           |
| 16     | Nitrate (as NO <sub>3</sub> )                           | mg/L | 6.13           | 5.89           | 2.16           | 3.41           | 2.86           | 3.91           | 2.49           | 3.62           |
| 17     | Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH) | mg/L | BDL(DL:0.0001) | BDL(DL:0.0001) | BDL(DL:0.0001) | BDL(DL:0.0001) | BDL(DL:0.0001) | BDL(DL:0.0001) | BDL(DL:0.0001) | BDL(DL:0.0001) |
| 18     | Sulphates (as SO <sub>4</sub> -2)                       | mg/L | 23.70          | 19.20          | 14.10          | 28.60          | 12.70          | 27.40          | 16.20          | 21.80          |
| 19     | Pesticides                                              | mg/L | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  |
| 20     | Total Alkalinity (as CaCO <sub>3</sub> )                | mg/L | 125.00         | 43.50          | 15.80          | 127.00         | 135.00         | 127.00         | 121.00         | 119.00         |
| 21     | Total Hardness (as CaCO <sub>3</sub> )                  | mg/L | 144.00         | 80.00          | 48.00          | 180.00         | 130.00         | 132.00         | 134.00         | 172.00         |
| 22     | Zinc ( as Zn)                                           | mg/L | BDL(DL:0.01)   | BDL(DL:0.01)   | BDL(DL:0.01)   | BDL(DL:0.01)   | BDL(DL:0.01)   | BDL(DL:0.01)   | BDL(DL:0.01)   | BDL(DL:0.01)   |
| 23     | Cadmium (as Cd)                                         | mg/L | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  |
| 24     | Cyanide (as CN)                                         | mg/L | BDL(DL:0.02)   | BDL(DL:0.02)   | BDL(DL:0.02)   | BDL(DL:0.02)   | BDL(DL:0.02)   | BDL(DL:0.02)   | BDL(DL:0.02)   | BDL(DL:0.02)   |
| 25     | Lead (as Pb)                                            | mg/L | BDL(DL:0.01)   | BDL(DL:0.01)   | BDL(DL:0.01)   | BDL(DL:0.01)   | BDL(DL:0.01)   | BDL(DL:0.01)   | BDL(DL:0.01)   | BDL(DL:0.01)   |
| 26     | Mercury (as Hg)                                         | mg/L | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  | BDL(DL:0.001)  |

|                                                         |                                           |                                                                                    |            |
|---------------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|------------|
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| Sr.No. | PARAMETER              | UNIT      | SW1           | SW2          | SW3          | SW4          | SW5 -        | SW6          | SW7          | SW8          |
|--------|------------------------|-----------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 27     | Nickel (as Ni)         | mg/L      | BDL(DL:0.01)  | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) |
| 28     | Total Arsenic (as As)  | mg/L      | BDL(DL:0.001) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) |
| 29     | Total Chromium (as Cr) | mg/L      | BDL(DL:0.01)  | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) |
| 30     | Feecal Coliform        | MPN/100ml | 40            | 34           | 60           | 30           | 50           | 22           | 70           | 34           |
| 31     | Total Coliform         | MPN/100ml | 23            | 22           | 40           | 23           | 30           | 23           | 30           | 22           |

**Note:** Sampling & Analysis performed by M/s. PolluCare Engineering India Private Limited (Environmental Testing Laboratory)

The surface water quality results across all eight monitoring locations (SW1–SW8) indicate generally good water quality in the study area. The pH values ranged from 6.49 to 8.07, indicating neutral to slightly alkaline conditions suitable for aquatic life. Electrical conductivity (153–690  $\mu\text{S}/\text{cm}$ ), TDS (96.3–446 mg/L), alkalinity (15.8–135 mg/L), and total hardness (48–180 mg/L) were found to be within acceptable ranges, reflecting low to moderate mineral content in the water bodies. Dissolved oxygen concentrations ranged from 3.8 to 5.8 mg/L, indicating moderate to good oxygen availability for sustaining aquatic ecosystems. BOD (2.19–20.70 mg/L) and COD (8.22–82.20 mg/L) values suggest the presence of some organic load at a few locations, likely due to domestic runoff, agricultural activities, and natural decomposition of organic matter. Concentrations of major ions such as calcium, magnesium, chlorides, sulphates, and nitrates were within normal limits. Heavy metals and toxic contaminants including copper, zinc, cadmium, lead, mercury, nickel, arsenic, chromium, cyanide, phenolic compounds, and pesticides were below detectable limits at all monitoring locations, indicating the absence of significant industrial contamination. The presence of fecal and total coliforms at low to moderate levels suggests localized microbial contamination from anthropogenic and natural sources. Overall, the surface water quality in the study area is satisfactory and does not indicate any significant pollution concerns.

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**TABLE 3.6 – GROUND WATER QUALITY OF STUDY AREA**

| Sr. No. | PARAMETER                                               | UNIT  | GW1            | GW2            | GW3            | GW4            | GW5            | GW6            | GW7            | GW8            |
|---------|---------------------------------------------------------|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1       | Colour                                                  | Hazen | 50.0           | 30.0           | 30.0           | 30.0           | 50.0           | 50.0           | 50.0           | 30.0           |
| 2       | Odour                                                   | -     | Agreeable      | Agreeable      | Agreeable      | Agreeable      | Agreeable      | Agreeable      | Agreeable      | Agreeable      |
| 3       | Taste                                                   | -     | Agreeable      | Agreeable      | Agreeable      | Agreeable      | Agreeable      | Agreeable      | Agreeable      | Agreeable      |
| 4       | Turbidity                                               | NTU   | 1.6            | 3.8            | 2.1            | 2.2            | 1.9            | 2.6            | 1.9            | 1.6            |
| 5       | pH Value @ 25oC                                         | -     | 7.58           | 7.22           | 7.63           | 7.82           | 7.69           | 7.74           | 7.91           | 7.56           |
| 6       | Total Hardness (as CaCO <sub>3</sub> )                  | mg/L  | 890            | 850            | 960            | 887            | 983            | 865            | 898            | 959            |
| 7       | Iron (as Fe)                                            | mg/L  | 0.13           | 0.19           | 0.42           | 0.12           | 0.28           | 0.35           | 0.27           | 0.37           |
| 8       | Chloride (as Cl)                                        | mg/L  | 380            | 355            | 365            | 479            | 423            | 393            | 386            | 411            |
| 9       | Free Residual Chlorine                                  | mg/L  | BDL(DL:0.1 )   | BDL(DL:0.1 )   | BDL(DL:0.1 )   | BDL(DL:0.1 )   | BDL(DL:0.1 )   | BDL(DL:0.1 )   | BDL(DL:0.1 )   | BDL(DL:0.1 )   |
| 10      | Total Dissolved Solids @ 180oC                          | mg/L  | 1286           | 1200           | 1382           | 1245           | 1378           | 1216           | 1263           | 1347           |
| 11      | Calcium (as Ca)                                         | mg/L  | 313.0          | 309.0          | 325.0          | 321.0          | 355.0          | 313.0          | 325.0          | 347.0          |
| 12      | Copper (as Cu)                                          | mg/L  | BDL(DL:0.0 1)  | BDL(DL:0.0 1)  | BDL(DL:0.0 1)  | BDL(DL:0.0 1)  | BDL(DL:0.0 1)  | BDL(DL:0.0 1)  | BDL(DL:0.0 1)  | BDL(DL:0.0 1)  |
| 13      | Manganese (as Mn)                                       | mg/L  | BDL(DL:0.0 5)  | BDL(DL:0.0 5)  | BDL(DL:0.0 5)  | BDL(DL:0.0 5)  | BDL(DL:0.0 5)  | BDL(DL:0.0 5)  | BDL(DL:0.0 5)  | BDL(DL:0.0 5)  |
| 14      | Sulphate (as SO <sub>4</sub> )                          | mg/L  | 128.0          | 118.0          | 122.0          | 160.0          | 141.0          | 131.0          | 129.0          | 137.0          |
| 15      | Nitrate (as NO <sub>3</sub> )                           | mg/L  | 10.3           | 10.6           | 12.4           | 10.6           | 10.1           | 11.3           | 10.7           | 11.2           |
| 16      | Fluoride (as F)                                         | mg/L  | 0.13           | 0.13           | 0.11           | 0.16           | 0.11           | 0.14           | 0.15           | 0.13           |
| 17      | Phenolic compound (as C <sub>6</sub> H <sub>5</sub> OH) | mg/L  | BDL(DL:0.0 01) | BDL(DL:0.0 01) | BDL(DL:0.0 01) | BDL(DL:0.0 01) | BDL(DL:0.0 01) | BDL(DL:0.0 01) | BDL(DL:0.0 01) | BDL(DL:0.0 01) |

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| Sr. No. | PARAMETER                                | UNIT | GW1           | GW2           | GW3           | GW4           | GW5           | GW6           | GW7           | GW8           |
|---------|------------------------------------------|------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 18      | Mercury (as Hg)                          | mg/L | BDL(DL:0.001) | BDL(DL:0.001) | BDL(DL:0.001) | BDL(DL:0.001) | BDL(DL:0.001) | BDL(DL:0.001) | BDL(DL:0.001) | BDL(DL:0.001) |
| 19      | Selenium (as Se)                         | mg/L | BDL(DL:0.01)  | BDL(DL:0.01)  | BDL(DL:0.01)  | BDL(DL:0.01)  | BDL(DL:0.01)  | BDL(DL:0.01)  | BDL(DL:0.01)  | BDL(DL:0.01)  |
| 20      | Arsenic (as As)                          | mg/L | BDL(DL:0.001) | BDL(DL:0.001) | BDL(DL:0.001) | BDL(DL:0.001) | BDL(DL:0.001) | BDL(DL:0.001) | BDL(DL:0.001) | BDL(DL:0.001) |
| 21      | Cyanide (as CN)                          | mg/L | BDL(DL:0.02)  | BDL(DL:0.02)  | BDL(DL:0.02)  | BDL(DL:0.02)  | BDL(DL:0.02)  | BDL(DL:0.02)  | BDL(DL:0.02)  | BDL(DL:0.02)  |
| 22      | Lead (as Pb)                             | mg/L | BDL(DL:0.01)  | BDL(DL:0.01)  | BDL(DL:0.01)  | BDL(DL:0.01)  | BDL(DL:0.01)  | BDL(DL:0.01)  | BDL(DL:0.01)  | BDL(DL:0.01)  |
| 23      | Zinc (as Zn)                             | mg/L | 0.16          | 0.12          | 0.11          | 0.11          | 0.12          | 0.16          | 0.11          | 0.12          |
| 24      | Anionic Detergents (as MBAS)             | mg/L | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   |
| 25      | Chromium (as Cr6+)                       | mg/L | BDL(DL:0.03)  | BDL(DL:0.03)  | BDL(DL:0.03)  | BDL(DL:0.03)  | BDL(DL:0.03)  | BDL(DL:0.03)  | BDL(DL:0.03)  | BDL(DL:0.03)  |
| 26      | Mineral Oil                              | mg/L | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   |
| 27      | Silica (as SiO <sub>2</sub> )            | mg/L | 7.23          | 6.98          | 7.14          | 6.18          | 7.25          | 7.59          | 6.37          | 6.89          |
| 28      | Total Alkalinity (as CaCO <sub>3</sub> ) | mg/L | 446           | 317           | 416           | 328           | 363           | 321           | 333           | 355           |
| 29      | Aluminium (as Al)                        | mg/L | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   | BDL(DL:0.1)   |
| 30      | Boron (as B)                             | mg/L | 0.08          | 0.07          | 0.06          | 0.06          | 0.07          | 0.08          | 0.08          | 0.07          |
| 31      | Magnesium (as Mg)                        | mg/l | 26.7          | 19.4          | 36.5          | 20.7          | 23.4          | 20.3          | 21.1          | 22.4          |

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| Sr. No. | PARAMETER                              | UNIT            | GW1          | GW2          | GW3          | GW4          | GW5          | GW6          | GW7          | GW8          |
|---------|----------------------------------------|-----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 32      | Molybdenum (as Mo)                     | mg/l            | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  |
| 33      | Nickel (as Ni)                         | mg/l            | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  |
| 34      | Silver (as Ag)                         | mg/l            | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) | BDL(DL:0.01) |
| 35      | Sulphide (as H <sub>2</sub> S)         | mg/l            | BDL(DL:0.02) | BDL(DL:0.02) | BDL(DL:0.02) | BDL(DL:0.02) | BDL(DL:0.02) | BDL(DL:0.02) | BDL(DL:0.02) | BDL(DL:0.02) |
| 36      | Ammonia Total (as NH <sub>3</sub> - N) | mg/l            | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  | BDL(DL:0.1)  |
| 37      | Chloramines (as Cl <sub>2</sub> )      | mg/l            | BDL(DL:1.0)  | BDL(DL:1.0)  | BDL(DL:1.0)  | BDL(DL:1.0)  | BDL(DL:1.0)  | BDL(DL:1.0)  | BDL(DL:1.0)  | BDL(DL:1.0)  |
| 38      | Escherichia coli                       | Present /Absent | 70           | 30           | 40           | 30           | 50           | 22           | 23           | 23           |
| 39      | Total coliform                         | Present /Absent | 90           | 70           | 60           | 90           | 80           | 50           | 40           | 60           |

**Note:** Sampling & Analysis performed by M/s. PolluCare Engineering India Private Limited (Environmental Testing Laboratory)

The groundwater quality results (GW1–GW8) indicate that the groundwater is generally free from toxic metal and organic contamination; however, certain physico-chemical parameters exceed desirable drinking water limits. The pH (7.22–7.91) remains within the acceptable range prescribed under IS 10500:2012. Total Dissolved Solids (1200–1382 mg/L) and Total Hardness (850–983 mg/L) are elevated, indicating highly mineralized and very hard groundwater, although values remain within the permissible limits in the absence of an alternate source. Chloride (355–479 mg/L), sulphate (118–160 mg/L), nitrate (10.1–12.4 mg/L), and fluoride (0.11–0.16 mg/L) are within permissible limits, suggesting no significant contamination from anthropogenic sources. Heavy metals such as arsenic, lead, mercury, chromium, selenium, nickel, and other trace elements were below detectable limits in all samples, indicating the absence of industrial pollution. However, microbiological analysis revealed the presence of E. coli (22–70 CFU/100 mL) and total coliforms (40–90 CFU/100 mL) in all samples, indicating bacteriological contamination and rendering the groundwater unsuitable for direct drinking without disinfection. Overall, the groundwater quality is characterized by high hardness and TDS of geogenic origin, with no evidence of heavy metal contamination, but requires appropriate treatment prior to potable use due to microbial contamination.



|                                                  |                                           |                                                                                    |            |
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### 3.3.1.5 Interpretation:

**Surface water:** The analytical results are compared with the published guidelines as per CPCB criteria for water quality. Surface water is categorized in A, B, C, D and E categories considering the allowable limits of different parameters. The details of the categories and parameters is provided in below **TABLE 3.7**.

**TABLE 3.7 – CPCB CRITERIA FOR DESIGNATED BEST USE FOR WATER QUALITY**

| Sr. No. | Parameters                                   | Designated Best Use Water Quality Criteria, for Human Activity              |           |       |           |           |
|---------|----------------------------------------------|-----------------------------------------------------------------------------|-----------|-------|-----------|-----------|
|         |                                              | A                                                                           | B         | C     | D         | E         |
| 1       | pH                                           | 6.5-8.5                                                                     | 6.5 - 8.5 | 6 - 9 | 6.5 - 8.5 | 6.0 – 8.5 |
| 2       | Dissolved Oxygen, mg/L                       | >6                                                                          | >5        | >4    | >4        | --        |
| 3       | Electrical Conductance at 25 °C, µS/cm       | --                                                                          | --        | --    | --        | <2250     |
| 4       | Biochemical Oxygen Demand @27°C 3 days, mg/L | <2                                                                          | <3        | <3    | --        | --        |
| 5       | Total Coliform by MPN/100ml                  | <50                                                                         | <500      | <5000 | --        | --        |
|         | Class A                                      | Drinking Water Source without conventional treatment but after disinfection |           |       |           |           |
|         | Class B                                      | Outdoor bathing (Organised)                                                 |           |       |           |           |
|         | Class C                                      | Drinking water source after conventional treatment and disinfection         |           |       |           |           |
|         | Class D                                      | Propagation of Wild life and Fisheries                                      |           |       |           |           |
|         | Class E                                      | Irrigation, Industrial Cooling, Controlled Waste disposal                   |           |       |           |           |

**(Ref. CPCB CRITERIA FOR DESIGNATED BEST USE FOR WATER QUALITY)**

### Interpretation of results with respect to CPCB Water Quality Criteria:

| Stn. Code  | pH   | DO (mg/L) | EC at 25 °C, µS/cm | BOD (mg/L) | Total Coliform (MPN/100 mL) | Water Quality as per CPCB Class |
|------------|------|-----------|--------------------|------------|-----------------------------|---------------------------------|
| <b>SW1</b> | 7.14 | 4.60      | 349                | 11.30      | 23                          | <b>D</b>                        |
| <b>SW2</b> | 7.33 | 5.10      | 185                | 8.24       | 22                          | <b>D</b>                        |
| <b>SW3</b> | 6.49 | 3.80      | 153                | 20.70      | 40                          | <b>D</b>                        |
| <b>SW4</b> | 6.88 | 5.50      | 580                | 6.12       | 23                          | <b>D</b>                        |
| <b>SW5</b> | 8.07 | 5.70      | 272                | 2.28       | 30                          | <b>B</b>                        |
| <b>SW6</b> | 7.44 | 5.10      | 690                | 15.20      | 23                          | <b>D</b>                        |
| <b>SW7</b> | 7.62 | 5.30      | 582                | 10.13      | 30                          | <b>D</b>                        |
| <b>SW8</b> | 7.45 | 5.80      | 491                | 2.19       | 22                          | <b>B</b>                        |

Parameters considered for selection of CPCB class for surface water locations.

Surface water quality assessment indicates that locations SW5 and SW8 meet CPCB Class B criteria, reflecting comparatively good water quality suitable for outdoor bathing, with dissolved oxygen levels above 5 mg/L, low BOD concentrations, and controlled coliform counts. Locations SW1, SW2, SW3, SW4, SW6, and SW7 fall under CPCB Class D, indicating water quality suitable for propagation of

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wildlife and fisheries. The classification is primarily influenced by relatively higher BOD levels and lower dissolved oxygen concentrations at some locations, suggesting the presence of moderate organic pollution. The observed organic load may be attributed to domestic runoff, agricultural activities, and natural decomposition of organic matter. However, no evidence of industrial contamination was observed, and the overall water quality remains adequate for supporting aquatic ecosystems and designated Class D uses.

**Ground water:** As ground water is mainly used for drinking purpose, the analytical results of ground water samples were compared with the established guidelines published by IS 10500: 2012.

The groundwater quality results (GW1–GW8) indicate that the groundwater is generally free from toxic metal and organic contamination; however, certain physico-chemical parameters exceed desirable drinking water limits. The pH (7.22–7.91) remains within the acceptable range prescribed under IS 10500:2012. Total Dissolved Solids (1200–1382 mg/L) and Total Hardness (850–983 mg/L) are elevated, indicating highly mineralized and very hard groundwater, although values remain within the permissible limits in the absence of an alternate source. Chloride (355–479 mg/L), sulphate (118–160 mg/L), nitrate (10.1–12.4 mg/L), and fluoride (0.11–0.16 mg/L) are within permissible limits, suggesting no significant contamination from anthropogenic sources. Heavy metals such as arsenic, lead, mercury, chromium, selenium, nickel, and other trace elements were below detectable limits in all samples, indicating the absence of industrial pollution. However, microbiological analysis revealed the presence of *E. coli* (22–70 CFU/100 mL) and total coliforms (40–90 CFU/100 mL) in all samples, indicating bacteriological contamination and rendering the groundwater unsuitable for direct drinking without disinfection. Overall, the groundwater quality is characterized by high hardness and TDS of geogenic origin, with no evidence of heavy metal contamination, but requires appropriate treatment prior to potable use due to microbial contamination.

## ❖ Water Quality Index

### Introduction

The Weighted Arithmetic Water Quality Index (WAWQI) is a technique used to evaluate the overall water quality status for human consumption and environmental health by aggregating the concentration of various physiochemical parameters into a single, standardized number. This index is calculated based on three primary steps: determining the unit weight ( $w_i$ ), calculating the quality rating scale ( $q_i$ ) and finally aggregating these values to compute the Water Quality Index (WQI). Further Details regarding calculations and methodology for WQI is provided below:

#### ➤ Step 1: Calculation of Relative Weight ( $w_i$ )

First, a unit weight ( $w_i$ ) is assigned inversely proportional to the standard permissible limit ( $S_i$ ). Then, the Relative Weight ( $W_i$ ) is calculated by normalizing the unit weights so that their sum equals 1.

$$w_i = \frac{1}{S_i}$$

$$W_i = \frac{w_i}{\sum_{i=1}^n w_i}$$

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**Where,**

**Where  $S_i$  is the permissible limit as per IS 10500:2012**

➤ **Step 2: Calculation of Quality Rating ( $q_i$ ):**

The quality rating is calculated based on the comparison of the observed value with the standard value.

$$q_i = \left( \frac{V_o - V_{id}}{S_i - V_{id}} \right) \times 100$$

**Where,**

- $V_o$  = Observed value of the parameter
- $V_{id}$  = Ideal value of the  $n^{th}$  parameter in pure water. (0 for all parameters, for pH 7.0 and for DO 14.6 mg/L)
- $S_i$  = Standard permissible value of the  $n^{th}$  Parameter.

➤ **Step 3: Calculation of Water Quality Index (WQI)**

The overall Water Quality Index is calculated by aggregating the quality rating with the unit weight linearly.

$$WQI = \sum_{i=1}^n (W_i \times q_i)$$

Where:

$WQI$  = Water Quality Index

$Q_i$  = Quality rating for the  $i^{th}$  parameter

$W_i$  = Relative weight of the  $i^{th}$  parameter

➤ **Classification of Water Quality Index**

**Once the WQI value is calculated, the water quality is classified according to a predetermined scale. The interpretation generally follows the guidelines below, though specific EIA regulations may necessitate adjustments.**

**TABLE 3.8 – WATER QUALITY INDEX CLASSIFICATION**

| WQI Value | Water Quality |
|-----------|---------------|
| 0–25      | Excellent     |
| 26–50     | Good          |
| 51–75     | Poor          |
| 76–100    | Very Poor     |
| >100      | Unsuitable    |

**Source:** Brown et al. (1972), Chatterjee and Raziuddin (2002)

✓ **Water Quality Index for Ground water:**

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The Water Quality Index (WQI) for groundwater has been calculated using the most commonly measured water quality parameters — pH, TDS, Alkalinity, Total Hardness, Calcium, Magnesium, Sulphate, Chloride, and Nitrate. The standard limits for these parameters have been taken from IS 10500 (Drinking Water Standards). The results of the WQI for all groundwater monitoring locations are given below in **TABLE 3.9**.

**TABLE 3.9 – RESULTS OF WQI AT ALL GROUND WATER SAMPLING LOCATIONS BASED ON IS 10500:2012**

| Sr. No. | Station Code | Results of WQI | Water Quality |
|---------|--------------|----------------|---------------|
| 1       | GW1          | 53.4           | Poor          |
| 2       | GW2          | 49.4           | Good          |
| 3       | GW3          | 55.4           | Poor          |
| 4       | GW4          | 55.9           | Poor          |
| 5       | GW5          | 57.3           | Poor          |
| 6       | GW6          | 50.8           | Poor          |
| 7       | GW7          | 51.6           | Poor          |
| 8       | GW8          | 55.4           | Poor          |

The Water Quality Index (WQI) assessment for the eight groundwater stations (GW1–GW8) indicates that the overall groundwater quality in the study area ranges from Good to Poor. Station GW2 falls under the Good category, with a WQI value of 49.4, indicating generally acceptable water quality suitable for domestic use with basic treatment such as filtration or disinfection. The remaining stations (GW1, GW3, GW4, GW5, GW6, GW7, and GW8) are classified as Poor, with WQI values ranging from 50.8 to 57.3, suggesting higher mineral content, hardness, and microbiological presence that require adequate treatment before consumption. Overall, while groundwater quality shows some variability, there is no evidence of heavy metal or industrial contamination, and with appropriate treatment, the water can be made suitable for drinking and domestic purposes.

### 3.3.2 Meteorology

#### 3.3.2.1 Introduction

Meteorology is an interdisciplinary scientific field that focuses on the study of atmospheric conditions and plays a crucial role in understanding environmental phenomena such as pollutant dispersion. Parameters like temperature, humidity, wind speed and wind direction significantly influence the dispersion, dilution and transport of pollutants in the atmosphere. In the context of Environmental Impact Assessment (EIA), meteorological data is essential and is typically collected throughout the baseline monitoring period to support accurate air quality modelling and impact prediction. For this study, site-specific micrometeorological data was recorded using an automated weather station installed at the project site. This data is critical for developing reliable air dispersion models and assessing potential impacts from the expansion of existing unit. Given the temporal variability in meteorological conditions, long-term data is also referenced for contextual analysis. Accordingly, secondary data from the India Meteorological Department (IMD) — which operates a comprehensive network of weather stations — was obtained from the nearest IMD station located in Karur, Tamil Nadu. The historical dataset spans the period from 1991 to 2020 and provides valuable insight into regional climatic trends and ambient air quality considerations.



### 3.19

|                                                  |                                           |                                                                                    |            |
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### ❖ Temperature

In Karur, Tamil Nadu, the hot season starts in March and reaches its peak in May as temperatures increase rapidly. During the cooler season, temperatures remain comparatively low, especially during nighttime, and January is typically the coldest month. A significant diurnal (daily) temperature variation is observed in all months of the year.

As per the Climatological Normals (1991-2020), different month wise recorded mean temperature is given **TABLE 3.12**.

**TABLE 3.11 – MONTHLY RECORDED MEAN TEMPERATURE OF KARUR PARAMATHI (1991-2020)**

| Sr. No. | Month     | Highest in the Month (°C) | Lowest in the Month (°C) |
|---------|-----------|---------------------------|--------------------------|
| 1.      | January   | 35.6                      | 13.4                     |
| 2.      | February  | 40.0                      | 13.5                     |
| 3.      | March     | 42.0                      | 15.0                     |
| 4.      | April     | 45.4                      | 17.6                     |
| 5.      | May       | 42.0                      | 18.0                     |
| 6.      | June      | 42.5                      | 20.0                     |
| 7.      | July      | 39.6                      | 18.6                     |
| 8.      | August    | 38.8                      | 20.5                     |
| 9.      | September | 39.0                      | 19.8                     |
| 10.     | October   | 38.4                      | 16.4                     |
| 11.     | November  | 37.2                      | 15.5                     |
| 12.     | December  | 36.5                      | 13.6                     |

**Source:** Climatological Table 1991 – 2020, IMD

Winter maximum mean temperature recorded as 40.0°C, and minimum mean temperature was recorded as 13.4°C. In summer maximum mean temperature rise up to 45.4°C, whereas lowest was accounted as 15.0°C. June, July, August and September is regarded as monsoon season, and the highest and lowest mean temperature recorded as 42.5 °C and 18.6 °C.

### ❖ Relative Humidity

Most wet conditions are during monsoons, followed by post monsoons, winter, and summer. The annual mean relative humidity of 30 years is furnished in **TABLE 3.13**.

**TABLE 3.12 – MONTHLY AVERAGE RELATIVE HUMIDITY OF KARUR PARAMATH (1991-2020)**

| Months | Jan | Feb | Mar | Apr | May | Jun | July | Aug | Sept | Oct | Nov | Dec |
|--------|-----|-----|-----|-----|-----|-----|------|-----|------|-----|-----|-----|
| (I)    | 84  | 80  | 76  | 72  | 72  | 71  | 74   | 76  | 76   | 82  | 87  | 86  |
| (II)   | 51  | 43  | 37  | 40  | 47  | 53  | 58   | 59  | 56   | 65  | 71  | 66  |

**Source:** Climatological Table 1991 – 2020, IMD

|                                                  |                                           |                                                                                    |            |
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### ❖ Rainfall

The monsoon starts in June and ends in September. Karur has annual mean rainfall of 625.4 mm throughout the year.

#### 3.3.2.3 Site-Specific Meteorological Condition

For site-specific meteorological data, Weather Monitoring Station was set up at the Project Site from **1<sup>st</sup> July 2025 to 17<sup>th</sup> September 2025 (South West Monsoon Season)**. The summary of sitespecific data is presented in **TABLE 3.14**.

**TABLE 3.13 – SITE SPECIFIC METEOROLOGICAL DATA**

| PARAMETERS            | 1 <sup>st</sup> July 2025 to 30 <sup>th</sup> September 2025 |        |           |                   |
|-----------------------|--------------------------------------------------------------|--------|-----------|-------------------|
| Temperature (°C)      | July                                                         | August | September | July to September |
| Minimum               | 27.0                                                         | 24.0   | 24.0      | 24.0              |
| Maximum               | 39.0                                                         | 39.0   | 39.0      | 39.0              |
| Average               | 32.0                                                         | 30.4   | 30.7      | 31.1              |
| Relative Humidity (%) | July                                                         | August | September | July to September |
| Minimum               | 35.6                                                         | 35.1   | 40.0      | 35.1              |
| Maximum               | 83.7                                                         | 100.0  | 100.0     | 100.0             |
| Average               | 59.3                                                         | 70.5   | 71.4      | 66.2              |
| Wind Speed (m/s)      | July                                                         | August | September | July to September |
| Minimum               | 3.0                                                          | 0.0    | 0.0       | 0.0               |
| Maximum               | 23.0                                                         | 20.0   | 340.0     | 23.0              |
| Average               | 12.4                                                         | 8.4    | 88.2      | 9.9               |

#### 3.3.2.4 Results

Hourly records of wind speed and wind direction during the study period have been used for computing the relative percentage frequencies of wind occurrences in various directions. Wind rose diagram for each month – July 2025, August 2025, September 2025 and for the study period of July 2025 to September 2025 are shown in below figures.



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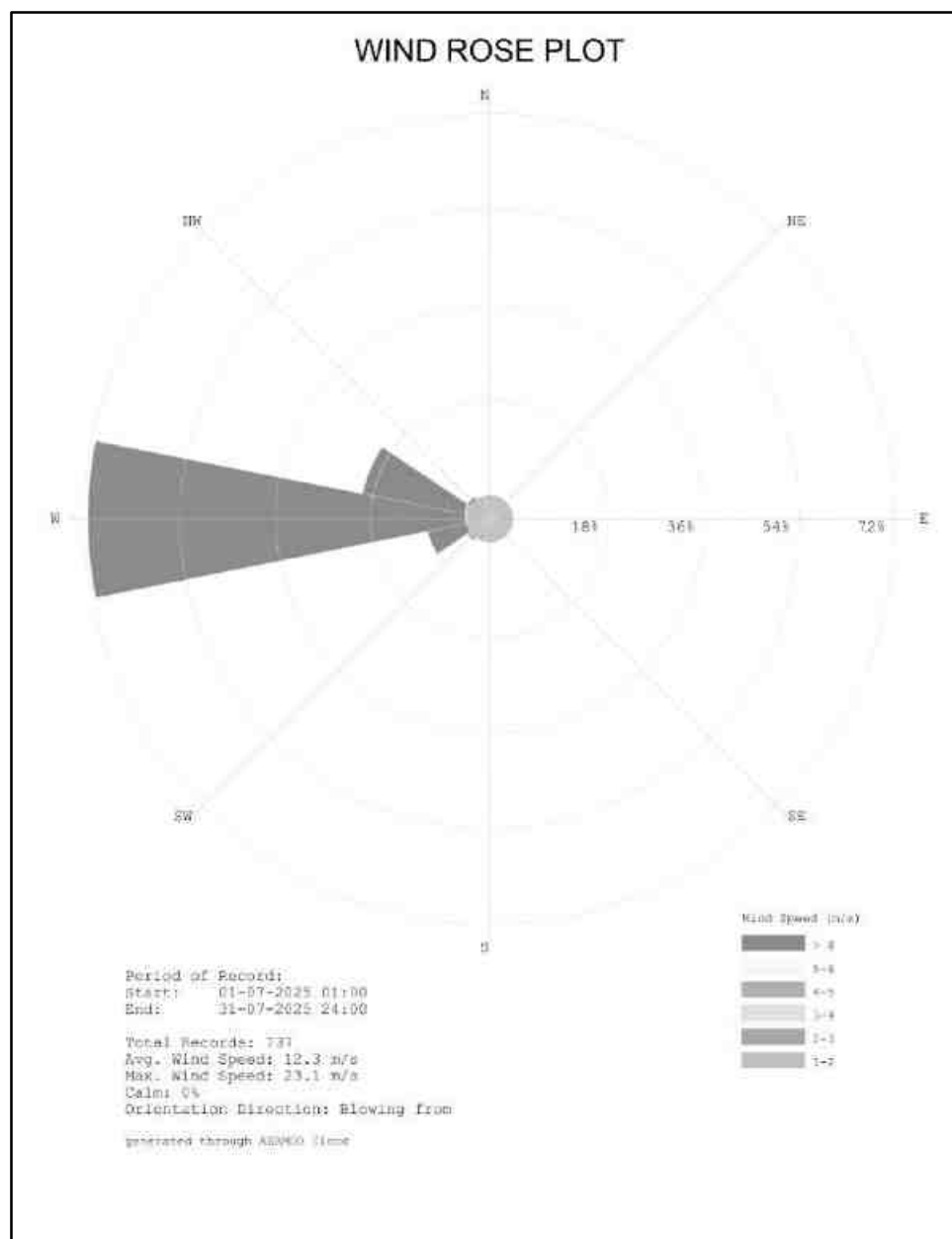


**FIGURE 3.1 – WIND ROSE DIAGRAM FOR MONTH OF JULY-2025**

### 3.3.2.5 Interpretation for Month of July 2025

|                                          |                    |
|------------------------------------------|--------------------|
| <b>Predominant Wind Direction:</b>       | W to E             |
| <b>Calm Condition:</b>                   | 0 %                |
| <b>Average Wind Speed:</b>               | 12.3 m/s.          |
| <b>Average Temperature:</b>              | 32.0 °C            |
| <b>Temperature Ranges Between:</b>       | 27.0 °C to 39.0 °C |
| <b>Average Relative Humidity:</b>        | 59.3 %             |
| <b>Relative Humidity Ranges Between:</b> | 35.6 % to 83.7 %   |

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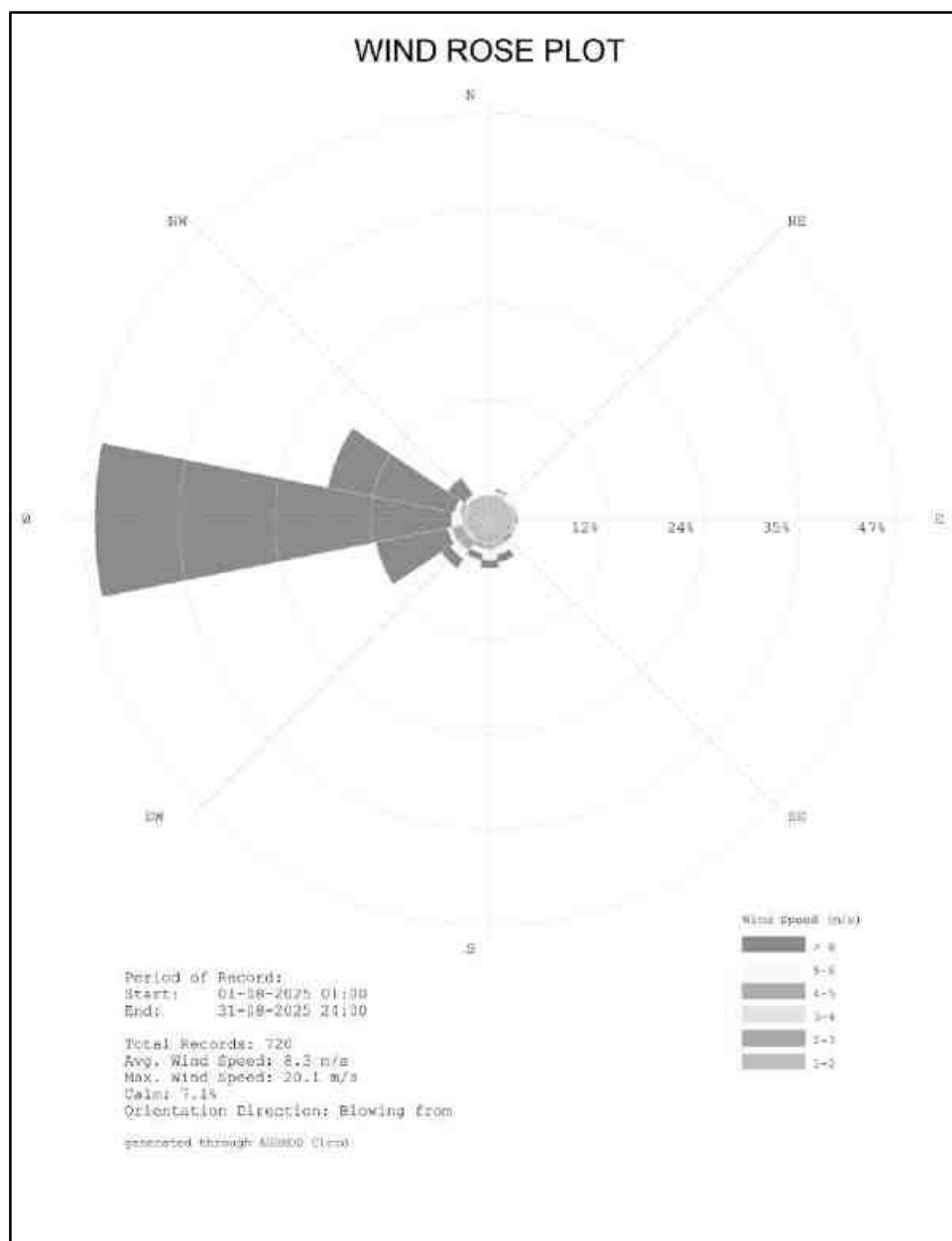


**FIGURE 3.2 – WIND ROSE DIAGRAM FOR MONTH OF AUGUST 2025**

### 3.3.2.6 Interpretation for Month of August 2025

|                                          |                    |
|------------------------------------------|--------------------|
| <b>Predominant Wind Direction:</b>       | W to E             |
| <b>Calm Condition:</b>                   | 7.1 %              |
| <b>Average Wind Speed:</b>               | 8.3 m/s.           |
| <b>Average Temperature:</b>              | 30.4 °C            |
| <b>Temperature Ranges Between:</b>       | 24.0 °C to 39.0 °C |
| <b>Average Relative Humidity:</b>        | 70.5 %             |
| <b>Relative Humidity Ranges Between:</b> | 35.1 % to 100.0 %  |

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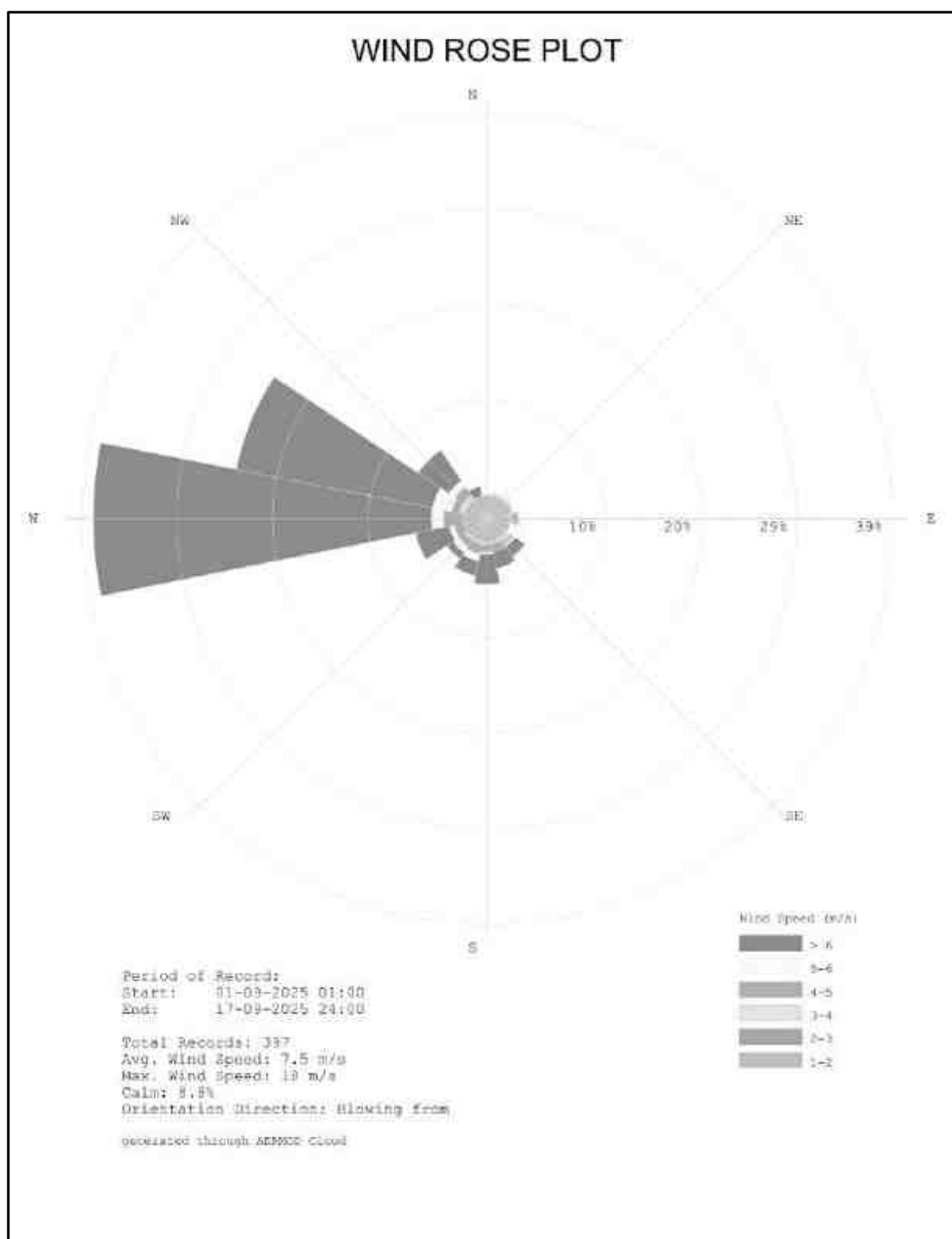


**FIGURE 3.3 – WIND ROSE DIAGRAM FOR MONTH OF SEPTEMBER 2025**

### 3.3.2.7 Interpretation for Month of September 2025

|                                          |                    |
|------------------------------------------|--------------------|
| <b>Predominant Wind Direction:</b>       | W to E             |
| <b>Calm Condition:</b>                   | 8.8 %              |
| <b>Average Wind Speed:</b>               | 7.5 m/s.           |
| <b>Average Temperature:</b>              | 30.7 °C            |
| <b>Temperature Ranges Between:</b>       | 24.0 °C to 39.0 °C |
| <b>Average Relative Humidity:</b>        | 71.4 %             |
| <b>Relative Humidity Ranges Between:</b> | 40.0 % to 100.0 %  |

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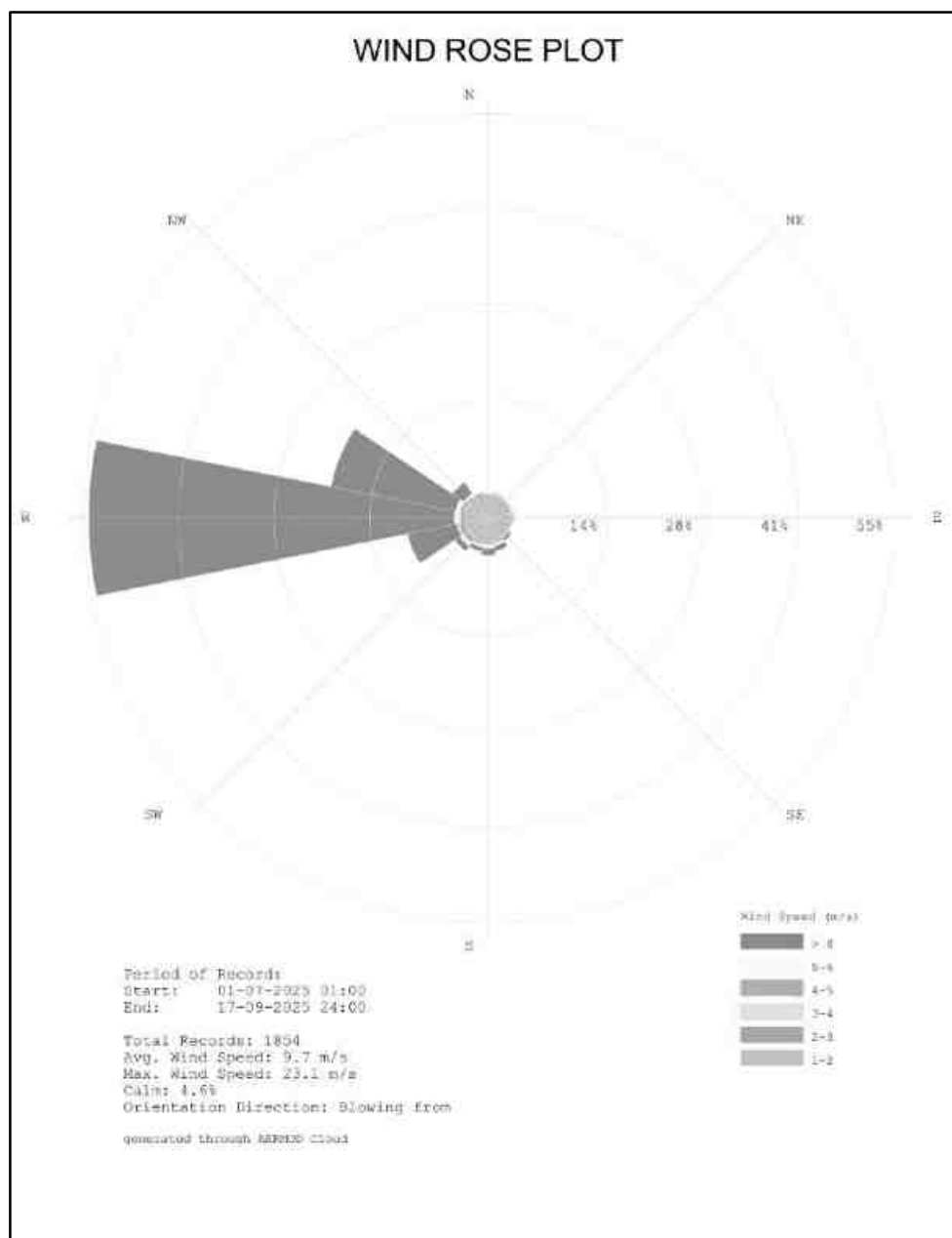


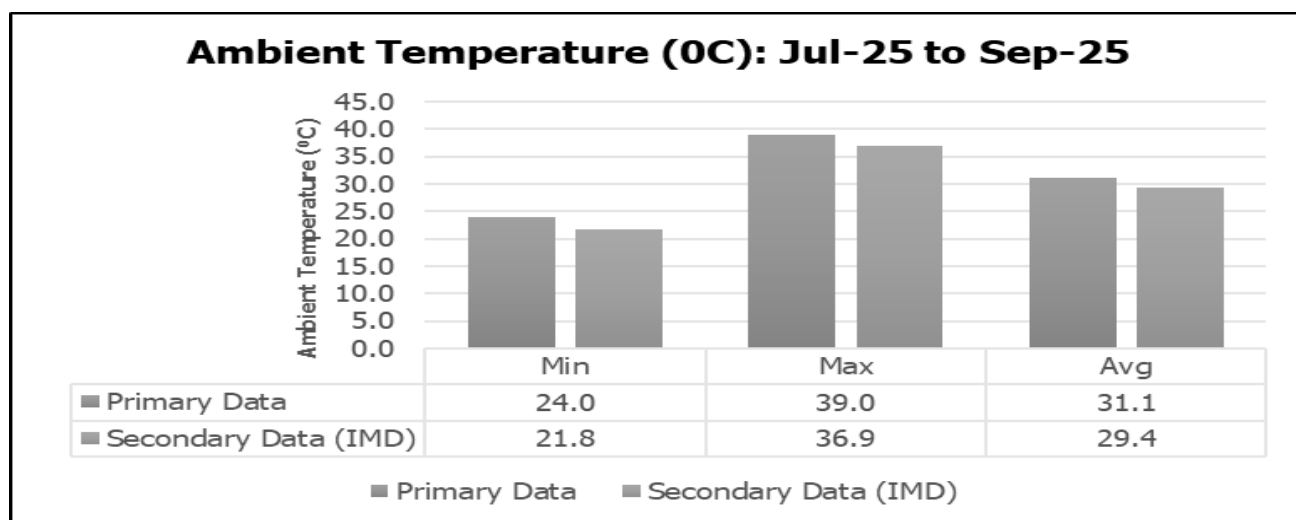
**FIGURE 3.4 – WIND ROSE DIAGRAM FOR JULY- 2025 TO SEPTEMBER- 2025**

### 3.3.2.8 Interpretation for July-2025 to September- 2025

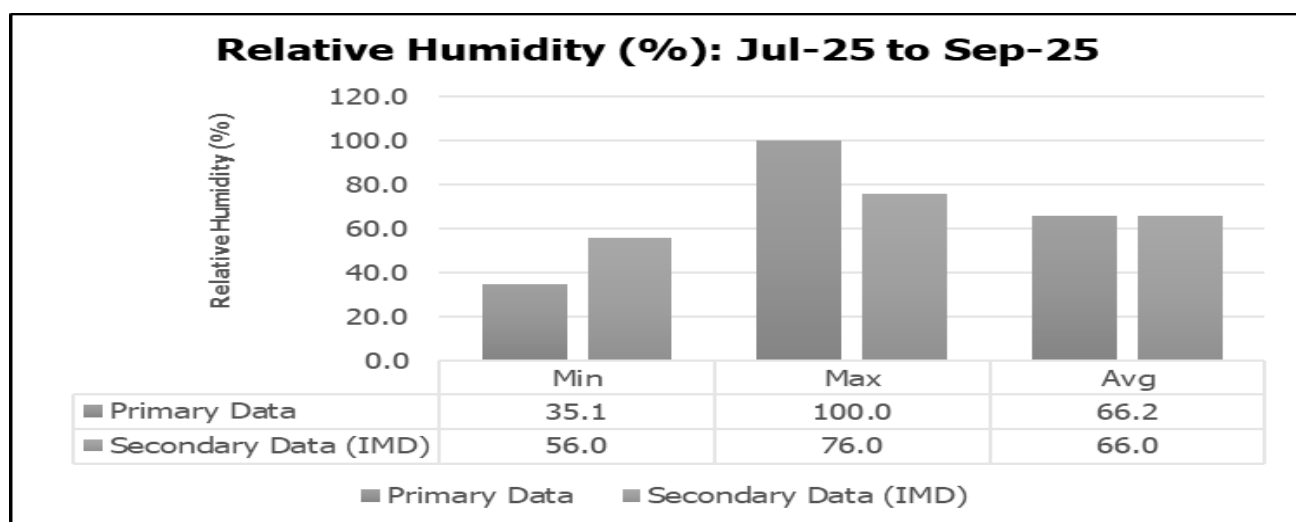
|                                          |                    |
|------------------------------------------|--------------------|
| <b>Predominant Wind Direction:</b>       | W to E             |
| <b>Calm Condition:</b>                   | 4.6 %              |
| <b>Average Wind Speed:</b>               | 9.7 m/s.           |
| <b>Average Temperature:</b>              | 31.1 °C            |
| <b>Temperature Ranges Between:</b>       | 24.0 °C to 39.0 °C |
| <b>Average Relative Humidity:</b>        | 66.2 %             |
| <b>Relative Humidity Ranges Between:</b> | 35.1 % to 100.0 %  |

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To understand the representativeness and accuracy of the site-specific meteorological data recorded during the baseline period, a comparative analysis was conducted with historical secondary data obtained from the India Meteorological Department (IMD), Karur Paramathi (1991–2020). The comparison helps to assess whether the monitoring period reflects the typical regional climatology and to identify any anomalies or deviations. This step is essential in validating air dispersion modelling results and ensuring environmental predictions remain within reasonable limits of certainty. Comparison between primary and secondary data are provided in below Graphs.

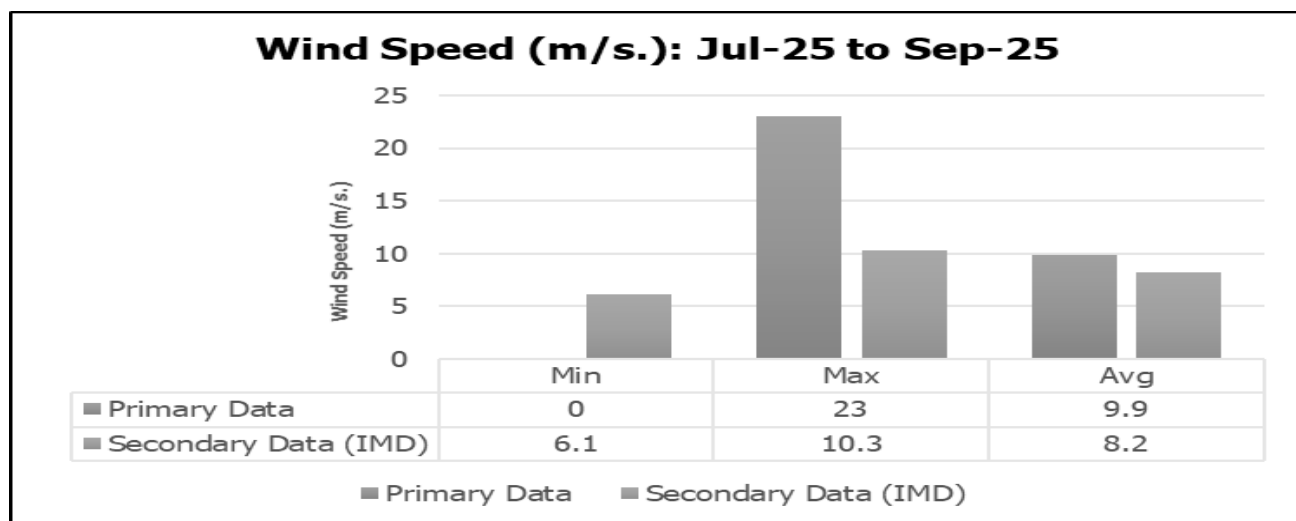


**GRAPH 3.1 – COMPARISON IN AMBIENT AIR TEMPERATURE BETWEEN PRIMARY AND SECONDARY DATA**



**GRAPH 3.2 - COMPARISON IN RELATIVE HUMIDITY BETWEEN PRIMARY AND SECONDARY DATA**

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**GRAPH 3.3 – COMPARISON IN WIND SPEED BETWEEN PRIMARY AND SECONDARY DATA**

### 3.3.3 Ambient Air

#### 3.3.3.1 Design of Air Monitoring Sample Network

To design network of Air Quality monitoring stations following criteria have been considered-

1. Topography / terrain of study area
2. Pockets of habitants (Sensitive receptors)
3. Guideline of network selection criteria
4. Predominant wind direction for the season
5. Infrastructure for safe operation of AAQM station
6. Climatological Norms (1991-2020)

Baseline study period was 1<sup>st</sup> July 2025 to 17<sup>th</sup> September 2025 (South West Monsoon season). The Historical data of past years presented in **TABLE 3.11** which indicates that the predominant wind direction is W during South West Monsoon season. So, the ambient air quality monitoring stations have been selected through historical micro-meteorological data (IMD Data).

- Two AAQM stations were setup in the downwind direction,
- One in upwind directions,
- Four in crosswind direction,
- One near Project site.

Ambient Air quality has been assessed based on the various pollutants: PM<sub>10</sub>, PM<sub>2.5</sub>, Sulphur Dioxide (SO<sub>2</sub>), Oxides of Nitrogen (NO<sub>x</sub>), Carbon Monoxide (CO), NH<sub>3</sub> and O<sub>3</sub>

|                                                  |                                           |                                                                                    |            |
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**TABLE 3.14 – METHODOLOGY OF ANALYZING AMBIENT AIR MONITORING PARAMETERS**

| Sampling Parameter | Method of Measurement         | Unit              | Minimum Detection Limit |
|--------------------|-------------------------------|-------------------|-------------------------|
| PM <sub>10</sub>   | IS: 5182 (Part-23): 2006      | µg/m <sup>3</sup> | 10.0                    |
| PM <sub>2.5</sub>  | IS 5182 (Part-24): 2019       | µg/m <sup>3</sup> | 10.0                    |
| SO <sub>2</sub>    | IS 5182 (Part 2/Sec 1): 2023  | µg/m <sup>3</sup> | 8.0                     |
| NO <sub>2</sub>    | IS 5182 (Part 6): Sec 1: 2006 | µg/m <sup>3</sup> | 5.0                     |
| O <sub>3</sub>     | IS 5182 (Part 9): 2026        | mg/m <sup>3</sup> | 5.0                     |
| NH <sub>3</sub>    | IS 5182 (Part-25): 2026       | µg/m <sup>3</sup> | 1.0                     |

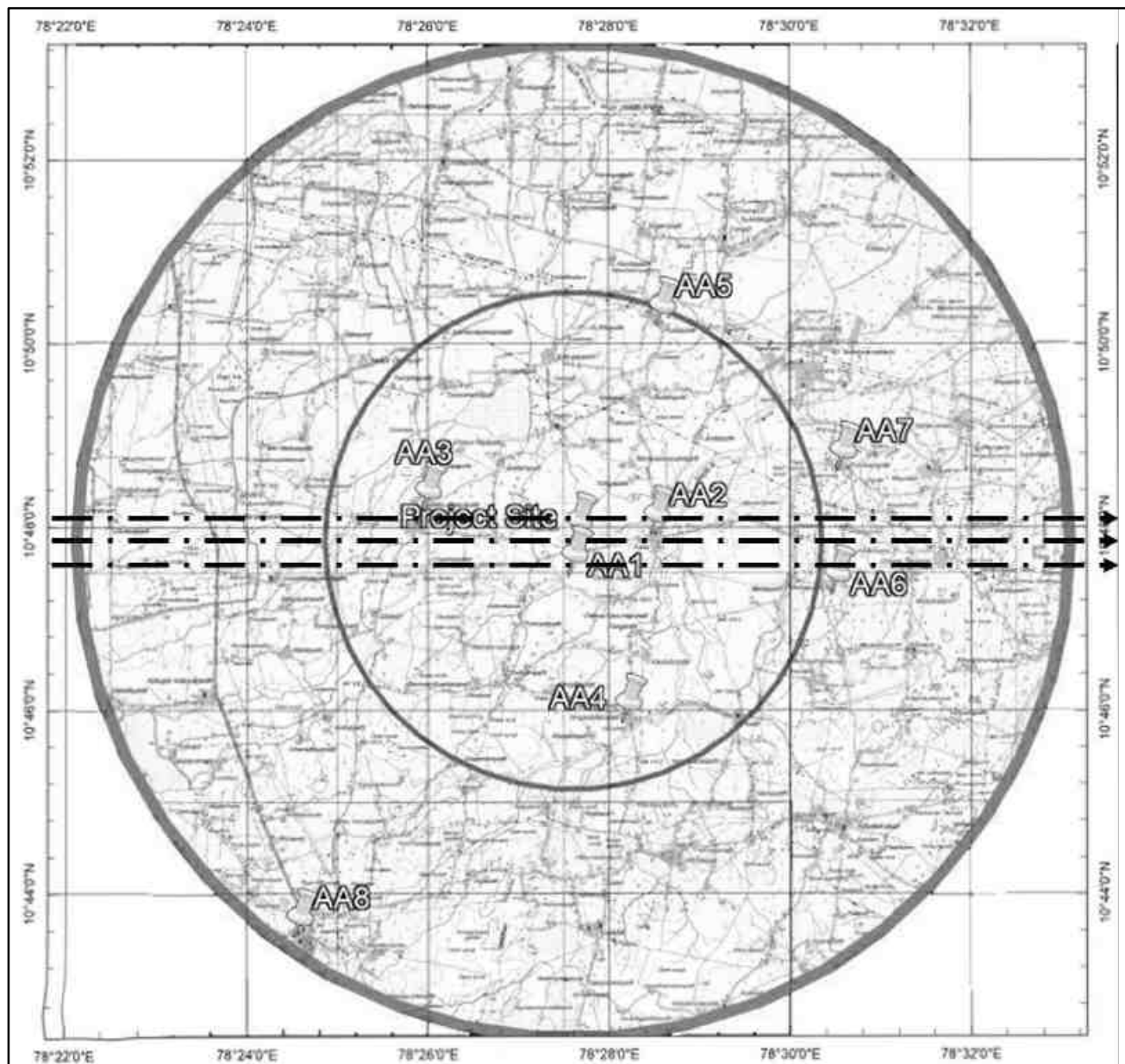
### 3.3.3.2 Ambient Air Quality Monitoring (AAQM) Locations

The locations for Ambient Air Quality Monitoring (AAQM) were selected as per prescribed guidelines with the objective of determining the baseline pollutant concentrations in the ambient air of the study area. The criteria focused on capturing air quality at key human settlements and sensitive zones to reflect potential exposure levels. The selected monitoring locations are presented in **TABLE 3.16** and their geographic distribution is illustrated in **MAP 3.4**.

**TABLE 3.15 – AAQM LOCATIONS WITH JUSTIFICATION**

| Stn. Code             | Location & Address | Geographical Location |               | Zone        | Aerial Dist. from Project Site (km) | Direction w. r. t. Project Site | Justification for selection of station |
|-----------------------|--------------------|-----------------------|---------------|-------------|-------------------------------------|---------------------------------|----------------------------------------|
|                       |                    | Latitude              | Longitude     |             |                                     |                                 |                                        |
| Core Zone (0-5 km)    |                    |                       |               |             |                                     |                                 |                                        |
| AA1                   | Near Project site  | 10°47'29.12"N         | 78°27'33.43"E | Industrial  | 0.68                                | S                               | -                                      |
| AA2                   | Kallai             | 10°47'55.22"N         | 78°28'27.97"E | Residential | 1.57                                | E                               | Downwind                               |
| AA3                   | Perur Udayappatti  | 10°48'10.94"N         | 78°25'56.07"E | Residential | 3.11                                | WNW                             | Upwind                                 |
| AA4                   | Vengatampatti      | 10°45'52.54"N         | 78°28'8.97"E  | Residential | 3.77                                | SSE                             | Crosswind                              |
| AA5                   | Bullpatti          | 10°50'11.70"N         | 78°28'31.89"E | Residential | 4.64                                | NNE                             | Crosswind                              |
| Buffer Zone (5-10 km) |                    |                       |               |             |                                     |                                 |                                        |
| AA6                   | Thalinji           | 10°47'16.47"N         | 78°30'28.03"E | Residential | 5.32                                | ESE                             | Downwind                               |
| AA7                   | Purasampatti       | 10°48'36.98"N         | 78°30'32.00"E | Residential | 5.52                                | ENE                             | Crosswind                              |
| AA8                   | Thogaimalai        | 10°43'32.53"N         | 78°24'30.73"E | Residential | 9.74                                | SW                              | Crosswind                              |

|                                                  |                                           |                                                                                    |            |
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-----> Prevailing Wind Direction During Baseline Monitoring period of July 2025 to September 2025

 5 km Radius  
 10 km Radius

**MAP 3.4 – MONITORING LOCATIONS FOR AMBIENT AIR**



|                                                  |                                           |                                                                                    |            |
|--------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|------------|
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### 3.3.3.3 Results

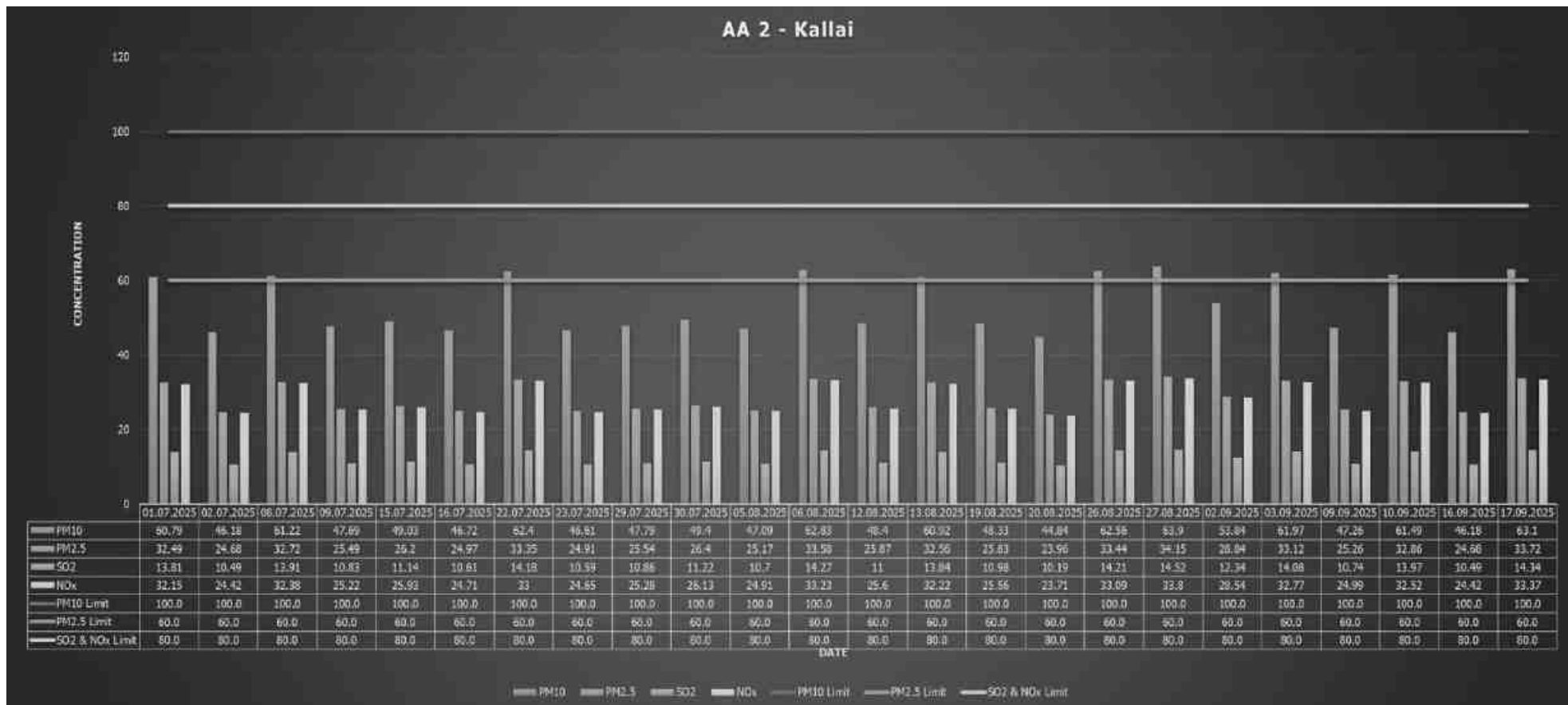
The results of ambient air quality monitoring provide insight into the prevailing air quality in the study area surrounding the project site. The parameters monitored include Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>), Sulphur Dioxide (SO<sub>2</sub>), Nitrogen Dioxide (NO<sub>2</sub>), Ammonia (NH<sub>3</sub>) and Ozon (O<sub>3</sub>). The monitoring was carried out over a period of one season to capture representative baseline conditions. The observed values have been compared with the National Ambient Air Quality Standards (NAAQS) prescribed by CPCB to assess the air quality status.

PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub> were monitored twice in a week at each location and NH<sub>3</sub> & O<sub>3</sub> were monitored two times at each location. Samples collected were analysed at NABL approved and MoEFCC recognized laboratory, M/s. PolluCare Engineering India Private Limited (Environmental Testing Laboratory) by following Standard Procedures during the baseline period of 1<sup>st</sup> July, 2025 to 17<sup>th</sup> September, 2025.

Ambient Air monitoring results are provided in below **GRAPH 3.4** to **GRAPH 3.11** and **TABLE 3.17**.



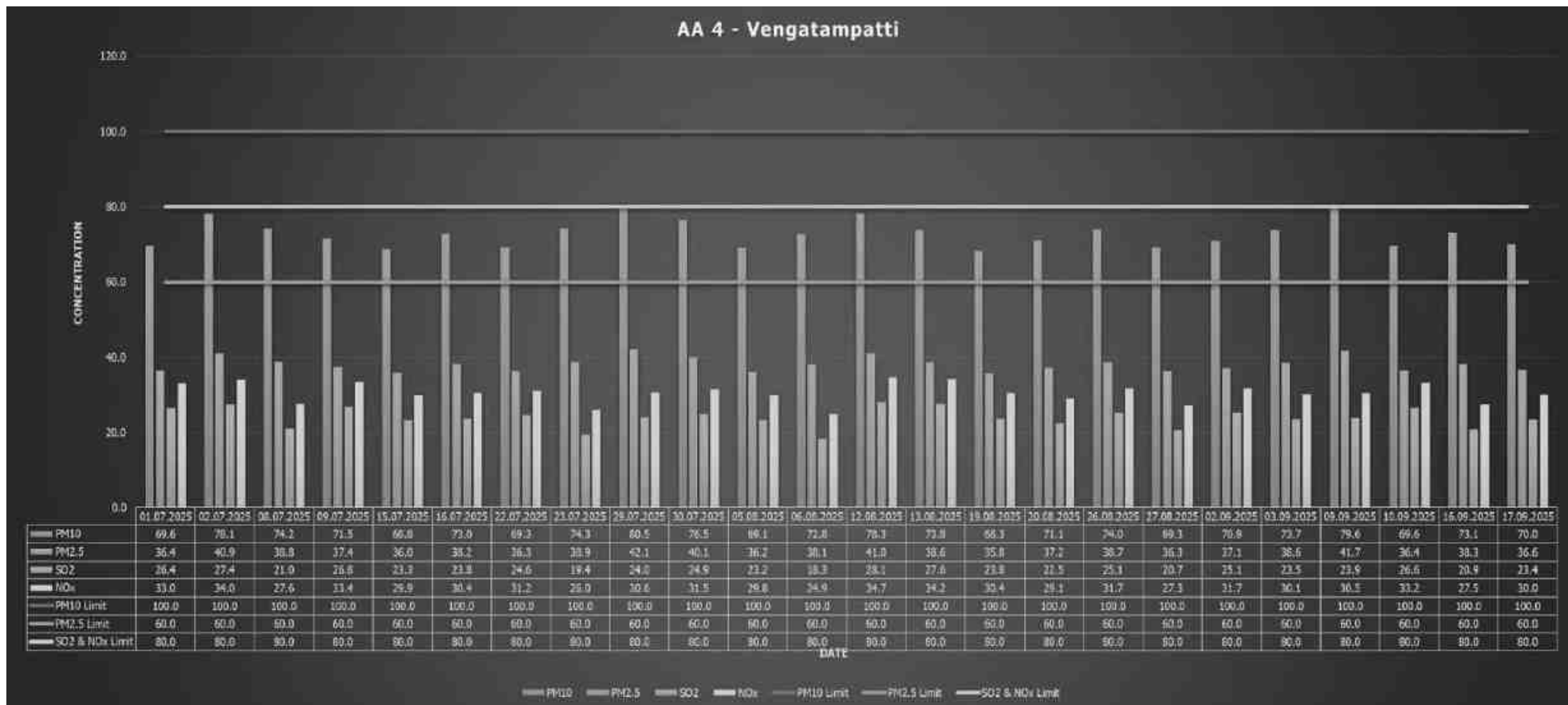
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|                                           |                                           | Date                                                                                | 08/06/2026 |



**GRAPH 3.5 – AMBIENT AIR MONITORING RESULTS AT AA 2: KALLAI VILLAGE**



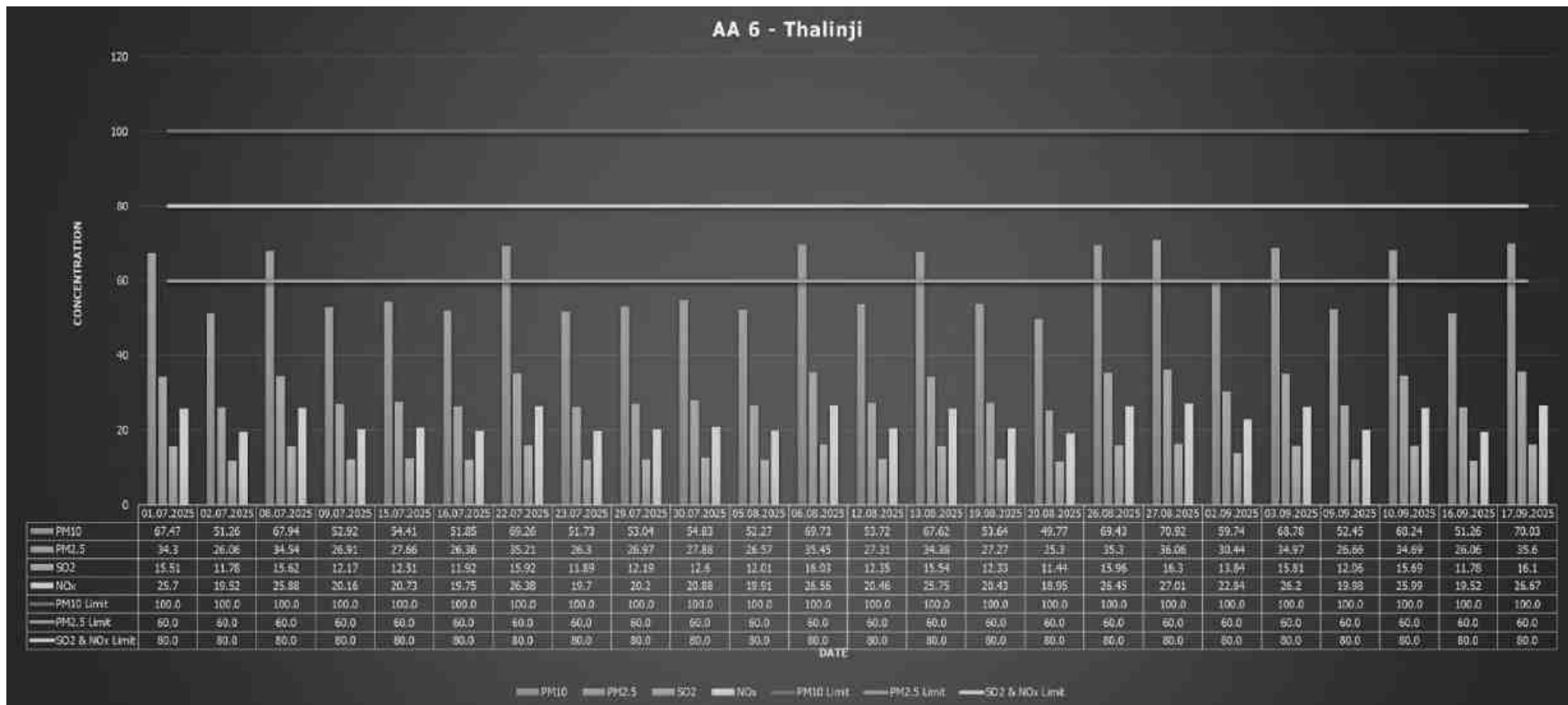
|                                                  |                                           |                                                                                     |            |
|--------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|------------|
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**GRAPH 3.7 – AMBIENT AIR MONITORING RESULTS AT AA 4: VENGATAMPATTI VILLAGE**

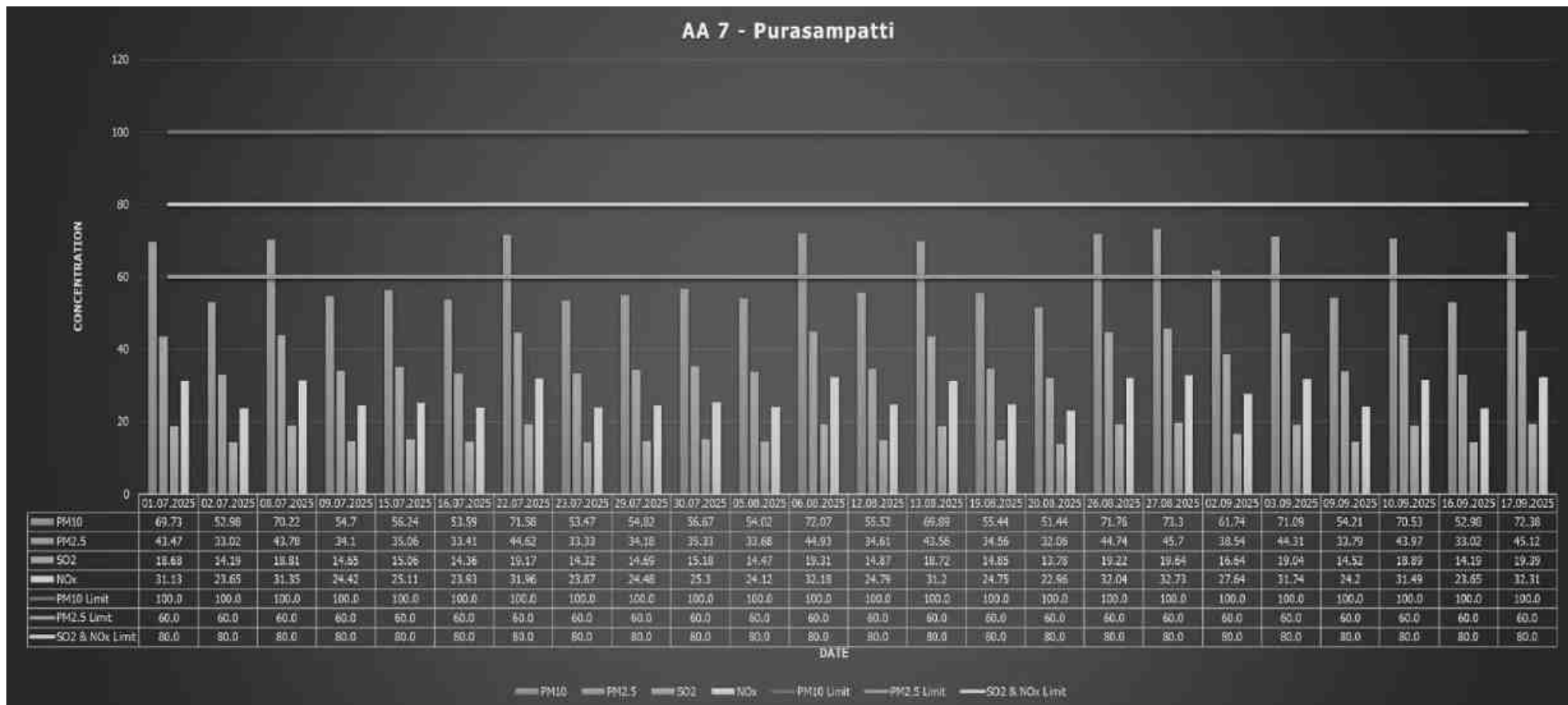


|                                                  |                                           |                                                                                     |            |
|--------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|------------|
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**GRAPH 3.9 – AMBIENT AIR MONITORING RESULTS AT AA 6: THALINJI VILLAGE**

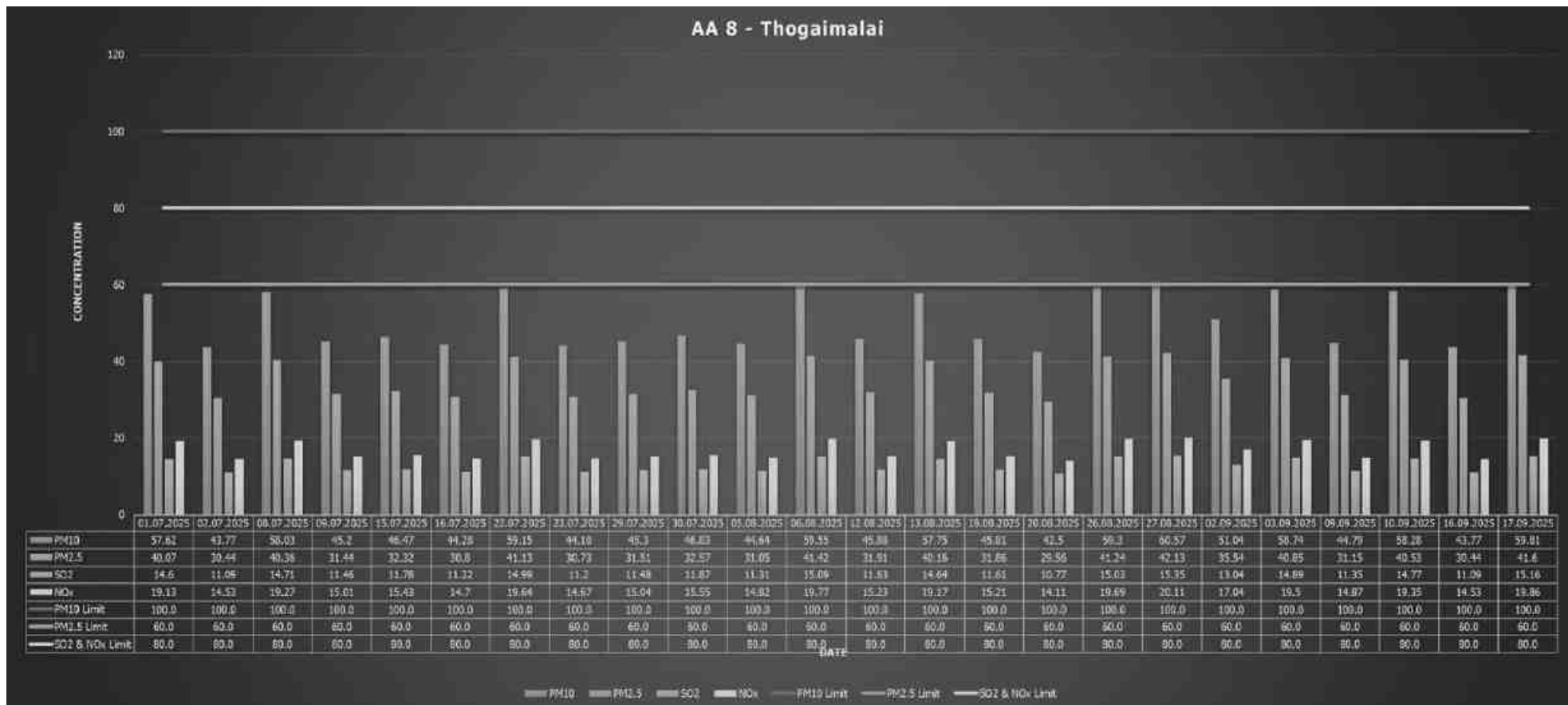
| ENPRO Enviro Tech and Engineers Pvt. Ltd. |                                           |  |            |
|-------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|------------|
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**GRAPH 3.10 – AMBIENT AIR MONITORING RESULTS AT AA 7: PURASAMPATTI VILLAGE**



|                                                  |                                           |                                                                                     |            |
|--------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|------------|
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**GRAPH 3.11 – AMBIENT AIR MONITORING RESULTS AT AA 8: THOGAIMALAI VILLAGE**

|                                                  |                                           |                                                                                     |            |
|--------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|------------|
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**TABLE 3.16 – AMBIENT AIR QUALITY MONITORING RESULTS**

| Station Code | CPCB Limits              | Parameters & Results  |                      |                      |                      |                       |                       |
|--------------|--------------------------|-----------------------|----------------------|----------------------|----------------------|-----------------------|-----------------------|
|              |                          | PM <sub>10</sub>      | PM <sub>2.5</sub>    | SO <sub>2</sub>      | NO <sub>x</sub>      | O <sub>3</sub>        | NH <sub>3</sub>       |
|              | AAQM Locations           | 100 µg/m <sup>3</sup> | 60 µg/m <sup>3</sup> | 80 µg/m <sup>3</sup> | 80 µg/m <sup>3</sup> | 180 µg/m <sup>3</sup> | 400 µg/m <sup>3</sup> |
|              |                          | 24 Hours              | 24 Hours             | 24 Hours             | 24 Hours             | 1 Hour                | 24 Hours              |
| AA1          | <b>Near Project site</b> |                       |                      |                      |                      |                       |                       |
|              | Minimum                  | 47.09                 | 23.80                | 9.52                 | 16.12                | 12.44                 | 4.38                  |
|              | Maximum                  | 67.12                 | 33.92                | 13.57                | 22.97                | 17.73                 | 6.25                  |
|              | Average                  | 56.48                 | 28.54                | 11.42                | 19.33                | 14.92                 | 5.26                  |
|              | 98 Percentile            | 66.73                 | 33.72                | 13.49                | 22.84                | 17.63                 | 6.21                  |
| AA2          | <b>Kallai</b>            |                       |                      |                      |                      |                       |                       |
|              | Minimum                  | 44.84                 | 23.96                | 10.19                | 23.71                | 11.44                 | 4.38                  |
|              | Maximum                  | 63.9                  | 34.15                | 14.52                | 33.8                 | 16.30                 | 6.88                  |
|              | Average                  | 53.77                 | 28.74                | 12.22                | 28.44                | 13.72                 | 5.79                  |
|              | 98 Percentile            | 63.53                 | 33.95                | 14.44                | 33.60                | 16.21                 | 6.84                  |
| AA3          | <b>Perur Udayappatti</b> |                       |                      |                      |                      |                       |                       |
|              | Minimum                  | 43.00                 | 29.89                | 12.27                | 20.46                | 9.60                  | 5.28                  |
|              | Maximum                  | 61.29                 | 42.6                 | 17.49                | 29.16                | 13.69                 | 7.52                  |
|              | Average                  | 51.57                 | 35.85                | 14.72                | 24.54                | 11.52                 | 6.33                  |
|              | 98 Percentile            | 60.93                 | 42.36                | 17.39                | 28.99                | 13.61                 | 7.48                  |
| AA4          | <b>Vengatampatti</b>     |                       |                      |                      |                      |                       |                       |
|              | Minimum                  | 44.00                 | 26.39                | 8.77                 | 15.53                | 12.11                 | 6.75                  |
|              | Maximum                  | 62.71                 | 37.6                 | 12.5                 | 22.13                | 17.26                 | 9.62                  |
|              | Average                  | 52.77                 | 31.64                | 10.52                | 18.63                | 14.52                 | 8.10                  |
|              | 98 Percentile            | 62.35                 | 37.38                | 12.43                | 22.01                | 17.15                 | 9.56                  |
| AA5          | <b>Bullpatti</b>         |                       |                      |                      |                      |                       |                       |
|              | Minimum                  | 50.77                 | 21.38                | 10.69                | 17.45                | 11.61                 | 5.66                  |

|                                                  |                                           |                                                                                    |            |
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| Station Code | CPCB Limits         | Parameters & Results  |                      |                      |                      |                       |                       |
|--------------|---------------------|-----------------------|----------------------|----------------------|----------------------|-----------------------|-----------------------|
|              |                     | PM <sub>10</sub>      | PM <sub>2.5</sub>    | SO <sub>2</sub>      | NO <sub>x</sub>      | O <sub>3</sub>        | NH <sub>3</sub>       |
|              | AAQM Locations      | 100 µg/m <sup>3</sup> | 60 µg/m <sup>3</sup> | 80 µg/m <sup>3</sup> | 80 µg/m <sup>3</sup> | 180 µg/m <sup>3</sup> | 400 µg/m <sup>3</sup> |
|              |                     | 24 Hours              | 24 Hours             | 24 Hours             | 24 Hours             | 1 Hour                | 24 Hours              |
|              | Maximum             | 72.35                 | 30.46                | 15.23                | 24.87                | 16.54                 | 8.07                  |
|              | Average             | 60.88                 | 25.64                | 12.82                | 20.93                | 13.92                 | 6.79                  |
|              | 98 Percentile       | 71.93                 | 30.29                | 15.14                | 24.73                | 16.45                 | 6.21                  |
| AA6          | <b>Thalinji</b>     |                       |                      |                      |                      |                       |                       |
|              | Minimum             | 49.77                 | 25.30                | 11.44                | 18.95                | 10.19                 | 5.91                  |
|              | Maximum             | 70.92                 | 36.06                | 16.3                 | 27.01                | 14.52                 | 8.43                  |
|              | Average             | 59.68                 | 30.34                | 13.72                | 22.73                | 12.22                 | 7.09                  |
|              | 98 Percentile       | 70.51                 | 35.85                | 16.21                | 26.85                | 14.43                 | 8.38                  |
| AA7          | <b>Purasampatti</b> |                       |                      |                      |                      |                       |                       |
|              | Minimum             | 51.44                 | 32.06                | 13.78                | 22.96                | 12.69                 | 4.94                  |
|              | Maximum             | 73.3                  | 45.7                 | 19.64                | 32.73                | 18.09                 | 7.04                  |
|              | Average             | 61.68                 | 38.45                | 16.53                | 27.54                | 15.22                 | 5.93                  |
|              | 98 Percentile       | 72.88                 | 45.43                | 19.53                | 32.54                | 17.98                 | 7.00                  |
| AA8          | <b>Thogaimalai</b>  |                       |                      |                      |                      |                       |                       |
|              | Minimum             | 42.50                 | 29.56                | 10.77                | 14.11                | 14.03                 | 3.81                  |
|              | Maximum             | 60.57                 | 42.13                | 15.35                | 20.11                | 19.99                 | 5.43                  |
|              | Average             | 50.97                 | 35.45                | 12.92                | 16.93                | 16.83                 | 4.57                  |
|              | 98 Percentile       | 60.22                 | 41.89                | 15.26                | 20.00                | 19.88                 | 5.39                  |

**Note:** Sampling & Analysis performed by M/s. PolluCare Engineering India Private Limited (Environmental Testing Laboratory)

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### 3.3.3.4 Interpretation of Results

To interpret the overall ambient air quality around the proposed project site, the monitored data has been analysed to assess existing pollutant levels. This helps in understanding the baseline status and potential implications of the upcoming unit on local air quality. For the same, Air Quality Index has been find out at existing location. Details of the same are provided below:

#### ❖ **Air Quality Index (AQI)**

The Air Quality Index (AQI) is an index for reporting air quality on a daily basis. It is a measure of how air pollution affects one's health within a short time period. The purpose of the AQI is to help people know how the local air quality impacts their health. The Environmental Protection Agency (EPA) calculates the AQI for five major air pollutants, for which national air quality standards have been established to safeguard public health.

1. Particle pollution/particulate matter (PM<sub>2.5</sub>/PM<sub>10</sub>)
2. Carbon Monoxide
3. Sulphur dioxide
4. Nitrogen dioxide
5. Carbon Monoxide

The higher the AQI value, the greater the level of air pollution and the greater the health concerns. The concept of AQI has been widely used in many developed countries for over the last three decades. AQI quickly disseminates air quality information in real-time.

#### **Importance of Air Quality Index (AQI)**

The Air Quality Index (AQI) is a standardized tool that simplifies complex air pollution data into a single value to reflect the overall air quality status. It helps in assessing the impact of key pollutants on human health and the environment. In the context of EIA, AQI is crucial for evaluating baseline air quality and understanding the potential implications of the proposed project on ambient air conditions.

#### **Objectives of Air Quality Index (AQI)**

- Comparing air quality conditions at different locations/cities.
- It also helps in identifying faulty standards and inadequate monitoring programmes.
- AQI helps in analysing the change in air quality (improvement or degradation).
- AQI informs the public about environmental conditions. It is especially useful for people suffering from illnesses aggravated or caused by air pollution.

|                                                  |                                           |                                                                                    |            |
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### Air Quality Index Categories

| <b>AQI Category</b> | <b>AQI</b> | <b>Health Impact</b>                                          |
|---------------------|------------|---------------------------------------------------------------|
| Good                | 0-50       | Minimal impact                                                |
| Satisfactory        | 51-100     | Minor breathing discomfort to sensitive people                |
| Moderately Polluted | 101-200    | Breathing discomfort to sensitive people                      |
| Poor                | 201-300    | Breathing discomfort on prolonged exposure                    |
| Very Poor           | 301-400    | Respiratory illness on prolonged exposure                     |
| Severe              | 401-500    | Affects healthy people and seriously impacts sensitive groups |

For the proposed new project, the Air Quality Index study has been carried out. The average values of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO and NH<sub>3</sub> from the baseline concentrations have been considered for eight stations and for which the results of AQI have been calculated. The results for AQI are mentioned in below **TABLE 3.17**.

**TABLE 3.17 – RESULTS OF AQI AT ALL THE MONITORING STATIONS**

| <b>Sr. No.</b>               | <b>Station Code</b> | <b>Place</b>      | <b>Results of AQI</b> |
|------------------------------|---------------------|-------------------|-----------------------|
| <b>Core Zone (0-5 km)</b>    |                     |                   |                       |
| 1                            | AA-1                | Project site      | 56                    |
| 2                            | AA-2                | Kallai            | 54                    |
| 3                            | AA-3                | Perur Udayappatti | 60                    |
| 4                            | AA-4                | Vengatampatti     | 53                    |
| 5                            | AA-5                | Bullpatti         | 61                    |
| <b>Buffer Zone (5-10 km)</b> |                     |                   |                       |
| 6                            | AA-6                | Thalinji          | 60                    |
| 7                            | AA-7                | Purasampatti      | 64                    |
| 8                            | AA-8                | Thogaimalai       | 59                    |

### Interpretation

The Air Quality Index (AQI) values for all the monitored locations fall within the range of 53 to 64, which classifies the air quality under the "Satisfactory" category as per the Air Quality Index (AQI) standards. The highest AQI of 64 was recorded at the Purasampatti (AA7), while the lowest value of 53 was observed at Vengatampatti Village (AA4). A "Satisfactory" AQI indicates that the air quality is acceptable; however, there may be a risk for sensitive groups such as children, elderly people, or those with pre-existing respiratory conditions. Overall, the baseline ambient air quality in the study area is satisfactory and not likely to pose significant health concerns for the general population under current conditions.

|                                                  |                                           |                                                                                    |            |
|--------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|------------|
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### 3.3.4 Noise

#### 3.3.4.1 Introduction

Noise, commonly defined as unwanted or harmful sound, is an important environmental factor influencing human health and ecological balance. In an Environmental Impact Assessment (EIA), assessment of the existing noise environment is crucial to understand baseline levels and predict the impact of project-related activities on surrounding areas. As per Noise Pollution [Regulation and Control] Rules, 2000 notified by the Ministry of Environment and Forests, New Delhi, on 14/02/2000, noise standards have been designated for different types of land-use i.e. Residential, Commercial, Industrial and Silence Zone during day time (6 am to 10 pm) and night time (10 pm to 6 am). The noise rating method as Leq i.e. Equivalent sound pressure level has been adopted for the measurement of noise level at sampling locations in the study area.

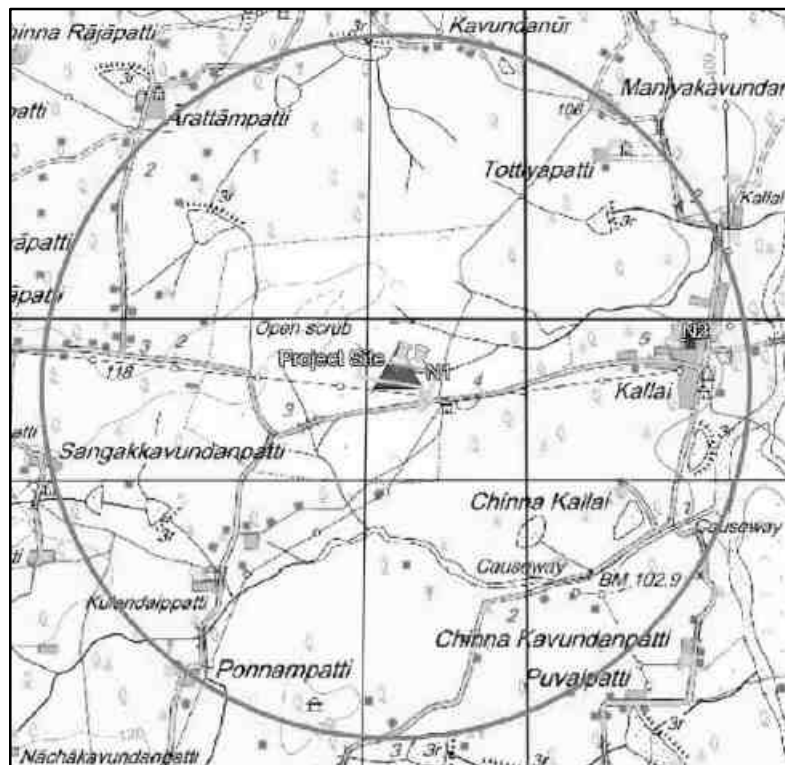
#### 3.3.4.2 Noise Sampling Locations

To assess the existing ambient noise environment in the study area, noise monitoring was carried out at strategically selected locations representing residential zones. The locations were chosen based on proximity to sensitive receptors like schools, hospitals & residential colonies and accessibility. Monitoring has been carried out considering different zones falling within 0-2 km from project site i.e., locations N1 and N2. In addition to this, noise levels are measures at various locations within 2-10 km radius from the project site i.e., locations N3 to N8. Geographical coordinates with respective zones and aerial distance & direction from project site of monitoring locations are mentioned in **TABLE 3.18**.

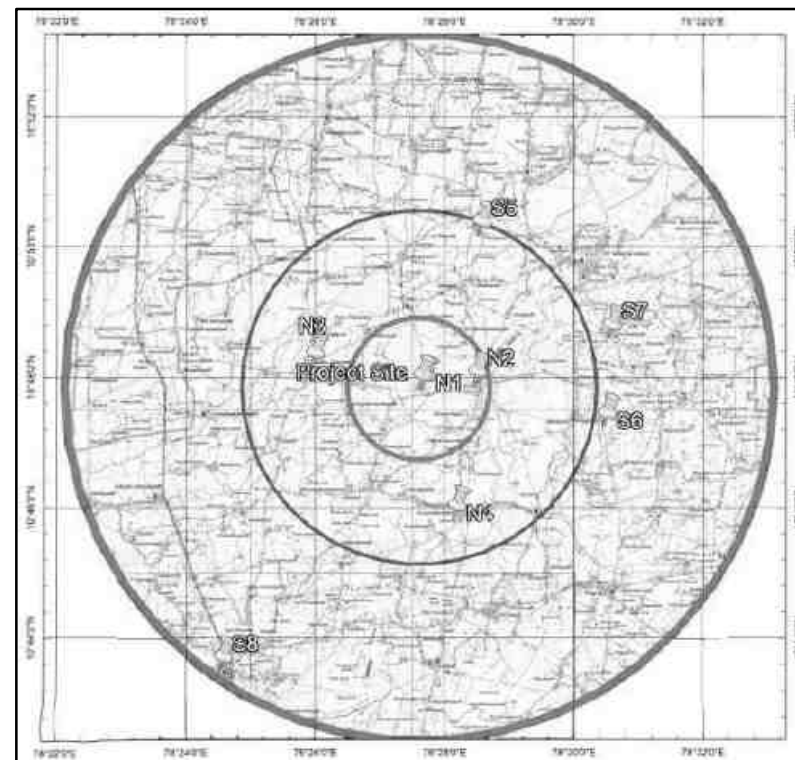
**TABLE 3.18 – LOCATION OF NOISE LEVEL MONITORING**

| Stn. Code                               | Location & Address | Geographical Location |               | Zone            | Aerial Dist. from Project Site (km) | Direction |
|-----------------------------------------|--------------------|-----------------------|---------------|-----------------|-------------------------------------|-----------|
|                                         |                    | Latitude              | Longitude     |                 |                                     |           |
| Noise Locations Within 2 km Radius      |                    |                       |               |                 |                                     |           |
| N1                                      | Project site       | 10°47'29.12"N         | 78°27'33.43"E | Commercial      | --                                  | --        |
| N2                                      | Kallai             | 10°47'55.22"N         | 78°28'27.97"E | Area            | 1.57                                | E         |
| Noise Locations Within 2 - 10 km Radius |                    |                       |               |                 |                                     |           |
| N3                                      | Perur Udayappatti  | 10°48'10.94"N         | 78°25'56.07"E | Commercial Area | 3.11                                | WNW       |
| N4                                      | Vengatampatti      | 10°45'52.54"N         | 78°28'8.97"E  |                 | 3.77                                | SSE       |
| N5                                      | Bullpatti          | 10°50'11.70"N         | 78°28'31.89"E |                 | 4.64                                | NNE       |
| N6                                      | Thalinji           | 10°47'16.47"N         | 78°30'28.03"E |                 | 5.32                                | ESE       |
| N7                                      | Purasampatti       | 10°48'36.98"N         | 78°30'32.00"E |                 | 5.52                                | ENE       |
| N8                                      | Thogaimalai        | 10°43'32.53"N         | 78°24'30.73"E |                 | 9.74                                | SW        |

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■ 2 km Radius



■ 2 km Radius  
■ 5 km Radius  
■ 10 km Radius

**MAP 3.5 – NOISE LEVEL MONITORING LOCATIONS**

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|-------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|------------|
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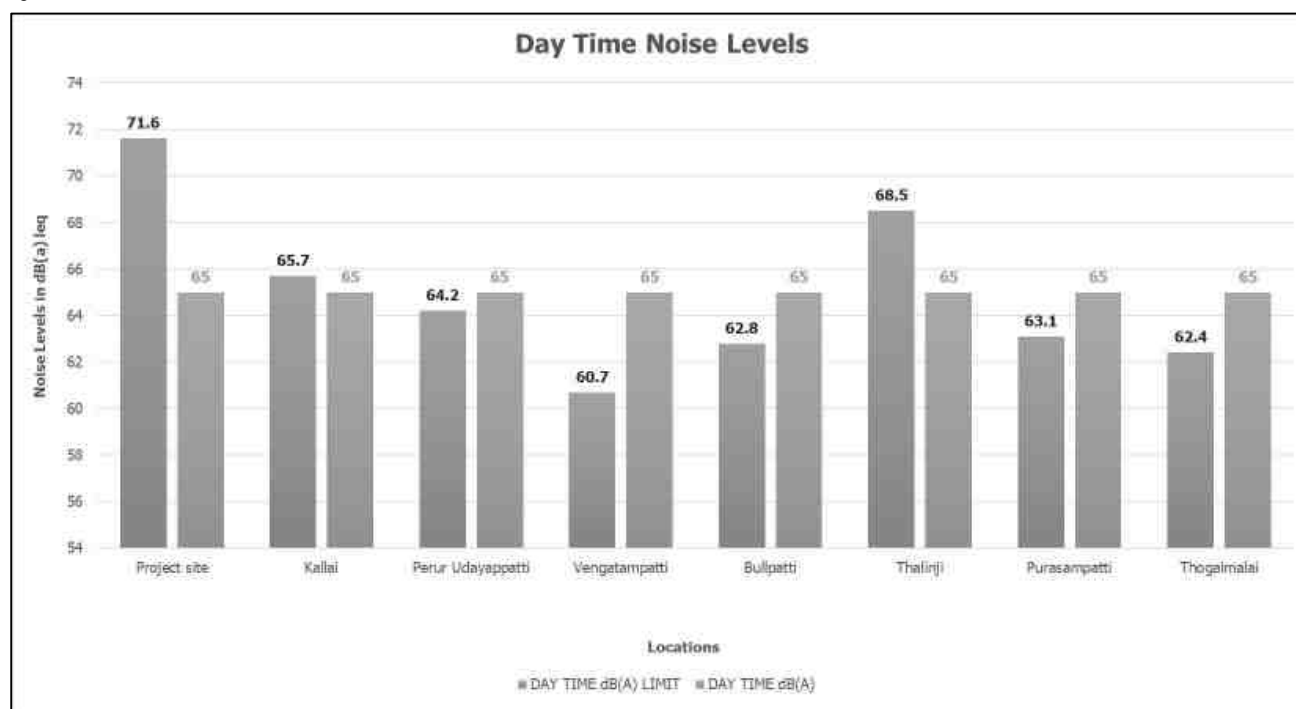
### 3.3.4.3 Results

The equivalent noise levels, Leq [day] and Leq [night] have been monitored and the results are tabulated in **TABLE - 3.19**. Noise levels were measured using Sound Level Meter.

**TABLE 3.19 – NOISE LEVEL AT PROJECT SITE & STUDY AREA**

| Stn. Code                               | Location<br>(Category of Area) | CPCB Noise Limits in<br>dB(A) Leq |            | Noise Level in<br>dB(A) Leq |            |
|-----------------------------------------|--------------------------------|-----------------------------------|------------|-----------------------------|------------|
|                                         |                                | Day<br>Time                       | Night Time | Day Time                    | Night Time |
| Noise Locations Within 2 km Radius      |                                |                                   |            |                             |            |
| N1                                      | Project site                   | 65.0                              | 55.0       | 71.6                        | 59.8       |
| N2                                      | Kallai                         | 65.0                              | 55.0       | 65.7                        | 49.7       |
| Noise Locations Within 2 - 10 km Radius |                                |                                   |            |                             |            |
| N3                                      | Perur Udayappatti              | 65.0                              | 55.0       | 64.2                        | 53.8       |
| N4                                      | Vengatampatti                  | 65.0                              | 55.0       | 60.7                        | 47.8       |
| N5                                      | Bullpatti                      | 65.0                              | 55.0       | 62.8                        | 48.6       |
| N6                                      | Thalinji                       | 65.0                              | 55.0       | 68.5                        | 56.2       |
| N7                                      | Purasampatti                   | 65.0                              | 55.0       | 63.1                        | 52.6       |
| N8                                      | Thogaimalai                    | 65.0                              | 55.0       | 62.4                        | 54.1       |

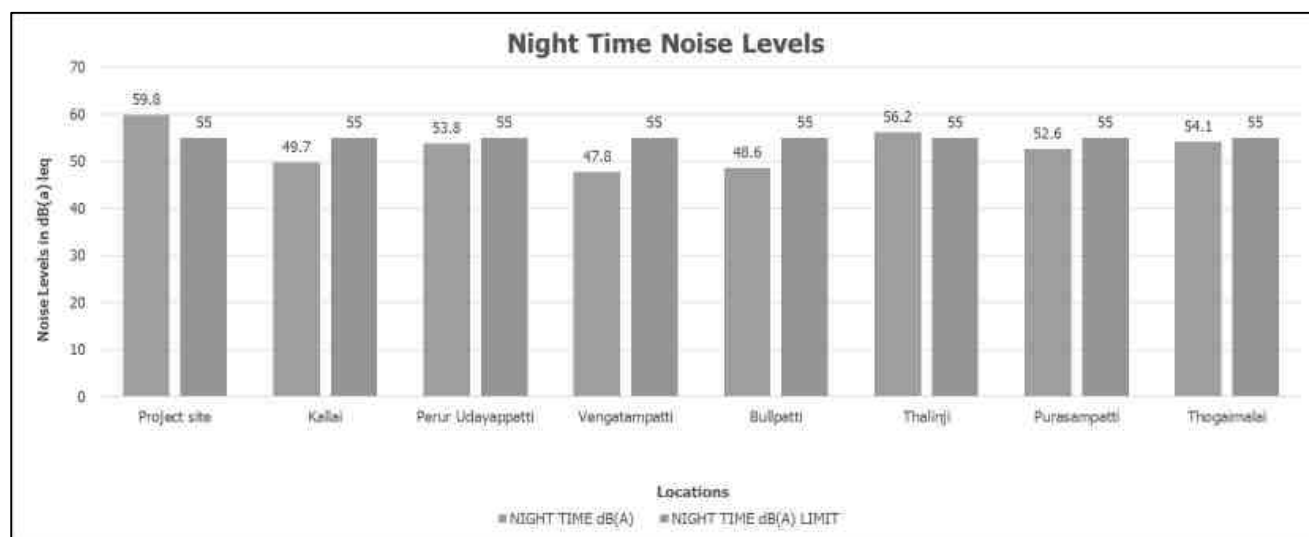
- Day Time is from 6.00 a.m. to 10.00 p.m.
- Night Time is from 10.00 p.m. to 6.00 a.m.
- 



**GRAPH 3.12 – DAY TIME NOISE LEVEL DB(A) LEQ**



|                                                  |                                           |                                                                                    |            |
|--------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                           |  |            |
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**GRAPH 3.13 – NIGHT TIME NOISE LEVEL DB(A) LEQ**

#### 3.3.4.4 Interpretation

The monitored ambient noise levels in the study area ranged from 60.7–71.6 dB(A) during daytime and 47.8–59.8 dB(A) during nighttime. Most locations exhibited noise levels within the CPCB prescribed standards. Marginal exceedances were noted at the project site and Thalinji, reflecting the influence of existing transportation corridors, and localized human activities. The noise environment in the remaining locations was found to be satisfactory, indicating that ambient noise conditions are generally under control within the study area.

#### 3.3.5 Land Environment

##### 3.3.5.1 Soil Quality

Soil quality is the capacity of a specific kind of soil to function, within natural or managed ecosystem boundaries, to sustain plant and animal productivity, maintain or enhance water and air quality and support human health and habitation. Soil quality reflects how well a soil performs the functions of maintaining biodiversity and productivity, partitioning water and solute flow, filtering and buffering, nutrient cycling and providing support for plants and other structures. Thus, soil quality plays vital role in any particular geographical phenomenon of ecology as well as physico-chemical environment. Soil quality can indicate the current as well as future issues related with the water, ecology and life in the particular region.

Thus, it is clearly visible that soil contamination may result in eventuality in form of contamination of water, ecological destruction and loss of productivity, food crisis and so threat to life. Thus, to determine the exact impacts of any proposed expansion project, it is very essential to determine the existing status of soil quality and existing stress through a study of soil quality assessment.

#### Criteria for Soil Sampling Location:

The locations for collection of representative samples were selected considering –

1. From different types of land uses in the study area.
2. From possible polluted & comparatively controlled locations in the study area.

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3. From the windward and leeward side of the prominent wind direction.

### Sampling Depth

- For most purposes, soil sampling is done to a depth of about 20-cm.
- In some cases, especially in irrigated areas, sampling to a depth of 60-100 cm is desirable.

### Procedure for Composite Sampling

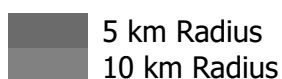
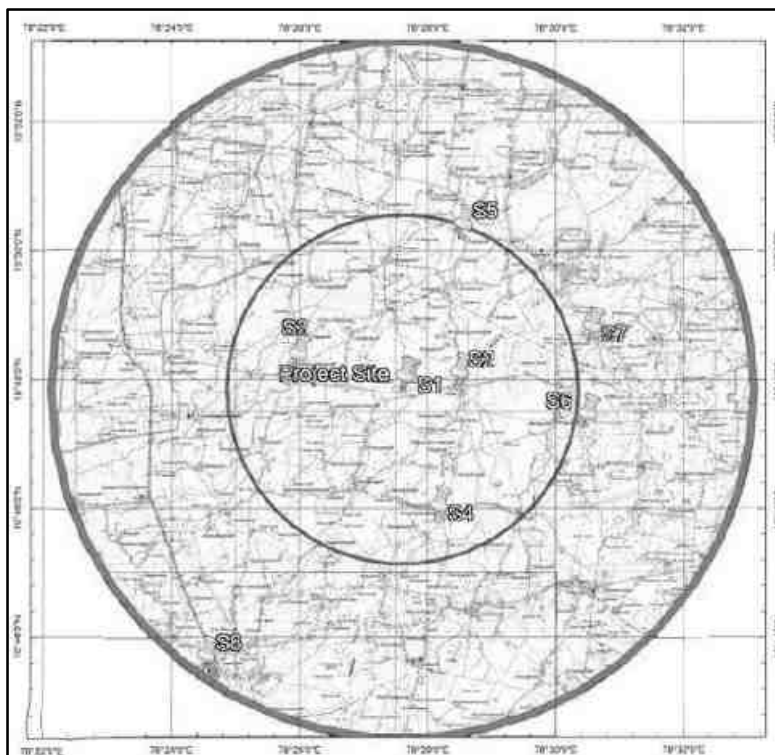
- Prepare a map of the area to be covered in a survey showing different sampling unit boundaries. A plan of the number of samples and manner of composite sampling is entered on the map, different fields being designated by letters A, B, C etc. Each area is traverse separately. A slice of the plough-layer is cut at intervals of 15 to 20 steps or according to the area to be covered. Generally, 10 to 20 spots must be taken for one composite sample depending on the size of the field.
- Soil samples for micronutrient analysis should be taken using a stainless steel auger, or at least ungalvanized auger (because galvanized coating is zinc oxide).
- Before sending soil samples to the testing laboratory, it should be ensured that proper identification marks are present on the sample bags as well as labels placed in the bags.
- Pack the samples properly. Wooden boxes are most suitable for long transport. Sample bags may be packed only in clean bags never used for fertilizer or detergent packing.

Based on the above understanding, soil samples were collected from Eight locations of study area once in study period. The soil samples were collected and analyzed by M/s. PolluCare Engineering India Private Limited (NABL Accredited Environmental Testing Laboratory). Analysis was done for physical properties and chemical characteristics of soil. The evaluation of initial soil quality based on the above characteristics is done and presented as below. The details about the sampling points are given in **TABLE 3.23 & MAP 3.6**.

**TABLE 3.20 - LOCATION OF SOIL SAMPLING**

| Station Code | Location & Address | Geographical Location |               | Aerial Dist. from Project Site (km) | Direction w. r. t. Project Site | Land Classification |
|--------------|--------------------|-----------------------|---------------|-------------------------------------|---------------------------------|---------------------|
|              |                    | Latitude              | Longitude     |                                     |                                 |                     |
| S1           | Project Site       | 10°47'50.95"N         | 78°27'36.29"E | -                                   | -                               | Industrial          |
| S2           | Kallai Village     | 10°47'54.19"N         | 78°28'27.41"E | 1.55                                | E                               | Agricultural        |
| S3           | Perur Udayappatti  | 10°48'11.29"N         | 78°25'56.62"E | 3.10                                | WNW                             | Agricultural        |
| S4           | Vengatampatti      | 10°45'51.51"N         | 78°28'8.30"E  | 3.77                                | SSE                             | Agricultural        |
| S5           | Bullpatti          | 10°50'11.54"N         | 78°28'31.20"E | 4.66                                | NNE                             | Agricultural        |
| S6           | Thalinji           | 10°47'16.03"N         | 78°30'27.59"E | 5.30                                | ESE                             | Agricultural        |
| S7           | Purasampatti       | 10°48'36.82"N         | 78°30'32.38"E | 5.55                                | ENE                             | Agricultural        |
| S8           | Thogaimalai        | 10°43'33.06"N         | 78°24'31.02"E | 9.72                                | SW                              | Agricultural        |

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**MAP 3.6 - LOCATIONS OF SOIL MONITORING STATIONS**

### 3.3.5.2 Results

The results of physical and chemical analysis, carried out as per standard procedure is given in **TABLE 3.24.**

**TABLE 3.21 – RESULTS FOR SOIL SAMPLING**

| Sr.No. | PARAMETER                      | UNIT  | TEST METHOD                 | S 1  | S 2  | S 3  | S 4  | S 5  | S 6  | S 7  | S 8  |
|--------|--------------------------------|-------|-----------------------------|------|------|------|------|------|------|------|------|
| 1      | pH @ 25°C                      | -     | IS 2720 (Part 26) (RA 2016) | 7.92 | 7.83 | 8.12 | 8.01 | 7.72 | 7.95 | 7.87 | 7.63 |
| 2      | Electrical Conductivity @ 25°C | µS/cm | IS 14767:2000 (RA 2016)     | 993  | 1368 | 1027 | 1087 | 1159 | 984  | 1139 | 1255 |
| 3      | Organic Matter                 | %     | IS 2720 (Part 22) 1972      | 1.73 | 1.88 | 1.35 | 1.52 | 1.36 | 1.56 | 1.81 | 1.39 |
| 4      | Moisture Content @105° C       | %     | IS 2720 (Part 2) 1973       | 6.97 | 7.06 | 6.33 | 6.49 | 7.35 | 5.05 | 6.18 | 6.24 |
| 5      | Chloride (as Cl-)              | meq/L | PCEI/SOP/SOIL/015           | 205  | 255  | 181  | 219  | 209  | 235  | 264  | 232  |
| 6      | Sulphates (as SO4)             | mg/kg | PCEI/SOP/SOIL/010           | 193  | 154  | 196  | 196  | 243  | 211  | 193  | 219  |

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| Sr.No. | PARAMETER         | UNIT  | TEST METHOD  | S 1  | S 2  | S 3  | S 4  | S 5  | S 6  | S 7  | S 8  |
|--------|-------------------|-------|--------------|------|------|------|------|------|------|------|------|
| 7      | Manganese (as Mn) | mg/kg | USEPA 3050 B | 1.36 | 1.3  | 1.18 | 1.28 | 1.22 | 1.39 | 1.15 | 1.17 |
| 8      | Copper (as Cu)    | mg/kg | USEPA 3050 B | 0.96 | 0.68 | 0.55 | 0.78 | 0.9  | 0.54 | 0.58 | 0.69 |
| 9      | Cadmium (as Cd)   | mg/kg | USEPA 3050 B | 0.04 | 0.04 | 0.05 | 0.06 | 0.05 | 0.04 | 0.04 | 0.05 |
| 10     | Lead (as Pb)      | mg/kg | USEPA 3050 B | 0.12 | 0.1  | 0.09 | 0.14 | 0.13 | 0.11 | 0.11 | 0.1  |
| 11     | Chromium (as Cr)  | mg/kg | USEPA 3050 B | 0.19 | 0.19 | 0.15 | 0.21 | 0.21 | 0.15 | 0.2  | 0.19 |
| 12     | Selenium (as Se)  | mg/kg | USEPA 3050 B | 0.25 | 0.29 | 0.18 | 0.23 | 0.18 | 0.28 | 0.34 | 0.28 |
| 13     | Arsenic (as As)   | mg/kg | USEPA 3050 B | 0.11 | 0.1  | 0.09 | 0.07 | 0.11 | 0.08 | 0.04 | 0.05 |
| 14     | Nickel (as Ni)    | mg/kg | USEPA 3050 B | 0.18 | 0.18 | 0.18 | 0.23 | 0.21 | 0.14 | 0.2  | 0.26 |
| 15     | Boron (as B)      | mg/kg | USEPA 3050 B | 1.16 | 1.2  | 1.06 | 1.18 | 1.16 | 1.14 | 1.21 | 1.15 |
| 16     | Zinc (as Zn)      | mg/kg | USEPA 3050 B | 5.16 | 4.98 | 3.78 | 3.9  | 3.26 | 2.83 | 3.91 | 4.98 |

**Note:** Sampling & Analysis performed by M/s. PolluCare Engineering India Private Limited (Environmental Testing Laboratory)

### 3.3.5.3 Interpretation

The soil quality analysis carried out at eight locations (S1–S8) indicates that the soils in the study area are generally alkaline in nature, with pH values ranging from 7.63 to 8.12, which are favorable for most agricultural and terrestrial ecosystem functions. Electrical conductivity values (984–1368  $\mu\text{S}/\text{cm}$ ) indicate non-saline to slightly saline soil conditions and do not suggest any significant salinity-related concerns.

Organic matter content varied from 1.35% to 1.88%, indicating moderate soil fertility and the presence of adequate organic nutrients. Moisture content ranged between 5.05% and 7.35%, reflecting normal soil moisture conditions prevailing during the sampling period. Chloride and sulphate concentrations were within typical ranges for natural soils and do not indicate any adverse accumulation of soluble salts.

The concentrations of micronutrients and trace metals such as manganese, copper, boron, and zinc were found to be within normal ranges, supporting soil productivity. Heavy metals including cadmium, lead, chromium, arsenic, nickel, and selenium were detected only at very low concentrations and were well within commonly reported background levels for soils, indicating the absence of significant contamination from industrial or anthropogenic sources.

Overall, the soil quality in the study area is satisfactory, with good physicochemical characteristics and no evidence of heavy metal contamination. The baseline soil conditions are suitable for supporting vegetation growth and do not indicate any significant environmental concerns.

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### 3.4 BASEMAP DETAILS

#### 3.4.1 Land Use Pattern-Remote Sensing Data

The basic purpose of land use pattern and classification in an EIA study is to identify the manner in which different parts of land area is utilized or not utilized. Remote sensing data provides reliable accurate baseline information for land use mapping as it is a rapid method of acquiring up-to-date information of over a large geological area.

Studies on land use aspects of eco-system play an imperative role in identifying susceptible issues and to take appropriate action to uphold ecological equilibrium in the region. The main objective of this section is to provide a baseline status of the study area covering 10 km radius around the Proposed plant site so that temporal changes due to the industrial activities on the surroundings can be assessed in future.

The objectives of Land Use Pattern are to:

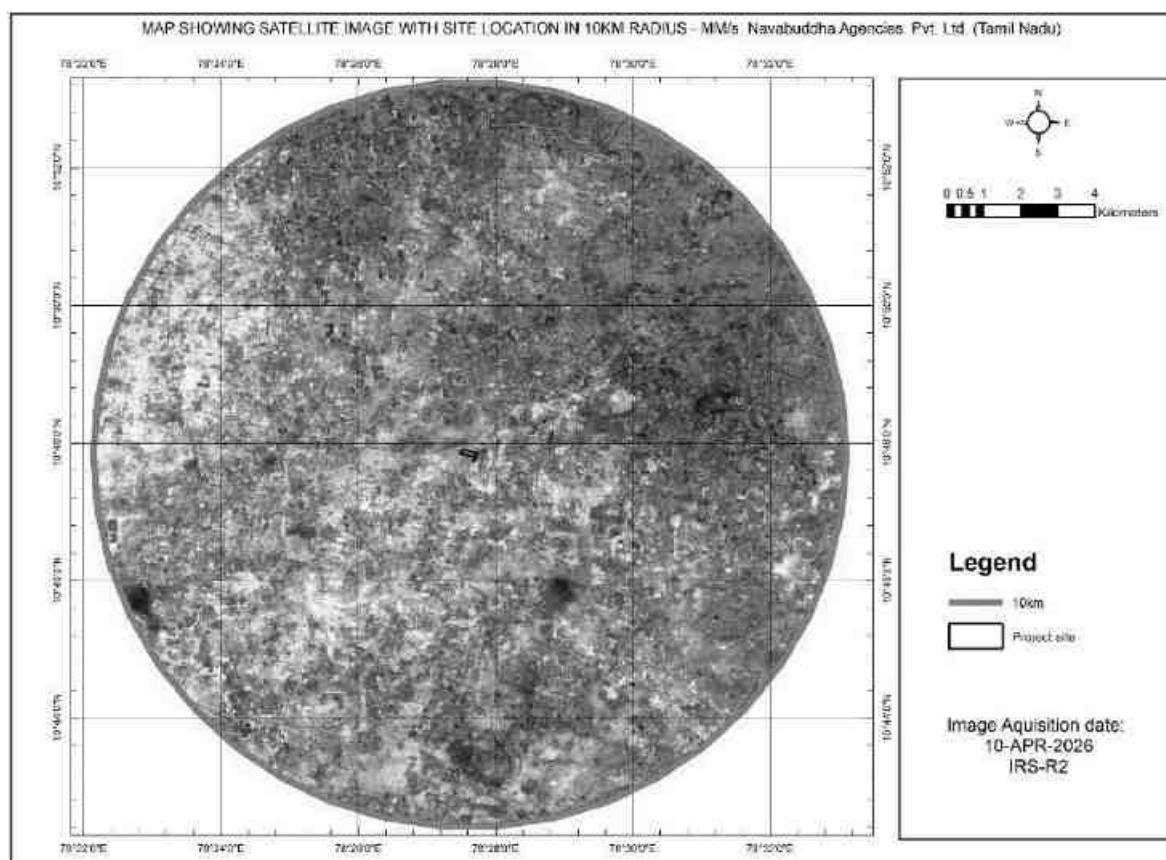
- Determine the present Land use pattern
- Analyze the impacts on Land use due to the Proposed plant site in the study area
- Study area with Proposed unit as epicenter 10 km radius from the core area boundaries is considered for land use study

**Satellite Data:** The Satellite IRS P-6 LISSR2 images are obtained from National Remote Sensing Centre (NRSC) Hyderabad. Latitude: 10°47'50.38"N and Longitude: 78°27'37.24"E as observed in the site by GPS are.

| Points | Latitude      | Longitude     |
|--------|---------------|---------------|
| A      | 10°47'44.17"N | 78°27'40.75"E |
| B      | 10°47'47.91"N | 78°27'41.85"E |
| C      | 10°47'48.52"N | 78°27'41.13"E |
| D      | 10°47'50.41"N | 78°27'29.26"E |
| E      | 10°47'54.06"N | 78°27'30.63"E |
| F      | 10°47'51.59"N | 78°27'43.99"E |
| G      | 10°47'44.33"N | 78°27'41.60"E |

The satellite image of the site is presented in below **MAP 3.7**.

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**MAP 3.7 – SATELLITE IMAGE OF THE SITE**

### 3.4.2 Topographical Data

Topographical maps of Survey of India (SOI) were obtained for land use study as well to develop contour and drainages pattern of area from C44G5, C44G6, C44G9, C44G10

#### Methodology:

The major steps involved in the study area Primary data collection, Secondary data collection, Processing the raw data, preparing base line maps, Quantitative analysis, Predicting the impacts and suggesting the mitigation measures. The equipment and software used for the present study are: GPS, Arc GIS, ERADAS.

The overall methodology adopted and followed to achieve the objectives of the present study involves the following:

- Collection of source data of Survey of India (SOI) toposheets. These are the main inputs for the preparation of essential layers
- Satellite data of IRS P-6 LISSIV sensor is geometrically corrected and enhanced using principal component method and nearest neighborhood resampling technique

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- Preparation of basic themes like layout map, transport & settlement map and contour map from the source data. Then updating of layout map, transport map and drainage map from the satellite image by visual interpretation
- Essential maps (related to natural resources) like Land use / Land cover map are prepared by visual interpretation of the satellite imagery. Visual interpretation is carried out based on the image characteristics like tone, size, shape, pattern, texture, location, association, background etc. in conjunction with existing maps/ literature
- Preliminary quality check and necessary corrections are carried out for all the maps prepared
- All the maps prepared are converted into soft copy by digitization of contours and drainages. In that process editing, labeling, mosaicking, quality checking, data integration etc. are done, finally Land use areas are measured in Sq.km.

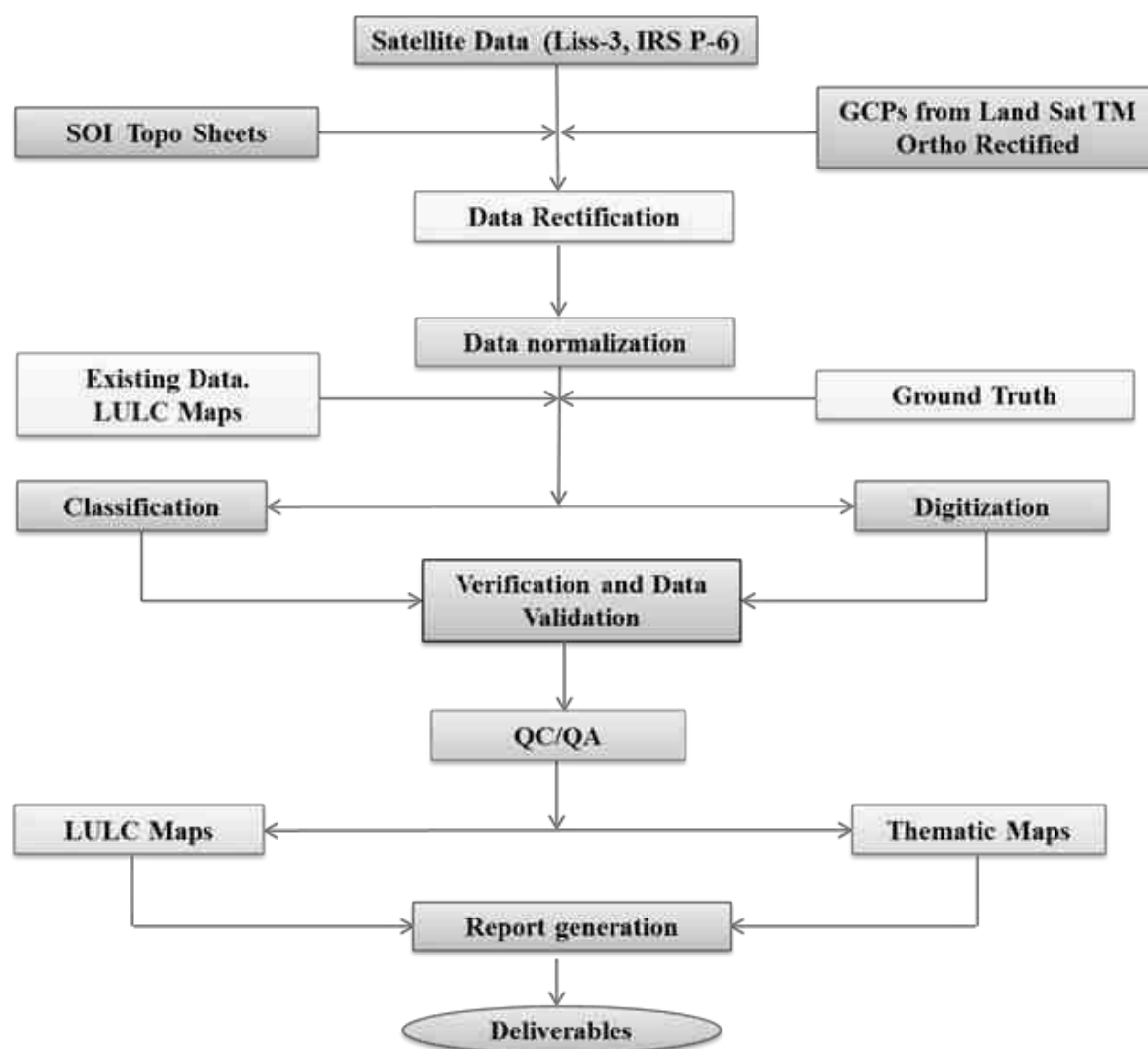


**FIGURE 3.5 – FLOW CHART OF METHODOLOGY**

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### 3.4.3 Land Use Map Analysis

Land use Map Analysis carried out based on the image color, texture, Tone etc. Following steps are used to analyze the Land use pattern of project site:

- Collection of scanned toposheets and Geo-reference the scanned image using the available coordinates
- Collection of IRS LISS IV images and made fused and blended the images for color combinations using Image interpreter-Utilities and Layer stack option available in ERDAS
- Identification Area of interest (AOI) and made a buffer of 10 km radius.
- Enhance the Fused and blended LISS IV image using the Spatial, Radiometric and Temporal options in ERDAS
- Rectified the LISS IV image using Geo-referencing technique, Toposheet to get UTM coordinate system
- Subset the LISS images and Toposheet using 10 km buffer AOI
- Automatic classifications done for LISS IV images using maximum iterations and number of options in unsupervised classification options
- Created the signature file by selecting the more samples of different features with AOI on Unsupervised classification image
- Visual interpretation and supervised classification mixed with recoding practice
- Verified through the QC / QA and finalized the data.

### 3.4.4 Spatial Data from SOI Topographical Sheets

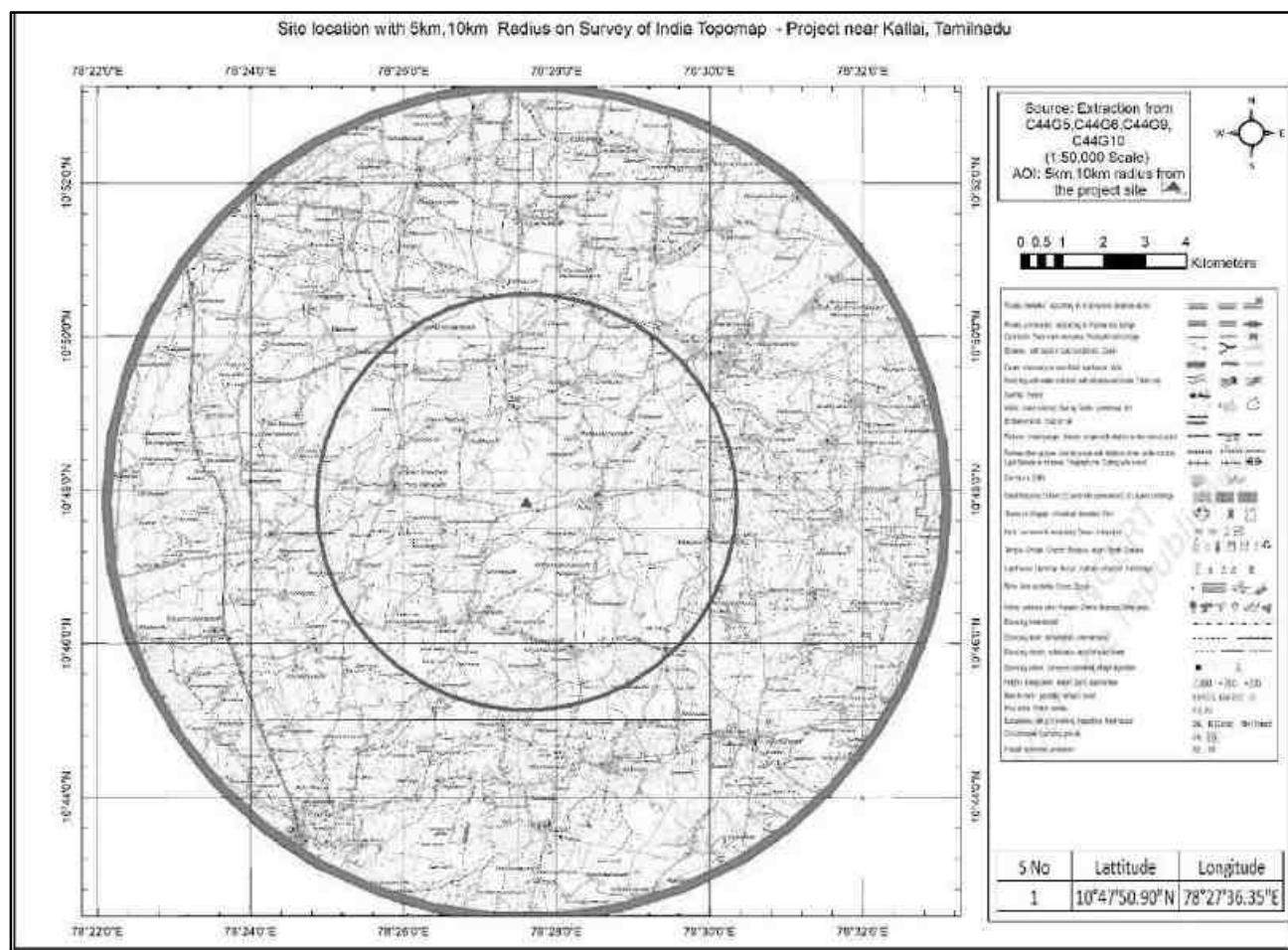
Creating a GIS spatial database is a complex operation, and is the heart of the entire work; it involves data capture, verification and structuring processes. Raw geographical data are available in many different analogue and digital form such as toposheets, aerial photographs, satellite imageries and tables. Out of all these sources, the source of toposheets is of much concern to natural resource scientist and an environmentalist.

In the present study, the essential maps generated from SOI topographical maps. Using the topographical maps, the drainage map and contour Map were also developed. The maps are prepared to a certain scale and with attributes complying with the requirement of terms of reference (ToR). The location of entities on the earth's surface is then specified by means of an agreed co-ordinate system. For most GIS, the common frame of co-ordinate system used for the study is UTM co-ordinates system. All the maps are first Geo-referenced. The same procedure is also applied on remote sensing data before it is used to prepare the Essential maps.

Map showing site location, canals, Lakes, drains are connected to Napali River etc. There is a road network connecting built-up areas and industries. As the terrain conditions are black cotton soil and bit undulated terrain and also there is a drainage network around the site location. No National parks and wild life sanctuaries located in the study area.



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**5 km radius**  
**10 km radius**

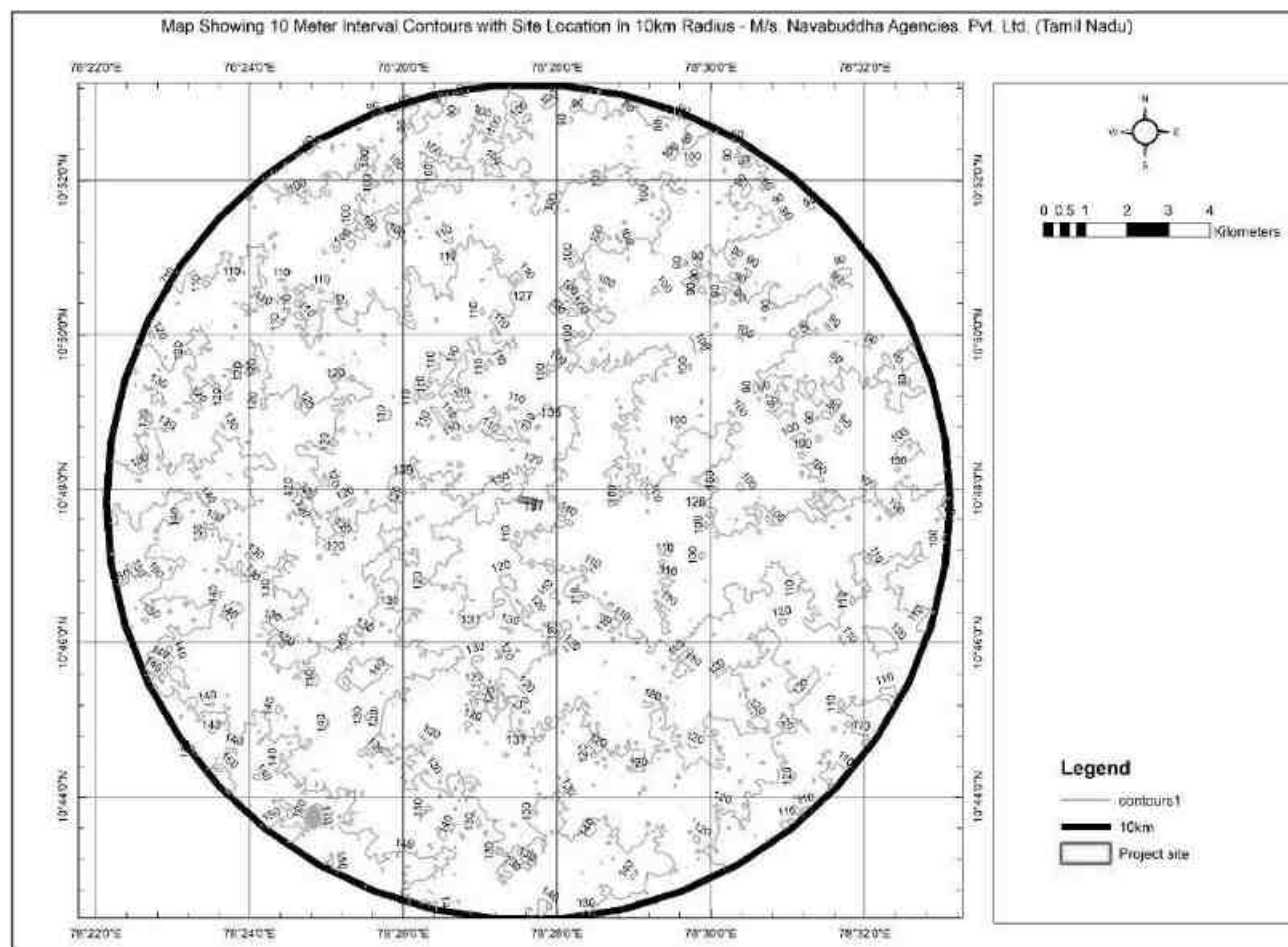
**MAP 3.8 – SITE LOCATION WITHIN 5 & 10 KM RADIUS ON TOPOMAP**

### 3.4.5 Contour Map and Elevations of Study Area

The contours in Toposheet have been digitized in the GIS environment and assigned the respective elevation values in meters with reference to the mean sea level. Using the SRTM (Shuttle Radar Topography Mission) data, the elevation values has been verified. Thereafter final contour map has been prepared with combination of Toposheet and SRTM with contour interval of 10 m. Project site contours vary from 132 m to 138 m above MSL and the study area contours vary from 75 m to 251 m above MSL. From the project site lowest contours were observed in NE direction. While the remaining areas showed variations with respect to contours.

Contour Map and Elevations of Study Area is presented in below **MAP 3.9**.

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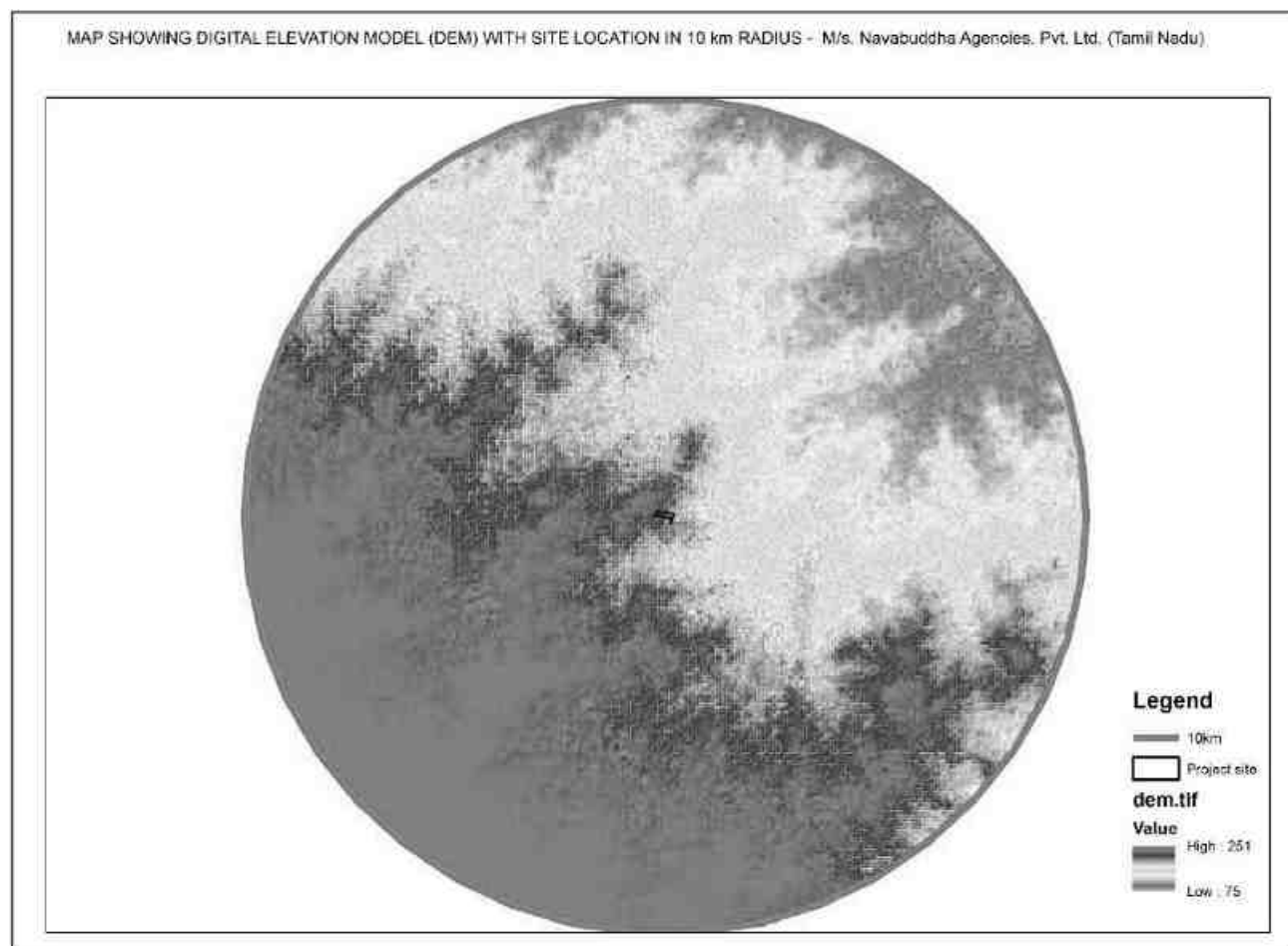


**MAP 3.9 – CONTOUR MAP OF SITE LOCATION WITHIN 10 KM**

### 3.4.6 Topography (Digital Elevation Model)

A digital elevation model (DEM) is a digital representation of ground surface topography or terrain. It is also widely known as a digital terrain model (DTM). A DEM can be represented as a raster (a grid of squares, also known as a height map when representing elevation) or as a triangular irregular network. The proposed plant location is shown in that Relief map. For the relief study of the area very higher quality SRTM (Shuttle Radar Topography Mission) and DEM is downloaded. These DEMs of the Terra represents elevation at a 30 m resolution.

|                                                  |                                           |                                                                                    |            |
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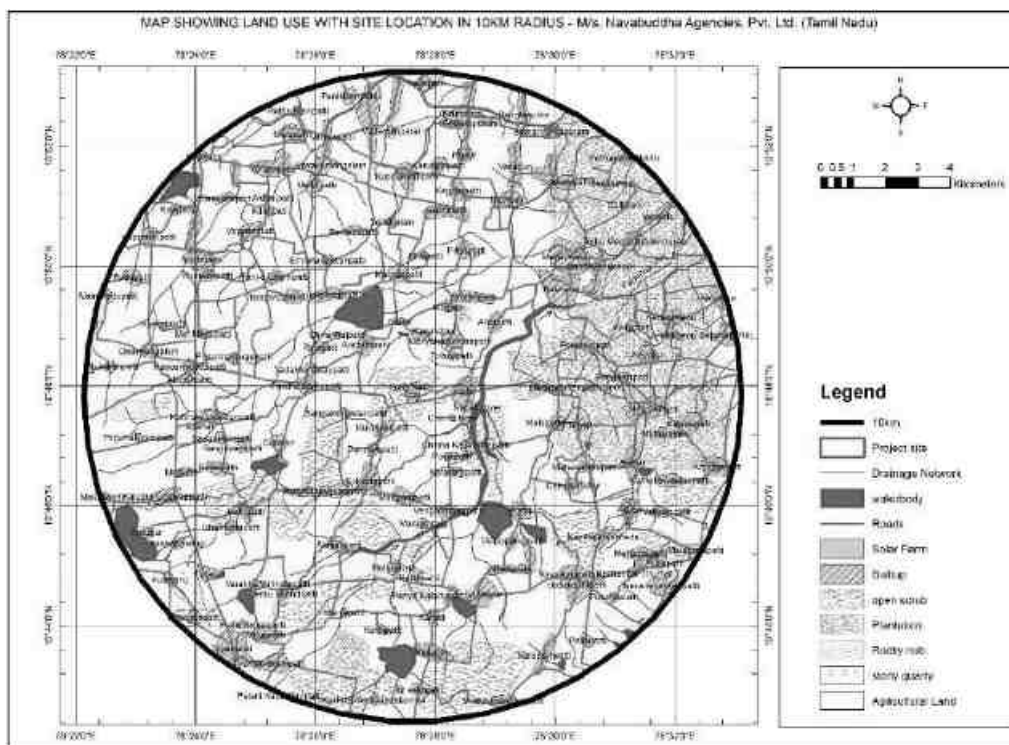


**MAP 3.10 – MAP SHOWING DIGITAL ELEVATION MODEL IN STUDY AREA**

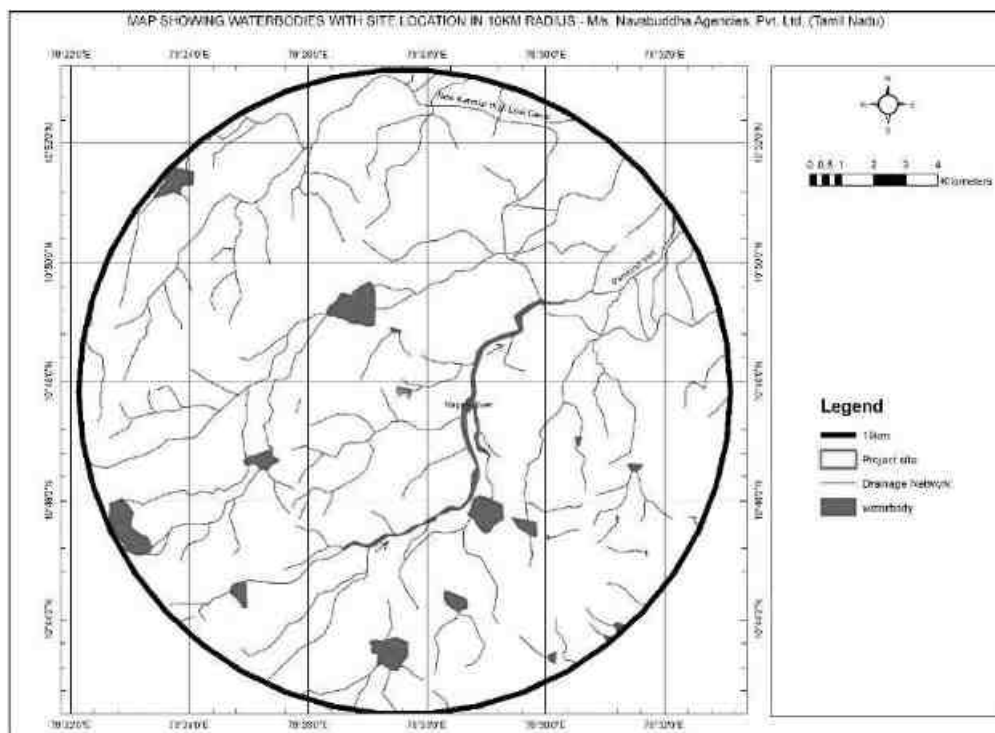
#### **3.4.7 Land use land cover statistics of Core Zone and Buffer Zone**

Map showing the Land Use Land Cover classification in the study area is presented in Fig.3.4.11 it is clearly that the area is covered with Agricultural Cultivable land around 28 % respectively of the total area. which is taken up for cultivation but is temporarily allowed to rest, cropped for one or more season, but not less than one year. Thus, total cultivable land is 28 %. Other class is Roads within the study area 18%, Around the Fallow edges the Settlement (Built-up area) is located and occupies around 10%, and. It is an area of human habitation developed due to non-agricultural use and that has a cover of buildings, transport and communication, utilities in association with water, vegetation and plantation. The proposed project is on Agricultural Cultivable land and does not have any significant impact on the surrounding villages and habitation. The water bodies cover 12% of the total area. The water bodies cover Napali River etc. These areas have a very prominent signature and can be seen as almost Dark blue and light blue in the satellite image. The statistical break-up of the land use classes of buffer zone are presented in **TABLE 3.28** and depicted in **MAP 3.14**.

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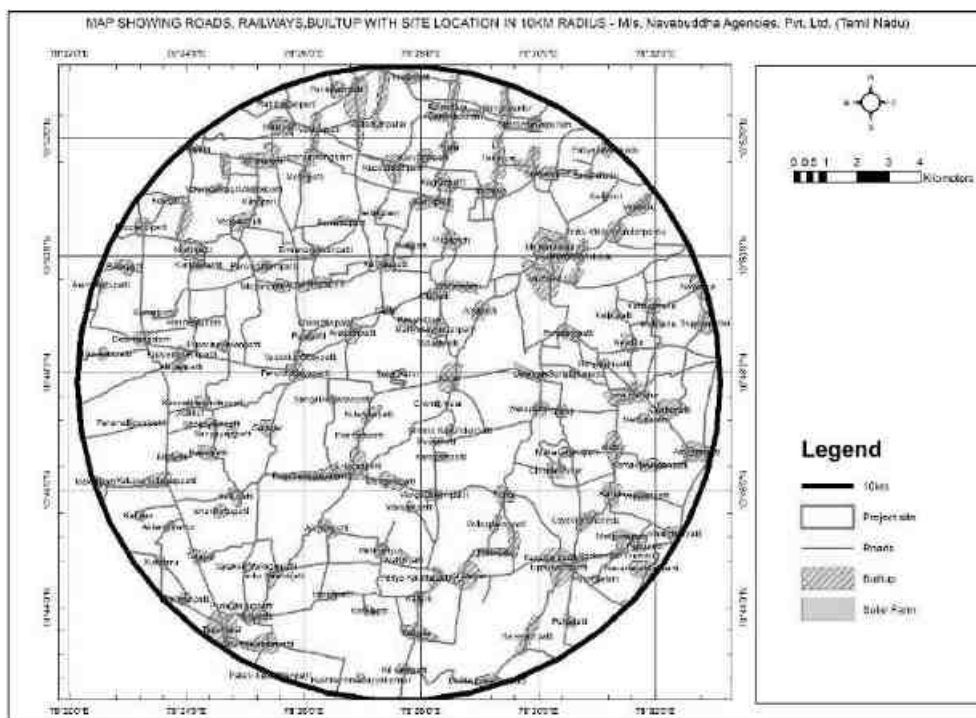


**MAP 3.11 – MAP SHOWING LAND USE LAND COVER IN STUDY AREA**

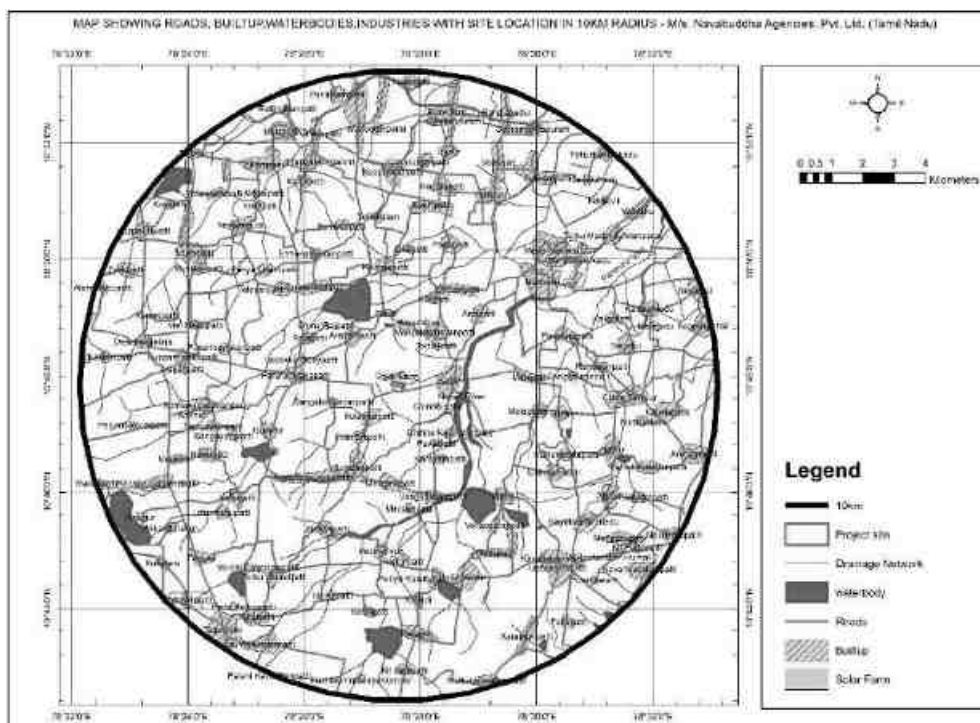


**MAP 3.12 – MAP SHOWING WATER BODIES, DRAINAGE IN STUDY AREA**

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**MAP 3.13 – MAP SHOWING ROADS, SOLAR FARMS & BUILTUP**

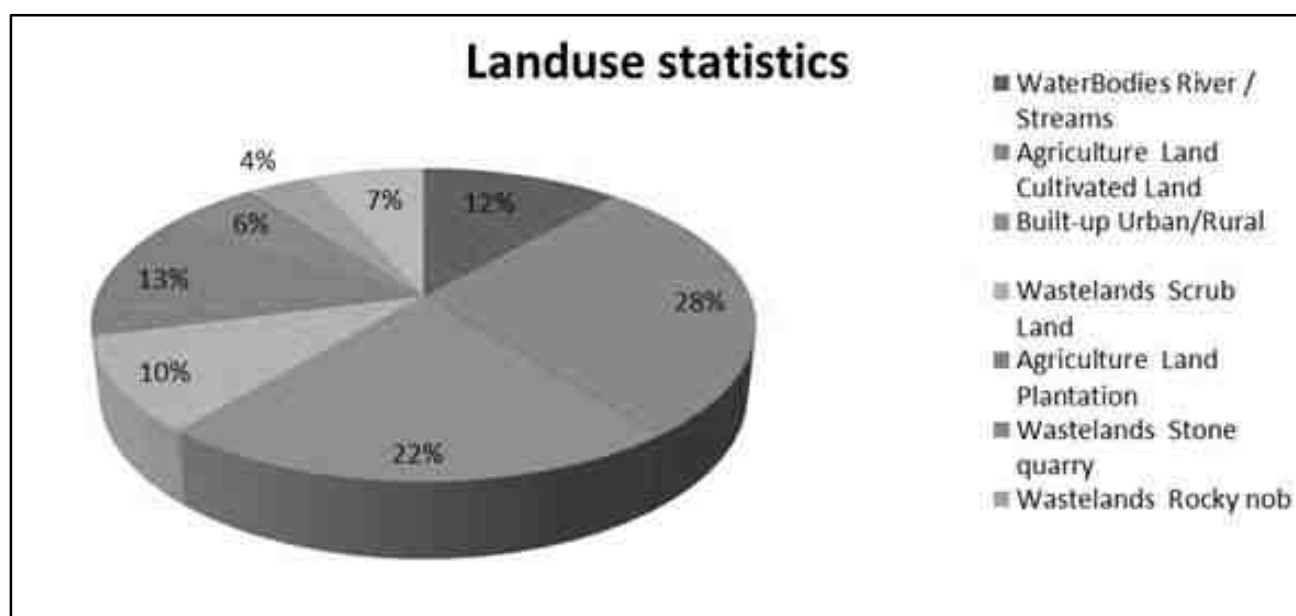


**MAP 3.14 – MAP SHOWING ROADS, BUILTUP, WATERBODIES, etc.**

|                                                  |                                           |                                                                                    |            |
|--------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|------------|
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**TABLE 3.22 – LAND USE LAND COVERS STATISTICS OF STUDY AREA (0-10 km)**

| Sr. No.      | LULC_Level 1&2 Classifications |                 | Area (Ha)       | Area (%)    |
|--------------|--------------------------------|-----------------|-----------------|-------------|
| 1            | WaterBodies                    | River / Streams | 3668.31         | 12%         |
| 2            | Agriculture Land               | Cultivated Land | 8880.44         | 28%         |
| 3            | Built-up                       | Urban/Rural     | 6866.75         | 22%         |
| 4            | Wastelands                     | Scrub Land      | 3112.00         | 10%         |
| 5            | Agriculture Land               | Plantation      | 4110.00         | 13%         |
| 6            | Wastelands                     | Stone quarry    | 1810.00         | 6%          |
| 7            | Wastelands                     | Rocky nob       | 1210.00         | 4%          |
| 8            | Built-up                       | Industria area  | 2100.00         | 7%          |
| <b>Total</b> |                                |                 | <b>31757.50</b> | <b>100%</b> |



**GRAPH 3.14 – GRAPHICAL PRESENTATION OF LAND USE STATISTICS**

|                                                  |                                           |                                                                                    |            |
|--------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|------------|
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### 3.5 ECOLOGY AND BIODIVERSITY

#### 3.5.1 Introduction

Biological assessment of the site was done to identify whether there are any rare, endangered, endemic, threatened (REET) species of flora or fauna within the study area (proposed site boundary to 10 km radius). The entire study area divided into three major zones, The proposed project site area, the core zone which considered to be high impact area (project site boundary to 5 km radial distance) and the buffer zone (core zone boundary to 10 km radial distance) which considered to be moderate impacted area. The study also designed to identify impacts and suggest suitable mitigation measures. A reconnaissance survey randomly made for one day for proposed unit and surrounding buffer area during Summer season 2026. The floral and faunal survey has been conducted during day time (Morning 9 am to 5 pm) and Avian survey has been conducted in selected locations during dawn (early morning 5.30 am to 7.30 am) and in dusk (evening 5.00 pm to 6.30 pm) depends on light intensity. General interviews made with local people on seasonal migratory birds, animal corridors and Ethno botanical knowledge and recorded in field data sheets. No physical damage created to flora and fauna during data collection.

#### 3.5.2 Scope of the Study

The ecology study basically to know the existing vegetation and faunal habitats of the study area and this study also in line with the ToR that includes preparation of greenbelt plan. The scope of the work also includes to identify ecologically sensitive areas and the presence of any Rare or Endangered or Endemic or Threatened (REET) species of flora or fauna which are having regional, national and global significance of the region. The study include collection of information on project and site, desktop study, secondary data collection, primary field survey, identification, quantification the data, interpretation of the results with predicted impacts, suggesting mitigation measures and preparing conservation plan for schedule -I species (if any) and preparing greenbelt plan. The survey has been made to understand the existing situation at ground level and to suggest mitigation measures based on impacts quantified.

#### 3.5.3 Secondary Data/ Rationality, Eco-sensitive Habitats and Limitations of the study

The key referral material is from Forest working plan, Karur district Tamil Nadu. Certain published papers related to region in the recent years are also considered. Ground validation has done through elderly village people and personal field visits. Few Trees, shrubs and herbs are scattered throughout the core region. The possible impacted regions are intensively studied. Impacts on the surrounding agricultural lands are also studied and quantified. The sampling points are selected in all the directions and ecosensitive habitats of the study area. There are no RF/PF are existing within 10km study area.

#### Flora References:

Mounika, S., Geetha, K., Anjana Devi, N. & Sharmila S. (2022). Ethno-botanical Examination of Medicinal Plants Diversity in Molamalai, Karur District, Tamil Nadu. ScieXplore International Journal of Research in Science, 7(1&2): 1–8. This study documents medicinal plant diversity and traditional ethnobotanical knowledge from Molamalai Hills of Karur District.

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Tamil Nadu Forest Department. Working Plans and Forest Management Records of Karur Forest Division, Tamil Nadu. These provide baseline information on vegetation, dry deciduous forests, scrub forests, and associated biodiversity.

Rapid EIA Reports of Karur District Quarry and Infrastructure Projects. Several environmental impact assessment reports contain detailed floral inventories from Karur District, especially around Kattalai, Kulithalai, and Cauvery riverine habitats.

### Fauna References:

**Birds:** Salahudeen, M., Saranya, E., Gunasekaran, C. & Vadivalagan, C. (2013). Studies on the Abundance and Distribution of Birds in Three Different Habitats of Karur District, South India. *Journal of Entomology and Zoolical Studies*, 1(3): 57–63.

Deepan, R., Vikram, B., Harish, B., Balasundaram, R. & Samson, A. (2017). Occurrence of Tricoloured Munia (*Lonchura malacca*) in Karur District, Tamil Nadu. *Journal of Applied Science and Research*, 5(6): 79–80. The paper reports an additional avian species for Karur District and notes that 67 bird species had previously been recorded from the district.

**Fishes:** Shereena, K.M., Tamil Kumar, T., Velmurugan, S., Jayapal, J., Basith, O., Rathika, R. & Mahmoodah Parveen, K. (2025). Studies on Physico-Chemical Properties and Ichthyofauna Diversity of Cauvery River, Karur District (Tamil Nadu, India). *International Journal of Environmental Sciences*, 11(9): 420–428. The study recorded 15 fish species belonging to Cichlidae, Channidae, Cyprinidae and Cobitidae families from the Cauvery River in Karur District.

**Mammals:** Tamil Nadu Forest Department (2022 onwards). Documentation related to the notification of the Kadavur Slender Loris Sanctuary covering parts of Karur and Dindigul districts. The sanctuary supports populations of the endangered Slender Loris and associated dry scrub fauna

- IUCN 2026. The IUCN Red List of Threatened Species. Version 2025-2. <http://www.iucnredlist.org> ISSN 2307-8235
- Indian Wild Life (Protection) Amendment Act, 2022, an act further to amend the Wild Life (Protection) Act, 1972 (Schedule I and II).

**Cultivated plants in the study area:** Agriculture is one of the major land-use activities in Karur District, Tamil Nadu, supported by the Cauvery and Amaravathi river systems as well as rainfed cultivation in upland areas. The principal crop cultivated in irrigated tracts is paddy (*Oryza sativa*), while important millets such as sorghum (*Sorghum bicolor*) and pearl millet (*Pennisetum glaucum*) are grown under rainfed conditions. Major pulse crops include red gram (*Cajanus cajan*), black gram (*Vigna mungo*), green gram (*Vigna radiata*), and horse gram (*Macrotyloma uniflorum*). Oilseed crops such as groundnut (*Arachis hypogaea*), sesame (*Sesamum indicum*), and sunflower (*Helianthus annuus*) are also widely cultivated. Commercial crops include sugarcane (*Saccharum officinarum*) and cotton (*Gossypium* spp.), while horticultural crops such as banana (*Musa paradisiaca*), mango (*Mangifera indica*), guava (*Psidium guajava*), lemon (*Citrus* spp.), coconut (*Cocos nucifera*), and drumstick (*Moringa oleifera*) contribute significantly to the district's agricultural economy. Vegetable cultivation includes tomato (*Solanum lycopersicum*), brinjal (*Solanum melongena*), chilli (*Capsicum annum*), and okra (*Abelmoschus esculentus*). The district is also known for the cultivation of turmeric (*Curcuma longa*), curry leaf (*Murraya koenigii*), jasmine (*Jasminum sambac*), tapioca (*Manihot esculenta*), and the medicinal plant gloriosa lily (*Gloriosa superba*). These crops form the backbone



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of the agricultural landscape of Karur District and play an important role in supporting local livelihoods and agro-based industries.

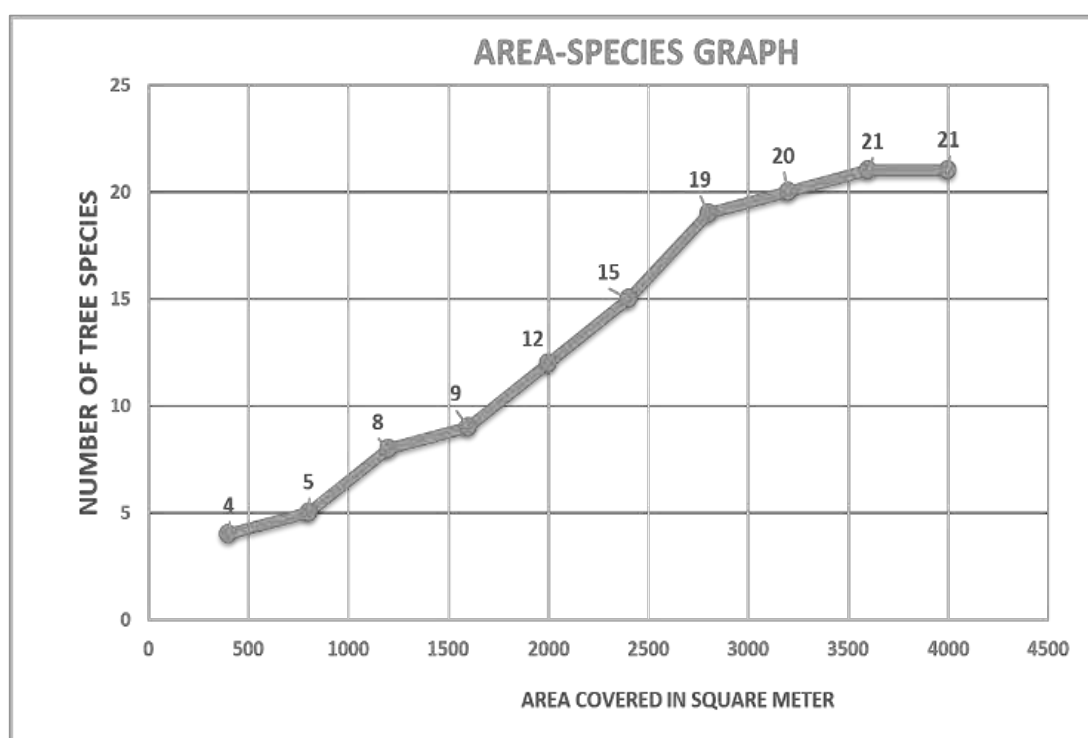
**Interpretation of Secondary data:** As per the secondary data from various sources, there are no national parks, wildlife sanctuaries and any other eco sensitive zones present within the study area. There are no migratory corridors and wetlands notified under "The Ramsar Convention – 1971" or listed under "the National Wetland Conservation Programme- 2009" is reported within 10 km from project boundary.

There are good number of ecologically sensitive areas such as rivers, water bodies in the study area: Considering topographical features, study has been carried out near dense vegetation regions, water bodies and roadside plantations. There are no Reserve forests present in the study area.

### 3.5.4 Sampling Locations

#### Methodology:

The total area is analyzed with GIS tools based on Landuse and Land cover pattern, forest types and number of sampling points finalized through Area- Species graph and marked around 10 sampling points by covering the vegetation types in stratified manner. The criteria for sampling points is mainly near open vegetation. The vegetation sampling done during 9 am to 5 pm and 20 to 30 min spend at each location and the frequency of sampling is for one time only. Mostly the area is agri habitations without any reserve forests. Hence 10 points selected near the Proposed project site area and core zone only covering all the major ecosystems.

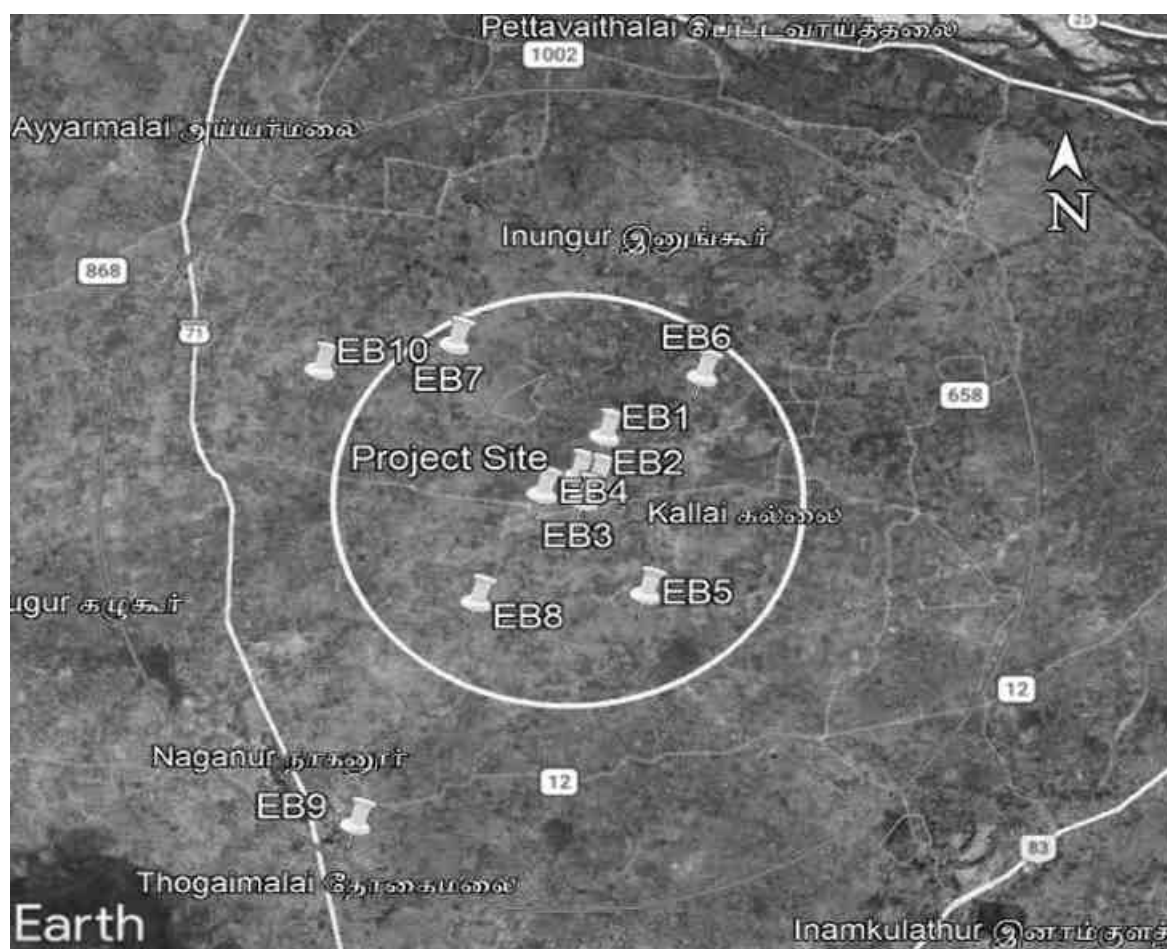


**GRAPH 3.15 – AREA SPECIES GRAPH**

|                                                  |                                           |                                                                                    |            |
|--------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------|------------|
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**TABLE 3.23 – SAMPLING POINTS SELECTED FOR THE PROPOSED STUDY AREA**

| Sr. No. | Latitude      | Longitude     |
|---------|---------------|---------------|
| 1       | 10°48'22.90"N | 78°27'56.05"E |
| 2       | 10°47'47.33"N | 78°27'49.90"E |
| 3       | 10°47'32.11"N | 78°27'41.18"E |
| 4       | 10°47'37.54"N | 78°27'12.14"E |
| 5       | 10°46'18.44"N | 78°28'24.51"E |
| 6       | 10°49'9.88"N  | 78°29'4.41"E  |
| 7       | 10°49'35.40"N | 78°26'10.75"E |
| 8       | 10°46'12.32"N | 78°26'25.96"E |
| 9       | 10°43'16.53"N | 78°25'1.24"E  |
| 10      | 10°49'15.30"N | 78°24'36.30"E |



**MAP 3. 15 – GOOGLE EARTH MAP SHOWING SELECTED SAMPLING POINTS WITHIN THE STUDY AREA (NOT TO SCALE)**

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### 3.5.5 Survey Types used:

1. Stratified random sampling method for flora and fauna by using Land Use classification.
2. Random surveys were made near dense vegetation areas near road side and human habitations.
3. Indirect and direct evidences recorded for faunal species in the sample plots.
4. Point count method for birds near aquatic bodies.
5. Interview with local villagers within the study area for history for faunal migratory routes and ecosensitive habitats.

### 3.5.6 Equipment Used

- Digital Camera (NIKON 42 x zoom)
- GPS
- Binoculars
- Measuring Tape
- Torch
- Field Observation book
- Pen, etc.

### 3.5.7 Floral Survey

#### Methodology:

The study area was carried out through primary field survey in selected sampling locations and considering secondary data collected from various sources of the region. Based on land use classification, the major vegetation types were identified and proportionate stratified random sampling conducted through quadrant method with 20 x 20 m for trees to know the predominant tree species grown in this region. The number of sampling points (Quadrants) are finalized based on the Area- Species graph. The floral species observed near road side, pond side and other vegetation rich areas are also surveyed randomly during the site visit and recorded the species. Species listed are compared with standard books and acts (BSI, ZSI and IUCN, IWPA) and noted the species required for conservation criteria. Ecological parameters viz., abundance, density, frequency, Relative abundance (RA), Relative density (RD), Relative frequency (RF), Important value index (IVI), Shannon-Wiener diversity index was derived from the quantitative primary data collected during field survey.

**TABLE 3.24 – LIST OF PLANT SPECIES RECORDED (PRIMARY DATA)**

| Sr.No. | Botanical Name                           | Common name      | Family        | Habit |
|--------|------------------------------------------|------------------|---------------|-------|
| 1      | <i>Acacia auriculiformis</i> Benth.      | Astrialian Babul | Mimosaceae    | Tree  |
| 2      | <i>Acacia leucophloea</i> (Roxb.) Willd. | Samdi / Renjh    | Mimosaceae    | Tree  |
| 3      | <i>Acacia nilotica</i> (L.) Delile       | Desi bavad       | Mimosaceae    | Tree  |
| 4      | <i>Ailanthus excelsa</i> Roxb.           | Maharuk          | Simaroubaceae | Tree  |
| 5      | <i>Albizia lebbeck</i>                   | Shirish          | Fabaceae      | Tree  |
| 6      | <i>Anogeissus pendula</i>                | Dhau / Dhonk     | Combretaceae  | Tree  |
| 7      | <i>Azadirachta indica</i> A. Juss.       | Neem             | Meliaceae     | Tree  |

|                                                  |                                           |                                                                                    |            |
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| Sr.No. | Botanical Name                            | Common name      | Family          | Habit |
|--------|-------------------------------------------|------------------|-----------------|-------|
| 8      | <i>Butea monosperma</i>                   | Khakharo, Palash | Fabaceae        | Tree  |
| 9      | <i>Cassia fistula</i>                     | Amaltas          | Fabaceae        | Tree  |
| 10     | <i>Cocos nucifera</i>                     | Nariar           | Arecaceae       | Tree  |
| 11     | <i>Delonix regia</i>                      | Krishna chuda    | Fabaceae        | Tree  |
| 12     | <i>Dendrocalamus strictus</i>             | Nar Bans         | Poaceae         | Tree  |
| 13     | <i>Eucalyptus citriodora</i>              | Nilgiri          | Myrtaceae       | Tree  |
| 14     | <i>Ficus benghalensis</i> L.              | Bata             | Moraceae        | Tree  |
| 15     | <i>Ficus religiosa</i> L.                 | Aswatta          | Moraceae        | Tree  |
| 16     | <i>Leucaena leucocephala</i>              | Subabool         | Fabaceae        | Tree  |
| 17     | <i>Mangifera indica</i> L.                | Aami             | Anacardiaceae   | Tree  |
| 18     | <i>Peltophorum pterocarpum</i>            | Peeli Gulmohar   | Fabaceae        | Tree  |
| 19     | <i>Plumeria rubra</i>                     | Chafa            | Apocynaceae     | Tree  |
| 20     | <i>Polyalthia longifolia</i>              | Ashok            | Annonaceae      | Tree  |
| 21     | <i>Pongamia pinnata</i>                   | Karanj           | Fabaceae        | Tree  |
| 22     | <i>Prosopis cineraria</i>                 | Khejri           | Fabaceae        | Tree  |
| 23     | <i>Prosopis juliflora</i>                 | Gando Baval      | Mimosaceae      | Tree  |
| 24     | <i>Psidium guajava</i>                    | Peru             | Myrtaceae       | Tree  |
| 25     | <i>Sammania samman</i>                    | Rain tree        | Mimosaceae      | Tree  |
| 26     | <i>Syzygium cumini</i> (L.) Skells        | Jam              | Myrtaceae       | Tree  |
| 27     | <i>Tecoma stans</i>                       |                  | Bignoniaceae    | Tree  |
| 28     | <i>Tectona grandis</i> L.f.               | Sagown           | Verbenaceae     | Tree  |
| 29     | <i>Terminalia arjuna</i>                  | Arjun            | Combretaceae    | Tree  |
| 30     | <i>Thespesia populnea</i>                 | Paras pimplo     | Malvaceae       | Tree  |
| 31     | <i>Vitex negundo</i>                      | Nirgundi         | Lamiaceae       | Tree  |
| 32     | <i>Zizyphus jujuba</i>                    | Bera             | Rhamnaceae      | Tree  |
| 33     | <i>Annona squamosa</i> L.                 | Sitafal          | Annonaceae      | Tree  |
| 34     | <i>Bauhinia racemosa</i> Lam.             | Asta             | Caesalpiniaceae | Tree  |
| 35     | <i>Bougainvillea spectabilis</i>          |                  | Nyctaginaceae   | Tree  |
| 36     | <i>Cassia siamea</i>                      | Chakunda         | Caesalpiniaceae | Tree  |
| 37     | <i>Ficus racemosa</i>                     | Umbar,           | Moraceae        | Tree  |
| 38     | <i>Phoenix sylvestris</i> (L.) Roxb.      | Sibna            | Arecaceae       | Tree  |
| 39     | <i>Tamarindus indica</i> L.               | Emli             | Caesalpiniaceae | Tree  |
| 40     | <i>Abutilon indicum</i> (L.) Sweet        | Dabli, Kanski    | Malvaceae       | Shrub |
| 41     | <i>Calotropis procera</i> (Aiton) Dryand. | Rui              | Asclepiadaceae  | Shrub |
| 42     | <i>Carissa carandas</i>                   | Karonda          | Apocynaceae     | Shrub |
| 43     | <i>Euphorbia cactus</i>                   | Jemudu           | Euphorbiaceae   | Shrub |
| 44     | <i>Hyptis suaveolens</i> (L.) Poit.       | Danthitulasi     | Lamiaceae       | Shrub |
| 45     | <i>Opuntia dillenii</i> (Ker Gawl.) Haw.  | Naga jamudu      | Cactaceae       | Shrub |
| 46     | <i>Senna auriculata</i> (L.) Roxb.        | Tangedu          | Leguminosae     | Shrub |
| 47     | <i>Ziziphus oenopolia</i> (L.) Mill.      | Parimi           | Rhamnaceae      | Shrub |
| 48     | <i>Caesalpinia bonduc</i>                 | Kanchki          | Fabaceae        | Shrub |
| 49     | <i>Calotropis gigantea</i> (L.) Dryand.   | Tella jilledu    | Apocynaceae     | Shrub |
| 50     | <i>Cassia auriculata</i>                  | Tarwad           | Caesalpiniaceae | Shrub |

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| Sr.No. | Botanical Name                                  | Common name             | Family          | Habit      |
|--------|-------------------------------------------------|-------------------------|-----------------|------------|
| 51     | <i>Lantana camara L.</i>                        | Tantani                 | Verbenaceae     | Shrub      |
| 52     | <i>Zizyphus mauritiana</i>                      | Bor                     | Rhamnaceae      | Shrub      |
| 53     | <i>Ipomoea aquatica</i>                         | Nari Val, Pani Ji Val   | Convolvulaceae  | Hydrophyte |
| 54     | <i>Acalypha indica L.</i>                       | Kupi, Vichhi Kanta      | Euphorbiaceae   | Herb       |
| 55     | <i>Ageratum conyzoides (L.) L.</i>              | Makand Mari             | Asteraceae      | Herb       |
| 56     | <i>Alternanthera sessilis (L.) R.Br. ex DC.</i> | Jar Bhaji, Jar Bhangaro | Amaranthaceae   | Herb       |
| 57     | <i>Amaranthus spinosus L.</i>                   | Kandharo Tandarbhe      | Amaranthaceae   | Herb       |
| 58     | <i>Argemone mexicana L.</i>                     | Darudi, Uzar Kandho     | Papaveraceae    | Herb       |
| 59     | <i>Boerhavia diffusa</i>                        | Rafadi, Rafadiaul, Rati | Nyctaginaceae   | Herb       |
| 60     | <i>Cassia occidentalis</i>                      | Vado Sundaro, Vadi      | Caesalpiniaceae | Herb       |
| 61     | <i>Cassia tora</i>                              |                         | Caesalpiniaceae | Herb       |
| 62     | <i>Datura metel L.</i>                          | Dhaturo                 | Solanaceae      | Herb       |
| 63     | <i>Euphorbia hirta</i>                          | Vadi Dudheli            | Euphorbiaceae   | Herb       |
| 64     | <i>Hygrophila auriculata</i>                    | Kantaro Akaro           | Acanthaceae     | Herb       |
| 65     | <i>Ocimum basilicum</i>                         | Maruo, Maruvo           | Lamiaceae       | Herb       |
| 66     | <i>Ocimum sanctum</i>                           | Tulsi                   | Lamiaceae       | Herb       |
| 67     | <i>Parthenium hysterophorus</i>                 | Congress Grass          | Asteraceae      | Herb       |
| 68     | <i>Plumbago zeylanica</i>                       | Vara Val, Gadar Zipto   | Plumbaginaceae  | Herb       |
| 69     | <i>Solanum surattense</i>                       | Jangali Ringani, Pat    | Solanaceae      | Herb       |
| 70     | <i>Tephrosia purpurea</i>                       | Sarpankho               | Fabaceae        | Herb       |
| 71     | <i>Typha angustata</i>                          | Gha Bajariu             | Typhaceae       | Herb       |
| 72     | <i>Waltheria indica</i>                         | Pilu Fulaju Zadvu       | Sterculiaceae   | Herb       |
| 73     | <i>Achyranthes aspera L.</i>                    | Agado, Kandhero         | Amaranthaceae   | Herb       |
| 74     | <i>Aerva lanata (L.) Juss</i>                   | Kapuri madhuri          | Amaranthaceae   | Herb       |
| 75     | <i>Sida acuta</i>                               | Adbau bala              | Malvaceae       | Herb       |
| 76     | <i>Tridax procumbens</i>                        | Ganthiyu                | Asteraceae      | Herb       |
| 77     | <i>Vernonia cinerea</i>                         | Moti sedrd, Sahadevi    | Asteraceae      | Herb       |
| 78     | <i>Apluda mutica L.f.</i>                       | Grass                   | Poaceae         | Grass      |
| 79     | <i>Cenchrus ciliaris</i>                        | Buffel Grass            | Poaceae         | Grass      |
| 80     | <i>Cynodon dactylon (L.) Pers.</i>              | Grass                   | Poaceae         | Grass      |
| 81     | <i>Cyperus castaneus Willd.</i>                 | Grass                   | Poaceae         | Grass      |
| 82     | <i>Eragrostis tenella</i>                       | Limor, Kalavo           | Poaceae         | Grass      |
| 83     | <i>Abrus precatorius L.</i>                     | Chanothi                | Fabaceae        | Climber    |
| 84     | <i>Clitoria ternatea L.</i>                     |                         | Leguminosae     | Climber    |
| 85     | <i>Ipomoea carnea Jacq.</i>                     | Beshram                 | Convolvulaceae  | Climber    |
| 86     | <i>Cissus quadrangularis</i>                    | Sandhiyal, Sandhaval    | Vitaceae        | Climber    |
| 87     | <i>Pergularia daemia</i>                        | Dudhariyal, Dudhar Val  | Asclepiadaceae  | Climber    |

**TABLE 3.25 – LIST OF PLANT SPECIES RECORDED (SECONDARY DATA)**

| Sr.No. | Botanical Name             | Common name | Family      | Habit |
|--------|----------------------------|-------------|-------------|-------|
| 1      | <i>Thevetia neriifolia</i> | Peeli Kaner | Apocynaceae | Tree  |

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| Sr.No. | Botanical Name                               | Common name        | Family         | Habit |
|--------|----------------------------------------------|--------------------|----------------|-------|
| 2      | <i>Thevetia peruviana</i>                    | Piri Karen         | Apocynaceae    | Tree  |
| 3      | <i>Acacia arabica</i> Willd                  | Babool             | Mimosaceae     | Tree  |
| 4      | <i>Aegle marmelos</i> (L.) Corr.             | Billi              | Rutaceae       | Tree  |
| 5      | <i>Alstonia scholaris</i> R.BR               | Saptparni          | Apocynaceae    | Tree  |
| 6      | <i>Bombax ceiba</i>                          | Shimlo             | Malvaceae      | Tree  |
| 7      | <i>Caesalpinia pulcherrima</i> (L.) Sw.      | Galtoro            | Fabaceae       | Tree  |
| 8      | <i>Cordia gharaf</i>                         | Gundi              | Boraginaceae   | Tree  |
| 9      | <i>Dalbergia latifolia</i>                   | Sisam              | Fabaceae       | Tree  |
| 10     | <i>Dalbergia sissoo</i> Roxb.                | Sissoo             | Fabaceae       | Tree  |
| 11     | <i>Diospyros melanoxylon</i>                 | Timru / Timbervo   | Ebenaceae      | Tree  |
| 12     | <i>Embllica officinalis</i> Gaertn.          | Naal               | Euphorbiaceae  | Tree  |
| 13     | <i>Erythrina suberosa</i>                    | Jangariyo Khakharo | Fabaceae       | Tree  |
| 14     | <i>Eucalyptus globulosa</i>                  | Nilgiri            | Myrtaceae      | Tree  |
| 15     | <i>Eucalyptus tereticornis</i>               | Nilgiri            | Myrtaceae      | Tree  |
| 16     | <i>Ficus benamina</i>                        |                    | Moraceae       | Tree  |
| 17     | <i>Gmelina arborea</i>                       | Savan              | Lamiaceae      | Tree  |
| 18     | <i>Holoptelea integrifolia</i>               | Kanjho, Charal     | Ulmaceae       | Tree  |
| 19     | <i>Ixora coccinea</i>                        | Ixora-Lal          | Rubiaceae      | Tree  |
| 20     | <i>Ixora parviflora</i> Vahl                 | Lokandi            | Rubiaceae      | Tree  |
| 21     | <i>Manilkara hexandra</i>                    | Rayan              | Sapotaceae     | Tree  |
| 22     | <i>Melia azadirachta</i>                     | Batra              | Miliaceae      | Tree  |
| 23     | <i>Mimusops elengi</i>                       | Mursal Jo Zad      | Sapotaceae     | Tree  |
| 24     | <i>Morinda tomentosa</i>                     | Aledi              | Rubiaceae      | Tree  |
| 25     | <i>Moringa cancanensis</i>                   | Kadvo sargavo      | Moringaceae    | Tree  |
| 26     | <i>Moringa oleifera</i>                      | Sargavo            | Moringaceae    | Tree  |
| 27     | <i>Pithecellobium dulce</i>                  | Vilayati chinch    | Mimosaceae     | Tree  |
| 28     | <i>Pterocarpus marsupium</i>                 | Biyo, Vijaysarar   | Fabaceae       | Tree  |
| 29     | <i>Spondias mangifera</i>                    | Tad                | Arecaceae      | Tree  |
| 30     | <i>Terminalia bellarica</i> Roxb             | Baheda             | Combretaceae   | Tree  |
| 31     | <i>Zizyphus xylopyrus</i>                    | Ghut boradi        | Rhamnaceae     | Tree  |
| 32     | <i>Catunaregam spinosa</i> (Thunb.) Tirveng. |                    | Rubiaceae      | Shrub |
| 33     | <i>Abelmoschus manihot</i>                   | Jungle bhindo      | Malvaceae      | Shrub |
| 34     | <i>Anisomeles indica</i>                     | Chodharo           | Lamiaceae      | Shrub |
| 35     | <i>Barleria prionitis</i>                    | Vajradanti         | Acanthaceae    | Shrub |
| 36     | <i>Breynia retusa</i>                        | Kamboi             | Phyllanthaceae | Shrub |
| 37     | <i>Cassia sophora</i>                        | Kasaunda           | Fabaceae       | Shrub |
| 38     | <i>Clerodendrum phlomidis</i>                | Aarani             | Lamiaceae      | Shrub |
| 39     | <i>Echinops echinatus</i>                    | Unt katto          | Asteraceae     | Shrub |
| 40     | <i>Euphorbia tirucalli</i> L.                | Tirukalli          | Euphorbiaceae  | Shrub |
| 41     | <i>Jatropha gossypifolia</i>                 | Ratan Jyot         | Euphorbiaceae  | Shrub |
| 42     | <i>Lawsonia inermis</i>                      | Mendi              | Lythraceae     | Shrub |
| 43     | <i>Leonotis nepetifolia</i> (L.) R.Br.       | Rana bheri         | Lamiaceae      | Shrub |
| 44     | <i>Lindenbergia indica</i>                   | Bhint chati        | Orobanchaceae  | Shrub |
| 45     | <i>Malvastrum coromandelianum</i>            | —                  | Malvaceae      | Shrub |

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| Sr.No. | Botanical Name                      | Common name            | Family         | Habit      |
|--------|-------------------------------------|------------------------|----------------|------------|
| 46     | <i>Martynia annua</i>               | Vichudiyo akdo         | Martyniaceae   | Shrub      |
| 47     | <i>Nerium indicum</i>               | Lal Karen              | Apocynaceae    | Shrub      |
| 48     | <i>Neuracanthus sphaerostachyus</i> | —                      | Acanthaceae    | Shrub      |
| 49     | <i>Uraria picta</i>                 | —                      | Fabaceae       | Shrub      |
| 50     | <i>Woodfordia fruticosa</i>         | Dhawani                | Lythraceae     | Shrub      |
| 51     | <i>Xanthium strumarium</i>          | Marula-Mathangi        | Asteraceae     | Shrub      |
| 52     | <i>Xeromphis spinosa</i>            | Mindhol                | Rubiaceae      | Shrub      |
| 53     | <i>Zizyphus glabrata</i>            | Nani bordi             | Rhamnaceae     | Shrub      |
| 54     | <i>Azolla pinnata</i>               |                        | Salviniaceae   | Hydrophyte |
| 55     | <i>Eichornia crassipes</i>          | Water Hyacinth         | Pontederiaceae | Hydrophyte |
| 56     | <i>Lemna minor</i>                  | Paniji Sevar           | Araceae        | Hydrophyte |
| 57     | <i>Marsilea quadrifolia</i>         |                        | Marsileaceae   | Hydrophyte |
| 58     | <i>Nymphaea pubescens</i>           | Kum, Kumbh, Kumi       | Nymphaeaceae   | Hydrophyte |
| 59     | <i>Celosia argentea</i>             | Kurdu                  | Amaranthaceae  | Herb       |
| 60     | <i>Sphaeranthus senegalensis</i>    | Gorakh mundi, Bhurandi | Asteraceae     | Herb       |
| 61     | <i>Alternanthera pungens</i>        | Kantaro Jar Bhangaro   | Amaranthaceae  | Herb       |
| 62     | <i>Amaranthus viridis</i> L.        | Dhhimdo                | Amaranthaceae  | Herb       |
| 63     | <i>Biophytum sensitivum</i>         | Jarer                  | Oxalidaceae    | Herb       |
| 64     | <i>Blepharis maderaspatensis</i>    | Utangan                | Acanthaceae    | Herb       |
| 65     | <i>Blepharis repens</i>             | Nadho Chopad Kandho    | Acanthaceae    | Herb       |
| 66     | <i>Blumea lacera</i>                | —                      | Asteraceae     | Herb       |
| 67     | <i>Blumea membranacea</i>           | —                      | Asteraceae     | Herb       |
| 68     | <i>Blumea mollis</i>                | Rato Fulvo             | Asteraceae     | Herb       |
| 69     | <i>Bryophyllum pinnatum</i>         | Miracle leaf           | Crassulaceae   | Herb       |
| 70     | <i>Catharanthus roseus</i>          | Sada phuli             | Apocynaceae    | Herb       |
| 71     | <i>Cleome viscosa</i>               | Pili talavani          | Cleomaceae     | Herb       |
| 72     | <i>Commelina benghalensis</i>       | Sishmuliu              | Commelinaceae  | Herb       |
| 73     | <i>Commelina nudiflora</i>          | Sheshmul               | Commelinaceae  | Herb       |
| 74     | <i>Convolvulus arvensis</i>         | Phudardi               | Convolvulaceae | Herb       |
| 75     | <i>Convolvulus microphyllus</i>     | Shankhawali            | Convolvulaceae | Herb       |
| 76     | <i>Convolvulus nummularius</i>      | —                      | Convolvulaceae | Herb       |

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| Sr.No. | Botanical Name                   | Common name               | Family         | Habit |
|--------|----------------------------------|---------------------------|----------------|-------|
| 77     | <i>Corchorus capsularis</i>      | Bore chhunchh             | Malvaceae      | Herb  |
| 78     | <i>Corchorus fascicularis</i>    | Nani chhunchh             | Malvaceae      | Herb  |
| 79     | <i>Corchorus olitorius</i>       | Moti chhunchh             | Malvaceae      | Herb  |
| 80     | <i>Corchorus trilocularis</i>    | Ubhi Mundheri             | Tiliaceae      | Herb  |
| 81     | <i>Crotalaria hirsuta</i>        | Fatakia                   | Fabaceae       | Herb  |
| 82     | <i>Crotalaria prostrata</i>      | Betha fatakia             | Fabaceae       | Herb  |
| 83     | <i>Crotalaria retusa</i>         | Jan Janiyu                | Fabaceae       | Herb  |
| 84     | <i>Croton bonplandianum</i>      |                           | Euphorbiaceae  | Herb  |
| 85     | <i>Digera arvensis</i>           | Kanejro                   | Amaranthaceae  | Herb  |
| 86     | <i>Eclipta alba</i>              | Bhangro                   | Asteraceae     | Herb  |
| 87     | <i>Evolvulus alsinoides</i>      | Kari Sankhval, Sani Buti, | Convolvulaceae | Herb  |
| 88     | <i>Gomphrena celosioides</i>     | —                         | Amaranthaceae  | Herb  |
| 89     | <i>Indigofera linnaei</i>        | —                         | Fabaceae       | Herb  |
| 90     | <i>Justicia procumbens</i>       | —                         | Acanthaceae    | Herb  |
| 91     | <i>Launaea procumbens</i>        | Bho pathri                | Asteraceae     | Herb  |
| 92     | <i>Leucas aspera</i>             | Gumu                      | Lamiaceae      | Herb  |
| 93     | <i>Leucas cephalotes</i>         | Cubo                      | Lamiaceae      | Herb  |
| 94     | <i>Lindernia ciliata</i>         | —                         | Linderniaceae  | Herb  |
| 95     | <i>Medicago sativa</i>           | Gadab, Rajko              | Fabaceae       | Herb  |
| 96     | <i>Mimosa pudica</i>             | Risamani, Lajamani        | Mimosaceae     | Herb  |
| 97     | <i>Mollugo cerviana</i>          | —                         | Molluginaceae  | Herb  |
| 98     | <i>Ocimum canum</i>              | Tak Marvo                 | Lamiaceae      | Herb  |
| 99     | <i>Ocimum tenuiflorum</i>        | Tulsi                     | Lamiaceae      | Herb  |
| 100    | <i>Pavonia zeylanica</i>         | -                         | Malvaceae      | Herb  |
| 101    | <i>Peristrophe bicalyculata</i>  | Kari agheri               | Acanthaceae    | Herb  |
| 102    | <i>Phyllanthus niruri</i>        | Bhoi aamli                | Phyllanthaceae | Herb  |
| 103    | <i>Phyllanthus simplex</i>       | Moti Bhoi aamli           | Phyllanthaceae | Herb  |
| 104    | <i>Portulaca oleracea</i>        | Moti luni                 | Portulacaceae  | Herb  |
| 105    | <i>Portulaca quadrifida</i>      | Jinni luni                | Portulacaceae  | Herb  |
| 106    | <i>Rungia repens</i>             | Khadsalio                 | Acanthaceae    | Herb  |
| 107    | <i>Sesamum laciniatum</i>        | Jungle tal                | Pedaliaceae    | Herb  |
| 108    | <i>Sida cordifolia</i>           | Bhoi bala                 | Malvaceae      | Herb  |
| 109    | <i>Sida retusa</i>               | Khetrau Barbuvaro         | Malvaceae      | Herb  |
| 110    | <i>Sida rhombifolia</i>          | Khetrau Balbuvaro         | Malvaceae      | Herb  |
| 111    | <i>Solanum nigrum</i>            | Bethi piludi              | Solanaceae     | Herb  |
| 112    | <i>Sonchus asper</i>             | -                         | Asteraceae     | Herb  |
| 113    | <i>Sphaeranthus indicus</i>      | Gorakh mundi              | Asteraceae     | Herb  |
| 114    | <i>Trianthema portulacastrum</i> | Satodo                    | Aizoaceae      | Herb  |
| 115    | <i>Trichodesma indicum</i>       | Undha fuli                | Boraginaceae   | Herb  |
| 116    | <i>Triumfetta rotundifolia</i>   | Gypto                     | Malvaceae      | Herb  |
| 117    | <i>Urena lobata</i>              | San Bhindi                | Malvaceae      | Herb  |
| 118    | <i>Zizyphus nummularia</i>       | Bordi, Boedi, Chania Bor  | Rhamnaceae     | Herb  |



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| Sr.No. | Botanical Name                                 | Common name            | Family         | Habit   |
|--------|------------------------------------------------|------------------------|----------------|---------|
| 119    | <i>Chloris barbata</i> Sw.                     | Grass                  | Poaceae        | Grass   |
| 120    | <i>Cymbopogon citratus</i>                     |                        | Poaceae        | Grass   |
| 121    | <i>Cyperus flavidus</i>                        | Dhamur, Nirmanth,      | Cyperaceae     | Grass   |
| 122    | <i>Fimbristylis tenera</i>                     | -                      | Cyperaceae     | Grass   |
| 123    | <i>Aristida adscensionis</i>                   | Grass                  | Poaceae        | Grass   |
| 124    | <i>Aristida hystrix</i> L.f.                   | Grass                  | Poaceae        | Grass   |
| 125    | <i>Brachiaria setigera</i>                     | Grass                  | Poaceae        | Grass   |
| 126    | <i>Chloris montana</i>                         | Grass                  | Poaceae        | Grass   |
| 127    | <i>Chloris virgata</i> Sw.                     | Grass                  | Poaceae        | Grass   |
| 128    | <i>Chrysopogon lancearius</i> (Hook.f.) Haines | Grass                  | Poaceae        | Grass   |
| 129    | <i>Cymbopogon oliveri</i>                      | Geroi Gha, Kuyadi Gha  | Poaceae        | Grass   |
| 130    | <i>Cyperus exaltatus</i>                       | Zugar                  | Cyperaceae     | Grass   |
| 131    | <i>Cyperus rotundus</i> L.                     | Grass                  | Cyperaceae     | Grass   |
| 132    | <i>Dactyloctenium aegyptium</i>                | Grass                  | Poaceae        | Grass   |
| 133    | <i>Dichanthium annulatum</i>                   | Grass                  | Poaceae        | Grass   |
| 134    | <i>Digitaria ciliaris</i> (Retz.) Koeler       | Grass                  | Poaceae        | Grass   |
| 135    | <i>Eragrostis ciliaris</i>                     | Grass                  | Poaceae        | Grass   |
| 136    | <i>Eragrostis diarrhena</i>                    | -                      | Poaceae        | Grass   |
| 137    | <i>Eragrostis poaeoides</i>                    | Grass                  | Poaceae        | Grass   |
| 138    | <i>Eragrostis unioides</i>                     | Grass                  | Poaceae        | Grass   |
| 139    | <i>Heteropogon contortus</i>                   | Grass                  | Poaceae        | Grass   |
| 140    | <i>Sorghum halpense</i>                        | Grass                  | Poaceae        | Grass   |
| 141    | <i>Aganosma dichotoma</i> (Roth) K. Schum      |                        | Alangiaceae    | Climber |
| 142    | <i>Ipomoea mauritiana</i> Jacq.                |                        | Convolvulaceae | Climber |
| 143    | <i>Ipomoea obscura</i> (L.) Ker Gawl.          |                        | Convolvulaceae | Climber |
| 144    | <i>Cassytha filiformis</i> L.                  |                        | Lauraceae      | Climber |
| 145    | <i>Cocculus hirsutus</i>                       | —                      | Menispermaceae | Climber |
| 146    | <i>Cuscuta reflexa</i> Roxb.                   |                        | Convolvulaceae | Climber |
| 147    | <i>Hemidesmus indicus</i>                      | —                      | Apocynaceae    | Climber |
| 148    | <i>Ipomoea nil</i>                             | Trikhuni Potiyar, Kari | Convolvulaceae | Climber |
| 149    | <i>Loranthus europaeus</i>                     | —                      | Loranthaceae   | Climber |
| 150    | <i>Mucuna pruriens</i>                         | —                      | Fabaceae       | Climber |
| 151    | <i>Mukia maderaspatana</i>                     | —                      | Cucurbitaceae  | Climber |
| 152    | <i>Tinospora cordifolia</i>                    | —                      | Menispermaceae | Climber |
| 153    | <i>Tylophora indica</i>                        | —                      | Apocynaceae    | Climber |

**Source:** Forest working plan data

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### 3.5.8 Faunal Survey

#### Methodology:

As the faunal species are moving from one place to another place, no quantitative studies conducted. As the animals are migratory in nature, habitats used by protected, rare or sensitive species for breeding, nesting, foraging, migration are ascertained. General Interviews made with local people on seasonal migratory birds, animal corridors recorded. The direct and indirect evidences such as Indirect evidences will be collected through Vocal observations, Markings, feathers, Pellets, Scat and Pugmarks etc are recorded during the field survey and compared with secondary data sources and interaction with local villagers. All the species consolidated through primary and secondary data are Scheduled as per Indian Wildlife Protection act (1972) amended in 2022 and IUCN red list.

**TABLE 3.26 – MAMMALIAN SPECIES RECORDED (PRIMARY DATA)**

| S.No. | Scientific name            | Common Name                 | IUCN Status | WPA Status |
|-------|----------------------------|-----------------------------|-------------|------------|
| 1     | <i>Funambulus palmarum</i> | Three-striped Palm Squirrel | LC          | Not listed |

**TABLE 3.27 – MAMMALIAN SPECIES RECORDED (SECONDARY DATA)**

| Sr. No | Scientific name                  | Common Name               | IUCN Status | WPA (1972) |
|--------|----------------------------------|---------------------------|-------------|------------|
| 1      | <i>Bandicota bengalensis</i>     | Lesser Bandicoot rat      | LC          | Not listed |
| 2      | <i>Bandicota indica</i>          | Bandicoot rat             | LC          | Not listed |
| 3      | <i>Mus booduga</i>               | Little Indian Field Mouse | LC          | Not listed |
| 4      | <i>Mus musculus</i>              | House Mouse               | LC          | Not listed |
| 5      | <i>Rattus rattus</i>             | House Rat                 | LC          | Not listed |
| 6      | <i>Cynopterus sphinx</i>         | Short nosed fruitbat      | LC          | Not listed |
| 7      | <i>Megaderma lyra</i>            | Indian false vampire bat  | LC          | Not listed |
| 8      | <i>Rosettus leschenaultia</i>    | Fulvous fruit bat         | LC          | Not listed |
| 9      | <i>Taphozous melanopogon</i>     | Sheath-tailed bat         | LC          | Not listed |
| 10     | <i>Pipistrellus coromandra</i>   | Indian Pipistrelle        | LC          | Not listed |
| 11     | <i>Pipistrellus pipistrellus</i> | Common Pipistrelle        | LC          | Not listed |
| 12     | <i>Lepus nigricollis</i>         | Indian Hare               | LC          | SCH II     |
| 13     | <i>Pteropus giganteus</i>        | Indian flying Fox bat     | LC          | SCH II     |
| 14     | <i>Suncus murinus</i>            | House Shrew               | LC          | SCH II     |

**TABLE 3.28 – AVES SPECIES RECORDED FROM THE STUDY AREA**

| Sr.No. | Scientific name           | Common Name               | IUCN Status | WPA Status |
|--------|---------------------------|---------------------------|-------------|------------|
| 1      | <i>Milvus migrans</i>     | Pariah kite               | LC          | SCH II     |
| 2      | <i>Alauda gulgula</i>     | Oriental skylark          | LC          | SCH II     |
| 3      | <i>Eremopterix grisea</i> | Ashy crowned Sparrow lark | LC          | SCH II     |
| 4      | <i>Mirafr cantillans</i>  | Singing bush lark         | LC          | SCH II     |
| 5      | <i>Alcedo atthis</i>      | Small blue kingfisher     | LC          | SCH II     |
| 6      | <i>Ceryle rudis</i>       | Lesser pied kingfisher    | LC          | SCH II     |

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| Sr.No. | Scientific name                  | Common Name                   | IUCN Status | WPA Status |
|--------|----------------------------------|-------------------------------|-------------|------------|
| 7      | <i>Halcyon smyrnensis</i>        | White breasted kingfisher     | LC          | SCH II     |
| 8      | <i>Anas poecilorhyncha</i>       | Spotbilled duck               | LC          | SCH II     |
| 9      | <i>Dendrocygna javanica</i>      | Lesser whistling duck         | LC          | SCH II     |
| 10     | <i>Cypsiurus balasiensis</i>     | Asian Palm swift              | LC          | SCH II     |
| 11     | <i>Zoonavena sylvatica</i>       | Indian white rumped spinetail | LC          | SCH II     |
| 12     | <i>Ardea alba</i>                | Large Egrets                  | LC          | SCH II     |
| 13     | <i>Ardea cinerea</i>             | Grey heron                    | LC          | SCH II     |
| 14     | <i>Ardea purpurea</i>            | Purple heron                  | LC          | SCH II     |
| 15     | <i>Ardeola grayii</i>            | Indian pond heron             | LC          | SCH II     |
| 16     | <i>Bubulcus coromandus</i>       | Eastern Cattle egret          | LC          | SCH II     |
| 17     | <i>Bubulcus ibis</i>             | Cattle Egret                  | LC          | SCH II     |
| 18     | <i>Butorides striata</i>         | Striated Heron (Green heron)  | LC          | SCH II     |
| 19     | <i>Casmerodius albus</i>         | Great egret                   | LC          | SCH II     |
| 20     | <i>Egretta garzetta</i>          | Little egret                  | LC          | SCH II     |
| 21     | <i>Egretta gularis</i>           | Western reef heron            | LC          | SCH II     |
| 22     | <i>Ixobrychus cinnamomeus</i>    | Chestnut bittern              | LC          | Not listed |
| 23     | <i>Ixobrychus flavicollis</i>    | Black bittern                 | LC          | SCH II     |
| 24     | <i>Ixobrychus sinensis</i>       | Yellow bittern                | LC          | SCH II     |
| 25     | <i>Ardea intermedia</i>          | Intermediate egret            | LC          | SCH II     |
| 26     | <i>Nycticorax nycticorax</i>     | Night heron                   | LC          | SCH II     |
| 27     | <i>Artamus fuscus</i>            | Ashy woodswallow              | LC          | SCH II     |
| 28     | <i>Charadrius alexandrinus</i>   | Kentish plover                | LC          | SCH II     |
| 29     | <i>Charadrius leschenaultii</i>  | Greater sand plover           | LC          | SCH II     |
| 30     | <i>Charadrius mongolus</i>       | Lesser sand plover            | LC          | SCH II     |
| 31     | <i>Vanellus cinereus</i>         | Grey headed lapwing           | LC          | SCH II     |
| 32     | <i>Vanellus indicus</i>          | Red wattled lapwing           | LC          | SCH II     |
| 33     | <i>Anastomus oscitans</i>        | Asian Openbilled Stork        | LC          | SCH II     |
| 34     | <i>Columba livia</i>             | Blue rock pigeon              | LC          | Not listed |
| 35     | <i>Streptopelia chinensis</i>    | Spotted dove                  | LC          | SCH II     |
| 36     | <i>Streptopelia senegalensis</i> | Laughing Dove                 | LC          | SCH II     |
| 37     | <i>Coracias benghalensis</i>     | Indian roller                 | LC          | SCH II     |
| 38     | <i>Corvus macrorhynchos</i>      | Jungle crow                   | LC          | SCH II     |
| 39     | <i>Corvus splendens</i>          | House crow                    | LC          | Not listed |
| 40     | <i>Dendrocitta vagabunda</i>     | Rufous tree pie               | LC          | SCH II     |
| 41     | <i>Centropus sinensis</i>        | Southern coucal               | LC          | SCH II     |
| 42     | <i>Eudynamys scolopaceus</i>     | Asian koel                    | LC          | SCH II     |
| 43     | <i>Dicaeum agile</i>             | Thick-billed flowerpecker     | LC          | SCH II     |
| 44     | <i>Dicrurus macrocercus</i>      | Black drongo                  | LC          | SCH II     |
| 45     | <i>Himantopus himantopus</i>     | Black winged stilt            | LC          | SCH II     |
| 46     | <i>Euodice malabarica</i>        | White Throated Munia          | LC          | SCH II     |
| 47     | <i>Lonchura atricapilla</i>      | Black Headed Munia            | LC          | SCH II     |
| 48     | <i>Lonchura punctulata</i>       | Spotted Munia                 | LC          | SCH II     |

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| Sr.No. | Scientific name                   | Common Name                 | IUCN Status | WPA Status |
|--------|-----------------------------------|-----------------------------|-------------|------------|
| 49     | <i>Tachybaptus ruficollis</i>     | Little Grebe                | LC          | SCH II     |
| 50     | <i>Metopidius indicus</i>         | Bronze winged Jacana        | LC          | SCH II     |
| 51     | <i>Lanius cristatus</i>           | Brown Shrike                | LC          | SCH II     |
| 52     | <i>Chroicocephalus ridibundus</i> | Great back-headed gull      | LC          | SCH II     |
| 53     | <i>Larus brunnicephalus</i>       | Brown headed gull           | LC          | SCH II     |
| 54     | <i>Merops orientalis</i>          | Small green bee eater       | LC          | Not listed |
| 55     | <i>Merops philippinus</i>         | Blue tailed bee eater       | LC          | SCH II     |
| 56     | <i>Terpsiphone paradisi</i>       | Asian Paradise flycatcher   | LC          | SCH II     |
| 57     | <i>Anthus richardi</i>            | Richard's pipit             | LC          | SCH II     |
| 58     | <i>Anthus rufulus</i>             | Paddyfield pippit           | LC          | SCH II     |
| 59     | <i>Copsychus saularis</i>         | Oriental Magpie Robin       | LC          | SCH II     |
| 60     | <i>Copsychus fulicatus</i>        | Indian Robin                | LC          | SCH II     |
| 61     | <i>Cinnyris asiaticus</i>         | Purple sunbird              | LC          | SCH II     |
| 62     | <i>Nectarinia zeylonica</i>       | Purple rumped sunbird       | LC          | SCH II     |
| 63     | <i>Oriolus kundoo</i>             | Golden oriole               | LC          | SCH II     |
| 64     | <i>Passer domesticus</i>          | House sparrow               | LC          | SCH II     |
| 65     | <i>Phalacrocorax fuscicollis</i>  | Indian shag                 | LC          | SCH II     |
| 66     | <i>Phalacrocorax niger</i>        | Little cormorant            | LC          | SCH II     |
| 67     | <i>Francolinus pondicerianus</i>  | Grey francolin              | LC          | SCH II     |
| 68     | <i>Perdica asiatica</i>           | Jungle bush quail           | LC          | SCH II     |
| 69     | <i>Dinopium benghalense</i>       | Black- rumped flameback     | LC          | SCH II     |
| 70     | <i>Ploceus philippinus</i>        | Baya Weaver                 | LC          | SCH II     |
| 71     | <i>Psittacula eupatria</i>        | Alexandrine Parakeet        | NT          | SCH II     |
| 72     | <i>Psittacula krameri</i>         | Rose-ringed parakeet        | LC          | SCH II     |
| 73     | <i>Pycnonotus cafer</i>           | Red-vented bulbul           | LC          | SCH II     |
| 74     | <i>Amaurornis phoenicurus</i>     | White breasted waterhen     | LC          | SCH II     |
| 75     | <i>Fulica atra</i>                | Common Coot                 | LC          | SCH II     |
| 76     | <i>Gallinula chloropus</i>        | Common Moorhen              | LC          | SCH II     |
| 77     | <i>Gallirallus striatus</i>       | Slaty- breasted rail        | LC          | SCH II     |
| 78     | <i>Porphyrio porphyrio</i>        | Western swampen             | LC          | SCH II     |
| 79     | <i>Actitis hypoleucos</i>         | Common Sandpiper            | LC          | SCH II     |
| 80     | <i>Calidris alba</i>              | Sanderling                  | LC          | SCH II     |
| 81     | <i>Calidris alpina</i>            | Dunlin                      | LC          | SCH II     |
| 82     | <i>Calidris canutus</i>           | Red Knot                    | LC          | SCH II     |
| 83     | <i>Calidris ferruginea</i>        | Curlew sandpiper            | LC          | SCH II     |
| 84     | <i>Calidris minuta</i>            | Little stint                | LC          | SCH II     |
| 85     | <i>Calidris temminckii</i>        | Teminick's stint            | LC          | SCH II     |
| 86     | <i>Limosa lapponica</i>           | Bar-tailed Godwit           | LC          | SCH II     |
| 87     | <i>Limosa limosa</i>              | Western black tailed godwit | LC          | SCH II     |
| 88     | <i>Numenius phaeopus</i>          | Whimbrel                    | LC          | SCH II     |
| 89     | <i>Tringa erythropus</i>          | Spotted redshank            | LC          | SCH II     |
| 90     | <i>Tringa glareola</i>            | Wood sandpiper              | LC          | SCH II     |
| 91     | <i>Tringa nebularia</i>           | Green shank                 | LC          | SCH I      |

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| Sr.No. | Scientific name                    | Common Name          | IUCN Status | WPA Status |
|--------|------------------------------------|----------------------|-------------|------------|
| 92     | <i>Tringa ochropus</i>             | Green sandpiper      | LC          | SCH II     |
| 93     | <i>Tringa stagnatilis</i>          | Marsh sandpiper      | LC          | SCH II     |
| 94     | <i>Tringa totanus</i>              | Common Redshank      | LC          | SCH II     |
| 95     | <i>Acridotheres fuscus</i>         | Jungle mynah         | LC          | SCH II     |
| 96     | <i>Sterna hirundo</i>              | Common Tern          | LC          | SCH II     |
| 97     | <i>Sturnus contra</i>              | Pied myna            | LC          | Not listed |
| 98     | <i>Athene brama</i>                | Spotted owlet        | LC          | SCH II     |
| 99     | <i>Acridotheres tristis</i>        | Common mynah         | LC          | SCH II     |
| 100    | <i>Gracupica contra</i>            | Asian Pied starling  | LC          | SCH II     |
| 101    | <i>Sterna caspia</i>               | Caspian tern         | LC          | SCH II     |
| 102    | <i>Prinia hodgsonii</i>            | Grey breasted prinia | LC          | SCH II     |
| 103    | <i>Prinia inornata</i>             | Plain prinia         | LC          | SCH II     |
| 104    | <i>Threskiornis melanocephalus</i> | Black headed ibis    | LC          | SCH II     |
| 105    | <i>Turdoides caudata</i>           | Common Babbler       | LC          | SCH II     |
| 106    | <i>Turdoides striata</i>           | Jungle Babbler       | LC          | SCH II     |
| 107    | <i>Upupa epops</i>                 | Common hoopoe        | LC          | SCH II     |

### 3.5.9 Primary Data

Species of flora and fauna are identified through local field guides. Unidentified plant pictures are later confirmed by website and expert scientists from BSI, ZSI, forest officials etc. The primary field studies were focused in open vegetation. It was observed that most of the plants growing in the study area of open vegetations were of plantations and natural common species of Trees, shrubs and herbs.

#### 3.5.9.1 Habitat's Description of Project Site and its Immediate Surroundings

The proposed project site is a barren land without much vegetation except few shrubs and herbs. No single tree present within the existing site premises. Adjoining to this, Solar energy plant is also seen. This habitat is with terrestrial ecosystem is without any forest or agriculture land and it was devoid of any ecologically sensitive biological resources. No REET species observed in the core zone. No migratory corridors or breeding grounds for faunal species present here.

#### 3.5.9.2 Habitat's Description of the Core and Buffer Zone

The core zone habitat upto 5km area is mostly covered with semi urban and rural vegetation. The predominant trees in the study area is primarily characterized by tropical dry thorn and dry deciduous forest types, with a mix of native and invasive species. This zone is having good number of trees, shrubs and herbs in open vegetation. The predominant species present in the open vegetation area are *Leucaena leucocephala*, *Azadirachta indica*, *Mimosops elengi*, *Pithecellobium dulce*, *Samanea saman*, *Alstonia scholaris*, *Millettia pinnata*, *Tectona grandis*, *Dendrocalamus strictus*, *Dalbergia sissoo* are mainly restricted to waste and cultivable waste lands.

The faunal composition generally with arboreal and semi arboreal based animals. Within the core zone common mongoose, Squirrels are sighted apart from few reptilian species. From the secondary

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source (local people working in the plant), it is also revealed that presence of common snakes exists here.

### 3.5.10 Floral Diversity (Core and Buffer)

#### ❖ Hydrophytes in the area:

Hydrophytic vegetation along the banks and floodplains of the Yamuna River is well developed due to shallow water, seasonal inundation, and nutrient-rich alluvial soils. The aquatic flora includes free-floating, submerged, and emergent species. Common free-floating plants are *Eichhornia crassipes* (water hyacinth) and *Pistia stratiotes* (water lettuce), often forming dense mats in slow-moving or stagnant stretches. Submerged species such as *Hydrilla verticillata* and *Vallisneria spiralis* occur in relatively clearer water zones. Emergent and marginal hydrophytes include *Typha angustifolia* (cattail), *Phragmites karka* (reed), *Ipomoea aquatica* (water spinach), and *Saccharum spontaneum* (wild sugarcane), which dominate the floodplain edges. These plants play an important role in nutrient cycling, sediment stabilization, and providing habitat for aquatic fauna, although excessive growth of invasive species like water hyacinth indicates eutrophication and pollution stress in the river system.

### 3.5.11 Faunal Diversity (Core and Buffer)

Throughout the study area no direct evidence of wild animal species observed. In Mammals, Nilgai and three striped Squirrels were recorded apart from few reptilian species. From the secondary source (local people near villages), it is also revealed that presence of common snakes exists here in the agricultural fields. The faunal composition generally with arboreal and semi arboreal based animals. Within the core zone none of the faunal species sighted. Common birds seen in and around study area include a mix of urban-adapted and wetland-associated species. Frequently observed birds are the Indian Peafowl (*Pavo cristatus*), House Sparrow (*Passer domesticus*), Rock Pigeon (*Columba livia*), Common Myna (*Acridotheres tristis*), and Rose-ringed Parakeet (*Psittacula krameri*), which thrive in urban and peri-urban habitats. Birds of prey such as the Black Kite (*Milvus migrans*) are also abundant, especially over city areas. Near wetlands and the Yamuna River floodplains, species like egrets, herons, kingfishers, and seasonal migratory birds including ducks and waders are commonly recorded. This diversity reflects Delhi's mix of urban landscapes, forest patches, and aquatic ecosystems.

#### ❖ List of Fauna Observed in the Study Area

**TABLE 3.29 – AMPHIBIANS SPECIES RECORDED (PRIMARY DATA)**

| Sr. No. | Species                                  | Common Name      | IUCN Status | IW(P)A (2022) Status |
|---------|------------------------------------------|------------------|-------------|----------------------|
| 1       | <i>Hoplobatrachus tigerinus</i> (Daudin) | Indian bull frog | LC          | Sch II               |

**TABLE 3.30 – AMPHIBIANS SPECIES RECORDED (SECONDARY DATA)**

| Sr. No. | Species                                   | Common Name           | IUCN Status | WPA Status |
|---------|-------------------------------------------|-----------------------|-------------|------------|
| 1       | <i>Sphaerotheca breviceps</i> (Schneider) | Indian burrowing frog | LC          | Not listed |

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| Sr. No. | Species                                     | Common Name        | IUCN Status | WPA Status |
|---------|---------------------------------------------|--------------------|-------------|------------|
| 2       | <i>Duttaphrynus stomaticus</i> Lüken        | Marbled toad       | LC          | Sch II     |
| 3       | <i>Duttaphrynus melanostictus</i> Schneider | Common Indian toad | LC          | Sch II     |
| 4       | <i>Euphlyctis hexadactylus</i> (Lesson)     | Indian pond frog   | LC          | Sch II     |

**TABLE 3.31 – REPTILES SPECIES RECORDED (PRIMARY DATA)**

| Sr. No. | Species                       | Common Name          | IUCN Status | WPA status |
|---------|-------------------------------|----------------------|-------------|------------|
| 1       | <i>Hemidactylus brookii</i>   | Brooke's house gecko | LC          | Not listed |
| 2       | <i>Mabuya carinata</i>        | Common Skink         | LC          | Not listed |
| 3       | <i>Lycodon aulicus</i>        | Common wolf snake    |             | Sch II     |
| 4       | <i>Trimeresurus gramineus</i> | Green pit viper      | LC          | Sch II     |

**TABLE 3.32 – REPTILES SPECIES RECORDED (SECONDARY DATA)**

| Sr. No. | Species                          | Common Name          | IUCN Status | WPA status |
|---------|----------------------------------|----------------------|-------------|------------|
| 1       | <i>Bungarus caeruleus</i>        | Common Krait         | LC          | Not listed |
| 2       | <i>Dendrelaphis tristis</i>      | Common Tree Snake    | LC          | Not listed |
| 3       | <i>Hemidactylus flaviviridis</i> | North house gecko    | LC          | Not listed |
| 4       | <i>Calotes versicolor</i>        | Common garden lizard | LC          | Not listed |
| 5       | <i>Eryx conicus</i>              | Russells earth boa   | NT          | Sch II     |
| 6       | <i>Echis carinatus</i>           | Saw scaled wiper     | LC          | Sch II     |
| 7       | <i>Cyrtodactylus kaccchensis</i> | Black rock gecko     | NT          | Sch II     |

#### Source:

\*IWP act (1972) amended in 2022

IUCN: International Union for Conservation of Nature and Natural Resources;

EX: Extinct; CR: Critically Endangered; EN: Endangered; VU: Vulnerable; NT: Near Threatened; LC: Least Concern; DD: Data Deficient. IW(P)A: Indian Wildlife (Protection) Act, 1972 amended in 2022.

P: Primary data, S: Secondary data

### 3.5.12 Vegetation Analysis

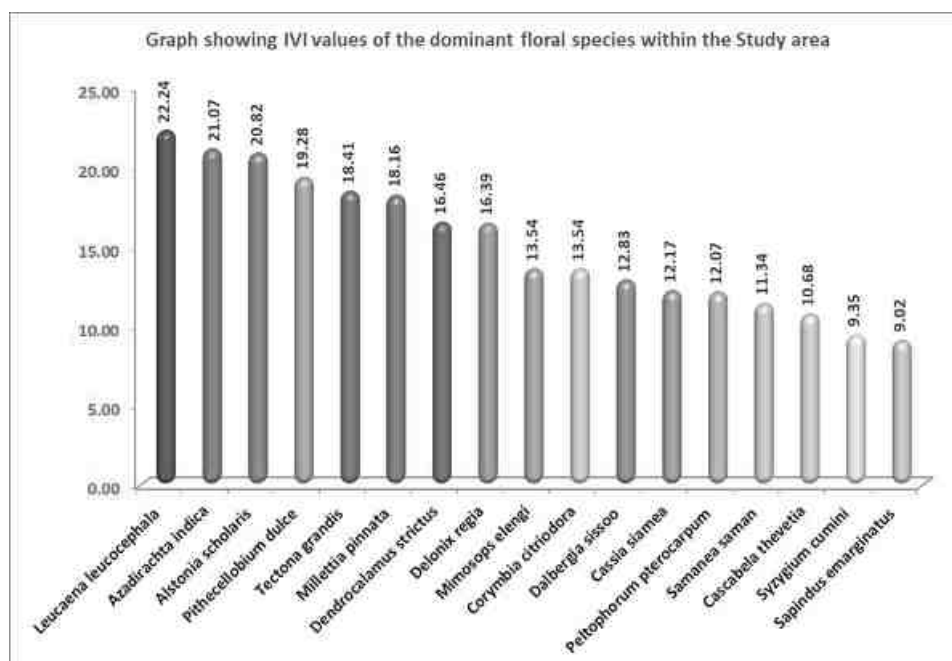
#### Quantitative analysis

The study area is mainly focused through secondary data validation from primary observations. 10 sampling points are finalized through Area-Species graph. And the quantitative analysis done based on the methodology adopted for various species.

**TABLE 3.33 – PHYTOSOCIOLOGICAL DATA OF STUDY AREA**

| <b><u>ENPRO Enviro Tech and Engineers Pvt. Ltd.</u></b> |                                           |  |            |
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| Sr.No. | Botanical Name                 | Rel Density | Rel Frequency | Rel Abundance | IVI   | Schannon Index |
|--------|--------------------------------|-------------|---------------|---------------|-------|----------------|
| 1      | <i>Leucaena leucocephala</i>   | 9.22        | 6.45          | 6.58          | 22.24 | 0.22           |
| 2      | <i>Azadirachta indica</i>      | 8.53        | 6.45          | 6.09          | 21.07 | 0.21           |
| 3      | <i>Mimosops elengi</i>         | 4.44        | 4.03          | 5.07          | 13.54 | 0.14           |
| 4      | <i>Pithecellobium dulce</i>    | 7.51        | 5.65          | 6.12          | 19.28 | 0.19           |
| 5      | <i>Samanea saman</i>           | 3.41        | 4.03          | 3.90          | 11.34 | 0.12           |
| 6      | <i>Alstonia scholaris</i>      | 8.19        | 4.84          | 7.79          | 20.82 | 0.20           |
| 7      | <i>Millettia pinnata</i>       | 6.83        | 4.84          | 6.49          | 18.16 | 0.18           |
| 8      | <i>Tectona grandis</i>         | 6.83        | 7.26          | 4.33          | 18.41 | 0.18           |
| 9      | <i>Dendrocalamus strictus</i>  | 5.80        | 4.03          | 6.62          | 16.46 | 0.17           |
| 10     | <i>Mangifera indica</i>        | 1.37        | 3.23          | 1.95          | 6.54  | 0.06           |
| 11     | <i>Cassia fistula</i>          | 1.37        | 3.23          | 1.95          | 6.54  | 0.06           |
| 12     | <i>Peltophorum pterocarpum</i> | 3.75        | 4.03          | 4.29          | 12.07 | 0.12           |
| 13     | <i>Vitex negundo</i>           | 2.05        | 4.03          | 2.34          | 8.42  | 0.08           |
| 14     | <i>Cascabela thevetia</i>      | 3.07        | 3.23          | 4.38          | 10.68 | 0.11           |
| 15     | <i>Syzygium cumini</i>         | 2.39        | 2.42          | 4.55          | 9.35  | 0.09           |
| 16     | <i>Dalbergia sissoo</i>        | 4.10        | 4.84          | 3.90          | 12.83 | 0.13           |
| 17     | <i>Sapindus emarginatus</i>    | 2.39        | 3.23          | 3.41          | 9.02  | 0.09           |
| 18     | <i>Phoenix sylvestris</i>      | 2.05        | 3.23          | 2.92          | 8.20  | 0.08           |
| 19     | <i>Thespecia populnea</i>      | 1.37        | 2.42          | 2.60          | 6.38  | 0.06           |
| 20     | <i>Corymbia citriodora</i>     | 4.44        | 4.03          | 5.07          | 13.54 | 0.14           |
| 21     | <i>Delonix regia</i>           | 5.80        | 6.45          | 4.14          | 16.39 | 0.17           |
| 22     | <i>Cassia siamea</i>           | 3.75        | 4.84          | 3.57          | 12.17 | 0.12           |
| 23     | <i>Ficus benghalensis</i>      | 1.37        | 3.23          | 1.95          | 6.54  | 0.06           |



**GRAPH 3. 16 – IMPORTANT VALUE INDEX OF DOMINANT TREE SPECIES WITHIN STUDY AREA**



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The biodiversity indices values observed in the study area are enlisted in the **TABLE 3.39.**

**TABLE 3.34 – BIODIVERSITY INDICES VALUES OF THE SAMPLING SITES IN BUFFER ZONE**

| Indices name                         | Study area result | Normal Range                                                 | Interpretation                                          | Reason                                                                                                                                                                |
|--------------------------------------|-------------------|--------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Dominance (D)</b>                 | 0.050 (5.0%)      | Value Proportional to D                                      | Very less dominance of trees                            | Due to open scrub forests and the total study area covered with natural vegetation and homesteaded plantation                                                         |
| <b>Shannon Indices (H)</b>           | 3.061             | 1.5 to 3.5                                                   | Good tree Diversity and abundance in all sampling sites | The overall vegetation type is similar in all sampling locations with good diversity and abundance. This is also due to similar abiotic factors throughout study area |
| <b>Simpson Indices (1-D)</b>         | 0.950             | 0-1                                                          | Good Abundance value                                    | All the species are abundantly grown in the study area.                                                                                                               |
| <b>Evenness (<math>e^H/S</math>)</b> | 0.928 (92.8%)     | Value Proportional to $e^H/S$                                | Trees Evenly distributed                                | Higher evenness is due to presence of similar ecosystem in all sampling locations.                                                                                    |
| <b>Abundance/Frequency Ratio</b>     | 0.041             | <0.025 Regular<br>>0.025 to <0.05 Random<br>>0.05 Contagious | Species Randomly Distribution                           | Same type of species are not present throughout the study area due to random natural tree growth. This is due to mixed vegetation observed in the wastelands.         |

### 3.5.13 Primary Data interpretation:

#### Interpretation of Primary data with Secondary sources:

The vegetation growth is similar in all sampling points with good diversity and all tree species are abundantly present with good evenness. The forest species are open scrub. The secondary data from forest department and other publications revealed that there are few rare and endangered species at

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district level. The primary data collected during the site visit and interaction with local public reveals that there are no such species in the vicinity of study area. The natural vegetation statistically not surveyed by any researchers in the study area (No specific surveys conducted or published from the study area). Hence the present data collected in the study area is cross verified with local people and forest department.

No single tree species is predominant throughout the study area and randomly distributed represents good undisturbed ecosystem. Due to fragmented ecosystem, the faunal movement will not enter in the proposed project site and hence there will be no habitat stress for any faunal species. No migratory routes for birds and other faunal aspects.

### **Fauna within the Study area:**

The faunal composition generally with arboreal and semi arboreal based animals. As the surrounding habitat is urban environment, very few faunal species observed in the core zone. Within the core zone Squirrels are sighted. Common bird species such as Spotted doves, Green bee eaters, Sparrows are observed in the core area. In the buffer zone, there no direct evidence of wild animal species observed in the reserve forests. In Mammals, three stripped Palm Squirrels are sighted apart from few reptilian species. From the secondary source (local people near villages and forest department work plan data), it is also revealed that presence of common snakes exists here. The faunal composition generally with arboreal and semi arboreal based animals. Common bird species such as Blue rock pigeons, Paddy egrets, Green bee eaters, Indian rollers, White headed babblers, Weaver birds, Mynas, Black drongos, Crows are sighted in the reserve forests. Butterflies and dragonflies are fairly common near herbs and flowering shrubs. There are no migratory corridors, nesting and breeding sites within the study area.

### **REET species:**

As per the list of flora there are no REET species present within the study area and Secondary data of the region also reveals the same. From the quantitative analysis the values observed are representing the diversity and distribution pattern of the tree species.

### **Endemic, Threatened and Endangered Species**

From the present survey, it appears that none of the terrestrial species are under endangered and threatened species, and not listed in the Schedule I of the Indian Wildlife (Protection) Act, 1972 as amended in 2022. It is apparent from the list that none of the species either spotted or reported is included in Schedule I of the Wildlife Protection Act. Similarly, none of them comes under the REET category. Some of the birds listed were rare locally but they do not fall under any of the REET categories. There are no migratory corridors, nesting and breeding sites within the proposed site or in the core area. No need to take any mitigation measures in this connection.

#### **3.5.14 Ecosystem Services Rendered**

- ❖ **Food and Fruits:** *Mangifera indica* (Mango), *Syzygium cumini*, *Tamarindus indica*, *Pithecellobium dulce*, *Phoenix sylvestris*, *Phyllanthus emblica* (Amla) and *Ziziphus mauritiana* provide edible fruits for both humans and wildlife.

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- ❖ **Timber and Fuelwood:** *Dalbergia sissoo*, *Acacia nilotica*, *Cassia siamea*, *Albizia amara*, and *Ailanthus excelsa* are valuable for timber and fuelwood.
- ❖ **Fodder:** *Butea monosperma*, *Albizia amara*, and *Vachellia leucophloea* provide fodder for grazing animals.
- ❖ **Medicinal Plants:** *Azadirachta indica* (neem), *Vitex negundo*, *Calotropis*, *Cassia tora*, *Pergularia daemia*, and *Tephrosia purpurea* are known for their medicinal properties in traditional and herbal medicine.
- ❖ **Carbon Sequestration and Climate Regulation:** Dense plantations of *Eucalyptus*, *Samanea saman*, *Bombax ceiba*, and other large trees help sequester CO<sub>2</sub> and regulate microclimates.
- ❖ **Pollution Control:** *Azadirachta indica* and *Ficus species* have air-purifying qualities, helping absorb pollutants.

**TABLE 3.35 – PRIMARY DATA INTERPRETATION FOR ECOLOGY AND BIODIVERSITY ASPECTS**

| Sr.No. | Stressors             | Observations                                                                                                                                                                                                                                              | Interpretation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | Habitat & Seasonality | No changes in land use are anticipated due to the project activities. The assessment was done in the Summer season with good vegetation, and secondary data from the forest department for Winter and Monsoon seasons were considered for the study area. | This suggests that the project is unlikely to directly cause vegetation or habitat loss. The use of secondary data for all three seasons (Summer, Winter, and Monsoon) is crucial for a holistic understanding, as it can help to determine if there are any potential indirect effects of seasonal variance on local wildlife. Seasonal shifts are important considerations, as environmental factors like resource availability and breeding conditions can vary significantly between seasons. |
| 2      | REET species          | No REET species present in the study area                                                                                                                                                                                                                 | Based on this finding, the assessment concludes that no specific conservation measures are necessary concerning REET species.                                                                                                                                                                                                                                                                                                                                                                     |

### 3.5.15 Quality Assurance of Data

The data collected from the primary field survey was verified through various field guides and subject experts. Secondary data also validated from primary field survey of the region. The quantitative analysis has been made for flora of the sampled region. Even though the region has been thoroughly studied as a part of other EIA studies, there are few limitations of this study related to study area, time, seasonality and correctness of the species.

- ❖ **Seasonal Coverage:** The primary limitation highlighted is that the survey was conducted solely during the Summer season. While secondary data from the forest department and local villagers was used to compensate for other seasons (Winter and Monsoon), relying heavily on secondary data can introduce potential for inaccuracies or gaps in information. Biological

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changes can vary significantly with the seasons, impacting vegetation patterns, species diversity, and abundance.

- ❖ **Diurnal Focus:** The field survey was limited to day-time activities, meaning that information on nocturnal species was derived from secondary sources. Nocturnal organisms can represent a crucial component of the ecosystem, and relying solely on secondary data may not offer a complete picture of the area's biodiversity.
- ❖ **Potential for Data Gaps and Inaccuracies:** Even with efforts towards validation, secondary data might not always be perfectly aligned with the specific study area or the needs of the current assessment. There's also the possibility of inherent biases or incomplete data within the secondary sources themselves.
- ❖ **Correctness of Species Identification:** The statement mentions potential limitations related to the correctness of species identification, suggesting that despite efforts to cross-check with field guides and experts, some degree of uncertainty might still exist

### 3.6 GEOLOGY AND HYDROLOGY STUDIES

#### 3.6.1 Geomorphology

Physiographically the area can be demarcated into hilly terrains and plains. The area is distinguished by the pediment-inselberg-hilly complex, gently undulating plains abounding with small hillocks, mounds, tors, and dykes. The area around the project site constitute matured, dissected, undulating and rolling topography with erosional landscape covered by a layer of reddish-brown loamy soils of varied thickness. Geomorphologically the land site forms a pediment area with gentle northerly slope towards Cauvery River situated 14.0 km north of the project site. The Manapparai, Rangamalai and Kadavur hills occurring in the south-western side of the project site constituting the remnants of the much denuded Eastern Ghats and rise to heights of over 1031 m above mean sea level (m amsl). In addition, there are small residual hills reaching elevation of ~ 200 m amsl. The area is underlain by weathered granite gneisses with general elevation in the range of 175 m above mean sea level.

|                                                  |                                           |                                                                                    |            |
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### MAP 3. 16 – ENLARGED PICTURE OF SITE LOCATION

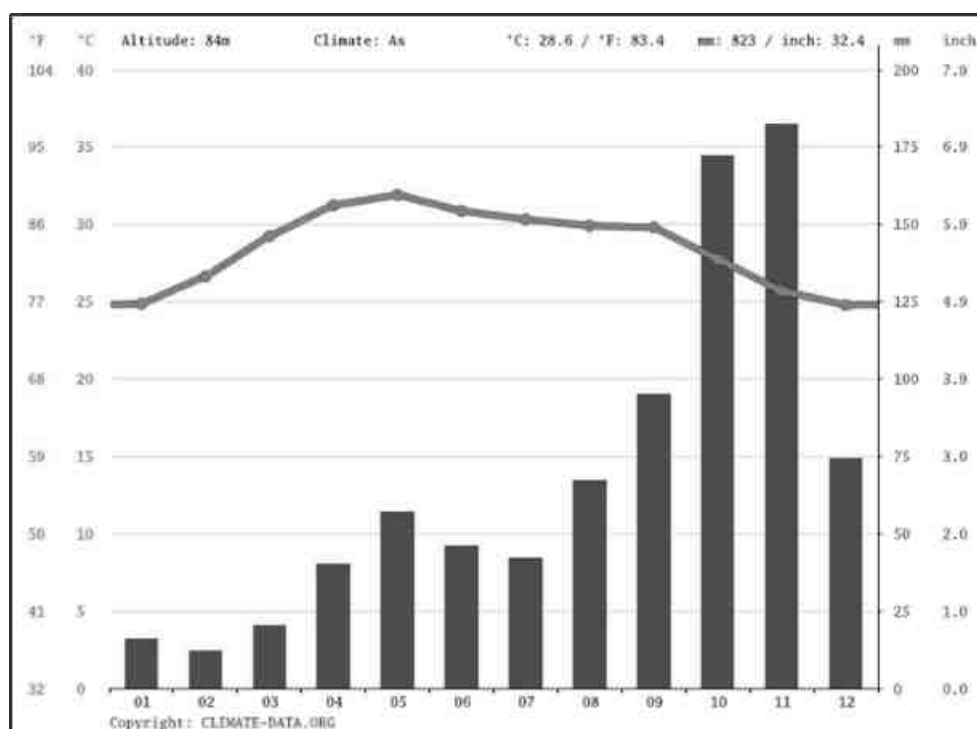
The land area acquired for the proposed plant is 49049.99 sq.m (4.905 hectares and 12.12 acres). No forestland involved. The entire land has been acquired for the project. Of the total area 15923.61 sq.m (33.4%) land will be used for green belt development. No national park/wildlife sanctuary/biosphere reserve/tiger reserve/elephant reserve etc are reported to be located in the core and buffer zone of the project. The area also does not report to form corridor for Schedule-I fauna.



### MAP 3.17 – PROJECT SITE AND SURROUNDINGS



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**GRAPH 3.17 – ANNUAL AVERAGE CLIMATOGRAPH OF TIRUCHIRAPPALLI (TRICHY), T.N.**

**TABLE 3.36 – CLIMATE DATA OF TIRUCHIRAPPALLI (TRICHY), T.N.**

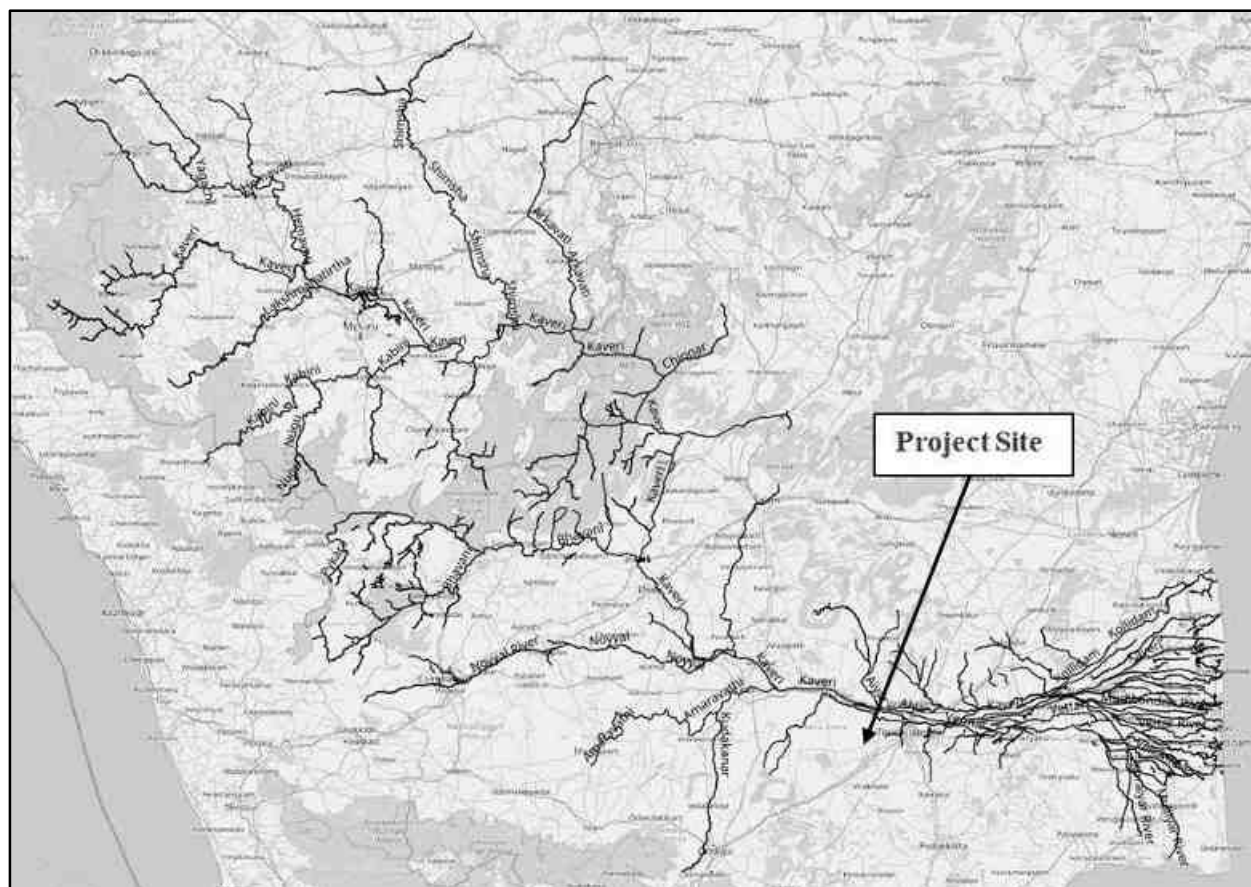
|                                  | January              | February             | March                | April                 | May                   | June                 | July                 | August               | September            | October              | November             | December             |
|----------------------------------|----------------------|----------------------|----------------------|-----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Avg. Temperature °C (°F)         | 24.9 °C<br>(76.7) °F | 26.6 °C<br>(79.9) °F | 29.2 °C<br>(84.6) °F | 31.2 °C<br>(88.2) °F  | 31.9 °C<br>(89.4) °F  | 30.9 °C<br>(87.5) °F | 30.3 °C<br>(86.6) °F | 29.9 °C<br>(85.8) °F | 29.8 °C<br>(85.6) °F | 27.7 °C<br>(81.9) °F | 25.7 °C<br>(78.2) °F | 24.8 °C<br>(76.6) °F |
| Min. Temperature °C (°F)         | 20 °C<br>(68) °F     | 20.9 °C<br>(69.6) °F | 23.2 °C<br>(73.8) °F | 26 °C<br>(78.7) °F    | 27.2 °C<br>(80.9) °F  | 26.6 °C<br>(79.9) °F | 26.1 °C<br>(78.9) °F | 25.7 °C<br>(78.2) °F | 25.5 °C<br>(78) °F   | 24.2 °C<br>(75.6) °F | 22.4 °C<br>(72.3) °F | 20.9 °C<br>(69.7) °F |
| Max. Temperature °C (°F)         | 30.2 °C<br>(86.3) °F | 33.1 °C<br>(91.6) °F | 36.2 °C<br>(97.1) °F | 37.8 °C<br>(100.1) °F | 38.2 °C<br>(100.8) °F | 38.8 °C<br>(98.3) °F | 36.1 °C<br>(97) °F   | 35.6 °C<br>(96.1) °F | 35.5 °C<br>(95.9) °F | 32.5 °C<br>(90.5) °F | 29.7 °C<br>(85.4) °F | 29 °C<br>(84.2) °F   |
| Precipitation / Rainfall mm (in) | 16<br>(0)            | 12<br>(0)            | 20<br>(0)            | 40<br>(1)             | 57<br>(2)             | 46<br>(1)            | 42<br>(1)            | 67<br>(2)            | 95<br>(3)            | 172<br>(6)           | 182<br>(7)           | 74<br>(2)            |
| Humidity(%)                      | 67%                  | 59%                  | 54%                  | 56%                   | 53%                   | 53%                  | 53%                  | 55%                  | 57%                  | 70%                  | 75%                  | 72%                  |
| Rainy days (d)                   | 3                    | 2                    | 2                    | 5                     | 8                     | 7                    | 7                    | 8                    | 10                   | 14                   | 12                   | 6                    |
| avg. Sun hours (hours)           | 7.1                  | 8.1                  | 9.1                  | 10.0                  | 10.9                  | 11.1                 | 11.0                 | 10.7                 | 10.2                 | 8.8                  | 6.9                  | 6.3                  |

Data: 1991 - 2021 Min. Temperature °C (°F), Max. Temperature °C (°F), Precipitation / Rainfall mm (in), Humidity, Rainy days. Data: 1999 - 2019: avg. Sun hours

Source: <https://en.climate-data.org/>

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### 3.6.4 Drainage & Water Bodies



**MAP 3. 19 CAUVERY (CAUVERY) RIVER BASIN**

The **Kaveri** (anglicized as **Cauvery**), also known as **Ponni** is a major river flowing across Southern India. It is the third largest river in the region after Godavari and Krishna. The catchment area of the Cauvery basin is estimated to be 81,155 km<sup>2</sup> (31,334 sq mi) and encompasses the states of Tamil Nadu, Karnataka, Kerala, and the union territory of Puducherry (**Figure 7**).

The Cauvery River is a major, sacred river in southern India, flowing 800 km from the Western Ghats in Karnataka through Tamil Nadu into the Bay of Bengal. It is vital for agricultural irrigation, hydroelectricity, and drinking water, though it frequently remains at the center of severe regional water-sharing disputes.

#### Key Facts

- **Origin:** Talakaveri, Kodagu district, Karnataka (Brahmagiri range of the Western Ghats).
- **Length:** 800 km (497 miles).
- **Basin States:** Karnataka, Tamil Nadu, Kerala, and the Union Territory of Puducherry.
- **Outfall:** Bay of Bengal (via multiple distributaries in the Cauvery Delta).
- **Also Known As:** Ponni, or the "Ganga of the South".

#### Geography & Ecology



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- **The Course:** After leaving the Kodagu hills, the river flows eastward across the Deccan Plateau, featuring major waterfalls such as the Shivanasamudra Falls and the Mekedatu gorge.
- **The Delta:** Before entering the sea, it splits into a wide, highly fertile agricultural delta often referred to as the "granary of South India."
- **Wildlife:** The River supports diverse aquatic life, though visitors are advised to obey warning signs regarding crocodiles and local riverine wildlife.

#### **Economic & Political Importance:**

- **Agriculture & Power:** The River's basin is extensively cultivated and generates significant hydroelectric power through dams like the Krishnaraja Sagara (KRS) in Karnataka and the Mettur Dam in Tamil Nadu.
- **Interstate Dispute:** The Cauvery River Water Dispute is a decades-long political and legal conflict between Karnataka and Tamil Nadu regarding how the river's water is distributed during drier monsoon seasons.
- **Environmental Challenges:** Rapid industrialization and urban growth have led to significant pollution concerns in certain stretches of the river, with ongoing campaigns by environmental activists and local boards attempting to protect its waters.

The study area forms part of the Cauvery River Basin. Cauvery River is the major river draining in the Karur and the neighbouring districts, It flows in an east and north-easterly with moderately little meandering pattern in the study area. The river is located 14.0 km north of the project site.

The area is regionally characterised by dendritic drainage, with a general slope towards Cauvery River. Major part of the pediment-inselberg-hilly complex in the area is dissected by streamlets flowing towards the ponds or gradually joining the Cauvery River. Out of the small and medium size tanks and water bodies situated in the area have seasonal and limited irrigation facilities.

#### **3.6.5 Geology**

Crystalline rocks of Archaean age occupy >90% of the area. Recent alluvium occurring in the area is of fluvial origin and restricted to the course of rivers and major systems. The hard rock terrain comprises of predominantly of Charnockite and Khondalite groups, and their Migmatitic derivatives, and supracrustal sequences of Peninsular Gneissic Complex occurring as granites and gneisses intruded by ultramafic-mafic complexes, basic dykes, granites, gneisses and syenites. The fluvial deposits occur along the Cauvery River and its stream courses (GSI, 2006).



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### 3.6.6 Hydrogeology

#### 3.6.6.1 Ground Water Conditions

Ground water occurrence, movement and recharge to aquifers are controlled by the degree of weathering, fracture pattern, geomorphological setup and rainfall. Charnockites, Granites and Gneisses of peninsular gneissic group constitute major aquifers in the area. Ground water occurs in phreatic condition in the weathered zone and under semi-confined condition in the fractured and jointed rock formations.

Ground water occurs under phreatic conditions in the weathered zone and under semi-confined conditions in the fractures. The thickness of weathered zone varies from less than a metre to about 15 m in the area depending on the topography. Potential aquifer zones are also developed in these rocks by fractures persisting to depths, particularly along lineaments and their inter sections. The depth of dug wells in crystalline formations varies from 8 – 19.5 meters below ground level (m bgl). The depth of the bore wells in the area varies from 50 to >120 m, and even some were drilled down to 200 m. Fracture zones have been encountered in the well down to a depth of 116 m bgl in the borehole drilled by Central Ground Water Board (CGWB).

Dug wells are the most common structures in recent alluvial formations too. The porous formations in the district are represented by river alluvium. These alluvial deposits are confined to the Cauvery River and its stream courses only. Ground water occurs under phreatic conditions. The maximum saturated thickness of these aquifers is up to 10 m depending upon the topographic conditions. The depth of dug wells tapping Cauvery alluvium ranges from 4.0 to 18.70 m bgl. These fluvial formations have moderate to good yield potential and can sustain pumping for 3 to 4 hrs even during peak summer months and yields ranging from 100 to 600 liters per minute (lpm). Filter points of 10 to 15 m bgl depth are also being used in these formations for tapping ground water for domestic and limited agriculture purposes. Due to increase in number of bore wells and overdevelopment of ground water the yields in the area have fallen leading to failure of some wells (CGWB, 2009).

The yields of dug wells are less than <1 lps in massive crystalline rocks whereas it is > 10 lps in highly weathered and fractured granites and gneisses. The specific capacity of dug wells tested in the area ranged from 18.82 to 80.58 lpm/m/dd. The yield of exploratory bore wells drilled in crystalline rock areas ranged from 0.27 to 10.55 lps. The specific capacity of bore wells ranged from 0.74 to 23.41 lps/m/dd. The aquifers were found to have transmissivity ranging from 1 to 134 m<sup>2</sup>/day and the storativity varies between  $5.7 \times 10^{-5}$  and  $9.2 \times 10^{-2}$ . The exploratory wells along river alluvium have yields in the range of 3 to 7 lps. The transmissivity of the alluvial aquifers varies from 200 and 300 m<sup>2</sup>/day and its hydraulic conductivity ranged from 20 to 30 m/day (CGWB, 2009).

#### 3.6.6.2 Ground Water Levels

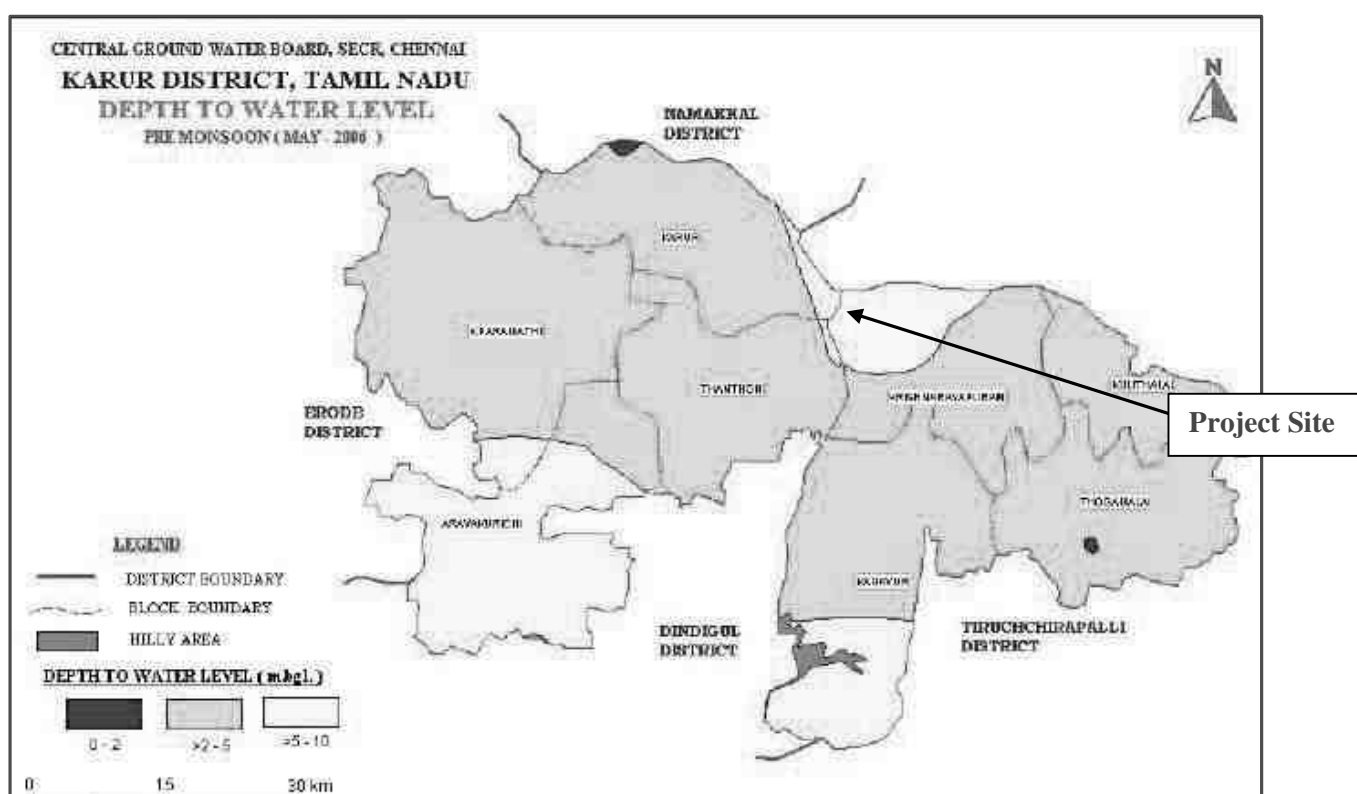
Behaviour of ground water level is essentially controlled by physiography, lithology and rainfall. There is general decline and rise of water during pre- and post-monsoon season. The rises are due to the general buildup of water levels in response to rains, and declines are due to erratic monsoon, less recharge (due to urbanization), and exploitation of groundwater resources.

Shallow to moderate water level conditions prevail in the study area. The depth to water levels in the area generally varies from <5 to >10 m bgl. The dug wells usually show phreatic, and the bore

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wells indicate semi-confined conditions. The regional ground water flow direction is towards the Cauvery river course, and sometimes locally towards the water bodies or ponds. With the prevalence of dug-cum-bore and bore wells, most of the open dug wells in the area are getting unused and even becoming obsolete.

Based on the ground water level monitoring data in the area, the depth to water levels in the study area is in the range of 10 to 20 m bgl, with the premonsoon (summer) season recording deeper water levels. The fluctuations between premonsoon and post monsoon seasons vary from 2 to >5 m, indicating a cyclic phenomenon of seasonal rises followed declines in water levels (CGWB, 2013).



**MAP 3. 21 – DEPTH TO GROUND WATER LEVELS KARUR DISTRICT - PRE-MONSOON**

### 3.6.6.3 Ground Water Resources Estimation and Utilization

In collaboration with the state departments, Central Ground Water Board (CGWB) carried out ground water resource estimation and categorization studies for the Karur District for the year 2008-09. The CGWB has categorized the area as 'over exploited' with the stage of ground water utilization of 63 %, indicating further scope for further ground water development. These details are applicable to the study area also, as it is forms part of this district. There is notable canal command irrigation in the area. The irrigation is carried through the use of water from percolation tanks, water bodies, and bore wells.

|                                                  |                                           |                                                                                    |            |
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**TABLE 3.37 – GROUND WATER RESOURCES OF KULITHALAI TALUK, KARUR DISTRICT, TAMIL NADU.**

| S. No. | Item                                                       | Item No.<br>(as per GEC) | Total<br>(ham) |
|--------|------------------------------------------------------------|--------------------------|----------------|
| 1a.    | Total Annual Ground Water Recharge, ham.                   | 7 = (3+4+5+6)            | 3598.31        |
| i      | Irrigation Use, ham.                                       | 10                       | 1976.24        |
| ii     | Domestic & Industrial Use, ham.                            | 11                       | 308.61         |
| iv     | Total Extraction, ham.                                     | 13= (10+11+12)           | 2284.85        |
| 3      | Annual Ground Water Allocation for Domestic Use as on 2025 | 14                       | 320.63         |
| 4      | Net Ground Water Availability for future use               | 15= {(9)-(10-11-14)}     | 1301.44        |
| 5      | Stage of Ground Water Extraction, %                        | 16= (16/12)*100          | 63 %           |
| 6      | Categorization                                             |                          | <b>Safe</b>    |
|        |                                                            |                          |                |

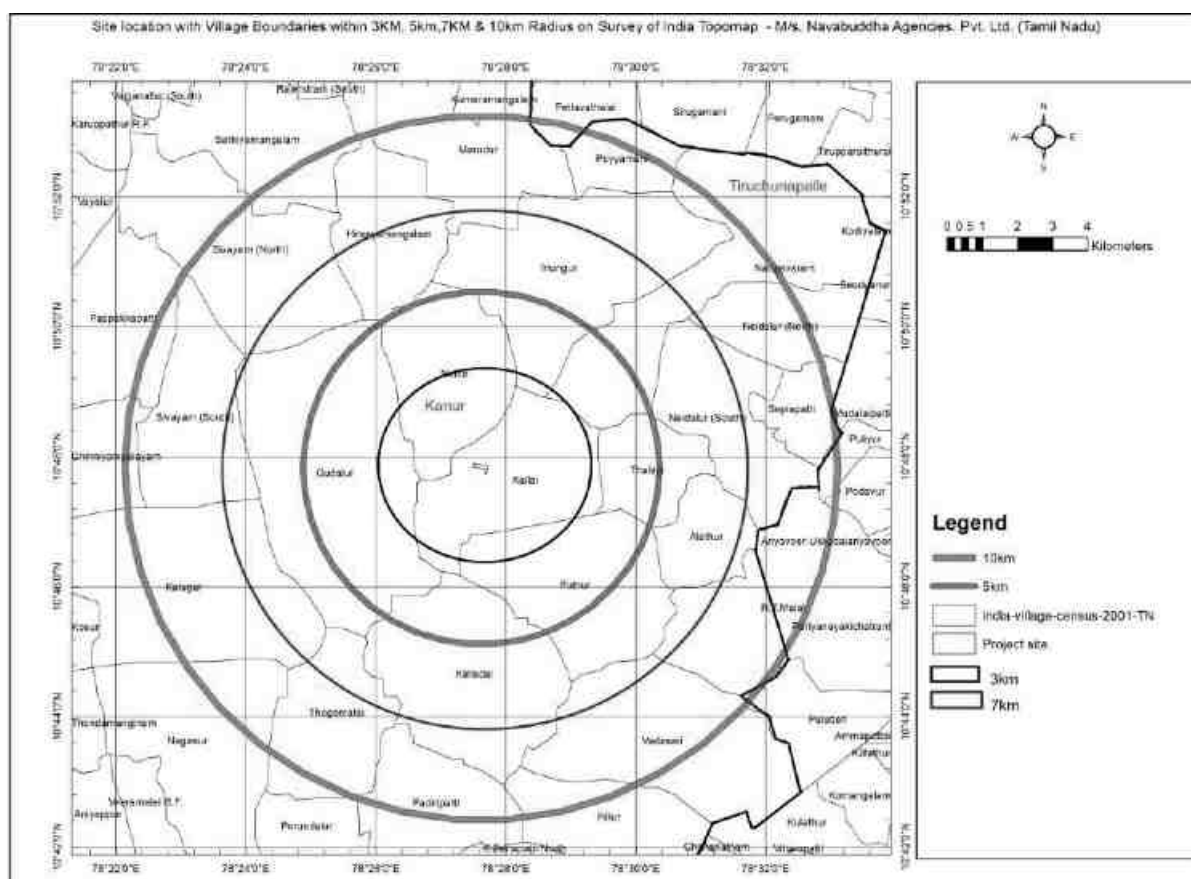
**Note: Dynamic Ground Water Resources of India as on 31st March 2009, CGWB. 2009.**

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### 3.7 SOCIO ECONOMICS ENVIRONMENT

A Socio-Economic Impact Assessment (SEIA) has been undertaken as part of the Environmental Impact Assessment (EIA) study for the proposed Common Bio-Medical Waste Treatment Facility (CBMWTF) at Kallai Village, Kulithalai Taluka, Karur District, Tamil Nadu. The proposed project comprises biomedical waste collection, transportation, treatment, storage and disposal facilities including incinerators, autoclaves, shredders, ETP and STP.

The study evaluates existing socio-economic conditions within the 10 km study area and assesses the potential impacts likely to arise during construction and operation phases of the project. The assessment has been carried out in line with MoEF&CC EIA Notification, 2006 and PFR for EIA emphasizing sustainability, stakeholder sensitivity and impact significance.



**MAP 3.22 - VILLAGE MAP (STUDY AREA)**

#### Methodology Adopted for the Study

The approach and methodology adopted for the socio-economic assessment includes desktop review and documentation pertaining to the project influence zone, government publications and legislations, qualitative and quantitative fieldwork data collection.

#### Purpose and Objectives of the Study

The main purpose and the objective of the study is to:

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- Assess the existing socio-economic profile of the study area;
- Evaluate positive and negative impacts of the proposed CBMWTF;
- Identify concerns likely to be raised during Public Hearing;
- Recommend mitigation and management measures;
- Develop CER/CSR-oriented community development strategies;
- Ensure compliance with MoEF&CC, CPCB and TNPCB requirements.

## Study Area

The study area is divided into core zone (0-3 km around the plant) and buffer zone (3-10 km radius around the plant).

Core Zone: The aerial distance of 3 km from the proposed project boundary has considered as the core zone (Direct Impact) based on the assumption that the magnitude of socio-economic impacts is likely to more visible than the remaining portion of the study area; and

Buffer Zone: The aerial distance from 3 km to 10 km around the proposed project boundary is considered as the buffer zone (Cummulative Impact) based on the assumption that the magnitude of socio-economic impacts is likely to be limited.

## Methodology Adopted

The primary field investigations undertaken as part of the study are:

- Reconnaissance visits to villages within the study area;
- Consultations and discussions with key stakeholders;
- Informal interactions with local households and residents;
- Observations of existing community and civic infrastructure facilities.

The secondary data and information required for the study were obtained from various authentic sources, including:

- Census of India publications;
- District Census Handbooks;
- Tamil Nadu Statistical Abstract reports;
- Records maintained by Gram Panchayats/local authorities;
- Data collected from Health and Education Departments;
- The Project Pre-Feasibility Report (PFR).

## Stakeholder Consultation

The stakeholder mapping and its analysis was conducted with the objective of identifying each stakeholder group; studying their profile, characteristics and the nature of their stakes; gauging their influence on the project; and understanding the specific issues, concerns as well as expectations of each group from the project.

The Key groups of stakeholders who were consulted during the primary survey were local community (including tribal communities), representatives of government Officials, NGOs, SHGs, Community Based Organizations (CBOs), representatives of the Panchayati Raj Institutions (PRI), etc. The site visit for this project was conducted on 18.5.2026 & 19.5.2026 by Mr. Anil Kumar Vishwakarma (QCI-NABET Approved FAE SE) to capture the socio-economic status of the study area.

|                                                  |                                           |                                                                                    |            |
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**TABLE 3. 38 – STAKEHOLDER GROUP CATEGORIZATION**

| Stakeholder Group          | Actual Stakeholders                                                 |
|----------------------------|---------------------------------------------------------------------|
| Community                  | Local Communities of the surrounding villages                       |
| Institutional Stakeholders | Local Gram Panchayat of Kallai, Nallur, Thalinji and T Melapatti    |
| Government Bodies          | Government Primary Schools, ITI's, Urban Primary Health Centre etc. |

Source: Primary Social Survey 2026

The 100% public consultation (social survey) was carried out in the core impact zone villages/habitation w.e.f. 18.5.2026 to 19.5.2026 by Anil Kumar Vishwakarma By adopting this method, the social experts were able to understand the trends of socio economic changes including migration of population and involuntary resettlement, local economy, utilization of land and local resources, social institutions, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases and working conditions.

|                                                                                     |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|   |   |
| <b>Village Fact Sheet Verification at Nallur Village</b>                            | <b>Meeting with Panchayat Secretary at Kallai Village</b>                            |
|  |  |
| <b>Consultation with the Medical Officer (UPHC)</b>                                 | <b>Interaction with Panchayat Members of Study Area</b>                              |



|                                                  |                                           |                                                                                    |            |
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|                                                                                   |                                                                                    |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|  |  |
| <b>Meeting with the Stakeholder</b>                                               | <b>Consultation with the Block Development Official</b>                            |

**Source:** Primary Social Survey 2025

### PHOTOGRAPH 3.1 – PRIMARY SOCIO ECONOMIC SURVEY

#### 3.7.1 Social Profile

The study area, covering a 10 km radius around the proposed project site, comprises predominantly rural settlements located in the Kulithalai Taluka of Karur District and adjoining areas of Tiruchirappalli District. The villages identified within the study area include Kallai, Kanur, Gudalur, Thalinsi, Alathur, Kalladai, Inungur, Sivayam (North & South), Neidalur (North & South), Pappakappatti, Hiranyamangalam, Puthur, and several surrounding habitations. The social structure of the area reflects the typical rural characteristics of Tamil Nadu, with agriculture being the primary occupation. The study area population is characterized by a predominantly rural social structure with moderate growth trends. Average household size in the region ranges between 4 and 5 persons per family.

The population within the study area mainly consists of Hindu communities, along with smaller populations of Muslims and Christians living in social harmony. Scheduled Castes (SCs) are present in most villages, whereas the Scheduled Tribe (ST) population is comparatively negligible. Both joint and nuclear family systems exist in the area; however, nuclear families are gradually increasing due to socio-economic changes and migration for employment and education.

The literacy rate in the surrounding villages is moderate to high compared to remote rural areas of Tamil Nadu, with improved educational access. Educational facilities available within the study area include government primary schools, middle schools, higher secondary schools, anganwadi centres, and private educational institutions. Higher education and technical institutions are accessible in Tiruchirappalli and Karur districts. Educational attainment among the younger population is steadily increasing, and many youth seek employment opportunities in industrial and service sectors.

Healthcare facilities available in the study area include Primary Health Centres (PHCs), sub-health centres, private clinics, pharmacies, and government hospitals located in nearby towns. However, advanced healthcare facilities are mainly concentrated in Tiruchirappalli city. Awareness regarding sanitation, drinking water quality, maternal health, and child immunization has improved considerably due to various government welfare programmes and rural health missions.

Basic infrastructure facilities such as electricity, village roads, public transportation, mobile connectivity, drinking water supply, and local markets are available in most villages. However, some

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interior habitations still require improvements in road conditions, drainage systems, sanitation facilities, and sustainable drinking water supply.

### Extrapolated Population Distribution-2025/Analysis (0-10 km)

The population of villages within the 10 km study area has been extrapolated considering decadal growth trends observed in rural Tamil Nadu, regional urban influence from Tiruchirappalli and Karur districts, and prevailing settlement expansion patterns. The extrapolation provides indicative demographic estimates for assessment of socio-economic impacts associated with the proposed Common Bio-Medical Waste Treatment Facility (CBMWTF).

A compounded annual growth approach with moderate rural growth assumptions has been considered for projection purposes.

**TABLE 3. 39 – POPULATION DISTRIBUTION**

| Sr. No.                    | Village Name    | Estimated Households (2025) | Estimated Population (2025) | Male Population | Female Population | Sex Ratio  |
|----------------------------|-----------------|-----------------------------|-----------------------------|-----------------|-------------------|------------|
| 1                          | Kallai          | 410                         | 2,010                       | 1,025           | 985               | 961        |
| 2                          | Kanur           | 365                         | 1,785                       | 915             | 870               | 951        |
| 3                          | Gudalur         | 520                         | 2,540                       | 1,300           | 1,240             | 954        |
| 4                          | Thalinji        | 445                         | 2,180                       | 1,115           | 1,065             | 955        |
| 5                          | Puthur          | 690                         | 3,360                       | 1,720           | 1,640             | 953        |
| 6                          | Alathur         | 610                         | 2,980                       | 1,520           | 1,460             | 961        |
| 7                          | Kalladai        | 575                         | 2,790                       | 1,425           | 1,365             | 958        |
| 8                          | Inungur         | 735                         | 3,580                       | 1,835           | 1,745             | 951        |
| 9                          | Namur           | 480                         | 2,340                       | 1,195           | 1,145             | 958        |
| 10                         | Nedalur (South) | 840                         | 4,120                       | 2,110           | 2,010             | 953        |
| 11                         | Nedalur (North) | 795                         | 3,890                       | 1,990           | 1,900             | 955        |
| 12                         | Sivayam (South) | 670                         | 3,260                       | 1,670           | 1,590             | 952        |
| 13                         | Hiranyamangalam | 720                         | 3,510                       | 1,795           | 1,715             | 955        |
| 14                         | Marudur         | 860                         | 4,220                       | 2,160           | 2,060             | 954        |
| 15                         | Poyyamani       | 920                         | 4,510                       | 2,305           | 2,205             | 957        |
| 16                         | Nangavaram      | 1,280                       | 6,260                       | 3,210           | 3,050             | 950        |
| 17                         | Thogamalai      | 1,050                       | 5,130                       | 2,625           | 2,505             | 954        |
| 18                         | Kulathur        | 980                         | 4,790                       | 2,450           | 2,340             | 955        |
| 19                         | Vadaseri        | 560                         | 2,730                       | 1,395           | 1,335             | 957        |
| 20                         | Puliyur         | 890                         | 4,350                       | 2,225           | 2,125             | 955        |
| 21                         | Kodiyalam       | 770                         | 3,760                       | 1,925           | 1,835             | 953        |
| 22                         | Sirugamani      | 1,340                       | 6,540                       | 3,355           | 3,185             | 949        |
| <b>Grand Total/Average</b> |                 | <b>16,505</b>               | <b>80,635</b>               | <b>41,265</b>   | <b>39,370</b>     | <b>955</b> |

|                                                  |                                           |                                                                                     |            |
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### 3.7.2 Quality of Life

The quality of life in the study area is moderate and reflects the typical characteristics of rural and semi-rural regions of Tamil Nadu. Over the years, the standard of living of the local population has improved due to better connectivity, access to education, government welfare schemes, rural electrification, and employment opportunities in nearby urban and industrial areas.

Most households in the study area have access to basic amenities such as electricity, drinking water supply, sanitation facilities, mobile connectivity, and public transportation. Pucca and semi-pucca houses are commonly observed in the villages, indicating gradual socio-economic improvement. Government schemes related to rural housing, sanitation, and drinking water have significantly contributed to improving living conditions.

Educational awareness among the local population has increased considerably, resulting in improved literacy levels and higher school enrolment rates. Access to healthcare facilities such as Primary Health Centres (PHCs), sub-health centres, private clinics, and nearby hospitals has also improved the general health condition of the residents. However, advanced medical facilities are still concentrated in urban centres such as Tiruchirappalli.

The economic condition of the people is mainly dependent on agriculture and allied activities. Seasonal employment fluctuations and dependence on monsoon conditions continue to affect household income in some villages. Nevertheless, employment opportunities in nearby towns, industries, transportation, trade, and service sectors have positively influenced the income levels and lifestyle of the local population.

Women's participation in Self-Help Groups (SHGs), dairy cooperatives, and small-scale businesses has enhanced social and financial empowerment in the region. Government welfare programmes related to education, healthcare, food security, pensions, and rural employment have also contributed towards improving the overall quality of life.

Despite these improvements, certain villages still face issues related to inadequate drainage systems, irregular water supply during summer months, limited advanced healthcare facilities, and the need for better road infrastructure and waste management systems. The quality of life in the study area can be considered moderate with gradual improvement due to ongoing socio-economic development and infrastructural growth.

### 3.7.3 Economic Profile of the Study Area

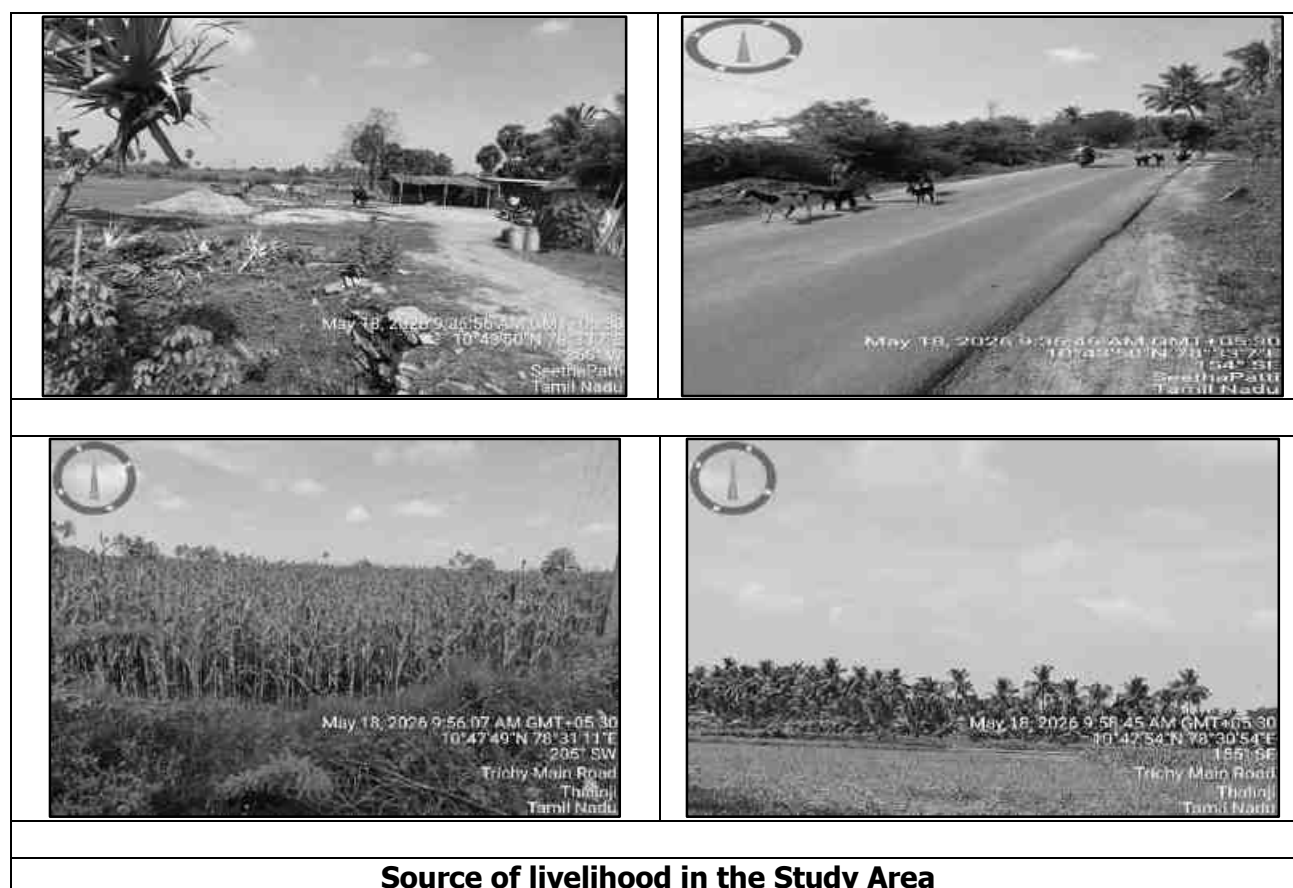
The economy of the study area is predominantly rural in nature and is primarily dependent on agriculture and allied activities. Agriculture serves as the major source of livelihood for the local population, with a significant proportion of households engaged in farming, agricultural labour, dairy farming, and livestock rearing. The fertile agricultural land and availability of irrigation facilities support the cultivation of crops such as paddy, sugarcane, banana, maize, pulses, and groundnut. Irrigation in the study area is mainly dependent on borewells, open wells, canal networks, and seasonal rainfall. In certain villages, farmers face challenges related to fluctuating groundwater levels and irregular rainfall patterns, which affect crop productivity during dry seasons.

Apart from agriculture, a considerable section of the population is engaged in wage labour, petty trade, transportation, construction activities, and small-scale businesses. Due to the proximity of

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Tiruchirappalli and nearby industrial areas, many residents, particularly the younger workforce, are employed in industries, commercial establishments, service sectors, and private enterprises.

The study area also benefits from livestock-related activities such as dairy farming, poultry farming, and goat rearing, which supplement household income and provide economic stability to rural families. Women actively participate in Self-Help Groups (SHGs), tailoring, handicrafts, dairy cooperatives, and other micro-enterprises, thereby contributing to family income and rural economic development.



**Source:** Primary Social Survey 2026

### PHOTOGRAPH 3.2 – LIVELIHOOD STATUS IN THE STUDY AREA

Local markets and weekly shandies play an important role in the rural economy by facilitating the trade of agricultural produce, livestock, vegetables, and essential commodities. Financial institutions such as banks, cooperative societies, and microfinance institutions are available in nearby towns and larger villages, providing access to credit and financial services for agricultural and small business activities.

The employment pattern in the study area indicates a gradual shift from purely agriculture-based occupations towards diversified economic activities due to improved transportation, urban connectivity, educational advancement, and industrial growth in surrounding regions. However,

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seasonal unemployment and fluctuations in agricultural productivity due to monsoon dependency continue to affect the income stability of rural households.

Infrastructure facilities such as roads, electricity, communication networks, and transportation have improved over the years, positively influencing economic growth and market accessibility. Government schemes related to rural employment, agriculture, housing, skill development, and poverty alleviation have also contributed towards improving the socio-economic condition of the local population.

The economic profile of the study area reflects a moderately developing rural economy with agriculture as its primary base, supplemented by allied activities, wage employment, small businesses, and increasing dependence on nearby urban and industrial sectors.

### Infrastructure profile

The infrastructure facilities available within the 10 km study area are moderate and indicate gradual rural development influenced by nearby urban centres and industrial growth. Basic infrastructure such as roads, electricity, drinking water supply, educational institutions, healthcare facilities, communication networks, and transportation services are available in most villages within the study area.

The road network in the area comprises village roads, Panchayat roads, district roads, and State Highways connecting the villages to nearby towns such as Tiruchirappalli and Karur. Most of the major roads are paved and motorable throughout the year, facilitating the movement of people, agricultural produce, and commercial goods. Public transportation facilities such as buses, private vehicles, auto-rickshaws, and mini transport services are available for inter-village and urban connectivity.

Electricity supply is available in almost all villages, and the majority of households are electrified. Power supply supports domestic consumption, irrigation pumps, small commercial establishments, and agricultural activities. Street lighting facilities are also available in most settlements.

### Source of Drinking Water

Drinking water supply in the study area is mainly provided through borewells, overhead tanks, hand pumps, village Panchayat water supply systems, and piped water schemes. The major sources of drinking water in the study area are as follows:

**TABLE 3. 40 – SOURCE OF DRINKING WATER**

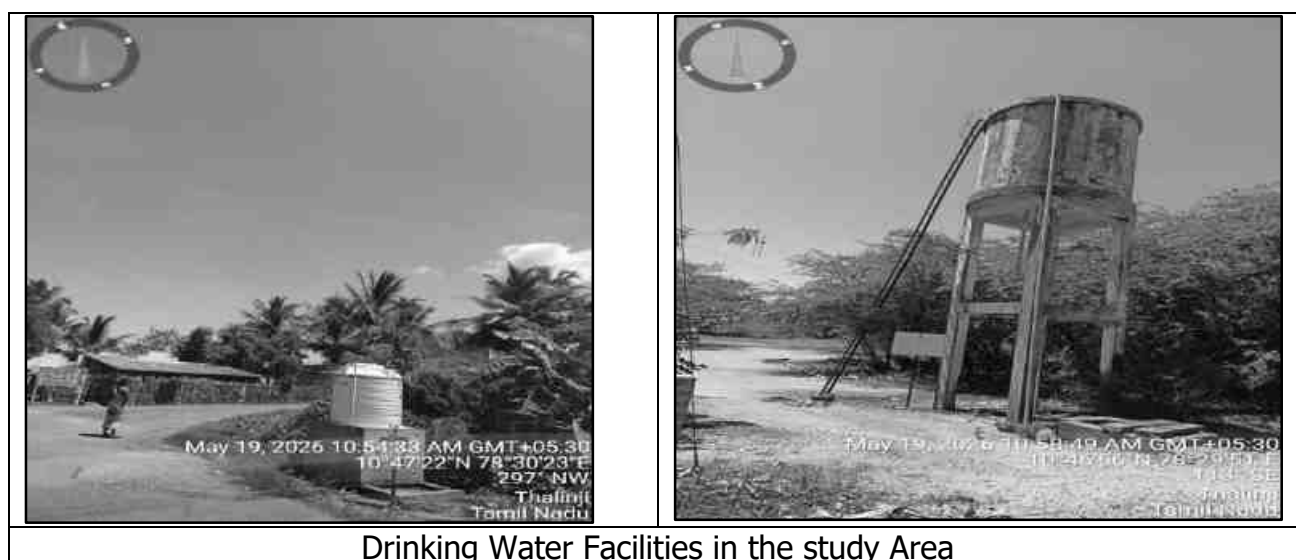
| Sr. No. | Source of Drinking Water     | Availability in Study Area                                                         |
|---------|------------------------------|------------------------------------------------------------------------------------|
| 1       | Borewells / Tube Wells       | Major source in almost all villages                                                |
| 2       | Open Wells                   | Available in few agricultural villages                                             |
| 3       | Panchayat Piped Water Supply | Available in larger villages such as Nangavaram, Sirugamani, Kulathur, Puliur etc. |
| 4       | Overhead Water Storage Tanks | Commonly used for village water distribution                                       |
| 5       | Hand Pumps                   | Present in interior habitations and rural settlements                              |
| 6       | Mini Water Supply Schemes    | Available in selected Panchayat villages                                           |

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| Sr. No. | Source of Drinking Water                | Availability in Study Area                                              |
|---------|-----------------------------------------|-------------------------------------------------------------------------|
| 7       | Cauvery River-based Supply (Indirectly) | Nearby areas influenced by Cauvery River system and irrigation channels |
| 8       | Private Water Tankers                   | Used occasionally during summer scarcity periods                        |

### Interpretation/Analysis:

Based on the reconnaissance survey, village interactions, and interpretation of the attached study area map, the surrounding villages within the 10 km radius of the proposed CBMWTF project at Kallai Village primarily depend on a combination of groundwater-based and public water supply systems for domestic and drinking water requirements. However, some villages experience water scarcity during summer months due to declining groundwater levels and seasonal variations.



Drinking Water Facilities in the study Area

### Impact Relevance to Proposed Project

The proposed CBMWTF project shall ensure:

- No extraction of excessive groundwater beyond permitted limits;
- No contamination of local water sources;
- Proper treatment and recycling of wastewater through ETP/STP systems;
- Impervious flooring and leachate management to prevent groundwater pollution;
- Periodic groundwater quality monitoring around the project site.

Hence, with implementation of proper environmental safeguards, no significant adverse impact on existing drinking water sources in the surrounding villages is anticipated.

|                                                  |                                           |                                                                                     |            |
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## Educational Facilities

Educational facilities such as Government Primary Schools, Middle Schools, High Schools, Higher Secondary Schools, Anganwadi Centres, and a few private educational institutions are available in most villages and nearby semi-urban areas.

## Educational Accessibility in Nearby Areas

**TABLE 3. 41 – EDUCATIONAL ACCESSIBILITY IN NEARBY AREAS**

| Location        | Educational Facilities                              |
|-----------------|-----------------------------------------------------|
| Kallai          | Primary School, Anganwadi                           |
| Kanur           | Government School Facilities                        |
| Nangavaram      | High School Facilities                              |
| Puliyur         | Higher Secondary Schools                            |
| Kulithalai      | Colleges, ITI and private institutions              |
| Tiruchirappalli | Universities, Engineering and Professional Colleges |
| Karur           | Arts, Science and Technical Institutions            |

## Interpretation/Analysis:

The literacy level in the study area is moderate to good compared to remote rural regions of Tamil Nadu. Awareness regarding education has improved significantly due to governmental educational schemes, mid-day meal programmes, Free textbook and uniform distribution, digital learning initiatives, improved transportation and communication facilities. The younger population increasingly pursues higher education and technical courses in nearby urban centres such as Tiruchirappalli and Karur. However, some villages still require improvement in classroom infrastructure, digital learning facilities, additional teaching staff, better sanitation facilities in schools and transportation support for higher education access. The proposed project is expected to support educational development further through CSR/CER initiatives and community development programmes.

The project proponent may undertake the following educational development activities under CSR/CER programmes:

- Distribution of educational materials and school kits
- Improvement of school infrastructure
- Digital learning support
- Provision of benches, desks and sanitation facilities
- Solar lighting in schools
- Skill development and vocational training programmes

## Health Facilities

Healthcare infrastructure includes Primary Health Centres (PHCs), sub-health centres, maternity centres, pharmacies, and private clinics. Government hospitals and advanced medical facilities are available in nearby towns and cities, particularly in Tiruchirappalli.

|                                                  |                                           |                                                                                     |            |
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### ***Existing Health Facilities in the Study Area***

**TABLE 3. 42 – EXISTING HEALTH FACILITIES IN THE STUDY AREA**

| <b>Sr. No.</b> | <b>Type of Health Facility</b>     | <b>Availability / Location</b>                           |
|----------------|------------------------------------|----------------------------------------------------------|
| 1              | Primary Health Centre (PHC)        | Available in nearby larger villages and semi-urban areas |
| 2              | Sub-Health Centres                 | Present in Gram Panchayat villages                       |
| 3              | Government Hospitals               | Available at Kulithalai, Karur and Tiruchirappalli       |
| 4              | Urban Primary Health Centre (UPHC) | Accessible in nearby urban settlements                   |
| 5              | Private Clinics                    | Available in Puliur, Nangavaram, Kulithalai etc.         |
| 6              | Pharmacies / Medical Stores        | Available in most major villages and roadside markets    |
| 7              | Maternal & Child Health Services   | Through PHCs and Anganwadi Centres                       |
| 8              | Ambulance Services                 | Government 108 Ambulance services available              |
| 9              | Veterinary Health Centres          | Available in selected villages for livestock care        |

### **Interpretation/Analysis:**

During stakeholder interactions, the following concerns were identified:

- Requirement of periodic health camps
- Need for better sanitation facilities
- Concern regarding air emissions and odour from biomedical waste treatment
- Need for healthcare awareness programmes
- Assistance for elderly and physically challenged persons

The project proponent shall undertake the following measures:

- Regular medical and health check-up camps
- Environmental monitoring through approved laboratories
- Awareness programmes on sanitation and hygiene
- Emergency response and disaster management system
- Provision of PPE and occupational health monitoring for workers
- CSR/CER support for local health infrastructure

The study area possesses basic to moderate healthcare infrastructure with dependence on nearby urban centres such as Tiruchirappalli and Karur for specialized treatment. The proposed CBMWTF project, with proper environmental safeguards and CER activities, is expected to contribute positively towards public health management by ensuring scientific disposal and treatment of biomedical waste in the region.

### **Communication Facilities**

Communication facilities such as mobile networks, internet connectivity, post offices, and banking services are reasonably developed within the study area. Most villages are covered by major telecom service providers, enabling access to digital communication and online services. The communication



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facilities have improved significantly in recent years due to expansion of mobile networks, internet services, and digital infrastructure in rural Tamil Nadu.

### Existing Communication Facilities

The study area is covered by major telecom service providers such as: Jio Airtel, BSNL & Vodafone-Idea (VI).

**TABLE 3. 43 – EXISTING COMMUNICATION FACILITIES IN THE STUDY AREA**

| Sr. No. | Communication Facility                     | Status in Study Area                               |
|---------|--------------------------------------------|----------------------------------------------------|
| 1       | Mobile Network Connectivity                | Available in almost all villages                   |
| 2       | Internet / Mobile Data Services            | 4G services available in major villages            |
| 3       | Landline Telephone Services                | Limited availability                               |
| 4       | Postal Services                            | Available in nearby villages/towns                 |
| 5       | Banking & Digital Services                 | Available through banks, ATMs and online platforms |
| 6       | Television & DTH Services                  | Commonly available in households                   |
| 7       | Public Address / Local Announcement System | Available through Panchayat offices and temples    |
| 8       | Emergency Communication Services           | 108 Ambulance and emergency helpline accessible    |

### Interpretation/Analysis:

Major telecom service providers ensure adequate connectivity, while increasing digital awareness among the local population has improved access to information and government welfare schemes. The proposed project is not anticipated to cause any adverse impact on the existing communication infrastructure of the region.

### Sanitation and Waste Management

Sanitation and waste management facilities in the rural areas are gradually improving through various government programmes; however, some villages still require better drainage systems, solid waste management practices, and wastewater disposal arrangements.

**TABLE 3. 44 – EXISTING SANITATION FACILITIES IN THE STUDY AREA**

| Sr. No. | Sanitation Facility         | Status in Study Area                                            |
|---------|-----------------------------|-----------------------------------------------------------------|
| 1       | Household Toilets           | Available in majority of households under Swachh Bharat Mission |
| 2       | Community Toilets           | Limited availability in some villages                           |
| 3       | Open Drainage System        | Present in most villages                                        |
| 4       | Underground Drainage System | Mostly absent in rural settlements                              |
| 5       | Wastewater Disposal         | Through open drains and soak pits                               |

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| Sr. No. | Sanitation Facility         | Status in Study Area                       |
|---------|-----------------------------|--------------------------------------------|
| 6       | Solid Waste Collection      | Limited Panchayat-level collection system  |
| 7       | Village Cleaning Activities | Undertaken periodically by Gram Panchayats |
| 8       | Septic Tanks / Soak Pits    | Commonly used in residential areas         |

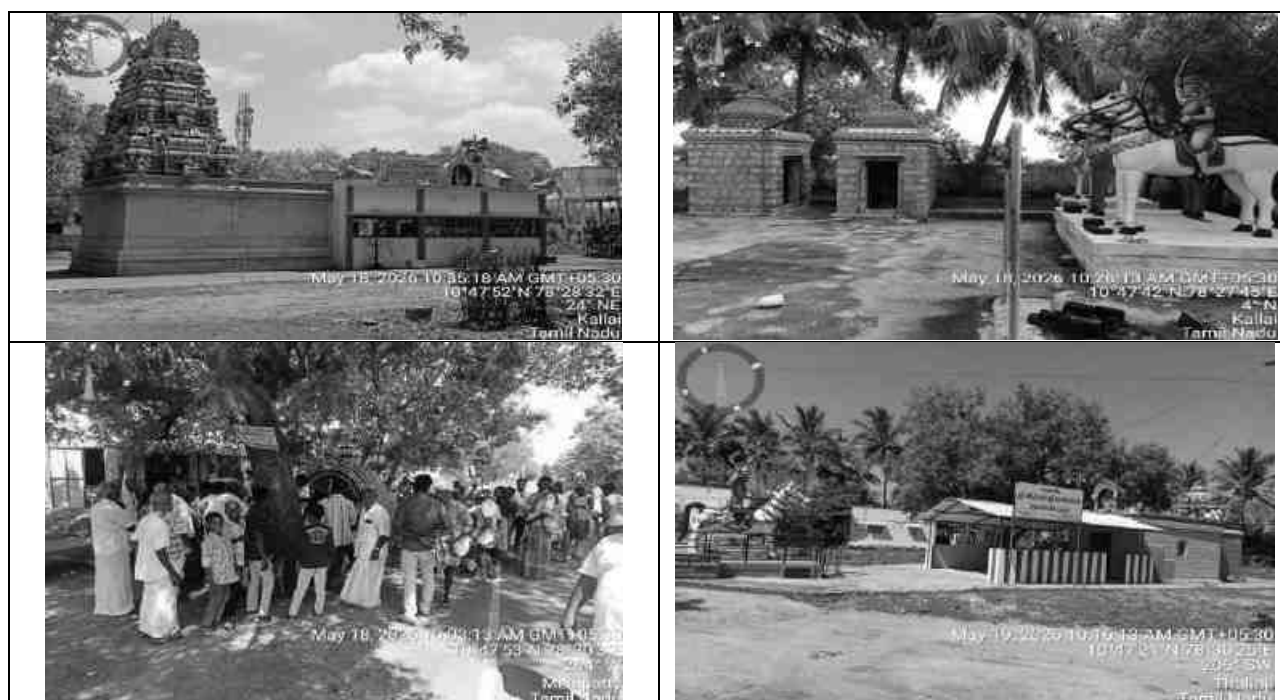
### Interpretation/Analysis:

The proposed project site at Kallai Village is located in a rural setting where sanitation infrastructure is moderate. The nearby villages generally possess, household sanitation facilities, open surface drainage village-level cleaning systems, limited organized waste segregation practices. Some interior habitations still requires improvement in drainage systems, proper wastewater management, scientific disposal of solid waste and community sanitation awareness.

The infrastructure profile of the study area indicates a moderately developed rural region with basic civic amenities and improving infrastructure facilities due to ongoing government initiatives and regional economic development.

### Archeological or Historical Sites/Places of Religious Importance

The study area and its surrounding regions possess cultural, historical, and religious significance typical of the central Tamil Nadu region. Several temples, local shrines, and places of worship are located within and around the villages of the study area, serving as important centres of social and cultural activities for the local population.



**Source:** Primary Social Survey (May 2026)

**PHOTOGRAPH 3.3 – PLACES OF RELIGIOUS IMPORTANCE**

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The nearest major religious and historical centres are located in and around Tiruchirappalli, which is well known for its ancient temples, historical monuments, and cultural heritage. Prominent places of religious importance in the broader region include the Sri Ranganathaswamy Temple, Rockfort Temple, and Jambukeswarar Temple, which attract a large number of devotees and tourists throughout the year.

Apart from these major temples, village temples dedicated to local deities such as Mariamman, Ayyanar, Karuppasamy, and Vinayagar are commonly found within the study area villages. These temples play an important role in preserving local traditions, festivals, and cultural practices.

Based on the available information and reconnaissance survey, no nationally protected archaeological monuments, Archaeological Survey of India (ASI) protected sites, biosphere reserves, wildlife sanctuaries, national parks, or ecologically sensitive areas are located within the immediate core project site. However, culturally significant temples and local religious structures are present in nearby villages.

The proposed project is not expected to have any adverse impact on archaeological monuments, historical sites, or places of religious importance, provided that all construction and operational activities are carried out in compliance with applicable environmental and statutory regulations.

#### **3.7.4 Conclusion**

The socio-economic assessment indicates that the study area is predominantly rural with agriculture-based livelihoods and gradually improving infrastructure facilities.

The proposed CBMWTF project is expected to:

- Improve scientific biomedical waste management
- Generate direct and indirect employment
- Support local economic growth
- Enhance community infrastructure through CER activities

With proper environmental safeguards, regulatory compliance, and implementation of mitigation measures, the project is not expected to cause any significant adverse socio-economic impacts in the surrounding villages.

|                                                  |                                                                      |      |            |
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| Title                                            | Chapter 4: Anticipated Environmental Impacts and Mitigation Measures | Date | 08/06/2026 |

# CHAPTER 4: ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

## 4.1 INTRODUCTION

Any project activity leads to specific environmental impacts, which may be either beneficial or adverse. Therefore, impact prediction forms a critical component of the Environmental Impact Assessment (EIA) process. Various techniques and methodologies are employed to predict the impacts of development activities on physico-ecological and socio-economic components of the environment.

Environmental impact identification and prediction aim to assess the nature and extent of impacts in terms of their characteristics, such as temporary or permanent, direct or indirect, positive or negative, and short-term or long-term. The predicted impacts are superimposed on the baseline environmental conditions to establish the post-project environmental scenario. Objective prediction and evaluation of impacts necessitate the formulation of a comprehensive Environmental Management Plan (EMP), which is to be implemented during the operational phase of the proposed project to minimize adverse environmental effects and enhance positive outcomes.

In this chapter, an attempt has been made to identify the probable environmental impacts due to different types of project components involved in the proposed new project by establishing cause-effect relationship through impact identification matrix. For, identification and evaluation of impacts associated with the project, related information presented in Chapter - 2 and baseline environmental information presented in Chapter - 3 have been utilized. The various activities of the proposed new project and anticipated environmental attributes likely to be affected have been described in subsequent sections of this chapter.

## 4.2 IDENTIFICATION OF ACTIVITIES

An environmental impact is defined as any change in the physical, chemical, biological, cultural, and/or socio-economic environment attributable to activities associated with the proposed project or its alternatives. The overall environmental impacts are broadly categorized into two phases, namely the **Construction Phase** and the **Operational Phase**:

- (i) **Construction Phase:** Construction and Establishment phases mainly consist of civil works such as earth moving, levelling of land, construction of foundations, buildings and approach roads. Machinery installation and commissioning involve activities like fabrication work, cutting, welding and construction of buildings and other facilities, laying of cables and pipelines etc. It involves testing of plant for any type of leakages and designed capacity. During the Construction phase of the project there would be impacts on the air environment, water environment, Impact due to Noise, Ecology Flora and Fauna and socio-economic aspects.
- (ii) **Operation Phase:** There is no as such major source of noise pollution during operation of facility as compare to construction phase however there shall be disturbance in noise ambient of area due to regular traffic movement to the facility. During the operation phase of the

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project there would be impacts on the air environment, water environment, Land environment and socio-economic aspects

#### 4.2.1 Construction Phase

Following activities have been identified for possible environmental impacts due to proposed project during construction phase.

- Transportation of construction materials
- Storage and Handling of Construction Material/ Construction and Demolition waste
- Civil Construction/Demolition
- Mechanical erection
- Greenbelt development

#### 4.2.2 Operational Phase

Following activities have been identified for possible environmental impacts due to proposed project during operation phase.

- Storage & Handling of Bio-Medical Waste
- Transportation of Bio-Medical Waste
- Operation and Maintenance
- Fugitive and Gaseous Emission
- Green Belt Development
- Solid Hazardous Waste Generation
- Effluent Treatment Plant with ZLD

The identification of environmental impacts has been made, based on the understanding of cause-condition-effect relationship between an activity and the impact component. The activities identified as sources having potential to cause impact upon above stated environmental parameters due to proposed new project during the construction & operation phase are given in **TABLE 4.1** and **TABLE 4.2** respectively.

### 4.3 ENVIRONMENTAL ATTRIBUTES

The various environmental attributes likely to be affected by the various activities of the proposed expansion project are given below:

- Air Environment
  - Air Quality
- Water Environment
  - Quality
  - Quantity
- Land Environment
  - Soil Characteristics
- Noise Environment
- Health & Safety
- Ecology

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- Flora & Fauna
- Socio Economic Environment
  - Employment Generation

#### 4.4 IMPACT IDENTIFICATION MATRIX

To establish a clear cause-effect relationship between project activities and their potential impacts on various environmental components, an Impact Identification Matrix has been employed. This matrix serves as a systematic tool for identifying interactions between specific activities of the proposed new project and the associated environmental attributes. It enables the visual representation and qualitative assessment of potential impacts by mapping each project activity against environmental parameters such as air, water, soil, noise, biological environment, socio-economics, and occupational health. The matrix highlights whether the impact is likely to be beneficial or adverse, direct or indirect, short-term or long-term and reversible or irreversible. This structured approach not only facilitates comprehensive impact identification but also assists in prioritizing areas that require focused mitigation measures or monitoring during the project's lifecycle. The same has been presented in **TABLE 4.1 & TABLE 4.2.**

**TABLE 4.1 – IMPACT IDENTIFICATION MATRIX - CONSTRUCTION PHASE**

| Activity<br>Environmental Attributes                        | Transportation of construction materials | Storage and handling of construction material / Construction and Demolition waste | Civil construction / Demolition | Mechanical erection | Greenbelt development |
|-------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------|---------------------|-----------------------|
| <b>Air</b>                                                  | √                                        | √                                                                                 | √                               | √                   | √                     |
| <b>Water</b>                                                | X                                        | X                                                                                 | √                               | X                   | √                     |
| <b>Land</b>                                                 | √                                        | √                                                                                 | √                               | X                   | √                     |
| <b>Noise</b>                                                | √                                        | X                                                                                 | √                               | √                   | √                     |
| <b>Ecology</b>                                              | √                                        | X                                                                                 | √                               | X                   | √                     |
| <b>Health &amp; safety</b>                                  | √                                        | √                                                                                 | √                               | √                   | √                     |
| <b>Socio Economic</b>                                       | √                                        | √                                                                                 | √                               | √                   | √                     |
| Note: (√): Possibility of Impact (X): No Impact Will Happen |                                          |                                                                                   |                                 |                     |                       |

|                                                  |                                                                      |      |            |
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**TABLE 4.2 – IMPACT IDENTIFICATION MATRIX - OPERATION PHASE**

| Activity<br>Environmental Attributes | Storage & Handling of Bio-Medical Waste | Transportation of Bio-Medical Waste | Operation and Maintenance | Fugitive and Gaseous Emission | Greenbelt Development | Solid/Haz. Waste Generation | Effluent Treatment Plant |
|--------------------------------------|-----------------------------------------|-------------------------------------|---------------------------|-------------------------------|-----------------------|-----------------------------|--------------------------|
| <b>Air</b>                           | ✓                                       | ✓                                   | ✓                         | ✓                             | ✓                     | ✓                           | ✓                        |
| <b>Water</b>                         | X                                       | X                                   | ✓                         | X                             | ✓                     | X                           | ✓                        |
| <b>Land</b>                          | ✓                                       | ✓                                   | X                         | X                             | ✓                     | ✓                           | ✓                        |
| <b>Noise</b>                         | X                                       | ✓                                   | ✓                         | X                             | ✓                     | X                           | ✓                        |
| <b>Ecology</b>                       | X                                       | ✓                                   | X                         | ✓                             | ✓                     | X                           | X                        |
| <b>Health &amp; safety</b>           | ✓                                       | ✓                                   | ✓                         | ✓                             | ✓                     | ✓                           | ✓                        |
| <b>Socio Economic</b>                | ✓                                       | ✓                                   | ✓                         | X                             | ✓                     | ✓                           | ✓                        |

Note: (✓): Possibility of Impact (X): No Impact Will Occur

#### 4.5 APPROACH TO EVALUATION OF IMPACT THROUGH MATRIX METHOD

For the proposed new project, the impact evaluation matrix has been developed to calculate the environmental impact score, which will be helpful to define the overall impact of the project and as well as focus on areas for mitigation measures. The processes involved in computing Environmental Impact score are described below.

##### 4.5.1 Environmental Severity

Severity/ impact score has been assigned to all the activities for each of its environmental attributes as per criteria shown in **TABLE 4.3**.

**TABLE 4.3 – SEVERITY CRITERIA**

| Score | Description of Severity      |
|-------|------------------------------|
| 0     | No impact                    |
| 1     | Insignificant impact         |
| 2     | Short term reversible impact |
| 3     | Long term reversible impact  |
| 4     | Significant Impact           |

##### 4.5.2 Activity Score & Related Mitigation Measures

After assigning score of severity (value), the total activity score has been computed by algebraically adding score of each environmental attribute for each activity for construction as well as for operation phase separately. The impacts and mitigation measures are explained in **TABLE 4.4** and **TABLE 4.5** for both the phases of project separately and based on the severity criteria, matrix has been prepared assigning specific value as shown in **TABLE 4.6** to **TABLE 4.9** for construction and operation phase respectively.

|                                                  |                                                                      |      |            |
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**TABLE 4.4 – ASSIGNED VALUES FOR ANTICIPATED IMPACTS AND RELATED MITIGATION MEASURES (CONSTRUCTION PHASE)**

| Sr. No. | Project Activities                       | Environmental Attributes | Impacts                                                                                                                                                                                   | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                                                                                                     | Scoring After Implementation of Proposed Mitigation Measures |
|---------|------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| I       | Transportation of Construction Materials | Air Quality              | <ul style="list-style-type: none"> <li>Respiratory discomfort, coughing, and throat irritation for workers; potential for acute asthma triggers in nearby sensitive receptors.</li> </ul> | -2                             | <ul style="list-style-type: none"> <li>Trucks used for transportation materials shall be covered with tarpaulin sheet to avoid dust dispersion at site.</li> <li>Only PUC certified vehicle will be used for the transportation of materials and equipment</li> </ul>                                             | -1                                                           |
|         |                                          | Soil Characteristics     | <ul style="list-style-type: none"> <li>Minimal direct health impact, though spills can create slippery surfaces leading to physical injury risks.</li> </ul>                              | -2                             | <ul style="list-style-type: none"> <li>Minimize the speed of the construction vehicles. Also, in case of accident, isolate the area. Top soil to be collected and sent to TSDF site.</li> </ul>                                                                                                                   | -1                                                           |
|         |                                          | Noise                    | <ul style="list-style-type: none"> <li>Temporary sleep disturbance for the community; increased stress and irritability; minor communication interference for site workers.</li> </ul>    | -2                             | <ul style="list-style-type: none"> <li>Construction Vehicles should avoid residential roads.</li> <li>Routes for construction Vehicles to project site must be identified and agreed by all parties/stakeholders.</li> <li>Vehicles should be PUC certified and Unnecessary honking should be avoided.</li> </ul> | -1                                                           |
|         |                                          | Flora & Fauna            | <ul style="list-style-type: none"> <li>Indirect impact through the loss of local small-fauna biodiversity which helps control pests (like insects) in the area.</li> </ul>                | -2                             | <ul style="list-style-type: none"> <li>Trucks used for transportation materials shall be covered with tarpaulin sheet to avoid dust dispersion at site.</li> </ul>                                                                                                                                                | -1                                                           |



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| Sr. No. | Project Activities                          | Environmental Attributes | Impacts                                                                                                                                                                                                                                                                                                                        | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                                                                                                                               | Scoring After Implementation of Proposed Mitigation Measures |
|---------|---------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                                             |                          |                                                                                                                                                                                                                                                                                                                                |                                | <ul style="list-style-type: none"> <li>Only PUC certified vehicles will be used for the transportation of materials and equipment. Awareness to drivers on animal movement and minimize the vehicle speed to avoid such incidents.</li> </ul>                                                                                               |                                                              |
|         |                                             | Health & Safety          | <ul style="list-style-type: none"> <li>Short-term physical trauma, fractures, or more severe injuries resulting from road traffic accidents (RTA).</li> </ul>                                                                                                                                                                  | -2                             | <ul style="list-style-type: none"> <li>Only skilled drivers having valid license will be allowed for transportation purpose to avoid possibilities of accidents.</li> </ul>                                                                                                                                                                 | -1                                                           |
|         |                                             | Employment               | <ul style="list-style-type: none"> <li>Financial stability for temporary workers; improved access to basic needs and healthcare through earned wages.</li> </ul>                                                                                                                                                               | +2                             | <ul style="list-style-type: none"> <li>Note: For employment purpose, priority will be given to local workers from surrounding villages.</li> <li>Construction Materials shall be purchased from the local markets.</li> </ul>                                                                                                               | +2                                                           |
| II      | Storage & Handling of Construction Material | Air Quality              | <ul style="list-style-type: none"> <li>Localized increase in particulate matter (PM<sub>10</sub>); reduced air clarity within the site; dust settling on nearby surfaces.</li> <li>Inflammation of the respiratory tract; increased risk of silicosis or "cement dermatitis" (skin irritation); allergic reactions.</li> </ul> | -2                             | <ul style="list-style-type: none"> <li>Materials will be stored in designated closed area by which dust emission due to wind can be avoided.</li> <li>Proper traffic management shall be followed during loading and unloading of construction material.</li> <li>PPE's i.e. masks will be provided to the construction workers.</li> </ul> | -1                                                           |

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| Sr. No. | Project Activities | Environmental Attributes | Impacts                                                                                                                                                                                                                                                                                                 | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                  | Scoring After Implementation of Proposed Mitigation Measures |
|---------|--------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                    |                          |                                                                                                                                                                                                                                                                                                         |                                | <ul style="list-style-type: none"> <li>Water sprinkling activities will be carried out on regular basis to avoid dust emission.</li> </ul>                                                                                                                                                                                                                                                     |                                                              |
|         |                    | Soil Characteristics     | <ul style="list-style-type: none"> <li>Loss of topsoil structure; soil compaction under heavy loads; potential leaching of alkalinity (from cement) into the soil.</li> <li>Indirect health impact through the creation of uneven ground, increasing the risk of falls or trips for workers.</li> </ul> | -2                             | <ul style="list-style-type: none"> <li>Due care will be taken during storage and handling of construction materials to avoid any damage to topsoil.</li> <li>Separate bins shall be provided storing Garbage/wastes and will be disposed off adequately as per guidelines.</li> <li>Generated waste will be handled as per construction and demolition waste management rules, 2016</li> </ul> | -1                                                           |
|         |                    | Health & Safety          | <ul style="list-style-type: none"> <li>Potential for secondary soil or water pollution if materials (like cement) are washed away during heavy rain.</li> <li>Physical trauma from falling materials; musculoskeletal injuries from lifting; acute respiratory distress.</li> </ul>                     | -3                             | <ul style="list-style-type: none"> <li>Personal Protective Equipment such as gloves, helmets, safety shoes etc. will be provided to workers.</li> <li>Water sprinkling activities will be carried out on regular basis to avoid dust emission.</li> <li>Training will be provided to construction workers.</li> </ul>                                                                          | -1                                                           |
|         |                    | Employment               | <ul style="list-style-type: none"> <li>Slight increase in local household income; promotion of local labour rather than migrant labour.</li> </ul>                                                                                                                                                      | +2                             | <ul style="list-style-type: none"> <li>Note: For employment purpose, priority will be given to local workers from surrounding village</li> </ul>                                                                                                                                                                                                                                               | +2                                                           |

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| Sr. No. | Project Activities            | Environmental Attributes | Impacts                                                                                                                                                                                                                                                                              | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Scoring After Implementation of Proposed Mitigation Measures |
|---------|-------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                               |                          | <ul style="list-style-type: none"> <li>Improved financial stability for workers from nearby villages; better access to nutrition and social services.</li> </ul>                                                                                                                     |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                              |
| III     | Civil Construction/demolition | Air Quality              | <ul style="list-style-type: none"> <li>Temporary spike in PM10; reduced photosynthetic activity in nearby plants due to dust coating.</li> <li>Respiratory irritation; potential for "dust pneumonia" or aggravated sinus issues among workers.</li> </ul>                           | -2                             | <ul style="list-style-type: none"> <li>Demolition/Construction site to be screened by using wooden supports and shaded clothes (wind barrier) to avoid blow of fine particles with wind.</li> <li>Regular water sprinkling activity shall be done to avoid dust generation on working site.</li> <li>Cleared areas must be dampened periodically to avoid creation of excessive dust.</li> <li>The height for dropping construction materials will be minimum to limit fugitive dust generation.</li> </ul> | -1                                                           |
|         |                               | Water Quality            | <ul style="list-style-type: none"> <li>Increased turbidity in local water bodies; potential clogging of drainage channels leading to stagnant water.</li> <li>Indirect risk of water-borne diseases if stagnant water becomes a breeding ground for vectors (mosquitoes).</li> </ul> | -3                             | <ul style="list-style-type: none"> <li>Proper site management will minimize the surface water runoff</li> <li>Good housekeeping should be practiced like handling and disposing of solid waste i.e. debris to enter from drainage column.</li> </ul>                                                                                                                                                                                                                                                        | -1                                                           |

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| Sr. No. | Project Activities | Environmental Attributes | Impacts                                                                                                                                                                                                                                                   | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                                                                                            | Scoring After Implementation of Proposed Mitigation Measures |
|---------|--------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                    |                          |                                                                                                                                                                                                                                                           |                                | <ul style="list-style-type: none"> <li>Adopting proper construction and engineering practices will help in mitigating the water pollution.</li> </ul>                                                                                                                                                    |                                                              |
|         |                    | Water Quantity           | <ul style="list-style-type: none"> <li>Potential localized depletion of groundwater or stress on the municipal supply.</li> <li>Minimal direct impact, unless water diversion reduces the availability of clean water for the local community.</li> </ul> | -3                             | <ul style="list-style-type: none"> <li>Regular monitoring and proper examination of water consumption and its unnecessary wastage.</li> </ul>                                                                                                                                                            | -3                                                           |
|         |                    | Soil Characteristics     | <ul style="list-style-type: none"> <li>Alteration of soil horizons; loss of topsoil fertility; potential for soil erosion during monsoon seasons.</li> <li>Risk of physical injury from unstable soil/trench collapses during excavation.</li> </ul>      | -2                             | <ul style="list-style-type: none"> <li>Construction / Demolition activities will be carried out on plant area only so there will be minor impact on soil environment.</li> <li>Fertile Topsoil will be recovered and will be utilized for development of green belt.</li> </ul>                          | -1                                                           |
|         |                    | Noise                    | <ul style="list-style-type: none"> <li>Temporary displacement of sensitive local fauna; disruption of quiet zones.</li> <li>Temporary hearing threshold shift; increased fatigue; interference with site communication and safety warnings.</li> </ul>    | -2                             | <ul style="list-style-type: none"> <li>The noise generated from construction machinery will be kept low by keeping the moving parts serviced and properly lubricated.</li> <li>Construction activities will be carried out in shifts, so excess exposures to workers of noise can be avoided.</li> </ul> | -1                                                           |

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| Sr. No. | Project Activities | Environmental Attributes | Impacts                                                                                                                                                                                                                                                       | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Scoring After Implementation of Proposed Mitigation Measures |
|---------|--------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                    |                          |                                                                                                                                                                                                                                                               |                                | <ul style="list-style-type: none"> <li>Construction activities shall be carried out during day time only to comply noise standard provided by CPCB.</li> <li>To measure extent of noise during construction phase, noise modeling has been carried out, details for the same is mentioned in section 4.8.2 of this chapter.</li> <li>Regular monitoring of noise levels during construction phase shall be carried out to maintain noise levels below stipulated standards as mentioned in section 6.2 of Chapter 6</li> </ul> |                                                              |
|         |                    | Flora & Fauna            | <ul style="list-style-type: none"> <li>Short-term loss of micro-habitats; temporary reduction in local biodiversity until the site is stabilized.</li> <li>Reduced aesthetic and psychological benefits provided by the local natural environment.</li> </ul> | -2                             | <ul style="list-style-type: none"> <li>Maintenance of already developed dense greenbelt within premises</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                             | -1                                                           |
|         |                    | Health & Safety          | <ul style="list-style-type: none"> <li>Risk of localized soil contamination from construction chemical spills (e.g., admixtures).</li> </ul>                                                                                                                  | -2                             | <ul style="list-style-type: none"> <li>All the activities will be carried out under the supervision and control of the management.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                  | -1                                                           |

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| Sr. No. | Project Activities  | Environmental Attributes | Impacts                                                                                                                                                                                                                                                                                             | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                | Scoring After Implementation of Proposed Mitigation Measures |
|---------|---------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| IV      |                     |                          | <ul style="list-style-type: none"> <li>Minor injuries (cuts, bruises); risk of falls from heights; fractures from falling debris.</li> </ul>                                                                                                                                                        |                                | <ul style="list-style-type: none"> <li>Safety equipment such as helmet, goggles, ear plug, mask (during exposure of dust) etc., shall be provided to avoid any kind of accidents.</li> </ul> |                                                              |
|         |                     | Employment               | <ul style="list-style-type: none"> <li>Increased local spending power; boost to local small-scale construction material suppliers.</li> <li>Temporary poverty alleviation for local families; skill development in the construction trade.</li> </ul>                                               | +2                             | <ul style="list-style-type: none"> <li>Note: For employment purpose, priority will be given to local workers from surrounding village</li> </ul>                                             | +2                                                           |
|         | Mechanical erection | Air Quality              | <ul style="list-style-type: none"> <li>Localized particulate settling on nearby flora; minimal regional impact but may affect micro-climate within the shed.</li> <li>Irritation of the nasal passages and throat; "Welder's flash" (UV damage) from improper shielding during assembly.</li> </ul> | -2                             | <ul style="list-style-type: none"> <li>PPE's will be provided to the workers i.e. Masks</li> </ul>                                                                                           | -1                                                           |
|         |                     | Noise                    | <ul style="list-style-type: none"> <li>Disturbance to local avian species; noise may propagate further due to "echo" effects within newly erected structures.</li> <li>Increased risk of Noise-Induced Hearing Loss (NIHL); communication interference</li> </ul>                                   | -2                             | <ul style="list-style-type: none"> <li>Acoustic enclosure will be provided to machineries wherever applicable. Also, ear buds will be provided to the workers.</li> </ul>                    | -1                                                           |

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| <b>Sr. No.</b> | <b>Project Activities</b> | <b>Environmental Attributes</b> | <b>Impacts</b>                                                                                                                                                                                                                                                                                                                    | <b>Scoring for anticipated impact</b> | <b>Suggested Mitigation Measures</b>                                                                                                                                                                                                                                                                                                     | <b>Scoring After Implementation of Proposed Mitigation Measures</b> |
|----------------|---------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
|                |                           |                                 | leading to increased accident risk; physical fatigue.                                                                                                                                                                                                                                                                             |                                       |                                                                                                                                                                                                                                                                                                                                          |                                                                     |
|                |                           | Health & Safety                 | <ul style="list-style-type: none"> <li>Negligible environmental impact unless a mechanical failure leads to a drop/spill.</li> <li>Crushing injuries from suspended loads; falls from scaffolding; hand/finger injuries during alignment and bolting.</li> </ul>                                                                  | -2                                    | <ul style="list-style-type: none"> <li>Safety equipment such as helmet, goggles, ear plug, mask, safety shoes etc., shall be provided to avoid any kind of accidents.</li> <li>Medical facilities to be in place for emergency.</li> <li>Trained personals will be hired as possible &amp; regular training will be provided.</li> </ul> | -1                                                                  |
|                |                           | Employment                      | <ul style="list-style-type: none"> <li>Minor boost to local technical service providers and specialized tool rental businesses.</li> <li>Skill enhancement for local labour; improved financial stability through short-term specialized wages.</li> </ul>                                                                        | +2                                    | <ul style="list-style-type: none"> <li>Note: For employment purpose, priority will be given to local workers from surrounding village</li> </ul>                                                                                                                                                                                         | +2                                                                  |
| VI             | Greenbelt Development     | Air Quality                     | <ul style="list-style-type: none"> <li>Act as a "bio-filter" to trap particulate matter (PM10 &amp; PM 2.5), sequester CO<sub>2</sub> and release O<sub>2</sub>; helps in neutralizing odours.</li> <li>Reduction in respiratory ailments; cooler ambient temperatures within the site; fresher air for the workforce.</li> </ul> | +3                                    | --                                                                                                                                                                                                                                                                                                                                       | +3                                                                  |

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| Project                                          | Draft EIA Report                                                     |      |            |
| Report No                                        | EP/EIA/76                                                            | Rev. | 00         |
| Title                                            | Chapter 4: Anticipated Environmental Impacts and Mitigation Measures | Date | 08/06/2026 |

| Sr. No. | Project Activities | Environmental Attributes | Impacts                                                                                                                                                                                                                                                                                        | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                      | Scoring After Implementation of Proposed Mitigation Measures |
|---------|--------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                    | Water Quantity           | <ul style="list-style-type: none"> <li>Consumption of a fixed quantity of water; however, can be mitigated using recycled treated effluent.</li> <li>No direct health risk if non-potable/recycled water is used for irrigation.</li> </ul>                                                    | -3                             | <ul style="list-style-type: none"> <li>The treated water from ETP will be reused for gardening purpose.</li> </ul> | -2                                                           |
|         |                    | Soil Characteristics     | <ul style="list-style-type: none"> <li>Significant reduction in soil erosion; improvement in soil organic carbon (SOC) and nutrient cycling; better water retention.</li> <li>Positive: Stabilization of the ground prevents dusty conditions that lead to skin and eye irritation.</li> </ul> | +2                             | --                                                                                                                 | +2                                                           |
|         |                    | Noise                    | <ul style="list-style-type: none"> <li>Significant reduction in noise levels through sound absorption and scattering (acts as an acoustic barrier).</li> <li>Protection against noise-induced stress and hearing fatigue for workers and nearby communities.</li> </ul>                        | +1                             | --                                                                                                                 | +1                                                           |
|         |                    | Flora & Fauna            | <ul style="list-style-type: none"> <li>Increase in local floral diversity; provides a "safe haven" and nesting sites for birds, butterflies, and small reptiles.</li> </ul>                                                                                                                    | +3                             | --                                                                                                                 | +3                                                           |



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| Sr. No. | Project Activities | Environmental Attributes | Impacts                                                                                                                                                                                                                                                               | Scoring for anticipated impact | Suggested Mitigation Measures | Scoring After Implementation of Proposed Mitigation Measures |
|---------|--------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------|--------------------------------------------------------------|
|         |                    |                          | <ul style="list-style-type: none"> <li>Improved mental well-being (biophilia) and aesthetic environment, leading to higher job satisfaction for workers.</li> <li>Greenbelt can be proven a shelter for some faunal species.</li> </ul>                               |                                |                               |                                                              |
|         |                    | Health & Safety          | <ul style="list-style-type: none"> <li>Acts as a physical barrier against accidental gas leaks or dust plumes spreading off-site.</li> <li>Lower long-term health risks; provides shaded areas for workers, reducing the risk of heatstroke during breaks.</li> </ul> | +2                             | --                            | +2                                                           |
|         |                    | Employment               | <ul style="list-style-type: none"> <li>Encourages "green" jobs; involves local community members in sustainable land management.</li> <li>Stable, low-risk income for laborers and gardeners from nearby villages.</li> </ul>                                         | +2                             | --                            | +2                                                           |

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**TABLE 4.5 – ASSIGNED VALUES FOR ANTICIPATED IMPACTS AND RELATED MITIGATION MEASURES (OPERATION PHASE)**

| <b>Sr. No.</b> | <b>Project Activities</b>               | <b>Environmental Attributes</b> | <b>Impacts</b>                                                                                                                                                                                                                                                                                                                       | <b>Scoring for anticipated impact</b> | <b>Suggested Mitigation Measures</b>                                                                                                                                                                   | <b>Scoring After Implementation of Proposed Mitigation Measures</b> |
|----------------|-----------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| I              | Storage & Handling of Bio-Medical Waste | Air Quality                     | <ul style="list-style-type: none"> <li>• Release of foul odors (ammonia, hydrogen sulfide); potential for airborne pathogens if waste is not contained in sealed bags.</li> <li>• Nausea and headache from persistent odors; potential respiratory irritation; psychological discomfort for workers and visitors.</li> </ul>         | -3                                    | <ul style="list-style-type: none"> <li>• Bio-Medical Waste will be stored in designated closed area.</li> <li>• Native species will be used for development of green belt.</li> </ul>                  | -2                                                                  |
|                |                                         | Soil Characteristics            | <ul style="list-style-type: none"> <li>• Potential localized contamination with pathogens; risk of soil-borne transmission if waste is not immediately disinfected.</li> <li>• Risk of "sharps" injuries (needle sticks) if waste is dropped, potentially leading to the transmission of blood-borne pathogens.</li> </ul>           | -2                                    | <ul style="list-style-type: none"> <li>• Trained/Skilled workers will be assigned during handling of Bio-Medical Waste.</li> <li>• Pucca flooring will be provided in storage area.</li> </ul>         | -1                                                                  |
|                |                                         | Health & Safety                 | <ul style="list-style-type: none"> <li>• Potential for secondary contamination of surfaces; risk of "vector" attraction (flies, rodents) if storage is not secure.</li> <li>• Potential for infections (Hepatitis B, HIV, etc.); skin infections from contact with contaminated fluids; acute odors affecting well-being.</li> </ul> | -3                                    | <ul style="list-style-type: none"> <li>• Personal Protective Equipment such as masks, gloves, helmets, safety shoes etc. will be provided to workers. Also, SOPs for work will be followed.</li> </ul> | -2                                                                  |
|                |                                         | Employment                      | <ul style="list-style-type: none"> <li>• Improved institutional reputation for compliance and environmental stewardship.</li> </ul>                                                                                                                                                                                                  | +3                                    | <ul style="list-style-type: none"> <li>• Note: For employment purpose, priority will be given to local workers from surrounding village</li> </ul>                                                     | +3                                                                  |

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| Sr. No. | Project Activities                  | Environmental Attributes | Impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                                                                                                | Scoring After Implementation of Proposed Mitigation Measures |
|---------|-------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                                     |                          | <ul style="list-style-type: none"> <li>• Job creation for specialized waste handlers; improved community health safety through proper waste containment.</li> </ul>                                                                                                                                                                                                                                                                                                                                             |                                |                                                                                                                                                                                                                                                                                                              |                                                              |
| II      | Transportation of Bio-Medical Waste | Air Quality              | <ul style="list-style-type: none"> <li>• Minor increase in localized particulate matter and greenhouse gases; quickly dispersed along the route.</li> <li>• Minimal respiratory discomfort for people along the transit corridor.</li> <li>• Potential for significant localized soil contamination with infectious agents; disruption of soil micro-habitats in spill zones.</li> <li>• Indirect risk to health if pathogens leach from soil into local water or food chains following an accident.</li> </ul> | -2                             | <ul style="list-style-type: none"> <li>• Regular check on vehicle condition and proper road maintenance of the direct ways.</li> </ul>                                                                                                                                                                       | -1                                                           |
|         |                                     | Soil Characteristics     | <ul style="list-style-type: none"> <li>• Temporary disturbance to local fauna along the transportation route; minor addition to urban ambient noise.</li> <li>• Minimal impact; potential annoyance or sleep disturbance if transport occurs during night/early morning hours.</li> </ul>                                                                                                                                                                                                                       | -3                             | <ul style="list-style-type: none"> <li>• Speed limits for vehicles shall be maintained.</li> <li>• GPS tracking system will be installed to track movement of vehicles.</li> <li>• Skilled drivers having valid license shall be provided for transportation to avoid possibilities of accidents.</li> </ul> | -1                                                           |
|         |                                     | Noise                    | <ul style="list-style-type: none"> <li>• Short-term reversible impact on roadside vegetation (stomata blockage); minor risk of vehicle-wildlife collisions.</li> </ul>                                                                                                                                                                                                                                                                                                                                          | -2                             | <ul style="list-style-type: none"> <li>• Regular check on vehicle condition.</li> <li>• Drivers will be informed to not blow horns unless it is required.</li> </ul>                                                                                                                                         | -1                                                           |

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| Sr. No. | Project Activities | Environmental Attributes | Impacts                                                                                                                                                                                                                                                                       | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                        | Scoring After Implementation of Proposed Mitigation Measures |
|---------|--------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                    |                          | <ul style="list-style-type: none"> <li>Reduced ecosystem services from roadside greenery, though largely negligible given the temporary nature of the activity.</li> </ul>                                                                                                    |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                              |
|         |                    | Flora & Fauna            | <ul style="list-style-type: none"> <li>Risk of "biological pollution" if infectious waste is scattered in a public area following an accident.</li> <li>Risk of needle-sticks or fluid contact leading to infections; physical trauma from road traffic accidents.</li> </ul> | -2                             | <ul style="list-style-type: none"> <li>Awareness to drivers on animal movement and over speeding of vehicles will be restricted. There are chances of accident with animal species during transportation.</li> <li>Tree plantations around the project boundary will be initiated at the early stages by Plantation of 2 to 3 years old saplings, regular watering will be done, so that the area will be moist for most part of the day.</li> </ul> | -1                                                           |
|         |                    | Health & Safety          | <ul style="list-style-type: none"> <li>Long-term support for the specialized waste management sector.</li> <li>Permanent livelihood for trained drivers and handlers; socio-economic stability for the local workforce.</li> </ul>                                            | -3                             | <ul style="list-style-type: none"> <li>Personal Protective Equipment such as gloves, helmets, safety shoes etc. will be provided to workers.</li> <li>Necessary training will be provided to workers for transportation and handling of Bio-Medical Waste.</li> </ul>                                                                                                                                                                                | -2                                                           |
|         |                    | Employment               | <ul style="list-style-type: none"> <li>Minor increase in localized particulate matter and greenhouse gases; quickly dispersed along the route.</li> </ul>                                                                                                                     | +3                             | <ul style="list-style-type: none"> <li>Note: For employment purpose, priority will be given to local workers from surrounding village</li> </ul>                                                                                                                                                                                                                                                                                                     | +3                                                           |

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| Title                                            | Chapter 4: Anticipated Environmental Impacts and Mitigation Measures | Date | 08/06/2026 |

| Sr. No. | Project Activities      | Environmental Attributes | Impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Scoring After Implementation of Proposed Mitigation Measures |
|---------|-------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                         |                          | <ul style="list-style-type: none"> <li>Minimal respiratory discomfort for people along the transit corridor.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                     |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                              |
| III     | Operation & Maintenance | Air Quality              | <ul style="list-style-type: none"> <li>Contribution to regional acid rain; potential for persistent organic pollutants (POPs) to enter the food chain.</li> <li>Respiratory distress; chronic exposure to dioxins can lead to hormonal and immune system impairment.</li> <li>Temporary but high-intensity release of untreated toxic gases and heavy metals into the atmosphere.</li> <li>Acute respiratory irritation; localized toxic exposure for nearby residential receptors.</li> </ul>              | -3                             | <ul style="list-style-type: none"> <li>APCM will be attached to stack of incinerator and DG set.</li> <li>To prevent such incident, standard operating procedures (SOPs) shall be prepared, Mock drills will be carried out, monitoring shall be carried out on regular basis during the process, regular training shall be provided to workers.</li> </ul>                                                                                                                     | -2                                                           |
|         |                         | Water Quality            | <ul style="list-style-type: none"> <li>Increased chemical oxygen demand (COD) and total dissolved solids (TDS) in the discharge stream.</li> <li>Risk of groundwater contamination if untreated water leaks, leading to potential long-term ingestion of toxins.</li> <li>Discharge of hazardous wastewater into public drains or soil; localized ecological "kill zones" in water bodies.</li> <li>Potential for community-wide outbreaks of water-borne illnesses or acute chemical poisoning.</li> </ul> | -3                             | <ul style="list-style-type: none"> <li>Necessary treatment will be provided to generated effluent. Unit will provide ZLD based effluent treatment plant by which there will be no discharge of waste water out of the plant premises.</li> <li>To prevent such kind of incident, wastewater shall be collected and stored into dedicated temporary storage area. Effluent characteristics shall be analyzed at regular interval in inhouse laboratory. SOPs shall be</li> </ul> | -1                                                           |

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| Title                                            | Chapter 4: Anticipated Environmental Impacts and Mitigation Measures | Date | 08/06/2026 |

| Sr. No. | Project Activities | Environmental Attributes | Impacts                                                                                                                                                                                                                                                              | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                  | Scoring After Implementation of Proposed Mitigation Measures |
|---------|--------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                    |                          |                                                                                                                                                                                                                                                                      |                                | prepared for the operation of ETP and training shall be provided to workers working in ETP area to tackle such incident.                                                                                                       |                                                              |
|         |                    | Water Quantity           | <ul style="list-style-type: none"> <li>• Strain on local water tables or municipal supply, potentially lowering the static water level.</li> <li>• Physical Risks: Severe burns; exposure to toxic chemicals; mechanical injuries during maintenance.</li> </ul>     | -4                             | <ul style="list-style-type: none"> <li>• Regular monitoring and proper examination of water consumption to avoid its unnecessary wastage.</li> <li>• ZLD is proposed to recycle maximum waste water.</li> </ul>                | -3                                                           |
|         |                    | Noise                    | <ul style="list-style-type: none"> <li>• Chronic disturbance to nocturnal fauna; masking of environmental cues for local wildlife.</li> <li>• Noise-induced hearing loss (NIHL); increased stress and hypertension; reduced concentration for operators.</li> </ul>  | -2                             | <ul style="list-style-type: none"> <li>• Acoustic enclosure will be provided to machineries.</li> <li>• PPE kit will be provided to workers.</li> <li>• Regular maintenance of the equipment's will be carried out.</li> </ul> | -1                                                           |
|         |                    | Health & Safety          | <ul style="list-style-type: none"> <li>• Risk of thermal pollution or secondary contamination during industrial accidents.</li> <li>• Severe burns; exposure to toxic chemicals; mechanical injuries during maintenance.</li> </ul>                                  | -3                             | <ul style="list-style-type: none"> <li>• Safety equipment such as helmet, goggles, ear plug, mask, safety shoes etc., shall be provided to avoid any kind of accidents.</li> </ul>                                             | -2                                                           |
|         |                    | Employment               | <ul style="list-style-type: none"> <li>• Positive: Long-term economic stability; secondary growth in local services (canteens, supplies).</li> <li>• Improved quality of life; access to structured health benefits and permanent insurance for families.</li> </ul> | +3                             | <ul style="list-style-type: none"> <li>• Note: For employment purpose, priority will be given to local skilled workers from surrounding village</li> </ul>                                                                     | +3                                                           |

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| <b>Sr. No.</b> | <b>Project Activities</b>   | <b>Environmental Attributes</b> | <b>Impacts</b>                                                                                                                                                                                                                                                                                                                             | <b>Scoring for anticipated impact</b> | <b>Suggested Mitigation Measures</b>                                                                                                                                                                                                | <b>Scoring After Implementation of Proposed Mitigation Measures</b> |
|----------------|-----------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| IV             | Fugitive & Gaseous Emission | Air Quality                     | <ul style="list-style-type: none"> <li>Acidification of local moisture (acid rain); formation of secondary particulates; reduction in regional visual clarity (haze).</li> <li>Respiratory inflammation; reduced lung function; aggravation of cardiovascular conditions; irritation to eyes and throat.</li> </ul>                        | -3                                    | <ul style="list-style-type: none"> <li>APCS will be attached to stack of incinerator and DG set.</li> <li>OCEMS to be calibrated regularly.</li> <li>Care must be taken by management with regular monitoring mechanism.</li> </ul> | -2                                                                  |
|                |                             | Flora & Fauna                   | <ul style="list-style-type: none"> <li>Chlorosis and necrosis of leaf tissues; bioaccumulation of heavy metals/dioxins in the local food chain; disruption of insect pollinator cycles.</li> <li>Indirect health risks via the consumption of locally grown crops or dairy products that may have absorbed airborne pollutants.</li> </ul> | -2                                    | <ul style="list-style-type: none"> <li>APCM will be attached to stack of incinerator and DG set.</li> <li>There will be development of green belt within plant premises.</li> </ul>                                                 | -1                                                                  |
|                |                             | Health & Safety                 | <ul style="list-style-type: none"> <li>Potential for localized "hotspots" of soil and water contamination through atmospheric deposition of heavy metals.</li> <li>Long-term exposure to trace dioxins/furans can lead to reproductive issues, immune system damage, and carcinogenic risks.</li> </ul>                                    | -3                                    | <ul style="list-style-type: none"> <li>Safety equipment such as helmet, goggles, ear plug, mask, safety shoes etc., shall be provided to avoid any kind of accidents.</li> </ul>                                                    | -2                                                                  |
| V              | Greenbelt Development       | Air Quality                     | <ul style="list-style-type: none"> <li>Biological filtration of SO<sub>2</sub>, NO<sub>x</sub> and CO<sub>2</sub>; sequestration of carbon; confinement of fugitive dust within site boundaries.</li> </ul>                                                                                                                                | +4                                    | --                                                                                                                                                                                                                                  | +4                                                                  |

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| Sr. No. | Project Activities | Environmental Attributes | Impacts                                                                                                                                                                                                                                                                                              | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                  | Scoring After Implementation of Proposed Mitigation Measures |
|---------|--------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                    |                          | <ul style="list-style-type: none"> <li>Reduction in respiratory irritants; lower ambient temperatures; improved oxygen levels for the workforce.</li> </ul>                                                                                                                                          |                                |                                                                                                                |                                                              |
|         |                    | Water Quantity           | <ul style="list-style-type: none"> <li>Consistent demand for a fixed quantity of water. (Mitigated by using treated wastewater from ETP/STP).</li> <li>No negative health impact, provided it does not compete with local community drinking water sources.</li> </ul>                               | -4                             | <ul style="list-style-type: none"> <li>Treated water from ETP will be reused for gardening purpose.</li> </ul> | -3                                                           |
|         |                    | Soil Characteristics     | <ul style="list-style-type: none"> <li>Enhanced soil fertility; prevention of topsoil erosion; improved soil moisture retention and microbial activity.</li> <li>Reduction in dust-borne allergens; stabilization of the landscape prevents stagnant pools or mud-related safety hazards.</li> </ul> | +4                             | --                                                                                                             | +4                                                           |
|         |                    | Noise                    | <ul style="list-style-type: none"> <li>Attenuation of industrial noise by up to 10-15 dB(A) through sound absorption, deflection, and scattering.</li> <li>Significant reduction in noise-induced stress; protection of hearing for both workers and nearby residents.</li> </ul>                    | +3                             | --                                                                                                             | +3                                                           |
|         |                    | Flora & Fauna            | <ul style="list-style-type: none"> <li>Increase in native floral species; provision of shelter, food, and nesting grounds for birds, butterflies, and beneficial insects.</li> <li>"Biophilia" effect—improved mental health and psychological well-being</li> </ul>                                 | +4                             | --                                                                                                             | +4                                                           |



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| Sr. No. | Project Activities                      | Environmental Attributes | Impacts                                                                                                                                                                                                                                                                                              | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                             | Scoring After Implementation of Proposed Mitigation Measures |
|---------|-----------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                                         |                          | for employees working in a green environment.                                                                                                                                                                                                                                                        |                                |                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                              |
|         |                                         | Health & Safety          | <ul style="list-style-type: none"> <li>Acts as a final barrier to mitigate the spread of minor accidental gaseous releases toward neighboring areas.</li> <li>Lowered risk of heatstroke due to natural shading; overall improvement in the health and longevity of the workforce.</li> </ul>        | +2                             | --                                                                                                                                                                                                                                                                                                                                                                                                                        | +2                                                           |
|         |                                         | Employment               | <ul style="list-style-type: none"> <li>Support for local "green" livelihoods; promotes sustainable land management practices in the region.</li> <li>Stable, permanent income for local laborers from nearby villages; promotes a culture of safety and care for nature.</li> </ul>                  | +1                             | --                                                                                                                                                                                                                                                                                                                                                                                                                        | +1                                                           |
| VI      | Solid / BMW /Hazardous Waste Generation | Air Quality              | <ul style="list-style-type: none"> <li>Increase in localized pollution load; contribution to regional haze; odor nuisance for the surrounding community.</li> <li>Respiratory irritation; nausea and headaches from foul odors; potential psychological stress for workers and neighbors.</li> </ul> | -2                             | <ul style="list-style-type: none"> <li>Hazardous waste storage area will be kept isolated and closed to avoid odor exposure to plant workers. Provision of proper ventilation in hazardous waste storage area.</li> <li>Only PUC vehicles shall be used for transportation of Hazardous waste.</li> <li>Vehicles for hazardous waste transportation shall be covered with tarpaulin sheets and tracked by GPS.</li> </ul> | -1                                                           |

|                                                  |                                                                      |      |            |
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| Sr. No. | Project Activities | Environmental Attributes | Impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                                                                                                                                                                       | Scoring After Implementation of Proposed Mitigation Measures |
|---------|--------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                    | Soil Characteristics     | <ul style="list-style-type: none"> <li>• Permanent soil toxicity; heavy metal accumulation; loss of soil microbial life; risk of toxins leaching into groundwater.</li> <li>• Long-term risk of chemical exposure through soil-water pathways; potential for toxins to enter the local food chain.</li> <li>• Potential for localized "toxic hotspots" if spills are not remediated immediately.</li> <li>• Risk of chemical burns, infectious diseases (from BMW), or chronic toxicity; dermal irritation from handling sludge.</li> </ul> | -4                             | <ul style="list-style-type: none"> <li>• Hazardous waste will be collected, stored and handled as per Hazardous and other Wastes (Management &amp; Transboundary Movement) Rules, 2016 as mentioned in section 2.9.3 of chapter 2.</li> <li>• Dedicated storage area with leachate proof flooring shall be provided for generated hazardous waste with adequate storage.</li> </ul> | -2                                                           |
|         |                    | Health & Safety          | <ul style="list-style-type: none"> <li>• Encourages growth of authorized waste treatment infrastructure (TSDF/CHWTSDF).</li> <li>• Permanent livelihood for trained waste handlers, drivers, and safety auditors; improved economic stability for staff.</li> </ul>                                                                                                                                                                                                                                                                         | -3                             | <ul style="list-style-type: none"> <li>• Necessary PPEs will be provided to workers handling hazardous waste and minimum human exposure shall be kept to avoid any adverse impact of hazardous waste on human health.</li> </ul>                                                                                                                                                    | -2                                                           |
|         |                    | Employment               | <ul style="list-style-type: none"> <li>• Increase in localized pollution load; contribution to regional haze; odor nuisance for the surrounding community.</li> <li>• Respiratory irritation; nausea and headaches from foul odors; potential psychological stress for workers and neighbors.</li> </ul>                                                                                                                                                                                                                                    | +3                             | <ul style="list-style-type: none"> <li>• Note: For employment purpose, priority will be given to local skilled workers from surrounding village</li> </ul>                                                                                                                                                                                                                          | +3                                                           |

|                                                  |                                                                      |  |      |            |
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| Sr. No. | Project Activities       | Environmental Attributes | Impacts                                                                                                                                                                                                                                                                                                         | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Scoring After Implementation of Proposed Mitigation Measures |
|---------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| VII     | Effluent Treatment Plant | Air Quality              | <ul style="list-style-type: none"> <li>• Generation of localized foul odors; minor contribution to ambient air pollution.</li> <li>• Potential nausea or headache for workers near the ETP area; psychological discomfort due to persistent odors.</li> </ul>                                                   | -2                             | <ul style="list-style-type: none"> <li>• PPE's i.e. Masks will be provided to the workers.</li> <li>• Green belt will be developed within plant premises.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                          | -1                                                           |
|         |                          | Water Quality            | <ul style="list-style-type: none"> <li>• Rapid contamination of local water bodies; increase in Chemical Oxygen Demand (COD) and toxic load; potential groundwater infiltration.</li> <li>• Long-term risk of chemical toxicity or water-borne diseases if pollutants reach community water sources.</li> </ul> | -2                             | <ul style="list-style-type: none"> <li>• As unit has proposed ZLD system as mentioned in section 2.9.2.1 in chapter 2, there will be no liquid discharge outside plant premises.</li> <li>• In case of failure, unit will store the effluent in buffer storage until the matter is closed &amp; cleared.</li> <li>• Skilled technical personals shall be deployed in order to achieve effective and continuous operation of ETP.</li> <li>• Regular maintenance will be carried out in ETP units, pipes &amp; valves to achieve maximum efficiency and to avoid any accidental leakages during effluent treatment.</li> </ul> | -1                                                           |
|         |                          | Soil Characteristics     | <ul style="list-style-type: none"> <li>• Alteration of soil pH; localized "sterile" soil zones; deposition of heavy metals or non-biodegradable chemicals into the topsoil.</li> </ul>                                                                                                                          | -2                             | <ul style="list-style-type: none"> <li>• Regular monitoring of water quality and soil quality shall be carried out as mentioned in section 6.2 in chapter 6.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -1                                                           |

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| Sr. No. | Project Activities | Environmental Attributes | Impacts                                                                                                                                                                                                                                                                    | Scoring for anticipated impact | Suggested Mitigation Measures                                                                                                                                                                                                                                                             | Scoring After Implementation of Proposed Mitigation Measures |
|---------|--------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|         |                    |                          | <ul style="list-style-type: none"> <li>Indirect risk via the food chain if soil contaminants are absorbed by surrounding vegetation or grazing land.</li> </ul>                                                                                                            |                                |                                                                                                                                                                                                                                                                                           |                                                              |
|         |                    | Noise                    | <ul style="list-style-type: none"> <li>Disruption of local avian and insect behavior in the immediate vicinity of the treatment unit.</li> <li>Hearing fatigue for ETP operators; increased stress levels; minor interference with verbal safety communication.</li> </ul> | -2                             | <ul style="list-style-type: none"> <li>Workers will be provided with PPEs like ear muffs to avoid adverse impacts of noise during effluent treatment.</li> <li>Maintenance will be carried out at regular basis to avoid unnecessary noise generation from pumps, blowers etc.</li> </ul> | -1                                                           |
|         |                    | Health & Safety          | <ul style="list-style-type: none"> <li>Secondary risk of localized soil/water contamination if chemical bags are improperly stored.</li> <li>Potential chemical burns from dosing agents.</li> </ul>                                                                       | -2                             | <ul style="list-style-type: none"> <li>Necessary PPEs will be provided to workers.</li> <li>Training will be given to employees.</li> </ul>                                                                                                                                               | -1                                                           |
|         |                    | Employment               | <ul style="list-style-type: none"> <li>Support for the specialized water-tech sector; promotes industrial sustainability.</li> <li>Long-term livelihood for local technical labor; improved economic security for the operational staff.</li> </ul>                        | +3                             | <ul style="list-style-type: none"> <li>Note: For employment purpose, priority will be given to local skilled workers from surrounding village</li> </ul>                                                                                                                                  | +3                                                           |

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**TABLE 4.6 – IMPACT EVALUATION MATRIX – CONSTRUCTION PHASE  
(SCORING FOR IMPACT)**

| <b>Activity</b><br><br><b>Environmental Attributes</b> | <b>Transportation of construction materials</b> | <b>Storage and handling of construction material</b> | <b>Civil construction</b> | <b>Mechanical erection</b> | <b>Greenbelt development</b> |
|--------------------------------------------------------|-------------------------------------------------|------------------------------------------------------|---------------------------|----------------------------|------------------------------|
| <b>Air</b>                                             |                                                 |                                                      |                           |                            |                              |
| Quality                                                | -2                                              | -2                                                   | -2                        | -2                         | +3                           |
| <b>Water</b>                                           |                                                 |                                                      |                           |                            |                              |
| Quality                                                | -                                               | -                                                    | -3                        | -                          | -                            |
| Quantity                                               | -                                               | -                                                    | -3                        | -                          | -3                           |
| <b>Land</b>                                            |                                                 |                                                      |                           |                            |                              |
| Soil Characteristics                                   | -2                                              | -2                                                   | -2                        | -                          | +2                           |
| <b>Noise</b>                                           | -2                                              | -                                                    | -2                        | -2                         | +1                           |
| <b>Ecology</b>                                         |                                                 |                                                      |                           |                            |                              |
| Flora & Fauna                                          | -2                                              | -                                                    | -2                        | -                          | +3                           |
| <b>Health &amp; Safety</b>                             | -2                                              | -3                                                   | -2                        | -2                         | +2                           |
| <b>Socio Economic</b>                                  |                                                 |                                                      |                           |                            |                              |
| Employment Generation                                  | +2                                              | +2                                                   | +2                        | +2                         | +2                           |
| <b>Total Activity Score</b>                            | <b>-8</b>                                       | <b>-5</b>                                            | <b>-14</b>                | <b>-4</b>                  | <b>+10</b>                   |
| <b>Net Total</b>                                       | <b>-21</b>                                      |                                                      |                           |                            |                              |

**TABLE 4.7 – IMPACT EVALUATION MATRIX- CONSTRUCTION PHASE  
(SCORING AFTER IMPLEMENTATION OF PROPOSED MITIGATION)**

| <b>Activity</b><br><br><b>Environmental Attributes</b> | <b>Transportation of construction materials</b> | <b>Storage and handling of construction material</b> | <b>Civil construction</b> | <b>Mechanical erection</b> | <b>Greenbelt development</b> |
|--------------------------------------------------------|-------------------------------------------------|------------------------------------------------------|---------------------------|----------------------------|------------------------------|
| <b>Air</b>                                             |                                                 |                                                      |                           |                            |                              |
| Quality                                                | -1                                              | -1                                                   | -1                        | -1                         | +3                           |
| <b>Water</b>                                           |                                                 |                                                      |                           |                            |                              |
| Quality                                                | -                                               | -                                                    | -1                        | -                          | -                            |
| Quantity                                               | -                                               | -                                                    | -3                        | -                          | -2                           |
| <b>Land</b>                                            |                                                 |                                                      |                           |                            |                              |
| Soil Characteristics                                   | -1                                              | -1                                                   | -1                        | -                          | +2                           |
| <b>Noise</b>                                           | -1                                              | -                                                    | -1                        | -1                         | +1                           |

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| Activity<br>Environmental Attributes | Transportation of construction materials | Storage and handling of construction material | Civil construction | Mechanical erection | Greenbelt development |
|--------------------------------------|------------------------------------------|-----------------------------------------------|--------------------|---------------------|-----------------------|
| <b>Ecology</b>                       |                                          |                                               |                    |                     |                       |
| Flora & Fauna                        | -1                                       | -                                             | -1                 | -                   | +3                    |
| <b>Health &amp; Safety</b>           | -1                                       | -1                                            | -1                 | -1                  | +2                    |
| <b>Socio Economic</b>                |                                          |                                               |                    |                     |                       |
| Employment Generation                | +2                                       | +2                                            | +2                 | +2                  | +2                    |
| <b>Total Activity Score</b>          | <b>-3</b>                                | <b>-1</b>                                     | <b>-7</b>          | <b>-1</b>           | <b>+11</b>            |
| <b>Net Total</b>                     | <b>-1</b>                                |                                               |                    |                     |                       |

**TABLE 4.8 – IMPACT EVALUATION MATRIX OPERATIONAL PHASE  
(SCORING FOR IMPACT)**

| Activity<br>Environmental Attributes | Storage & handling of Bio-Medical Waste | Transportation of Bio-Medical Waste | Operation and Maintenance | Fugitive and Gaseous Emission | Greenbelt Development | Solid/BMW/ Haz. waste generation | Effluent Treatment Plant |
|--------------------------------------|-----------------------------------------|-------------------------------------|---------------------------|-------------------------------|-----------------------|----------------------------------|--------------------------|
| <b>Air</b>                           |                                         |                                     |                           |                               |                       |                                  |                          |
| Quality                              | -3                                      | -2                                  | -3                        | -3                            | +4                    | -2                               | -2                       |
| <b>Water</b>                         |                                         |                                     |                           |                               |                       |                                  |                          |
| Quality                              | -                                       | -                                   | -3                        | -                             | -                     | -                                | -2                       |
| Quantity                             | -                                       | -                                   | -4                        | -                             | -4                    | -                                | -                        |
| <b>Land</b>                          |                                         |                                     |                           |                               |                       |                                  |                          |
| Soil Characteristics                 | -2                                      | -3                                  | -                         | -                             | +4                    | -4                               | -2                       |
| <b>Noise</b>                         | -                                       | -2                                  | -2                        | -                             | +3                    | -                                | -2                       |
| <b>Ecology</b>                       |                                         |                                     |                           |                               |                       |                                  |                          |
| Flora & Fauna                        | -                                       | -2                                  | -                         | -2                            | +4                    | -                                | -                        |
| <b>Health &amp; Safety</b>           | -3                                      | -3                                  | -3                        | -3                            | +2                    | -3                               | -2                       |
| <b>Socio Economic</b>                |                                         |                                     |                           |                               |                       |                                  |                          |
| Employment Generation                | +3                                      | +3                                  | +3                        | -                             | +1                    | +3                               | +3                       |
| <b>Total Activity Score</b>          | <b>-5</b>                               | <b>-9</b>                           | <b>-12</b>                | <b>-8</b>                     | <b>+14</b>            | <b>-6</b>                        | <b>-7</b>                |
| <b>Total</b>                         | <b>-33</b>                              |                                     |                           |                               |                       |                                  |                          |

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**TABLE 4.9 – IMPACT EVALUATION MATRIX OPERATIONAL PHASE  
(SCORING AFTER IMPLEMENTATION OF PROPOSED MITIGATION)**

| <b>Activity</b>                 | <b>Storage &amp; handling of Bio-Medical Waste</b> | <b>Transportation of Bio-Medical Waste</b> | <b>Operation and Maintenance</b> | <b>Fugitive and Gaseous Emission</b> | <b>Greenbelt Development</b> | <b>Solid/BMW/ Haz. waste generation</b> | <b>Effluent Treatment Plant</b> |
|---------------------------------|----------------------------------------------------|--------------------------------------------|----------------------------------|--------------------------------------|------------------------------|-----------------------------------------|---------------------------------|
| <b>Environmental Attributes</b> |                                                    |                                            |                                  |                                      |                              |                                         |                                 |
| <b>Air</b>                      |                                                    |                                            |                                  |                                      |                              |                                         |                                 |
| Quality                         | -2                                                 | -1                                         | -2                               | -2                                   | +4                           | -1                                      | -1                              |
| <b>Water</b>                    |                                                    |                                            |                                  |                                      |                              |                                         |                                 |
| Quality                         | -                                                  | -                                          | -1                               | -                                    | -                            | -                                       | -1                              |
| Quantity                        | -                                                  | -                                          | -3                               | -                                    | -3                           | -                                       | -                               |
| <b>Land</b>                     |                                                    |                                            |                                  |                                      |                              |                                         |                                 |
| Soil Characteristics            | -1                                                 | -1                                         | -                                | -                                    | +4                           | -2                                      | -1                              |
| <b>Noise</b>                    | -                                                  | -1                                         | -1                               | -                                    | +3                           | -                                       | -1                              |
| <b>Ecology</b>                  |                                                    |                                            |                                  |                                      |                              |                                         |                                 |
| Flora & Fauna                   | -                                                  | -1                                         | -                                | -1                                   | +4                           | -                                       | -                               |
| <b>Health &amp; Safety</b>      | -2                                                 | -2                                         | -2                               | -2                                   | +2                           | -2                                      | -1                              |
| <b>Socio Economic</b>           |                                                    |                                            |                                  |                                      |                              |                                         |                                 |
| Employment Generation           | +3                                                 | +3                                         | +3                               | -                                    | +1                           | +3                                      | +3                              |
| <b>Total Activity Score</b>     | <b>-2</b>                                          | <b>-3</b>                                  | <b>-6</b>                        | <b>-5</b>                            | <b>+15</b>                   | <b>-2</b>                               | <b>-2</b>                       |
| <b>Total</b>                    | <b>-5</b>                                          |                                            |                                  |                                      |                              |                                         |                                 |

|                                                            |                                                |                                                |
|------------------------------------------------------------|------------------------------------------------|------------------------------------------------|
| <b>Scoring for impact</b>                                  | Total Score (Construction + Operational Phase) | $(-21) + (-33) = -54$                          |
|                                                            | Environment Impact Score                       | $-54/7$ (No. of Environment Attributes) = -9.0 |
| <b>Scoring after Implementation of proposed mitigation</b> | Total Score (Construction + Operational Phase) | $(-1) + (-5) = -6$                             |
|                                                            | Environment Impact Score                       | $-6/7$ (No. of Environment Attributes) = -0.8  |

#### 4.5.3 Environmental Impact Score

To evolve Environmental Impact Score - the algebraic sum of impacts due to all the activities, during construction and operation phases, on the various environmental attributes gives the net activity score. Divide the net activity score by no. of environmental attributes to get Environmental Impact Score. Potential of impact on environment based on Environmental Impact Score is anticipated based on **TABLE 4.10**.

|                                                  |                                                                      |      |            |
|--------------------------------------------------|----------------------------------------------------------------------|------|------------|
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**TABLE 4.10 – ENVIRONMENTAL IMPACT SCORE AND POTENTIAL OF IMPACTS**

| <b>Environmental Impact Score</b> | <b>Potential of Impacts</b>               |
|-----------------------------------|-------------------------------------------|
| <b>-41.1 &gt; X ≥ -54.9</b>       | Overall, highly negative impacts          |
| <b>-27.4 &gt; X ≥ -41.1</b>       | Overall Moderately negative impacts       |
| <b>-13.7 &gt; X ≥ -27.4</b>       | Overall, slightly negative impacts        |
| <b>0 &gt; X ≥ -13.7</b>           | Overall, insignificantly negative impacts |
| <b>X = 0</b>                      | Overall Neutral impacts                   |
| <b>0 &lt; X ≤ 13.7</b>            | Overall, insignificantly positive impacts |
| <b>13.7 &lt; X ≤ 27.4</b>         | Overall, slightly positive impacts        |
| <b>27.4 &lt; X ≤ 41.1</b>         | Overall Moderately positive impacts       |
| <b>41.1 &lt; X ≤ 54.9</b>         | Overall, highly positive impacts          |

**Where X is Environment Impact Score**

**Interpretation:** It is observed that, the overall scoring for anticipated impacts is -9.0. However, after implementation of suggested mitigation measures, it is estimated that the impact score will reduce to -0.8. Which suggests that, after implementation of mitigation measures, cumulative impacts will be Overall Insignificantly negative impacts. Overall mitigation measures for various environmental aspects are provided below.

## **4.6 MITIGATION MEASURES**

### **4.6.1 Construction Phase**

For the proposed new project, necessary construction will be carried out. This will contribute to various environmental pollution for which mitigation measures are suggested below:

#### **I. Air**

- Regular water sprinkling will be carried out on haul roads, construction areas, and exposed surfaces at least twice a day. The frequency will be increased during dry and windy conditions to effectively control dust emissions.
- Vehicle speed within the project premises will be restricted to **20 km/hr** to minimize fugitive dust generation from unpaved surfaces.
- All vehicles used for transportation of construction materials will have valid PUC certificates and will be regularly maintained.
- Construction materials such as sand, soil, and aggregates will be **covered during transportation** to prevent dust dispersion.
- **Stockpiles of loose materials** will be covered or protected with tarpaulin sheets.
- **Wheel washing facilities** will be provided at site exit points to prevent carryover of dust onto public roads.
- Proper traffic management will be implemented during loading and unloading of construction materials to minimize congestion and emissions.
- Drop height of materials during handling will be minimized to reduce dust generation.



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- Temporary **barricading / wind barriers** will be provided around construction areas to control dust dispersion.
- Separate bins will be provided for storage of construction waste, and waste will be disposed of as per applicable guidelines.
- DG sets (if used) will comply with CPCB emission norms and will be provided with adequate stack height.
- Ambient air quality will be periodically monitored to assess the effectiveness of mitigation measures.
- Management plan for ambient air quality, is provided in section 10.4.1 in chapter 10.

## **II. Water**

- Water is required for concrete preparation and curing application for minor construction activities.
- Optimum use of water will be done during construction activities.
- During construction activities all the equipment washed water will be diverted to working pit to arrest the suspended solids if any and the settled water will be reused for construction purposes, and for sprinkling on roads to control the dust emission, etc.
- Management plan for water quality, is provided in section 10.4.3 in chapter 10.

## **III. Noise**

- Wherever practical and possible, machinery generating less noise will be used during construction activities.
- Noise generating activity will be avoided during night time.
- Workers who are exposed to noise generating machinery will be provided with adequate PPEs such as ear plugs.
- All vehicles entering into the project will be informed to maintain speed limits, and not blow horns unless it is required.
- Provision of protective devices like ear muff/plugs to the workers. Provision of rubber padding/noise isolators.
- Management plan for Noise quality, is provided in section 10.4.2 in chapter 10.

## **IV. Land Use**

- Concrete / aggregate waste will be reused at site for site filling, levelling and any such application.
- Any Construction waste or debris generated during construction of the project will be segregated at site and shall be stored at designated location.
- Excavated soil will be reused at site for elevating level of the plot and will be also used for plantation, green belt development at site only.
- Management plan for Soil quality and solid waste, is provided in section 10.4.4 & 10.4.5 in chapter 10.

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## V. Occupational Health & Safety

- Site workers shall be provided with adequate training and PPEs such as Helmet, Safety Shoes, Mask (During exposure to dust) and goggles.
- During transportation of machineries and material, it will be ensured that vehicle used is registered under motor vehicle act, driver has valid license to drive designated vehicle and road permit is obtained in case of oversize material movement.
- Site workers will also be provided with safety belt for working at height. Dedicated safety officer shall be appointed at site for supervision on safety aspect. Adequate measures will be adopted by the developer to minimize the risk of accidents during construction phase.
- Management plan for occupational Health and Safety is provided in section 10.7 in chapter 10.

### 4.6.2 OPERATION PHASE

#### I. Air

The major air pollutants generated from the proposed expansion project are given below.

- Dust Particulates in flue gas from chimney
- HCl in flue gas
- Nitrogen Oxide (NO<sub>x</sub>) in flue gas

For proper dispersion of Oxides of Nitrogen emissions from the plant, Incinerator will be provided with a stack height (As mentioned in section 2.9.1 in chapter 2) meeting MoEFCC Guidelines (minimum 30 m) including APCs.

- Incinerator exhaust gases will be passed through air pollution control system consisting of Gas quencher, High Pressure Drop Venturi scrubber, Packed bed scrubber and activated carbon column followed by ID Fan and Common stack with height of 30 m for particulate matter and acidic gas pollutants. (As mentioned in section 2.9.1 in chapter 2)
- Scrubber circulation liquor is maintained with free alkalinity of at least 5% by wt. by continuous addition of caustic lye solution through auto pH control system. If required, after scrubbers, air pollution control system will be provided with activated carbon injection system for adsorption of any rare possibility of presence of mercury vapor in incineration flue gas.
- **Dioxins:** Incineration furnace will be operated as per CPCB guideline for Bio-Medical Waste incineration. Primary Combustion Chamber will be pirated at 800+/-50°C and Secondary Combustion Chamber will be operated at 1050+/-50°C to ensure complete destruction of organic and toxic compounds to basic elements. Secondary combustion chamber will be provided with minimum 2 second flue gas retention time to achieve minimum 99% destruction efficiency. Reformation of Dioxin and Furan is prevented by immediate quenching of flue gas to less than 200 deg C in high pressure drop venturi scrubber. This will eliminate temperature zone of 500 °C to 200 °C where there are chances of reformation.
- **Mercury:** Source of Mercury is eliminated at source only by segregating mercury bearing waste and storing separately. However, in worst case scenario in order to capture mercury vapor, activated carbon injection system will be provided for adsorption of mercury vapor.
- **Mist:** Mist eliminator will be provided at the top of packed bed scrubber for capturing mist from flue gas.

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- Assessment of incremental ground level concentration of PM, HCl and NO<sub>x</sub> are provided further in this section of report in **Section 4.8** using software AERMOD Cloud® Version 18.18 Build: 203 developed by M/S Envitrans Pvt. Ltd. AERMOD Cloud® is an integrated graphical user interface of AERMOD, ISCST3, AERMAP and AERMET.
- It will be ensured that, all the components are installed properly before startup of the incineration plant. During start-up of the incineration plant abnormal burning may occur, considering the same, APCMs will be provided as per CPCB guidelines. In addition to this, continuous monitoring system (CEMS) will be provided to monitor the concentration of the air pollutants on continuous basis. Calibration and maintenance of CEMS will be done on regular basis. In case of abnormal operation of plant (i.e., failure of APCM), interlock system will be provided which will shut down the operation to prevent the direct emission of pollutants in to the atmosphere.
- PLC/SCADA based automation system will be provided for operation of plant, which will control air-fuel ratio in the incinerator, feeding of BMW, maintain temperature in the primary and secondary chamber, retention time in the secondary chamber etc.
- Standard Operating Procedures (SOPs) will be prepared for the operation of plant. Training will be provided to all the workers for the operation of incinerator. Preventive schedule shall be prepared so that, regular maintenance shall be carried out.
- Management plan for the ambient air quality is provided in section 10.4.1 in chapter 10. In addition to this, budgetary allocation for the same is provided in section 10.8 in chapter 10.
- Emission due to the vehicular movements is provided further in this section of report in **Section 4.8.4** using CALINEpro traffic emission modelling software Version 1.7 (Build: 47) developed by M/s. Envitrans Pvt. Ltd.
- The proposed new facility will receive and store the waste in an enclosed area with a negative pressure with the airflow being routed through the incinerator which prevents unpleasant odours from escaping into the atmosphere.

### Odour control measures

- Green belt construction to create a surface capable of absorbing odorous gases and creating sinks. Because of the large surface area of leaves in a tree crown, contaminants sorb on their surface, thereby reducing their concentrations in the ambient air and reducing source emissions. Development and management of greenbelt along with types and numbers of species to be planted within the plant premises along with budget for next 5 years is provided in section 10.6.1 in chapter 10.

## II. Water

- Fresh water will be source through local water supply authority.
- Project will have ETP consisting of primary, secondary and tertiary treatment facility for treatment of waste water generated from the facility. Treated waste water will be reused within premises.
- Flowmeter with totalizer shall be provided at the inlet and outlet of ETP for data monitoring.
- Skilled manpower will be deployed for continuous and efficient operation of ETP.
- It will be ensured that, all the components of ETP are installed properly and all the mechanical pumps are working properly before start of effluent treatment plant. In case of breakdown of ETP during operation, unit will stop the plant operation and temporary storage tanks will be

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provided to store the wastewater which will be treated once the desired efficiency of ETP is achieved. Provision of stand by mechanical pumps shall be made. Characteristics of the wastewater will be analyzed by inhouse laboratory for the further treatment. During the shutdown of ETP, it will be ensured that, all the components of ETP are filled at certain level so that, MLSS will be maintained in the secondary treatment.

- SOPs shall be made for the regular operation of ETP. Logbooks shall be maintained to record the data of wastewater and treated water. Necessary training shall be provided to the workers for the operation of ETP.
- Management plan for water quality has been provided in section 10.4.3 in Chapter 10 which also includes start-up or abnormal or shut-down phase of effluent treatment plant. Budget allocation has been also provided in section 10.8 of Chapter 10 for the same.

### **III. Noise**

- Proper and timely maintenance of machineries and preventive maintenance of vehicles shall be adopted to control noise generated due to vehicle movement. Vehicle movement will be restricted during late evening and night time.
- ID Fan, FD Fan and Air Blower for ETP and shredder shall be selected such that noise level of these equipment are less than 85 dB when measured at 1 m distance from the equipment.
- High Noise generating equipment like pumps, motors on anti-vibration pads, placing shall be installed in enclosed room so that noise is contained within room only. All the equipment/vehicles are regularly maintained.
- Employees shall be provided with PPEs during entering to such rooms for maintenance purpose. Earmuffs will be used while running equipment of the industry.
- Green belt development is carried out within premises.
- In case of breakdown of noise generation equipment, adverse effect may occur on the workers due to sudden and heavy to avoid adverse effect on workers, necessary personal protective equipment like ear muffs and ear buds shall be provided to all the workers. Budget allocation for management of noise pollution is provided in section 10.8 in Chapter 10.
- Management plan for noise quality has been provided in section 10.4.2 in Chapter 10.

### **IV. Land Environment**

- All waste water generated during production shall be conveyed through pipeline to effluent collection tank. Spillage of waste water on ground or soil will be avoided.
- Due to failure of pipeline or any such event if such spillage takes place, contaminated soil due to such incidence shall be recovered from ground and shall be packed and stored in hazardous waste storage area for disposal to TSDF site.
- Bio-Medical Waste received at site will be unloaded at dedicated area and then stored in segregated storage area based on category of waste. Similarly treated solid waste such as plastic and glass waste shall be stored in designated storage area.
- Hazardous solid waste such as incineration ash and ETP sludge will be packed and stored in hazardous waste storage area. All such storage area shall be provided with impervious bottom and covered from side and top so that due to handling of these waste soil is not contaminated.
- Any leachate generated from these storage areas shall be connected with effluent treatment plant.
- Monitoring of soil samples shall be done as per Environmental monitoring plan.

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- Management plan for soil and solid and hazardous waste is provided in section 10.4.4 & 10.4.5 in chapter 10. Budget provision for management of solid and hazardous waste is provided in section 10.8.

## V. Occupational Health & Safety

- All workers shall be provided with training for handling of Bio-Medical Waste. The workers will be provided with skill development training and training in risk assessment and disaster management.
- Only trained workers will be employed for all the hazardous process operations within the plant and will be supervised by experienced supervisors.
- PPEs such as mask, goggles, gloves, safety shoes and safety helmet shall be provided to workers.
- Incident / accident reporting system will be developed and all the employees will be made aware of the same.
- Regular health checkup of all workers shall be conducted.
- Details regarding occupational health and safety is provided in section 10.7 of chapter 10. Budgetary provision for the safety is provided in section 10.8 in chapter 10.

## 4.7 AIR ENVIRONMENT/METEOROLOGY

The micro-meteorological data for the region indicates that the wind speed in the project site remained moderate. The predominant wind direction was W to E during July 2025 to September 2025.

The average wind speed reported during the study period observed 9.7 m/s. Details are given in Chapter-3, section 3.3.2. The hourly meteorological data used for prediction of pollutants Ground Level Concentrations (GLCs).

## 4.8 MODEL FOR INCREMENTAL GROUND LEVEL CONCENTRATION DUE TO PROPOSED NEW PROJECT

For the modelling purpose air emission from the proposed new project can be considered as Particulate Matter (PM) with a considerable parameter being PM, HCl and NO<sub>x</sub> from the stacks. Details of predicted emission from proposed stack are given in following **TABLE 4.11**.

**TABLE 4.11 - DETAILS OF PREDICTED EMISSION FROM STACKS**

| Sr. No. | Operating Parameter             | Unit | Source of Emission                                        |                                                                                   |
|---------|---------------------------------|------|-----------------------------------------------------------|-----------------------------------------------------------------------------------|
|         |                                 |      | Incinerator 1 stack                                       | Incinerator 2 stack                                                               |
| 1       | Stack height                    | m    | 30                                                        | 30                                                                                |
| 2       | Diameter                        | m    | 0.4                                                       | 0.4                                                                               |
| 3       | Flue gas temperature            | K    | 353                                                       | 353                                                                               |
| 4       | Air Pollution Control Equipment | -    | APC system consisting of Gas Quencher, High Pressure Drop | APC system consisting of Gas Quencher, High Pressure Drop Variable Throat Venturi |

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| Sr. No. | Operating Parameter    | Unit                | Source of Emission                                                                                                             |                                                                                                        |
|---------|------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|         |                        |                     | Incinerator 1 stack                                                                                                            | Incinerator 2 stack                                                                                    |
|         |                        |                     | Variable Throat Venturi Scrubber, Alkali Scrubber and Activated Carbon Adsorption System along with stack of 30 m Height each. | Scrubber, Alkali Scrubber and Activated Carbon Adsorption System along with stack of 30 m Height each. |
| 5       | Flue gas velocity      | m/s                 | 7.05                                                                                                                           | 8.46                                                                                                   |
| 6       | Flow Rate              | Nm <sup>3</sup> /hr | 2691.97                                                                                                                        | 3230.36                                                                                                |
| 7       | Emission Concentration |                     |                                                                                                                                |                                                                                                        |
|         | PM*                    | mg/Nm <sup>3</sup>  | 50                                                                                                                             | 50                                                                                                     |
|         | HCl*                   | mg/Nm <sup>3</sup>  | 50                                                                                                                             | 50                                                                                                     |
|         | NO <sub>x</sub> *      | mg/Nm <sup>3</sup>  | 400                                                                                                                            | 400                                                                                                    |
| 8       | Emission Rate          |                     |                                                                                                                                |                                                                                                        |
|         | PM                     | g/s                 | 0.04                                                                                                                           | 0.04                                                                                                   |
|         | HCl                    | g/s                 | 0.04                                                                                                                           | 0.04                                                                                                   |
|         | NO <sub>x</sub>        | g/s                 | 0.30                                                                                                                           | 0.36                                                                                                   |

(\* Permissible Limits)

#### 4.8.1 Model Isopleths and Maximum Incremental Ground Level Concentrations

Isopleths plots for the parameters – Particulate Matter (PM), HCl and NO<sub>x</sub> for proposed scenario are given in **FIGURE 4.1, 4.2 & 4.3**. The maximum incremental ground level concentration (24 Hourly) for PM, HCl and NO<sub>x</sub> due to the proposed new project is given in **TABLE 4.12**.

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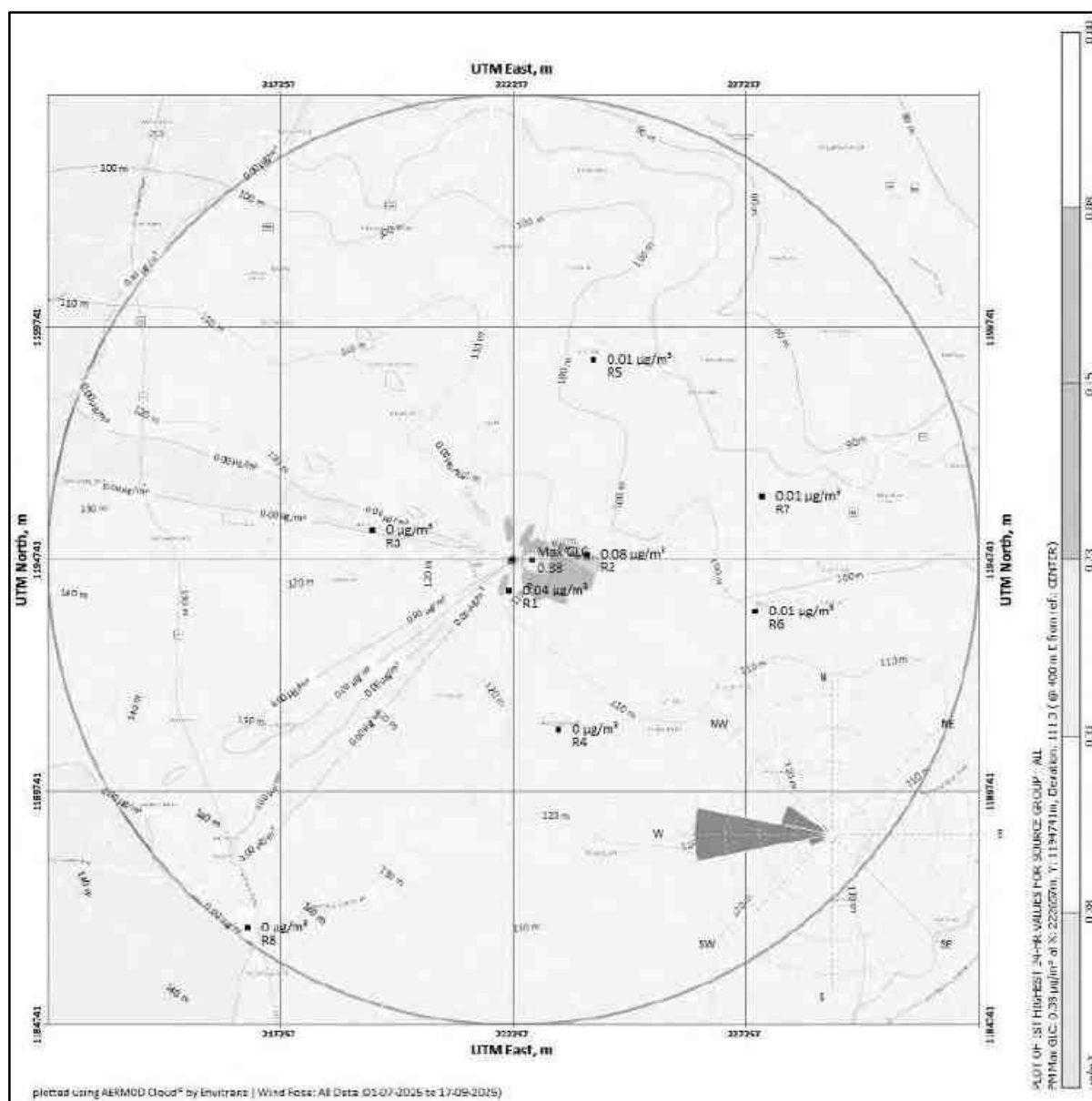


**FIGURE 4.1 - ISOPLETHS PLOT FOR PM (10 KM )**

**Interpretation:** Maximum incremental Ground Level Concentration for PM is  $0.38 \mu\text{g}/\text{m}^3$  at X: 222657 m and Y: 1194741 m at 400 m away in E direction from Project site as shown in above **FIGURE 4.1**

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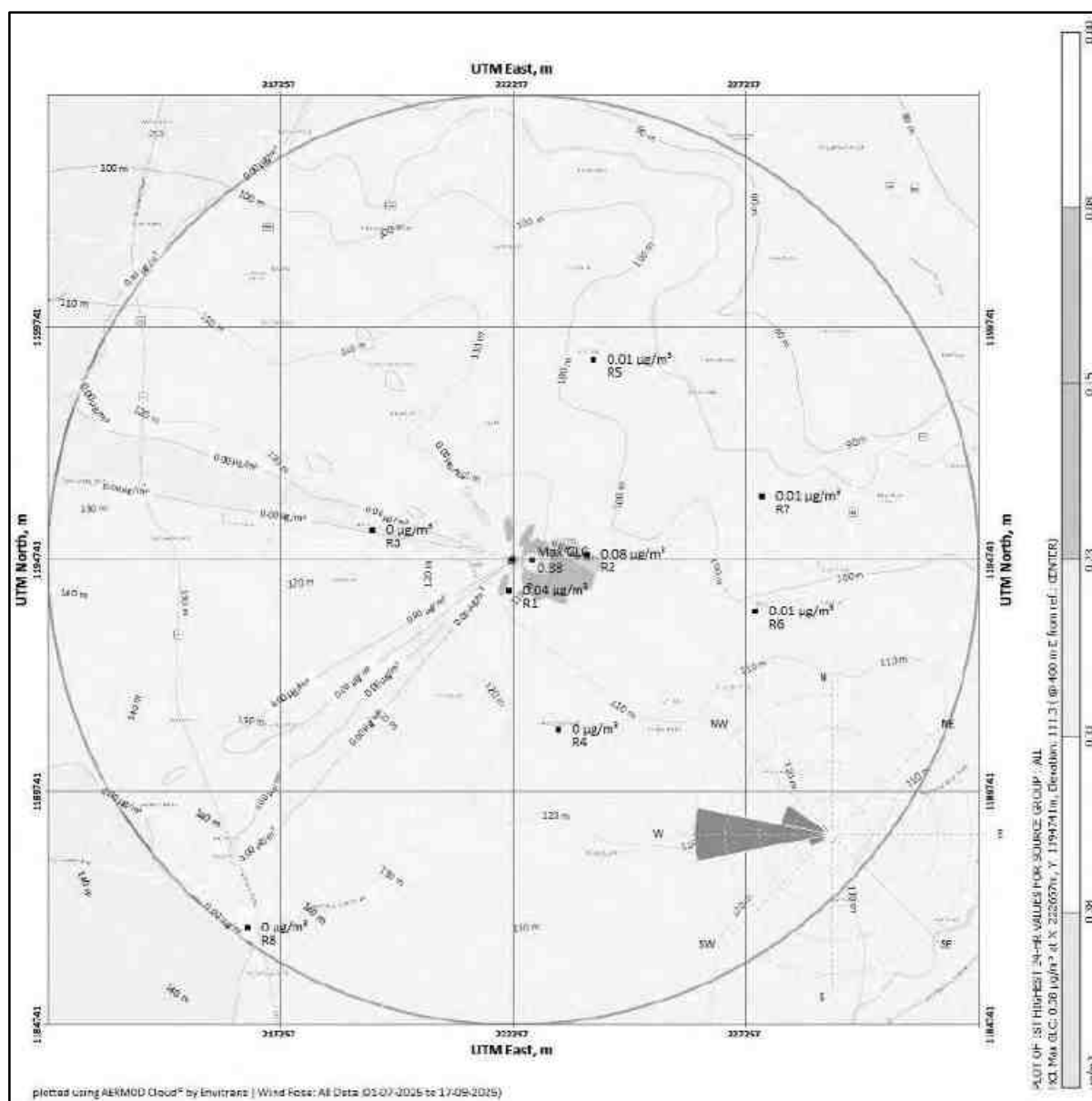


**FIGURE 4. 2 - ISOPLETHS PLOT FOR HCl (10 KM)**

**Interpretation:** Maximum incremental Ground Level Concentration for HCl is  $0.38 \mu\text{g}/\text{m}^3$  at X: 222657 m and Y: 1194741 m at 400 m away in E direction from Project site as shown in above **FIGURE 4.2.**





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**TABLE 4.13 - LOCATION OF RECEPTOR POINTS**

| Receptors | Location & Address | Geographical Location |                | Aerial Dist. from Project Site (km) | Direction w. r. t. Project Site | Justification for selection of station |
|-----------|--------------------|-----------------------|----------------|-------------------------------------|---------------------------------|----------------------------------------|
|           |                    | Easting               | Northing       |                                     |                                 |                                        |
| R1        | Near Project site  | 222164.00 m E         | 1194071.00 m N | 0.68                                | S                               | -                                      |
| R2        | Kallai             | 223828.00 m E         | 1194859.00 m N | 1.57                                | E                               | Downwind                               |
| R3        | Perur Udayappatti  | 219215.00 m E         | 1195381.00 m N | 3.11                                | WNW                             | Upwind                                 |
| R4        | Vengatampatti      | 223219.00 m E         | 1191093.00 m N | 3.77                                | SSE                             | Crosswind                              |
| R5        | Bullpatti          | 223982.00 m E         | 1199054.00 m N | 4.64                                | NNE                             | Crosswind                              |
| R6        | Thalinji           | 227467.00 m E         | 1193638.00 m N | 5.32                                | ESE                             | Downwind                               |
| R7        | Purasampatti       | 227608.00 m E         | 1196112.00 m N | 5.52                                | ENE                             | Crosswind                              |
| R8        | Thogaimalai        | 216549.00 m E         | 1186844.00 m N | 9.74                                | SW                              | Crosswind                              |

**TABLE 4.14 - INCREMENTAL GROUND LEVEL CONCENTRATION AT RECEPTOR POINTS WITHIN STUDY AREA**

| Sr. No. | Pollutant         | Name of Receptor  | Average Baseline Concentration ( $\mu\text{g}/\text{m}^3$ ) | Incremental Ground level concentration ( $\mu\text{g}/\text{m}^3$ ) | Total Ground level concentration ( $\mu\text{g}/\text{m}^3$ ) | Remaining Space (%) |
|---------|-------------------|-------------------|-------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------|---------------------|
| 1       | PM <sub>10</sub>  | Near Project site | 56.5                                                        | 0.04                                                                | 56.52                                                         | 43.48               |
|         |                   | Kallai            | 53.8                                                        | 0.08                                                                | 53.85                                                         | 46.15               |
|         |                   | Perur Udayappatti | 51.6                                                        | 0.0004                                                              | 51.57                                                         | 48.43               |
|         |                   | Vengatampatti     | 52.8                                                        | 0.003                                                               | 52.77                                                         | 47.23               |
|         |                   | Bullpatti         | 60.9                                                        | 0.01                                                                | 60.89                                                         | 39.11               |
|         |                   | Thalinji          | 59.7                                                        | 0.01                                                                | 59.69                                                         | 40.31               |
|         |                   | Purasampatti      | 61.7                                                        | 0.01                                                                | 61.69                                                         | 38.31               |
|         |                   | Thogaimalai       | 51.0                                                        | 0.00                                                                | 50.97                                                         | 49.03               |
| 2       | PM <sub>2.5</sub> | Near Project site | 28.5                                                        | 0.04                                                                | 28.58                                                         | 52.36               |
|         |                   | Kallai            | 28.7                                                        | 0.08                                                                | 28.82                                                         | 51.96               |
|         |                   | Perur Udayappatti | 35.9                                                        | 0.0004                                                              | 35.85                                                         | 40.25               |
|         |                   | Vengatampatti     | 31.6                                                        | 0.003                                                               | 31.64                                                         | 47.26               |
|         |                   | Bullpatti         | 25.6                                                        | 0.01                                                                | 25.65                                                         | 57.26               |
|         |                   | Thalinji          | 30.3                                                        | 0.01                                                                | 30.35                                                         | 49.41               |
|         |                   | Purasampatti      | 38.5                                                        | 0.01                                                                | 38.46                                                         | 35.89               |
|         |                   | Thogaimalai       | 35.5                                                        | 0.00                                                                | 35.45                                                         | 40.92               |
| 3       | NO <sub>x</sub>   | Near Project site | 19.3                                                        | 0.35                                                                | 19.68                                                         | 75.40               |
|         |                   | Kallai            | 28.4                                                        | 0.70                                                                | 29.14                                                         | 63.58               |
|         |                   | Perur Udayappatti | 24.5                                                        | 0.003                                                               | 24.54                                                         | 69.32               |
|         |                   | Vengatampatti     | 18.6                                                        | 0.02                                                                | 18.65                                                         | 76.68               |
|         |                   | Bullpatti         | 20.9                                                        | 0.05                                                                | 20.98                                                         | 73.77               |
|         |                   | Thalinji          | 22.7                                                        | 0.10                                                                | 22.83                                                         | 71.46               |
|         |                   | Purasampatti      | 27.5                                                        | 0.11                                                                | 27.65                                                         | 65.44               |

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| Sr. No. | Pollutant | Name of Receptor | Average Baseline Concentration ( $\mu\text{g}/\text{m}^3$ ) | Incremental Ground level concentration ( $\mu\text{g}/\text{m}^3$ ) | Total Ground level concentration ( $\mu\text{g}/\text{m}^3$ ) | Remaining Space (%) |
|---------|-----------|------------------|-------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------|---------------------|
|         |           | Thogaimalai      | 16.9                                                        | 0.0002                                                              | 16.93                                                         | 78.84               |

**NOTE:** Remaining Space = NAAQS Limit – (Baseline Concentration + Incremental Concentration)

$$\text{Remaining Space \%} = \frac{\text{Remaining Space} \times 100}{\text{NAAQS Limit}}$$

### Interpretation:

The resultant GLC for  $\text{PM}_{10}$  is maximum at 400 m E from Project site which is  $0.38 \mu\text{g}/\text{m}^3$ . The Maximum incremental value of  $\text{PM}_{10}$  above background GLC is  $0.08 \mu\text{g}/\text{m}^3$  at Kallai Village and minimum incremental value of  $\text{PM}_{10}$  above background GLC is  $0.00 \mu\text{g}/\text{m}^3$  at Thongaimalai. After getting Total concentration which are discussed in **TABLE 4.14**, It is observed that environmental space is still available in the area to reach NAAQS limit of  $100 \mu\text{g}/\text{m}^3$ .

The resultant GLC for  $\text{PM}_{2.5}$  is maximum at 400 m E from Project site which is  $0.38 \mu\text{g}/\text{m}^3$ . The Maximum incremental value of  $\text{PM}_{2.5}$  above background GLC is  $0.08 \mu\text{g}/\text{m}^3$  at Kallai Village and minimum incremental value of  $\text{PM}_{2.5}$  above background GLC is  $0.00 \mu\text{g}/\text{m}^3$  at Thongaimalai. After getting Total concentration which are discussed in **TABLE 4.14**, It is observed that environmental space is still available in the area to reach NAAQS limit of  $60 \mu\text{g}/\text{m}^3$ .

The resultant GLC for  $\text{NO}_x$  is maximum at 400 m E from Project site which is  $3.19 \mu\text{g}/\text{m}^3$ . The Maximum incremental value of  $\text{NO}_x$  above background GLC is  $0.70 \mu\text{g}/\text{m}^3$  at Kallai Village & minimum incremental value of  $\text{NO}_x$  above background GLC is  $0.0002 \mu\text{g}/\text{m}^3$  at Thongaimalai. After getting Total concentration which are discussed in **TABLE 4.14**, It is observed that environmental space is still available in the area to reach NAAQS limit of  $100 \mu\text{g}/\text{m}^3$ .

### 4.8.2 Incremental Noise Generation Due to Proposed Project Activities

Prediction of anticipated noise levels have been computed using point source model. A basic phenomenon of the model is the geometric attenuation of sound. Noise at a point generates spherical waves which are propagated outward from the source through the air at a speed of 1,100 ft/sec, with the first wave making an ever-increasing sphere with time. As the wave spreads the intensity of noise diminishes as the fixed amount of energy is spread over an increasing surface area of the sphere.

The assumption of the model is based on point source relationship i.e., for every doubling of the distance the noise levels are decreased by 6 dB(A). Point source propagation is defined by the following equation:

$$Lp2 = Lp1 - 20 \log r2/r1$$

Where,  $Lp1$  and  $Lp2$  are sound pressure levels at points located at distances  $r1$  and  $r2$ , respectively, from the source.

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Predictions carried out are on as is basis without taking into consideration any attenuation factors. Additional attenuation is expected, due to atmospheric effect or its interaction with objects in the transmission path.

M/s. Navabuddha Agencies Private Limited has proposed 2 Nos. of Incinerator [250 kg/hr x 1 no. and 300 kg/hr x 1 no.], and DG Set having capacity of 250 KVA x 2 nos. etc. Considering above details, noise level predicted at sensitive receptors around project shall be as per below Table:

**TABLE 4.15 – NOISE EMISSION LEVELS FROM CONSTRUCTION EQUIPMENT**

| Equipment      | Typical Noise Level dB(A) 15 m from Source |
|----------------|--------------------------------------------|
| Loaders        | 87                                         |
| Scrapers       | 90                                         |
| Pavers         | 90                                         |
| Trucks         | 92                                         |
| Concrete mixer | 88                                         |
| Generator      | 85                                         |
| Grader         | 88                                         |

**Source:** Based on EPA Report, measured data from Railroad construction equipment's taken during Northeast corridor improvement project and other measured data

Considering above details, noise level prediction at sensitive receptors around project site shall be as per **TABLE 4.16** for construction phase.

|                                                  |                                                                      |      |            |
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**TABLE 4.16 – INCREMENTAL NOISE GENERATION (CONSTRUCTION PHASE)**

| Particular                                 |              |             |                   |               |             |             | Value dB(A)  |             |
|--------------------------------------------|--------------|-------------|-------------------|---------------|-------------|-------------|--------------|-------------|
| Noise due to Operation of Loaders          |              |             |                   |               |             |             | 87           |             |
| Noise due to Operation of Scrapers         |              |             |                   |               |             |             | 90           |             |
| Noise due to Pavers                        |              |             |                   |               |             |             | 90           |             |
| Noise Due Captive Trucks                   |              |             |                   |               |             |             | 92           |             |
| Noise due to operation of Concrete Mixture |              |             |                   |               |             |             | 88           |             |
| Noise due to operation of Generators       |              |             |                   |               |             |             | 85           |             |
| Noise due to operation of Graders          |              |             |                   |               |             |             | 88           |             |
| <b>Combined Noise</b>                      |              |             |                   |               |             |             | <b>97.53</b> |             |
| Receptor, Location                         | Project Site | Kallai      | Perur Udayappatti | Vengatampatti | Bullpatti   | Thalinji    | Purasampatti | Thogaimalai |
| <b>Distance, KM</b>                        | <b>0</b>     | <b>1.57</b> | <b>3.11</b>       | <b>3.77</b>   | <b>4.64</b> | <b>5.32</b> | <b>5.52</b>  | <b>9.74</b> |
| Distance, meter                            | 0            | 1570        | 3110              | 3770          | 4640        | 5320        | 5520         | 9740        |
| Direction                                  | NA           | E           | WNW               | SSE           | NNE         | ESE         | ENE          | SW          |
| Formula = log(distance)                    | NA           | 3.2         | 3.5               | 3.6           | 3.7         | 3.7         | 3.7          | 4.0         |
| Formula = 20 log(distance)                 | NA           | 63.9        | 69.9              | 71.5          | 73.3        | 74.5        | 74.8         | 79.8        |
| Noise at receptor due to source            | -            | <b>33.6</b> | <b>27.7</b>       | <b>26.0</b>   | <b>24.2</b> | <b>23.0</b> | <b>22.7</b>  | <b>17.8</b> |
| Baseline, day                              | 71.6         | 65.7        | 64.2              | 60.7          | 62.8        | 68.5        | 63.1         | 62.4        |
| 10 <sup>baseline/10</sup>                  |              | 3715352.3   | 2630268.0         | 1174897.6     | 1905460.7   | 7079457.8   | 2041737.9    | 1737800.8   |
| 10 <sup>sorceeffect/10</sup>               |              | 2298.0      | 585.6             | 398.5         | 263.1       | 200.1       | 185.9        | 59.7        |
| Effective Noise                            |              | 65.7        | 64.2              | 60.7          | 62.8        | 68.5        | 63.1         | 62.4        |

**Note: \* As per formula, LP (Total) = 10 log (10 LPQ1/10 + 10 LPQ2/10), where LPQ1 and LPQ2 are noise generated by source 1 and 2 respectively.**

**\*\* Considering decrease in noise by 6 dB(A) for every doubling of distance.**

|                                                  |                                                                      |      |            |
|--------------------------------------------------|----------------------------------------------------------------------|------|------------|
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**TABLE 4.17 - INCREMENTAL NOISE GENERATION (OPERATION PHASE)**

| Particular                                                  | Value dB(A) |
|-------------------------------------------------------------|-------------|
| Noise generated due to operation of 2 Nos. of Incinerator   | 50          |
| Noise generated due to operation DG Set and other utilities | 95          |
| <b>Combined Noise (Considering Worst Case)</b>              | <b>95</b>   |

| Receptor, Location                  | Project Site | Kallai      | Perur Udayappatti | Vengatampatti | Bullpatti   | Thalinji    | Purasampatti | Thogaimalai |
|-------------------------------------|--------------|-------------|-------------------|---------------|-------------|-------------|--------------|-------------|
| <b>Distance, KM</b>                 | <b>0</b>     | <b>1.57</b> | <b>3.11</b>       | <b>3.77</b>   | <b>4.64</b> | <b>5.32</b> | <b>5.52</b>  | <b>9.74</b> |
| Distance, meter                     | 0            | 1570        | 3110              | 3770          | 4640        | 5320        | 5520         | 9740        |
| Direction                           | NA           | E           | WNW               | SSE           | NNE         | ESE         | ENE          | SW          |
| Noise at receptor due to source     | -            | <b>31.1</b> | <b>25.1</b>       | <b>23.5</b>   | <b>21.7</b> | <b>20.5</b> | <b>20.2</b>  | <b>15.2</b> |
| Baseline Noise Level (Day Time)     | 71.6         | 65.7        | 64.2              | 60.7          | 62.8        | 68.5        | 63.1         | 62.4        |
| <b>Effective Noise (Day Time)</b>   | -            | 65.7        | 64.2              | 60.7          | 62.8        | 68.5        | 63.1         | 62.4        |
| Baseline Noise Level (Night Time)   | 59.8         | 49.7        | 53.8              | 47.8          | 48.6        | 56.2        | 52.6         | 54.1        |
| <b>Effective Noise (Night Time)</b> |              | 1282.96     | 326.96            | 222.50        | 146.89      | 111.74      | 103.79       | 33.33       |

Note: \* As per formula,  $LP(Total) = 10 \log (10 LPQ1/10 + 10 LPQ2/10)$ , where LPQ1 and LPQ2 are noise generated by source 1 and 2 respectively. \*\* Considering decrease in noise by 6 dB(A) for every doubling of distance.

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As per the calculation provided in **TABLE 4.16 & TABLE 4.17**, it is predicted that, no significant increase in noise levels will occur due to proposed expansion. Incremental noise levels will remain within standard permissible limits.

### 4.8.3 Transportation of Vehicles

It is estimated that total 13 nos. of vehicles will be required for transportation of Bio-Medical Waste to site and solid / hazardous waste to TSDF site / authorized recycler.

- No. of vehicles per trip to transport Bio-Medical Waste – 11 vehicles per day
- Total hazardous waste to be sent to TSDF/authorized recycler – 1.38 TPD
- Capacity of vehicle for hazardous waste – 10,000 kg per vehicle
- No. of vehicles per trip for hazardous waste - 1 vehicle per day

### 4.8.4 Incremental Emission Due to Transportation of Proposed Vehicles

#### 4.8.4.1 Traffic Survey

- Traffic survey has been conducted for the proposed new project M/s. Navabuddha Agencies Private Limited for 24 hours.
- The traffic survey monitoring was done on 15/08/2025 to accessing the existing traffic and the load on the road and surroundings.
- Measurements of Traffic density were made continuously for 24 hours by visual observation and counting of vehicles under four categories, viz. two wheelers, three wheelers, four wheelers, and truck/containers.
- Calculations were made with reference to "Guidelines for Capacity of Urban Roads in Plain Areas" published by The Indian Roads Congress.
- The details of the traffic volume count are provided below.

**TABLE 4.18 – RECOMMENDED PCU FACTORS FOR VARIOUS TYPES OF VEHICLES ON URBAN ROADS**

| Sr. No. | Vehicle Type                            | Equivalent PCU Factors                                    |                                |
|---------|-----------------------------------------|-----------------------------------------------------------|--------------------------------|
|         |                                         | Percentage composition of Vehicles type in traffic stream |                                |
|         |                                         | 5 % of total vehicle                                      | 10% and above of total vehicle |
|         | <b>Fast Vehicles</b>                    |                                                           |                                |
| 1       | Two-wheeler motor cycle or scooter etc. | 0.5                                                       | 0.75                           |
| 2       | Passenger car, pick-up van              | 1.0                                                       | 1.0                            |
| 3       | Auto-rickshaw                           | 1.2                                                       | 2.0                            |
| 4       | Light commercial vehicle                | 1.4                                                       | 2.0                            |
| 5       | Truck or Bus                            | 2.2                                                       | 3.7                            |
| 6       | Agricultural Tractor Trailer            | 4.0                                                       | 5.0                            |

**Source:** Guidelines for Capacity of Urban Roads in Plain Areas" published by The Indian Roads Congress.

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**TABLE 4.19 – TRAFFIC SURVEY**

| Hours               | Two-Wheeler |               | Three-Wheeler |            | Passenger cars |            | Trucks ,Buses and lorry |              | Total vehicles |              |
|---------------------|-------------|---------------|---------------|------------|----------------|------------|-------------------------|--------------|----------------|--------------|
|                     | v/hr        | PCU/hr (0.75) | v/hr          | PCU/hr (2) | v/hr           | PCU/hr (1) | v/hr                    | PCU/hr (3.7) | Total          | Total PCU/hr |
| 06-07 am            | 2           | 2             | 1             | 2          | 2              | 2          | 2                       | 7            | 7              | 13           |
| 07-08 am            | 2           | 2             | 3             | 6          | 2              | 2          | 3                       | 11           | 10             | 21           |
| 08-09 am            | 3           | 2             | 4             | 8          | 3              | 3          | 3                       | 11           | 13             | 24           |
| 09-10 am            | 4           | 3             | 4             | 8          | 3              | 3          | 4                       | 15           | 15             | 29           |
| 10-11 am            | 4           | 3             | 5             | 10         | 4              | 4          | 4                       | 15           | 17             | 32           |
| 11-12 pm            | 5           | 4             | 5             | 10         | 4              | 4          | 5                       | 19           | 19             | 36           |
| 12-01 pm            | 5           | 4             | 6             | 12         | 5              | 5          | 6                       | 22           | 22             | 43           |
| 01-02 pm            | 6           | 5             | 6             | 12         | 5              | 5          | 6                       | 22           | 23             | 44           |
| 02-03 pm            | 7           | 5             | 6             | 12         | 6              | 6          | 6                       | 22           | 25             | 45           |
| 03-04 pm            | 8           | 6             | 7             | 14         | 6              | 6          | 6                       | 22           | 27             | 48           |
| 04-05 pm            | 9           | 7             | 7             | 14         | 6              | 6          | 6                       | 22           | 28             | 49           |
| 05-06 pm            | 10          | 8             | 7             | 14         | 7              | 7          | 7                       | 26           | 31             | 54           |
| 06-07 pm            | 8           | 6             | 6             | 12         | 7              | 7          | 6                       | 22           | 27             | 47           |
| 07-08 pm            | 8           | 6             | 6             | 12         | 6              | 6          | 3                       | 11           | 23             | 35           |
| 08-09pm             | 6           | 5             | 5             | 10         | 5              | 5          | 2                       | 7            | 18             | 27           |
| 09-10pm             | 4           | 3             | 3             | 6          | 5              | 5          | 1                       | 4            | 13             | 18           |
| 10-11pm             | 2           | 2             | 2             | 4          | 4              | 4          | 1                       | 4            | 9              | 13           |
| 11-12am             | 2           | 2             | 2             | 4          | 3              | 3          | 1                       | 4            | 8              | 12           |
| 12-01am             | 1           | 1             | 1             | 2          | 2              | 2          | 1                       | 4            | 5              | 8            |
| 01-02am             | 1           | 1             | 1             | 2          | 1              | 1          | 1                       | 4            | 4              | 7            |
| 02-03am             | 1           | 1             | 1             | 2          | 1              | 1          | 1                       | 4            | 4              | 7            |
| 03-04am             | 1           | 1             | 1             | 2          | 2              | 2          | 1                       | 4            | 5              | 8            |
| 04-05am             | 1           | 1             | 1             | 2          | 2              | 2          | 1                       | 4            | 5              | 8            |
| 05-06am             | 2           | 2             | 1             | 2          | 2              | 2          | 2                       | 7            | 7              | 13           |
| <b>Highest Peak</b> |             |               |               |            |                |            |                         |              | <b>54</b>      |              |

- Capacity of urban roads is also a function of the roadside fringe conditions, e.g., parking, extent of commercial activities, frontage access etc. For purpose of recommendations given further, the following conditions are assumed:
  - Arterials: no frontage access, no standing vehicles, very little cross traffic
  - Sub-Arterials: Frontage development, side roads, bus stops, no standing vehicles, waiting restrictions
  - Collectors: Free frontage access, parked vehicles, bus stops, no waiting restrictions
- Design service volumes for different categories of urban roads corresponding to above referred conditions are given in below table.



|                                                  |                                                                      |      |            |
|--------------------------------------------------|----------------------------------------------------------------------|------|------------|
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**TABLE 4.20 – RECOMMENDED DESIGN SERVICE VOLUMES (PCUs Per hour)**

| Sr. No. | Type of Carriage Way      | Total design service volume for different categories of Urban roads |              |           |
|---------|---------------------------|---------------------------------------------------------------------|--------------|-----------|
|         |                           | Arterial                                                            | Sub-Arterial | Collector |
| 1       | 2 Lane (one way)          | 2400                                                                | <b>1900</b>  | 1400      |
| 2       | 2 Lane (two Way)          | 1500                                                                | 1200         | 900       |
| 3       | 3 Lane (One way)          | 3600                                                                | 2900         | 2200      |
| 4       | 4 lanes undivided (2 way) | 3000                                                                | 2400         | 1800      |
| 5       | 4 lanes divided (2 way)   | 3600                                                                | 2900         | -         |
| 6       | 6 lanes undivided (2 way) | 4800                                                                | 3800         | -         |
| 7       | 6 lanes divided (2 way)   | 5400                                                                | 4300         | -         |
| 8       | 8 lanes divided (2 way)   | 7200                                                                | -            | -         |

#### Existing Traffic Scenario & Level of Services

Capacity of road as per IRC (PCU's/hr.) : 1900

Max. PCU/hr. : 54

Existing Volume/Capacity ratio : 0.03

| Existing Volume/Capacity Ratio | Level of Services    |
|--------------------------------|----------------------|
| 0.0 to 0.2                     | <b>Excellent "A"</b> |
| 0.2 to 0.4                     | Very Good "B"        |
| 0.4 to 0.6                     | Good "C"             |
| 0.6 to 0.8                     | Fair "D"             |
| 0.8 to 1.0                     | Poor "E"             |

- Considering above calculations our result for existing traffic volume is 0.03 which is considered as "Excellent - A" level of service.

#### EXISTING EMISSION CONCENTRATION DUE TO VEHICULAR MOVEMENTS

- Incremental emission for the parameters CO, PM & HC (Carbon Monoxide, Particulate Matters and Hydro Carbons) due to vehicular movements was carried using CALINEpro software Version 1.7 (Build: 48) by Envitrans.
- CALINEpro is traffic emission modelling software based on CALINE3.
- Vehicular Modelling was carried out for one-hour basis and considering area of 2 km radius from the project site as shown in below figure. Internal road where vehicular movement is expected to carry out is mentioned in the figure below.

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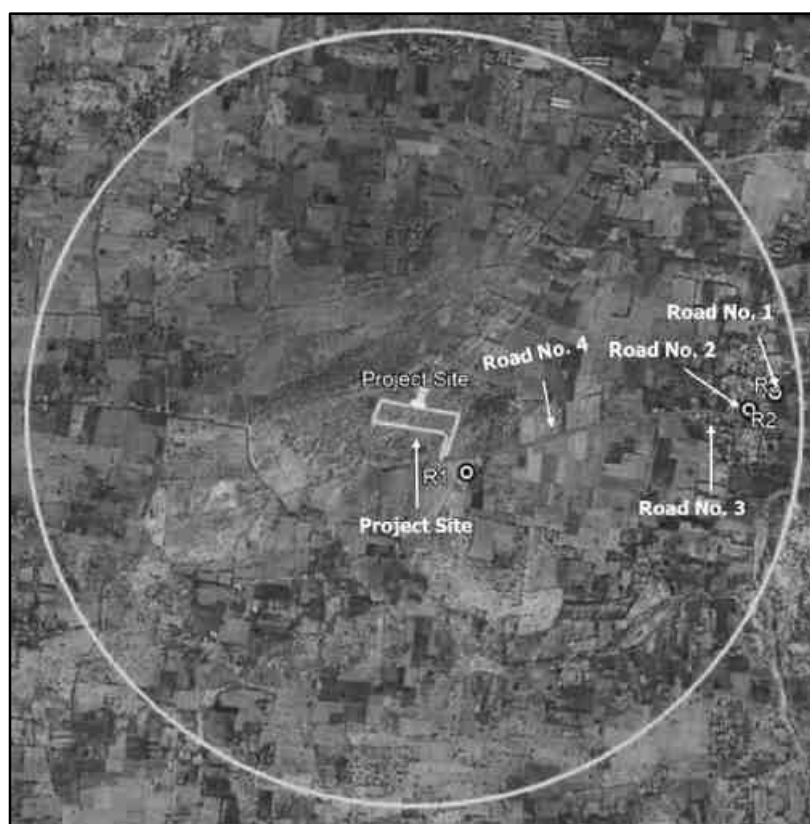


**FIGURE 4.4 – ROAD NETWORK CONSIDERING 2 KM RADIUS FROM THE PROJECT SITE**

**TABLE 4.21 – METEOREOLOGICAL DATA COSIDERED FOR PROPOSED VEHICULAR MODELLING**

| Wind speed (m/sec) | Wind direction | Stability class | Mixing height (m) | Temperature (°C) |
|--------------------|----------------|-----------------|-------------------|------------------|
| 9.7                | 270            | 1               | 10                | 31.1             |

**TABLE 4.22 – DETAILS OF EXISTING EMISSION DUE TO VEHICULAR MOVEMENTS**

| Roads     | Length (m) | Traffic Count for one hour | Mixing Zone Width (m) | Emission Factor of CO (g/km) | Emission Factor of PM (g/km) | Emission Factor of HC (g/km) |
|-----------|------------|----------------------------|-----------------------|------------------------------|------------------------------|------------------------------|
| Road no.1 | 275        | 30                         | 10                    | 6.65                         | 0.0165                       | 2.67                         |
| Road no.2 | 119        | 15                         | 10                    | 6.65                         | 0.0165                       | 2.67                         |
| Road no.3 | 230        | 9                          | 10                    | 6.65                         | 0.0165                       | 2.67                         |
| Road no.4 | 1325       | 9                          | 10                    | 6.65                         | 0.0165                       | 2.67                         |

**(Emission Factors Source: ARAI 2021)**

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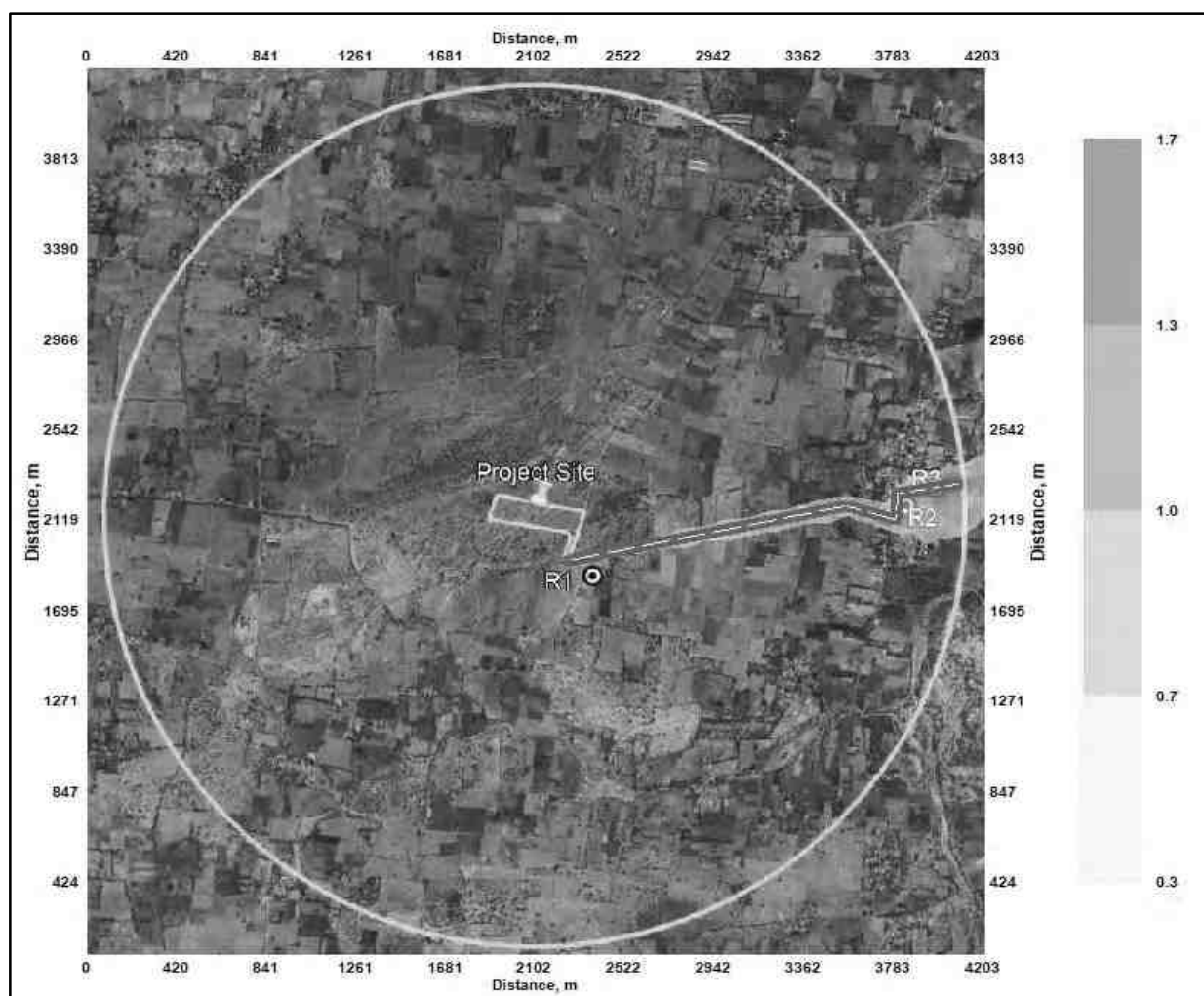


**FIGURE 4.5 – EXISTING GROUND LEVEL CONCENTRATION OF CARBON MONOXIDE ( $\mu\text{g}/\text{m}^3$ )**

| ENPRO Enviro Tech and Engineers Pvt. Ltd. |                                                                      |      |            |
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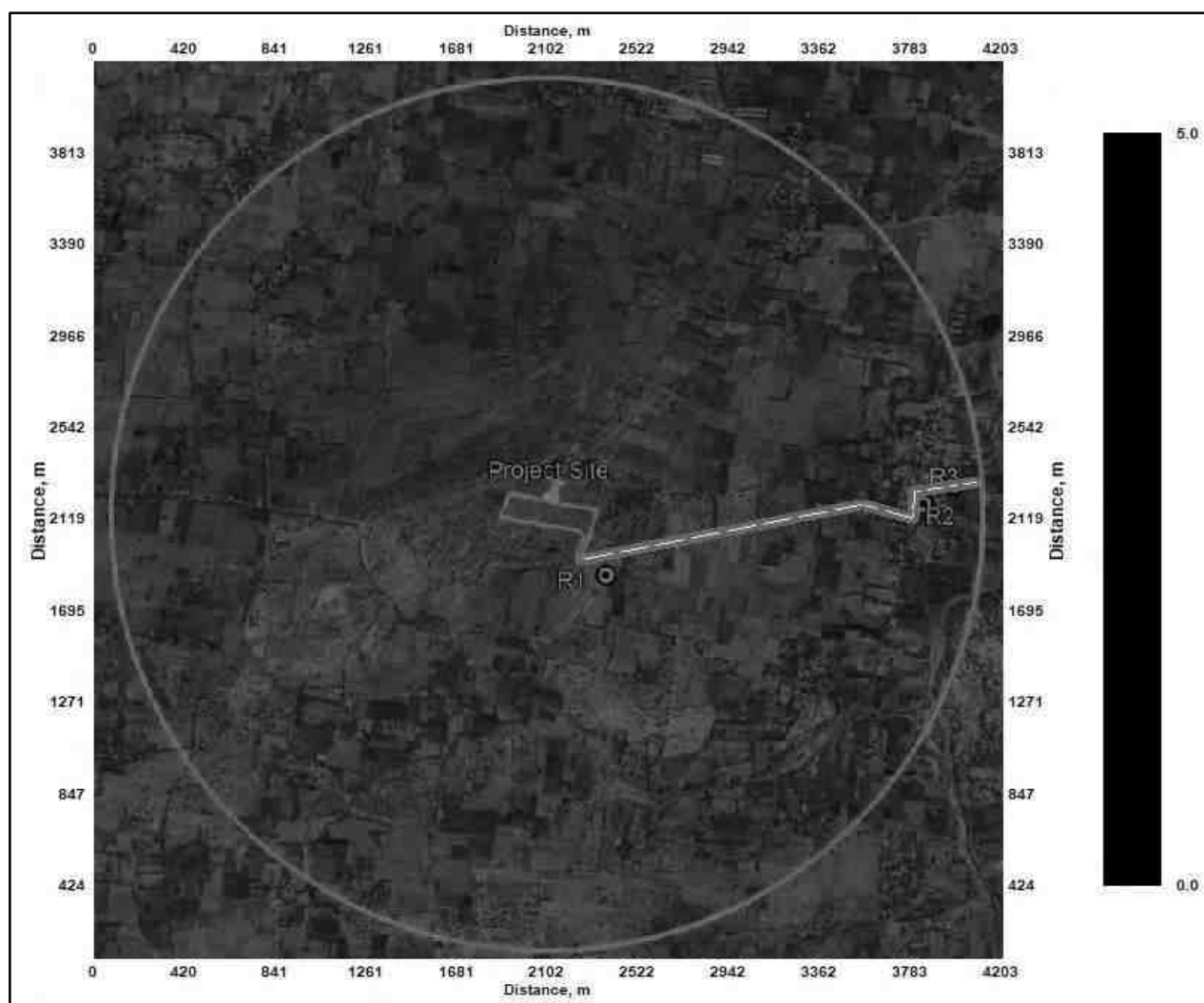


**FIGURE 4.6 – EXISTING GROUND LEVEL CONCENTRATION OF PARTICULATE MATTERS ( $\mu\text{g}/\text{m}^3$ )**

| ENPRO Enviro Tech and Engineers Pvt. Ltd. |                                                                      |      |            |
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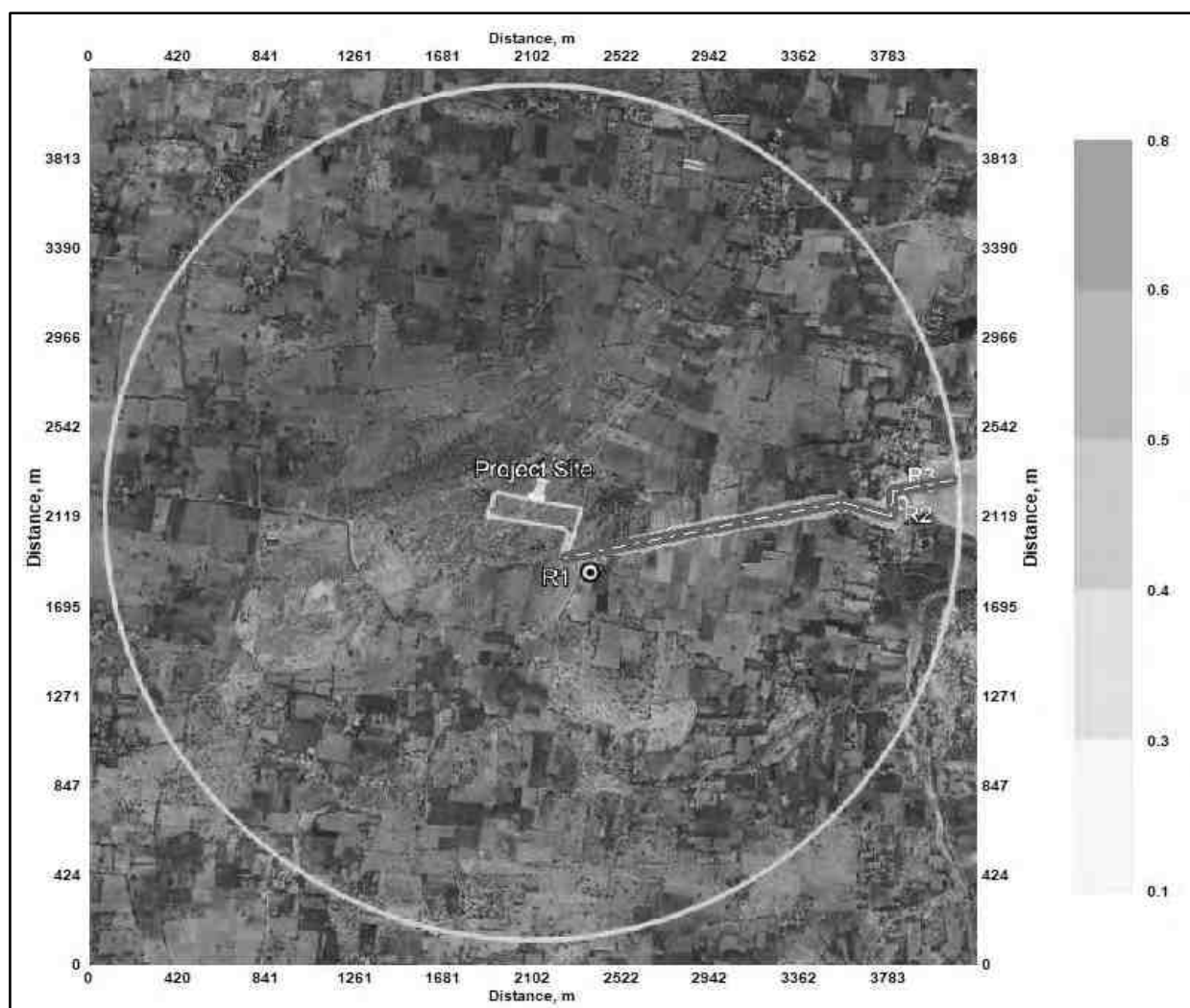


**FIGURE 4.7 – EXISTING GROUND LEVEL CONCENTRATION OF HYDRO CARBON ( $\mu\text{g}/\text{m}^3$ )**

- To know the value of existing concentration at different places around the roads and area, total 3 nos. of receptors were selected.
- Details of the existing concentration at receptors is given below.

**TABLE 4.23 – CONCENTRATION AT RECEPTORS DUE TO EXISTING TRAFIC**

| Sr. No. | Parameters ( $\mu\text{g}/\text{m}^3$ ) | Concentration at Receptors in ( $\mu\text{g}/\text{m}^3$ ) |                                      |                   |
|---------|-----------------------------------------|------------------------------------------------------------|--------------------------------------|-------------------|
|         |                                         | R1<br>periyakandiyamman<br>kovil pukkuli                   | R2<br>Kallai<br>kalliamman<br>temple | R3<br>Residential |
| 1       | CO                                      | 0.0                                                        | 0.6                                  | 0.8               |
| 2       | PM                                      | 0.0                                                        | 0.0                                  | 0.0               |
| 3       | HC                                      | 0.0                                                        | 0.3                                  | 0.3               |

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**TABLE 4.24 – INCREMENTAL PCU DUE TO ANTICIPATED ADDITIONAL VEHICLES**

| Additional PCU                  |               |            |                |
|---------------------------------|---------------|------------|----------------|
| Type of Vehicle                 | No of Vehicle | PCU factor | Additional PCU |
|                                 | per Day       | per Hour   | per Hour       |
| 4 wheeler tampo for BMW         | 13            | 2          | 26             |
| Trucks for Transportation of HW | 1             | 2.2        | 2.2            |
| Two Wheelers for Employees      | 15            | 0.75       | 11.25          |
| Car for Employees               | 3             | 1          | 3              |
| <b>Total</b>                    | <b>32</b>     | <b>6.0</b> | <b>42.45</b>   |

| Hours           | Baseline PCU/hr | Resultant PCU/hr |
|-----------------|-----------------|------------------|
| 06-07 am        | 13              | 55               |
| 07-08 am        | 21              | 63               |
| 08-09 am        | 24              | 66               |
| 09-10 am        | 29              | 71               |
| 10-11 am        | 32              | 74               |
| 11-12 pm        | 36              | 78               |
| 12-01 pm        | 43              | 85               |
| 01-02 pm        | 44              | 86               |
| 02-03 pm        | 45              | 87               |
| 03-04 pm        | 48              | 90               |
| 04-05 pm        | 49              | 91               |
| <b>05-06 pm</b> | <b>54</b>       | <b>96</b>        |
| 06-07 pm        | 47              | 89               |
| 07-08 pm        | 35              | 77               |
| 08-09pm         | 27              | 69               |
| 09-10pm         | 18              | 60               |
| 10-11pm         | 13              | 55               |
| 11-12am         | 12              | 54               |
| 12-01am         | 8               | 50               |
| 01-02am         | 7               | 49               |
| 02-03am         | 7               | 49               |
| 03-04am         | 8               | 50               |
| 04-05am         | 8               | 50               |
| 05-06am         | 13              | 55               |

**\*Note:** Resultant PCU/hr has been mentioned considering worst-case scenario of vehicular moment of all anticipated vehicles at same hour in a day.

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**TABLE 4.25 – DETAILS OF PREDICTED EMISSION DUE TO VEHICULAR MOVEMENTS**

| Roads     | Length (m) | Traffic Count for one hour | Mixing Zone Width (m) | Emission Factor of CO (g/km) | Emission Factor of PM (g/km) | Emission Factor of HC (g/km) |
|-----------|------------|----------------------------|-----------------------|------------------------------|------------------------------|------------------------------|
| Road no.1 | 275        | 32                         | 10                    | 6.65                         | 0.0165                       | 2.67                         |
| Road no.2 | 119        | 32                         | 10                    | 6.65                         | 0.0165                       | 2.67                         |
| Road no.3 | 230        | 32                         | 10                    | 6.65                         | 0.0165                       | 2.67                         |
| Road no.4 | 1325       | 32                         | 10                    | 6.65                         | 0.0165                       | 2.67                         |

**(Emission Factors Source: ARAI 2021)**

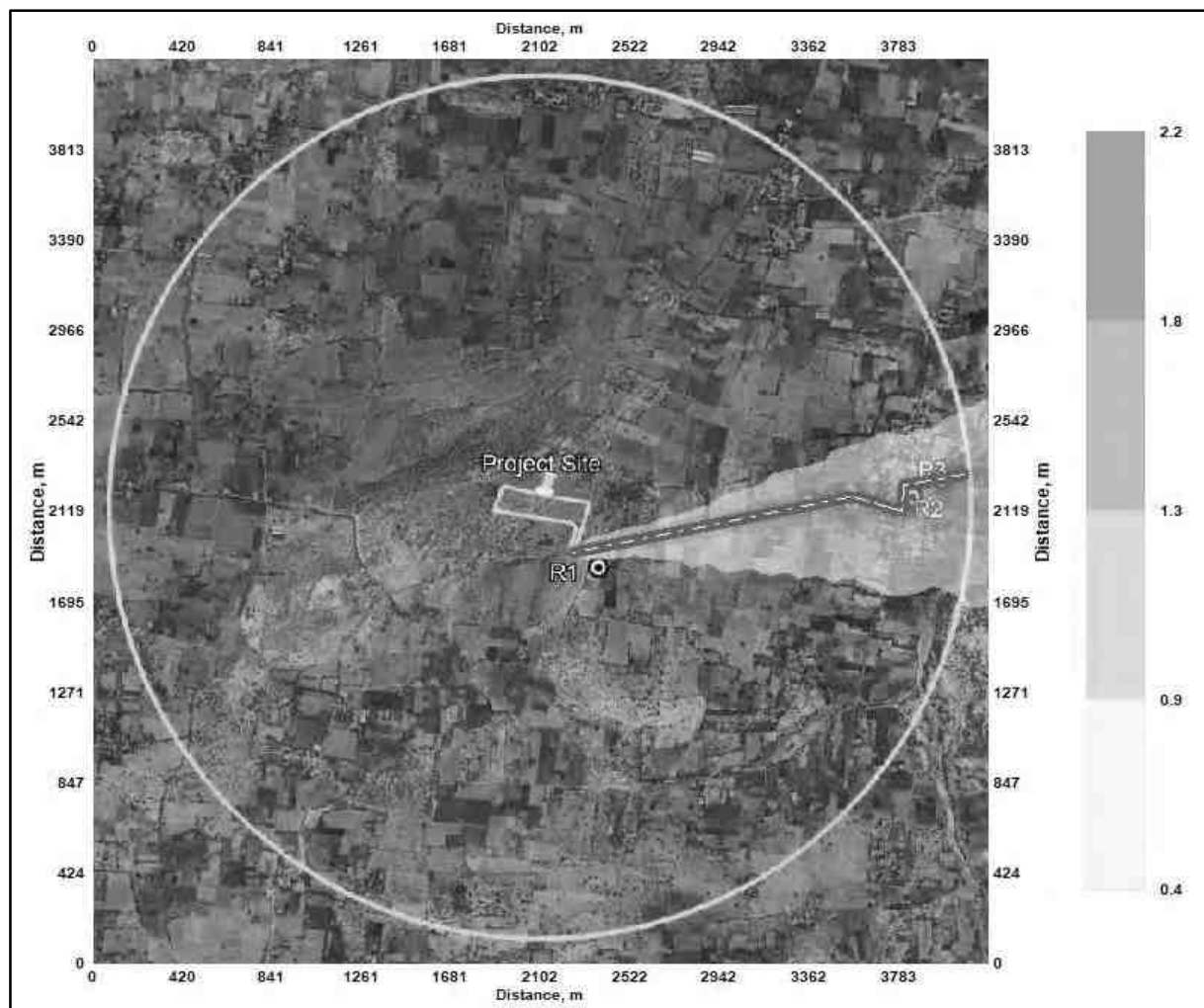


**FIGURE 4.8 – ADDITIONAL GROUND LEVEL CONCENTRATION OF CARBON MONOXIDE ( $\mu\text{g}/\text{m}^3$ )**

| ENPRO Enviro Tech and Engineers Pvt. Ltd. |                                                                      |      |            |
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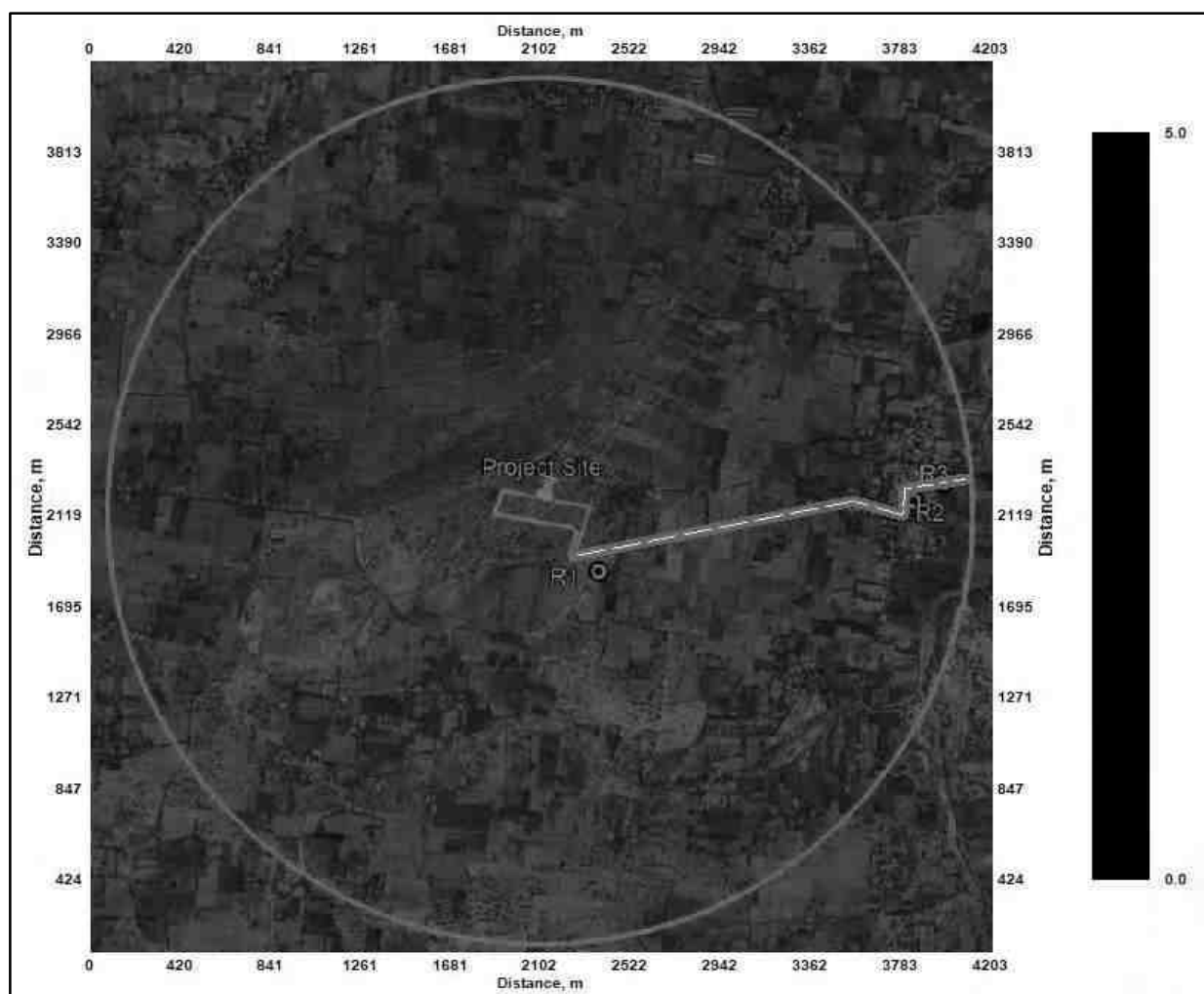


**FIGURE 4.9 – ADDITIONAL GROUND LEVEL CONCENTRATION OF PARTICULATE MATERS ( $\mu\text{g}/\text{m}^3$ )**



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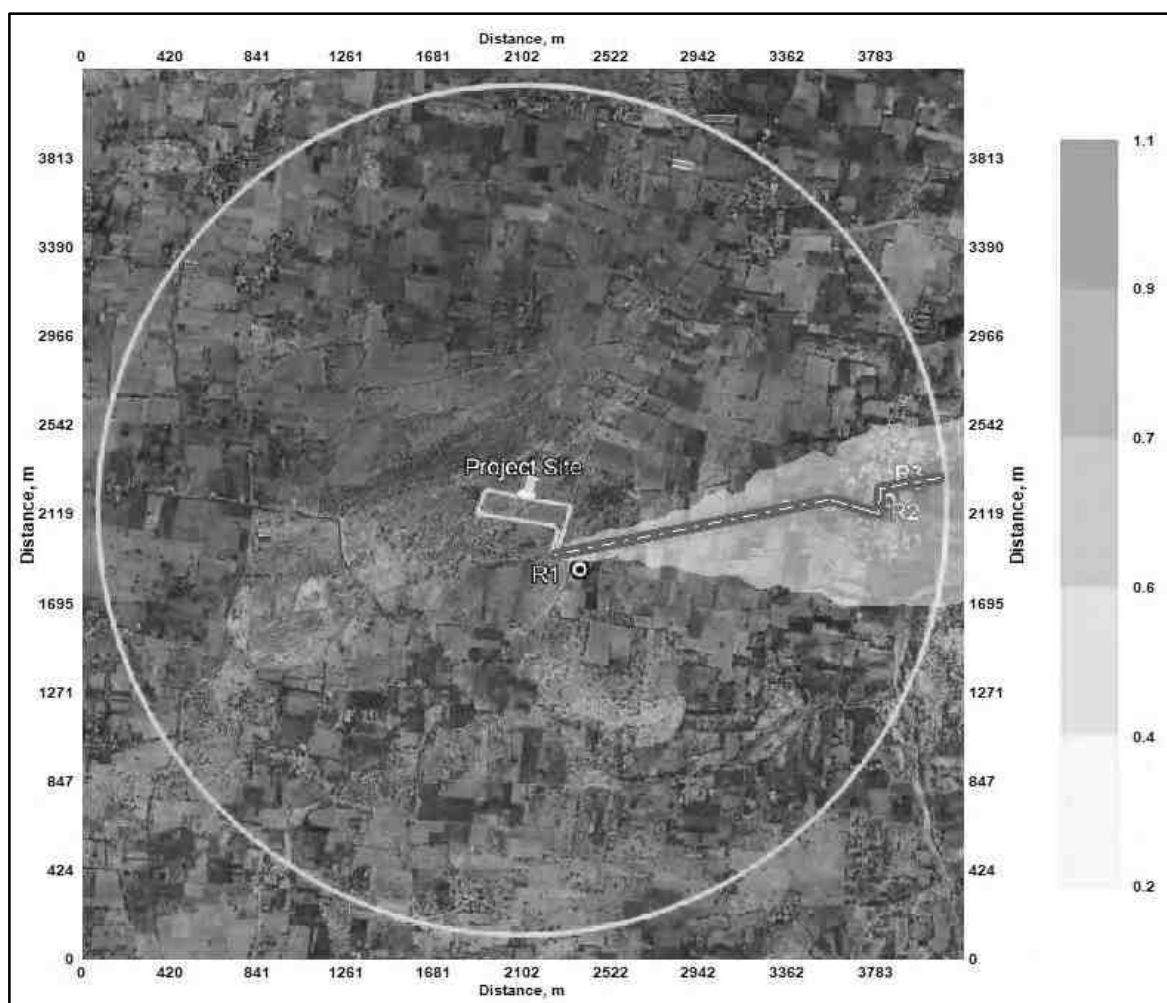
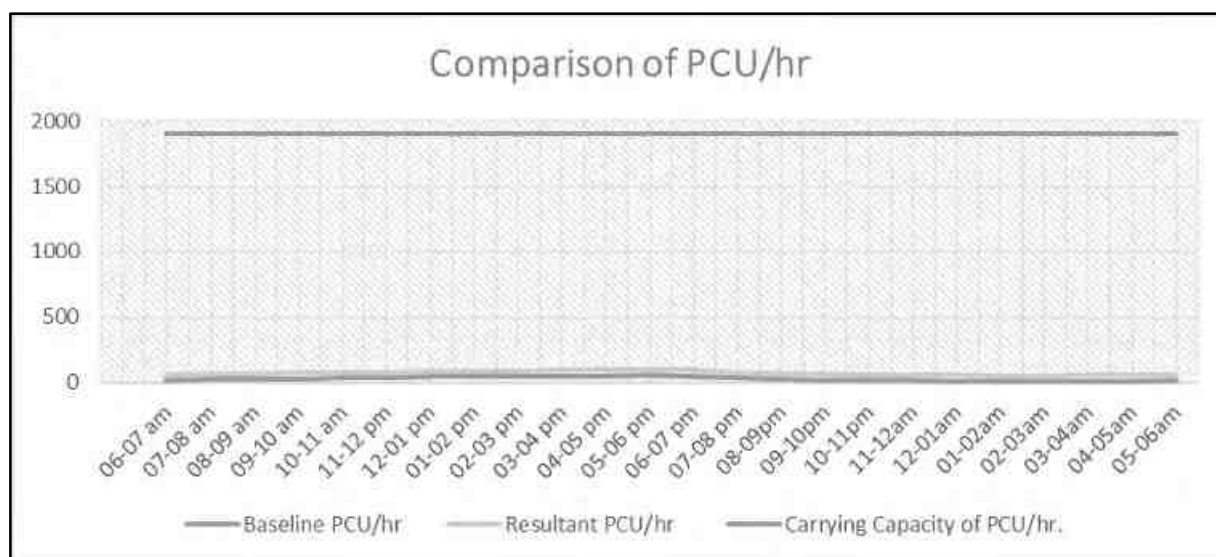


**FIGURE 4.10 – ADDITIONAL GROUND LEVEL CONCENTRATION OF HYDRO CARBON ( $\mu\text{g}/\text{m}^3$ )**

**TABLE 4.26 – CONCENTRATION AT RECEPTORS DUE TO ADDITIONAL VEHICLES**

| Sr. No. | Parameters ( $\mu\text{g}/\text{m}^3$ ) | Concentration at Receptors in ( $\mu\text{g}/\text{m}^3$ ) |                                      |                   |
|---------|-----------------------------------------|------------------------------------------------------------|--------------------------------------|-------------------|
|         |                                         | R1<br>periyakandiyamman kovil<br>pukkuli                   | R2<br>Kallai<br>kalliamman<br>temple | R3<br>Residential |
| 1       | CO                                      | 0.1                                                        | 1.8                                  | 1.5               |
| 2       | PM                                      | 0.0                                                        | 0.0                                  | 0.0               |
| 3       | HC                                      | 0.0                                                        | 0.7                                  | 0.6               |

|                                                  |                                                                      |      |            |
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**GRAPH 4.1 – COMPARISON OF PCU/Hr**

#### **Interpretation:**

From the above graph it can be concluded that, even after additional vehicular emission, resultant PCU/hr will remain within carrying capacity of existing road. Hence, there will be no requirement of construction of new roads for proposed additional vehicular load.

From the modelling carried out, it is estimated that, even after addition of pollutant levels due to proposed project, there will be no major impact on existing road network.

#### **Mitigation Measures:**

- Water sprinkling will be carried out on regular basis on roads to avoid dust emissions during transportation of the Bio-Medical Waste.
- Vehicle speed shall be limited to 20 km/h to reduce fugitive dust generated from unpaved areas.
- All vehicles for transportation will have valid PUC Certificate.
- Vehicles having close cabinets will be used for transportation of Bio-Medical Waste.
- Route maps will be prepared for all transportation vehicles, real time monitoring of the routes will be carried out through GPS tracking and drivers and helpers will be trained accordingly to avoid any accident during the transportation of the Bio-Medical Waste.

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## **4.9 CARBON FOOTPRINT, CARBON SEQUESTRATION AND WATER FOOTPRINT**

### **4.9.1 Carbon Footprint**

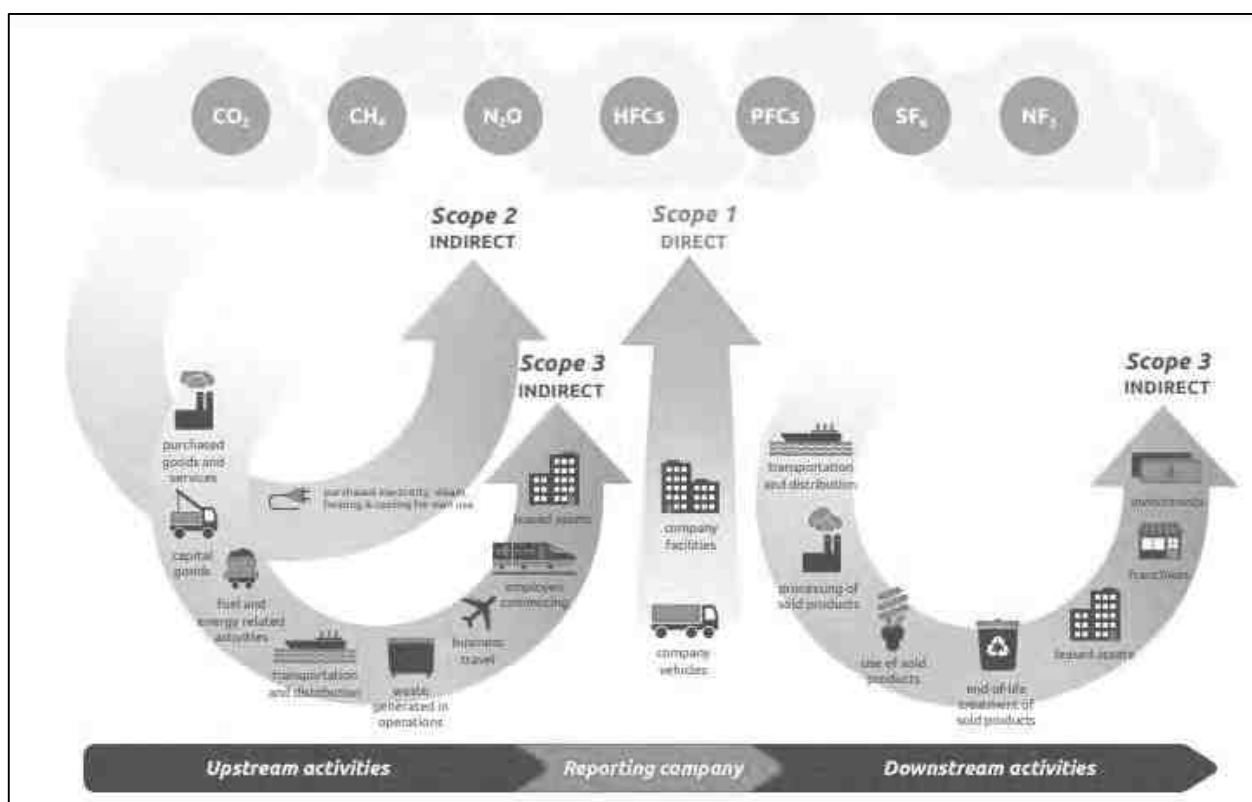
A Carbon footprint is the total amount of greenhouse gases [including carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) that are generated by our actions, events, organizations, service, place or products. Greenhouse gases, including the carbon-containing gases carbon dioxide and methane, can be emitted through the burning of fossil fuels, manufactured goods, materials, wood, roads, buildings, transportation and other services.

- The Carbon Footprint calculation is carried out on the basis of Gate to Gate methodology.

#### **❖ Details regarding the consideration of Direct and Indirect Emission Sources as per GHG Protocol are mentioned below:**

- There is a difference in measured and estimated quantity the measured quantity is considered as direct emission as it is the actual onsite scenario and the estimated quantity means the prediction made which comes under indirect emission.
- The source of emission within the premises boundary are considered as Direct source of emission i.e. Emission at the time of Construction activities, while transportation of construction materials, Burning of fuel for utilities and Operation of ETP.
- The source of emission is considered as Indirect when the emission is beyond the boundary of the project site (i.e. the material which are entering and exiting the gate and the electricity consumption because it is sourced from the grid system of Electricity Distribution Company)
- If the workers of the company are travelling by their own vehicle, then it is considered as indirect emission source but same if the vehicle is provided by the company the it will be considered as direct emission source.
- Purchased goods and services, Capital goods purchased, Upstream transportation and distribution, Solid Waste disposal outside plant premises, Business travel, Employee commuting etc. are considered as Indirect source of emission.

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(Source: GHG Protocol - World Resources Institute & World Business Council for Sustainable Development, 2013)

**FIGURE 4.10 – DIFFERENTS SCOPES OF CARBON EMISSION**

#### 4.9.1.1 Methodology

##### Carbon Emission During Operation Phase

Total Carbon Emission During Operational Phase is calculated as sum of following activities:

- ✓ Carbon emission from electricity consumption
- ✓ Carbon emission due to Fuel Burning for utilities
- ✓ Carbon emission during ETP operations
- ✓ Carbon emission due to transportation of Raw Materials, finished goods, Hazardous waste, workers etc.
- ✓ Carbon emission due to usage of Air Conditioners

|                                                  |                                                                      |      |            |
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Total Carbon Emission During Operational Phase is calculated as mentioned in below Table:

**TABLE 4.27 - CO<sub>2</sub> EMISSION DUE TO PROJECT ACTIVITIES**

| Sr. No. | Source                                                                                     | Assumptions/<br>Considerations                                                                                 | CO <sub>2</sub> Emission (MT/Annum) |          | Mitigation Measures for Carbon Sequestration / Reduction                                           | CO <sub>2</sub> can be reduced (MT/Annum) | Total CO <sub>2</sub> Emission by providing mitigation measures and fuel alternative (MT/Annum) |
|---------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------|----------|----------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------|
|         |                                                                                            |                                                                                                                | Direct                              | Indirect |                                                                                                    |                                           |                                                                                                 |
|         |                                                                                            |                                                                                                                | <b>A</b>                            |          |                                                                                                    | <b>B</b>                                  | <b>C = A - B</b>                                                                                |
| 1       | Electricity Consumption (Overall)                                                          | Electricity Consumption: 500 KVA Working Hours: 20 CO <sub>2</sub> emission factor = 0.757 kg/KW               | -                                   | 2184.2   | Unit shall install 100 KW Solar panel to reduce daily electricity requirement for proposed project | 698.0                                     | 1486.1                                                                                          |
| 2       | Transportation of Employees                                                                | Total Employees = 50 No. Two wheeler = 20 Four Wheeler = 2                                                     | -                                   | 13.8     | Public Transportation of workers instead of two wheeler (ex: Bus )                                 | 8.0                                       | 5.7                                                                                             |
| 3       | Transportation of Bio Medical Waste from HCFs to site and transportaion of Hazardous Waste | total fuel consumption liters/annum = 30419.6 CO <sub>2</sub> emission factor = 2.68 kgCO <sub>2</sub> /liters | -                                   | 80.6     | By reducing the distance for transportation, CO <sub>2</sub> emission can be reduced.              | 0.0                                       | 80.6                                                                                            |
| 4       | From Fuel Burning                                                                          | Using LDO: Requirement of fuel = 55 Liters/hr GCV of the fuel = 11000 Kcal/Kg                                  | 884.4                               | -        | -                                                                                                  | 0.0                                       | 884.4                                                                                           |

|                                                  |                                                                      |  |      |            |
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| Sr. No.      | Source | Assumptions/<br>Considerations | CO <sub>2</sub> Emission (MT/Annum) |          | Mitigation Measures for Carbon Sequestration / Reduction                                                                                                                                                                | CO <sub>2</sub> can be reduced (MT/Annum) | Total CO <sub>2</sub> Emission by providing mitigation measures and fuel alternative (MT/Annum) |
|--------------|--------|--------------------------------|-------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------|
|              |        |                                | Direct                              | Indirect |                                                                                                                                                                                                                         |                                           |                                                                                                 |
|              |        | Carbon Content in LDO= 60 %    |                                     |          |                                                                                                                                                                                                                         |                                           |                                                                                                 |
| 5            | ETP    | Effluent Load = 37.7 KLD       | 5.3                                 | -        | Green belt is developed in an area of 15930.8 m <sup>2</sup> (33.4 % of total plant area). Around 4780 nos. of native plant species developed. In one year a mature tree will absorb more than 25 Kgs of carbon dioxide | 119.5                                     | -114.2                                                                                          |
| <b>Total</b> |        |                                | <b>3168.3</b>                       |          | <b>Total</b>                                                                                                                                                                                                            | <b>825.6</b>                              | <b>2342.7</b>                                                                                   |

The total CO<sub>2</sub> emissions from the project are estimated at 3168.3 MT/annum, which are effectively reduced to 2342.7 MT/annum after implementation of proposed mitigation measures. This results in a net reduction of about 825.6 MT/annum, corresponding to an overall reduction of approximately 26.0%. The major reductions are achieved through increased renewable energy usage, and greenbelt development, reflecting the project's strong commitment to climate change mitigation and sustainability.

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#### 4.9.2 Carbon Sequestration

It is the process of capturing and storing atmospheric carbon dioxide. The process is for long-term storage of carbon in form of CO<sub>2</sub>. Reservoirs that store and keep the Stored Carbon from entering the atmosphere are called Carbon sinks i.e., Oceans, Soils, Vegetation and Geological Formations.

The Carbon Footprint calculation is carried out on the basis of Gate to Gate Methodology considering direct and indirect emission sources as per the GHG Protocol.

| <b>Total Plot Area</b>                                         |                            | 47696.91 m <sup>2</sup>                                                                                                                          |             |
|----------------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Green Belt</b>                                              |                            | 15923.61 m <sup>2</sup>                                                                                                                          |             |
| <b>Sr. No.</b>                                                 | <b>Category</b>            | <b>Quantity</b>                                                                                                                                  | <b>Unit</b> |
| 1.                                                             | Electricity Consumption    | 500                                                                                                                                              | KVA         |
| 2.                                                             | Fuel Consumption           |                                                                                                                                                  |             |
|                                                                | LDO                        | 55                                                                                                                                               | Lit./hr.    |
| 3.                                                             | Wastewater generation      | 37.7                                                                                                                                             | KL/Day      |
| <b>Activities Considered for Carbon foot print Calculation</b> |                            |                                                                                                                                                  |             |
| <b>Sr. No.</b>                                                 | <b>Activities</b>          | <b>Remarks</b>                                                                                                                                   |             |
| 1.                                                             | Greenbelt Development      | Unit will be developed greenbelt in area of around 15923.61 m <sup>2</sup> within plant premises, i.e., around 4780 trees within plant premises. |             |
| 2.                                                             | Transportation of Employee | Total 1 number of bus is proposed to provide for total 50 permanent employees.                                                                   |             |
| 5                                                              | Renewable energy           | Unit will install 100 KW Solar panel to reduce daily electricity requirement for proposed project                                                |             |

Direct as well as Indirect emissions are considered for carbon footprint calculation for the proposed project activities.

| <b>Scope</b> | <b>Description</b>                         |                                            | <b>Applicability</b> |
|--------------|--------------------------------------------|--------------------------------------------|----------------------|
| 1            | Direct GHG Emission                        |                                            |                      |
|              | 1.1                                        | Direct emission from Stationary combustion | Yes                  |
|              | 1.2                                        | Direct emission from mobile combustion     | Yes                  |
| 2            | Indirect GHG Emission From Imported Energy |                                            |                      |
|              | 2.1                                        | Indirect emission from electricity         | Yes                  |
| 3            | Other Indirect GHG Emission                |                                            |                      |
|              | 3.1                                        | Water Requirement and Wastewater treatment | Yes                  |
|              | 3.2                                        | Solid Waste Generation and management      | Yes                  |
|              | 3.3                                        | Upstream transportation of goods           | Yes                  |
|              | 3.4                                        | Employee transportation                    | Yes                  |

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**TABLE 4.28 – PROJECTION FOR TOTAL CO<sub>2</sub> EMISSION**

| Year  | Electricity Consumption | Transportation of Employees | Transportation of Bio Medical Waste and HW | Fuel Utilization | ETP & STP | Total CO <sub>2</sub> Emission |
|-------|-------------------------|-----------------------------|--------------------------------------------|------------------|-----------|--------------------------------|
| Scope | Scope II                | Scope III                   | Scope III                                  | Scope I          | Scope I   |                                |
| 2027  | 1090                    | 10                          | 40                                         | 531              | 3         | 1673                           |
| 2028  | 1090                    | 10                          | 40                                         | 531              | 3         | 1673                           |
| 2029  | 1526                    | 10                          | 56                                         | 531              | 4         | 2127                           |
| 2030  | 1526                    | 10                          | 56                                         | 743              | 4         | 2339                           |
| 2031  | 1526                    | 10                          | 56                                         | 743              | 4         | 2339                           |
| 2032  | 1526                    | 14                          | 56                                         | 743              | 4         | 2343                           |
| 2033  | 1526                    | 14                          | 56                                         | 743              | 4         | 2343                           |
| 2034  | 1962                    | 14                          | 73                                         | 955              | 5         | 3008                           |
| 2035  | 1962                    | 14                          | 73                                         | 955              | 5         | 3008                           |
| 2036  | 1962                    | 14                          | 73                                         | 955              | 5         | 3008                           |
| 2037  | 1962                    | 14                          | 73                                         | 955              | 5         | 3008                           |
| 2038  | 1962                    | 14                          | 81                                         | 1061             | 5         | 3123                           |
| 2039  | 1962                    | 14                          | 81                                         | 1061             | 5         | 3123                           |
| 2040  | 1962                    | 14                          | 81                                         | 1061             | 5         | 3123                           |

**TABLE 4.29 – CO<sub>2</sub> SEQUESTRATION (MT/ANNUM)**

| Year | Usage of Renewable Energy | Usage of Energy Efficient Equipment | Public Transportation | Through Greenbelt | Through CER | Total CO <sub>2</sub> Sequestration |
|------|---------------------------|-------------------------------------|-----------------------|-------------------|-------------|-------------------------------------|
| 2027 | 131                       | 1                                   | 6                     | 120               | 20          | 361                                 |
| 2028 | 131                       | 1                                   | 6                     | 120               | 20          | 361                                 |
| 2029 | 183                       | 1                                   | 6                     | 120               | 28          | 455                                 |
| 2030 | 183                       | 1                                   | 6                     | 120               | 28          | 455                                 |
| 2031 | 183                       | 1                                   | 6                     | 120               | 28          | 455                                 |
| 2032 | 183                       | 1                                   | 8                     | 120               | 28          | 458                                 |
| 2033 | 183                       | 1                                   | 8                     | 120               | 28          | 458                                 |
| 2034 | 235                       | 1                                   | 8                     | 120               | 36          | 552                                 |
| 2035 | 235                       | 1                                   | 8                     | 120               | 36          | 552                                 |
| 2036 | 235                       | 1                                   | 8                     | 120               | 36          | 552                                 |
| 2037 | 235                       | 1                                   | 8                     | 120               | 36          | 552                                 |
| 2038 | 262                       | 1                                   | 8                     | 120               | 36          | 595                                 |
| 2039 | 262                       | 1                                   | 8                     | 120               | 36          | 595                                 |
| 2040 | 262                       | 1                                   | 8                     | 120               | 36          | 595                                 |

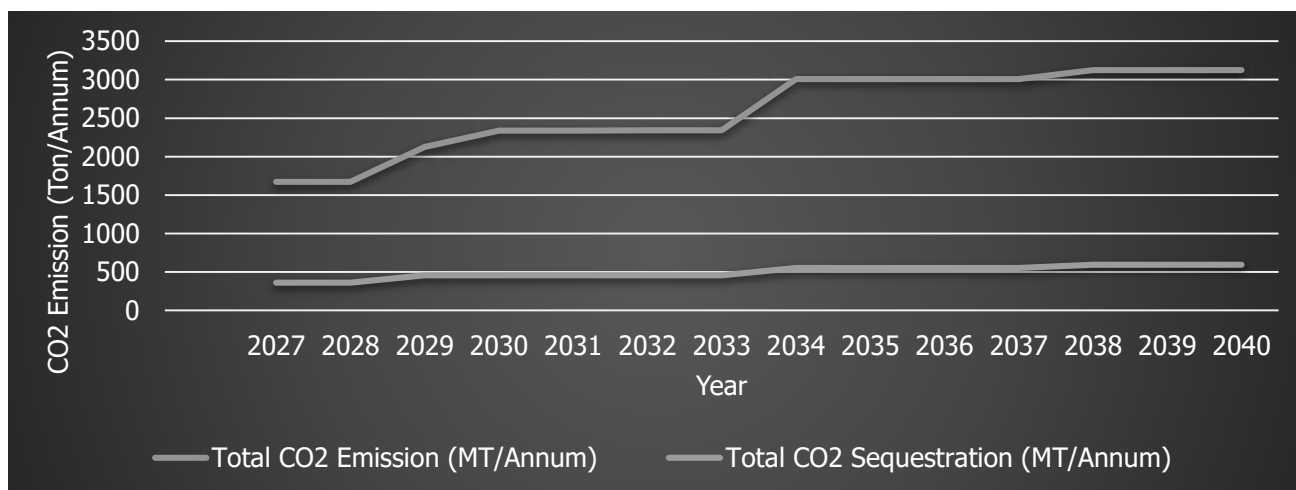


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❖ **Details of Carbon Footprint Projection:**

| Year | Total CO <sub>2</sub> Emission (MT/Annum) | Total CO <sub>2</sub> Sequestration (MT/Annum) |
|------|-------------------------------------------|------------------------------------------------|
| 2027 | 1673                                      | 361                                            |
| 2028 | 1673                                      | 361                                            |
| 2029 | 2127                                      | 455                                            |
| 2030 | 2339                                      | 455                                            |
| 2031 | 2339                                      | 455                                            |
| 2032 | 2343                                      | 458                                            |
| 2033 | 2343                                      | 458                                            |
| 2034 | 3008                                      | 552                                            |
| 2035 | 3008                                      | 552                                            |
| 2036 | 3008                                      | 552                                            |
| 2037 | 3008                                      | 552                                            |
| 2038 | 3123                                      | 595                                            |
| 2039 | 3123                                      | 595                                            |
| 2040 | 3123                                      | 595                                            |
| Avg. | 2589                                      | 499                                            |

By the end of the year 2040, it can be concluded that by proposed project there will be **19.3 %** of total CO<sub>2</sub> Sequestration from the proposed carbon Sequestration measure.



**GRAPH 4.2 – PROJECTION OF CO<sub>2</sub> EMISSION AND CO<sub>2</sub> SEQUESTRATION**

| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                                                      |      |            |
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### 4.9.3 Water Footprint

The water footprint of an individual, community, or Industry is defined as the total volume of fresh water used to produce the goods and services consumed by the individual or community or produced by the Industry. Water use is measured in water volume consumed (evaporated) and/or polluted per unit of time. A water footprint can be calculated for any well-defined group of consumers (e.g., an individual, family, village, city, province, state, or nation) or producers (e.g., a public organization, private enterprise, or economic sector), for a single process (such as growing rice) or for any product or service. Traditionally, water use has been approached from the production side, by quantifying the following three columns of water use: water withdrawals in the agricultural, industrial and domestic sector.

There are many different aspects to water footprint and therefore different definitions and measures to describe them. There are main three type of water foot prints. They are:

#### 1. Blue Water Footprint

A blue water footprint refers to the volume of water that has been sourced from surface or groundwater resources (lakes, rivers, wetlands and aquifers) and has either evaporated (for example while irrigating crops), or been incorporated into a product or taken from one body of water and returned to another, or returned at a different time. Irrigated agriculture, industry and domestic water use can each have a blue water footprint.

The total Blue Water Footprint (fresh water consumption) for the proposed expansion project is 94.7 KLD.

#### 2. Green water footprint

A green water footprint refers to the amount of water from precipitation that, after having been stored in the root zone of the soil (green water), is either lost by evapotranspiration or incorporated by plants. It is particularly relevant for agricultural, horticultural and forestry products.

Unit will develop Roof Top Rainwater Harvesting system for storing and using the precipitated rainwater in the monsoon season. Unit will develop rain water harvesting system as mentioned in section 2.9.5 of chapter 2.

#### 3. Grey Water Footprint

A grey water footprint refers to the volume of water that is required to dilute pollutants (industrial discharges, seepage from tailing ponds at mining operations, untreated municipal wastewater or nonpoint source pollution such as agricultural runoff or urban runoff) to such an extent that the quality of the water meets agreed water quality standards.

The waste water generated from the project activity are:

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Effluent stream of 35.7.0 KLD - will be treated into ETP having Primary, Secondary and Tertiary Treatment and treated water will be reused within plant premises.

Domestic waste water of 2.0 KLD – will be treated into STP and treated water will be reused within plant premises.

- Unit will Recycle & Reuse Total 37.7 KLD water.
- Thus, total Fresh water requirement shall be 94.7 KLD only.

Considering various disposal methods as shown in below table, unit has proposed Zero Liquid Discharge by which there will be discharge of effluent outside the plant premises.

**TABLE 4.30 – DISPOSAL METHOD**

| Particular                                                  | Case 1:<br>For Complete ZLD                                                                                                                                                                                   | Case 2:<br>For Total Effluent Discharge<br>outside plant premises |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Total Water Requirement                                     | 132.4 KLD                                                                                                                                                                                                     | 132.4 KLD                                                         |
| Total Effluent Generation                                   | 37.7KLD                                                                                                                                                                                                       | 37.7 KLD                                                          |
| Total Water Recycling                                       | 37.7 KLD                                                                                                                                                                                                      | 0 KLD                                                             |
| Total Fresh Water Requirement                               | 94.7 KLD                                                                                                                                                                                                      | 132.4 KLD                                                         |
| <b>For Complete ZLD:</b>                                    | 1. 35.7 KLD Industrial Effluent will be treated in ETP and will be reused within premises.<br>2. 2.0 KLD domestic wastewater will be treated into STP and treated water will be reused within plant premises. |                                                                   |
| <b>For Total Effluent Discharge outside plant premises:</b> | No recycling and reuse of Water and sending 37.7 KLD Effluent to Common Facility                                                                                                                              |                                                                   |

#### 4.10 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES OF HYDROLOGY AND GEOLOGY

The impacts felt during the field studies, consultation of available literature, and discussion with farmers, public and officials are as follows. The mitigation measures are given thereby.

1. **Rainfall:** The study area receives an average annual rainfall of about 745 mm. Study of rainfall records indicate that more than 70 % of total annual rainfall is during northeast monsoons (Table 3). Most of the rainfall flows as surface runoff following the general gradient of the terrain which north towards Cauvery Catchment. Suitable lined peripheral garland drains are suggested around the industrial zone so as to check and control the excess surface runoff water in to the industrial belts during monsoon season. Excess rainfall or runoff water collected into the garland drains should be discharged into the nearby streams in the downward reaches. In flow of rainwater in to industrial belt should be prevented to the possible extent, so as to check the contamination.

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2. **Geomorphology and Soils:** The area around the project site constitute matured, dissected, undulating and rolling topography with erosional landscape covered by a layer of reddish-brown loamy soil of varied thickness, underlain by the weathered/fractured parental rock. The premises of the site have become plain and flattened topography because of construction activity. The geomorphological units also provide suitable spots for the construction of ground water recharge structures, but because of the prevalence industrial pollution and water contamination in the study area, such activities should be taken up much away from the industrial zone. Proper drains should be dug along the boundary so as to keep the plant premises dry. Water logged and stagnation pools are not to be allowed in and around the chemical plant premises.
3. **Ground Water:** The common ground water abstraction structures in the area are dug, dug-cum-bore wells and bore wells and their yields mainly depends on the hydrogeological set up and recharge conditions in the area. To check the ground water contamination, sinking and pumping bore wells around the plant site has to be discouraged.
4. **Water Utilisation:** The Ground Water Estimation Committee (GEC) has categorized the study area as 'safe zone' with the stage of ground water utilization of 63 %, indicating further scope for further ground water development.
5. **Water Requirements:** The total water requirement for the proposed project will be 132.4 KLD and wastewater generation will be 37.7 (35.7 KLD industrial + 2.0 KLD domestic). Out of total water requirement of 132.4 KLD, 37.7 KLD treated waste water will be recycled after treatment of waste water from ETP and STP, rest 94.7 KLD fresh water will be sourced from Local Panchayat Water Supply. Necessary permissions shall be obtained from the concerned authorities.
6. **Water Quality:** The ground water in and around the plant site is generally potable, and suitable for domestic, irrigation, and industrial purposes with few exceptions.
7. **Green Belt:** In the proposed expansion substantial area has to be allocated for the green belt so as to provide ecofriendly environment. Of the total area 15923.61 sq.m (33.4%) land will be used for green belt development.

#### **4.11 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES OF LAND ENVIRONMENT**

##### **❖ Land Environment**

Any construction of infrastructure within open scrub will lead to permanent change in land use pattern at the site as a direct impact. Major changes in land use pattern will occur due to the project activities.

The construction activities will result in loss of topsoil and earthen material to some extent in the plant premises. However, it is proposed to use the soil and earthen material in greenbelt development. No solid or hazardous waste will be generated during construction thus no impact on soil environment is likely. There is no adverse impacts on soil in the surrounding area are anticipated.

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#### ❖ **Impact on Land Use:**

- The proposed plant mud and clay texture and flat terrain. Hence, there is an impact on change in land use i.e. Excavation / reclamation process to be made. There is a pot hole road is existing and that requires to be convert CC / Tar.
- Greenbelts are an effective mode of control of air pollution, where green plants form a surface capable of absorbing air pollutants and forming a sink for the pollutants. Unit will develop green belt area in (35.07 %) of total plot area.
- There is no ecologically sensitive area within 10km of radial distance from proposed project boundary. No wildlife sanctuaries, National parks, Tiger or elephant reserves exist in 10km radius. Also, no migration route of avifauna presents in 10 km radius.
- There will be a land cutting or filling activity is involved during construction / operation of the plant and hence the land degradation is envisaged.

**TABLE 4.31 – SUMMARY OF ANTICIPATED IMPACTS DURING OPERATION PHASE**

| <b>Discipline</b> | <b>Potential Impacts</b> | <b>Probable Source</b>    | <b>Mitigation Measures</b>                              | <b>Remarks</b> |
|-------------------|--------------------------|---------------------------|---------------------------------------------------------|----------------|
| Land              | Change in land use       | Scrub land to industrial  | Suggested to develop green belt around plant            | --             |
| Land              | Soil Eroement            | Vehicle movement          | Suggested to develop proper cc Roads upto site location | -              |
| Land              | Impact due to leaches    | Solid waste / waste water | Suggested to develop proper flooring                    | -              |

#### **4.12 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES OF ECOLOGY AND BIODIVERSITY**

##### ❖ **Prediction of Impacts on local flora and fauna**

The activities associated with the Proposed Project of Common Bio Medical Waste Treatment Facility (CBMWTF) will have very less impacts on terrestrial flora and fauna of study area. There are no migratory corridors, nesting and breeding sites within the core zone. There are no REET species present within the proposed site. No wildlife population is present in the study area except the common type of birds. No significant long-term residual impacts on fauna due to project. No need to take any mitigation measures in this connection. No effluents are discharged on land or in any water body. There will be no significant impacts on local ecological environment. No endangered species are reported from the core zone (proposed project site) and hence there will be no adverse impact during construction and operation phase. Moreover, analysis of abiotic factors reveals that ambient air and water quality will remain practically unaffected due to proposed project. Due to the development of green belt at the project vicinity, the impact on the ecology will be minimal. The quantification of impacts on project activities and aspects are given here.

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**TABLE 4.32 – PHASE WISE DIRECT AND INDIRECT IMPACTS ON ECOLOGICAL ASPECTS IDENTIFIED FROM PRIMARY AND SECONDARY DATA**

| <b>Ecological aspects</b>                                                                                                                                                           | <b>Construction</b>                    | <b>Commissioning</b> | <b>Regular Operation</b>                                                                   | <b>Overall impact</b> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------|--------------------------------------------------------------------------------------------|-----------------------|
| Species diversity and population reduction                                                                                                                                          | Nil                                    | No reduction         | No reduction                                                                               | 0                     |
| Habitat loss or fragmentation (Terrestrial and Aquatic)                                                                                                                             | No faunal habitat present in core zone | Nil                  | Nil                                                                                        | 0                     |
| Any impairment of ecological functions such as (i) disruption of food chains, (ii) decline in species population and or (iii) alterations in predator-prey relationships (Food web) | Nil                                    | Nil                  | Nil                                                                                        | 0                     |
| Changes to ecosystem services                                                                                                                                                       | Nil                                    | Nil                  | Nil                                                                                        | 0                     |
| Creating change in the natural environment that unbalances the natural order of the ecosystem                                                                                       | Nil                                    | Nil                  | Nil                                                                                        | 0                     |
| Man-made structures that may directly impact species                                                                                                                                | Nil                                    | Nil                  | Nil                                                                                        | 0                     |
| The spread of invasive alien species that can disrupt natural environments                                                                                                          | Nil                                    | Nil                  | The anthropogenic factors moving for transporting Hazardous waste.                         | -1                    |
| Changes in the environmental processes (river flow or levels, erosion control etc.)                                                                                                 | Nil                                    | Nil                  | Nil                                                                                        | 0                     |
| Pollution introduced into the ecosystem be it in the air, water or soil                                                                                                             | Nil                                    | Nil                  | PM, HCl and NOx from stacks attached to incinerator and PM, SOx and NOx from DG set stack. | 0                     |
| Greenbelt development/ Aesthetic and ecological values                                                                                                                              | Yes                                    | Yes                  | Yes                                                                                        | +2                    |
| Immediate impact zone 0 to                                                                                                                                                          | Yes                                    | No                   | No                                                                                         | -0.5                  |

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| Ecological aspects       | Construction   | Commissioning | Regular Operation | Overall impact |
|--------------------------|----------------|---------------|-------------------|----------------|
| project site boundary    |                |               |                   |                |
| impact upto 5km          | Yes (Moderate) | No            | No                | -0.5           |
| impact from 5km to 7km   | No             | No            | No                | 0              |
| impact from 7km to 10 km | No             | No            | No                | 0              |
| <b>Total score</b>       |                |               |                   | 0              |

From the above table, it is very clear that proposed activity shall not impact on the biodiversity of the region. Hence, it is recommended to proposed project in the proposed locality by following certain conservation measures. However, some positive impacts of the proposed unit are enriching the habitat and species with greenbelt activities in core and buffer region will enhance the beauty of the surrounding region.

#### ❖ **Impact interpretation:**

From the above table, it is very clear that proposed activity shall not impact on the biodiversity of the region. Hence, it is recommended to construct the proposed project in the proposed locality by following certain conservation measures. However, habitat and species conservation at large scale may give some benefits to the surrounding region. From the baseline data analysis, it was observed the following points:

There are few floral species having Commercial, edible, medicinal and ornamental values apart from ecosystem balancing and aesthetic values in natural vegetation around villages.

**TABLE 4.33 – IMPACTS IDENTIFIED (DIRECT AND INDIRECT) AND MITIGATION MEASURES PROPOSED**

| Impacts identified                                                                                                                                                                                                                                      | Mitigation measures proposed                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Direct Impacts</b>                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                         |
| No trees are going to be removed and the all the proposed activities are within the existing unit premices. Hence no direct impact on flora and fauna of the study area.                                                                                | Restriction of construction activities to defined project areas, which are ecologically less sensitive. Maintenance of dense greenbelt in and around the project premises.<br>No disposal of effluent and solid & Hazardous waste on land and in water bodies.                                          |
| Major impacts on ecology is due to dust and noise emitted from vehicles transporting the chemicals.                                                                                                                                                     | Regular check on vehicle condition and proper road maintenance of the direct ways.                                                                                                                                                                                                                      |
| <b>Indirect Impacts</b>                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                         |
| Adverse health effects on fauna and enrichment of toxic content in flora due to the Hazardous waste management may occur in case of mishap in operation of transportation & disposal of waste resulting in contamination of soil & air of the mishap or | Training must be given to all staff at regular intervals and creating awareness on ecological importance of each species. All necessary control & measures for prevention of release of toxic contaminants from project as well as for prevention of pollution due to emissions of the project shall be |

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| Impacts identified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Mitigation measures proposed                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>disposal area</p> <p>Persistent odours can cause physiological stress to nearby sensitive plant species. Improperly treated effluents may alter soil pH and increase toxicity, leading to reduced soil fertility and damage to root systems. Release of pollutants (particulate matter, SO<sub>2</sub>, NO<sub>x</sub>, dioxins, furans) can settle on plant leaves, affecting photosynthesis and growth. Deposition of heavy metals (mercury, cadmium, lead) may accumulate in soils, potentially toxic to vegetation. Dioxins, furans, and heavy metals can bioaccumulate in food chains, affecting birds, insects, amphibians, and small mammals. Noise from incinerators, DG sets, and vehicles can disturb nesting and foraging patterns of local fauna. If waste is improperly stored or handled, it may attract scavenging animals (dogs, rodents, birds), potentially spreading diseases. Improperly treated infectious waste can transmit pathogens to animals, some of which may act as disease vectors to humans.</p> | <p>implemented as suggested in other relevant sections of this chapter as well as mentioned in EMP.</p> <p>Few older resistant species will be planted in the greenbelt area.</p> <p>Use advanced air pollution control devices on incinerators.</p> <p>Implement zero-discharge wastewater treatment.</p> <p>Maintain greenbelt development around the facility to act as a buffer for dust and noise.</p> <p>Strict monitoring and maintenance of biomedical waste handling processes.</p> |

#### ❖ **Positive impacts on Ecological aspects:**

Due the plantation activities under Greenbelt will control the dispersal of air pollutants in the surrounding environment. More common varieties of trees which are suitable to the region can be taken into criteria. Involving local villagers in plantation activities and educating the people on importance of biodiversity leads to protection and conservation of flora and fauna in long term.

#### ❖ **Aesthetics**

The beauty of the region will be enhanced through various flowering plants which intern attracts bird species of the region



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#### **4.13 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES OF SOCIO ECONOMIC ENVIRONMENT**

The table below presents a summary of the socio-economic potential environmental impacts/risks from the proposed BMW Project with the recommended impact management and monitoring actions in place (i.e. post-mitigation)

##### **❖ Air Pollution:**

##### **Potential Impacts:**

- Emission of particulate matter, HCl, NO<sub>x</sub>, dioxins and furans from incinerators;
- Odour generation during waste handling.

##### **Mitigation Measures:**

- Installation of advanced Air Pollution Control System consisting of Gas Quencher, Venturi Scrubber, Alkali Scrubber, Activated Carbon Absorption System.
- 30 m high stack for adequate dispersion;
- Continuous Emission Monitoring System (CEMS);
- Compliance with CPCB emission norms;
- Maintaining secondary chamber temperature at 1050°C with 2-second residence time.
- Greenbelt development over 33.4% of plot area.

##### **❖ Water and Waste Water:**

##### **Potential Impacts**

- Contamination due to untreated wastewater;
- Leakage from waste storage areas.

##### **Mitigation Measures**

- Provision of 40 KLD ETP and 5 KLD STP.
- Impervious flooring in storage areas;
- Leachate collection and treatment system;
- Recycling of treated wastewater;
- No untreated discharge outside premises;
- Regular monitoring of groundwater quality.

|                                                  |                                                                      |      |            |
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#### ❖ **Odour and Hygienic Condition:**

##### **Potential Impacts**

- Odour from temporary waste storage
- Public discomfort.

##### **Mitigation Measures**

- Segregated storage rooms
- Timely treatment within 48 hours
- Regular disinfection
- Closed transportation vehicles
- Proper housekeeping and sanitization

#### ❖ **Traffic and Transportation Impacts:**

##### **Potential Impacts**

- Increase in biomedical waste transport vehicles
- Road safety concerns

##### **Mitigation Measures**

- Dedicated covered vehicles with GPS tracking
- Fixed transportation routes
- Vehicle disinfection protocol
- Driver training and emergency response system
- Avoidance of peak traffic movement

#### ❖ **Occupational Health and Safety:**

##### **Potential Impacts**

- Exposure of workers to infectious waste
- Injuries due to sharps
- Heat and machinery hazards

##### **Mitigation Measures**

- PPE for all workers;
- Vaccination programs;
- Health check-up camps;
- Emergency response plan;
- Fire hydrant and fire safety system;
- Training on biomedical waste handling.

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#### ❖ **Noise Pollution:**

##### **Potential Impacts**

- Noise from DG sets, shredders and machinery

##### **Mitigation Measures**

- Acoustic enclosure for DG sets;
- Regular maintenance;
- Greenbelt buffer;
- Use of PPE for workers.

Socio-economic impacts faced by the community living within the study area, cumulative impacts include environmental degradation, poor urban environmental quality, deteriorating air quality, health risks, land use conflicts, infrastructures limitation to economic growth, traffic congestion etc. The mitigation measures are reflected in the table below.

**TABLE 4.34 – SOCIAL & ENVIRONMENTAL IMPACT MANAGEMENT**

| <b>Sr. No.</b> | <b>Activity / Project Phase</b>             | <b>Potential Impact</b>                                                | <b>Nature of Impact</b> | <b>Significance</b> | <b>Mitigation / Enhancement Measures</b>                                                                                                                   |
|----------------|---------------------------------------------|------------------------------------------------------------------------|-------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | Land utilization and industrial development | Change in land use pattern and increased industrial activity           | Neutral                 | Low                 | No displacement or resettlement issues are anticipated. Compliance with land use regulations will be ensured.                                              |
| 2              | Construction phase activities               | Temporary employment opportunities for local workers                   | Positive                | Moderate            | Preference will be given to local labour for construction activities, thereby enhancing local income levels.                                               |
| 3              | Construction labour influx                  | Pressure on local infrastructure such as water, sanitation and housing | Negative                | Low                 | Provision of temporary labour camps with adequate sanitation, drinking water, and waste management facilities to avoid pressure on village infrastructure. |
| 4              | Industrial operation                        | Generation of direct and indirect employment                           | Positive                | High                | Priority will be given to local youth for suitable employment opportunities. Skill                                                                         |

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| <b>Sr. No.</b> | <b>Activity / Project Phase</b>                  | <b>Potential Impact</b>                                             | <b>Nature of Impact</b> | <b>Significance</b> | <b>Mitigation / Enhancement Measures</b>                                                                                                                |
|----------------|--------------------------------------------------|---------------------------------------------------------------------|-------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |                                                  |                                                                     |                         |                     | development and training programs will be encouraged.                                                                                                   |
| 5              | Industrial growth in the region                  | Growth of local economy through service sector and trade            | Positive                | Moderate            | Local procurement of goods and services will be encouraged to support small businesses and vendors in surrounding villages.                             |
| 6              | Increased transportation and industrial activity | Potential disturbance to nearby communities due to traffic movement | Negative                | Low                 | Proper traffic management, designated transport routes, and vehicle maintenance will be implemented to minimize disturbances.                           |
| 7              | Presence of vulnerable groups (SC/ST population) | Need for inclusive development program                              | Neutral                 | Moderate            | Community development programs focusing on SC communities welfare, education, health, and livelihood support will be implemented under CSR initiatives. |
| 8              | Population growth due to industrialization       | Increased demand for health and education facilities                | Neutral                 | Moderate            | Support to local schools, health camps, and community infrastructure through CSR activities.                                                            |
| 9              | Occupational exposure risks                      | Health and safety concerns for workers                              | Negative                | Moderate            | Strict adherence to occupational health and safety measures, provision of PPE, periodic health check-ups, and safety training programs.                 |
| 10             | Industrial presence in region                    | Improvement in infrastructure and connectivity                      | Positive                | Moderate            | Participation in community infrastructure development such as roads, sanitation, and drinking water facilities through CSR initiatives.                 |

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| Sr. No. | Activity / Project Phase     | Potential Impact                         | Nature of Impact | Significance | Mitigation / Enhancement Measures                                                                                                                         |
|---------|------------------------------|------------------------------------------|------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11      | Local community expectations | Potential grievances or social conflicts | Negative         | Low          | Establishment of a Grievance Redressal Mechanism (GRM) for addressing community concerns in a transparent manner.                                         |
| 12      | CSR / CER implementation     | Improvement in socio-economic conditions | Positive         | High         | Implementation of CSR activities focusing on education, healthcare, skill development, women empowerment, and environmental awareness in nearby villages. |

## Impacts Assessment Methodology

### Scoring the Impact Severity / Consequence

**TABLE 4.35 – OVERALL IMPACT SCORING SYSTEM DUE TO THE PROPOSED PROJECT**

| Sr. No. | Activity / Project Phase                  | Nature       | Magnitude    | Score | Impact Category  | Remarks                                   |
|---------|-------------------------------------------|--------------|--------------|-------|------------------|-------------------------------------------|
| 1       | Land Utilization & Industrial Development | Neutral (0)  | Low (1)      | 0     | Insignificant    | Located in industrial area; no R&R impact |
| 2       | Construction Phase Employment             | Positive (+) | Moderate (2) | 2     | Beneficial       | Temporary livelihood generation           |
| 3       | Labour Influx Pressure                    | Negative (-) | Low (1)      | -1    | Minor Adverse    | Managed through labour camp facilities    |
| 4       | Industrial Operation Employment           | Positive (+) | High (3)     | 3     | Major Beneficial | Long-term employment generation           |
| 5       | Regional Economic Growth                  | Positive (+) | Moderate (2) | 2     | Beneficial       | Boost to local trade & services           |
| 6       | Transportation Disturbance                | Negative (-) | Low (1)      | -1    | Minor Adverse    | Traffic management reduces impact         |
| 7       | Vulnerable Group Inclusion                | Neutral (0)  | Moderate (2) | 0     | Manageable       | CSR ensures inclusivity                   |

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| Sr. No. | Activity / Project Phase           | Nature       | Magnitude    | Score | Impact Category  | Remarks                          |
|---------|------------------------------------|--------------|--------------|-------|------------------|----------------------------------|
| 8       | Demand on Social Infrastructure    | Neutral (0)  | Moderate (2) | 0     | Manageable       | Balanced via CSR support         |
| 9       | Occupational Health & Safety Risks | Negative (-) | Moderate (2) | -2    | Moderate Adverse | Controlled with OHS measures     |
| 10      | Infrastructure Improvement         | Positive (+) | Moderate (2) | 2     | Beneficial       | Improved connectivity            |
| 11      | Community Grievances               | Negative (-) | Low (1)      | -1    | Minor Adverse    | GRM minimizes risks              |
| 12      | CSR / CER Activities               | Positive (+) | High (3)     | 3     | Major Beneficial | Strong socio-economic upliftment |

Overall Impact Interpretation

Total Positive Score=+12

Total Negative Score=-5

Net Impact Score=+7 (Overall Positive Impact)

**TABLE 4.36 – ISSUES RAISED DURING COMMUNITY CONSULTATION**

| Social Component | Issues Raised / Problems in Surrounding Areas                                                                                                                                                                                                                                                                      | Mitigation / Enhancement Measures by Proposed Bio-Medical Treatment Facility Operator                                                   |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Health & Hygiene | i. Concern regarding spread of infections, odour, and air pollution from bio-medical waste handling.<br>ii. Fear of health impacts on nearby villagers, children, elderly people, and sensitive groups.<br>iii. Increase in vectors such as flies, mosquitoes, and stray animals if waste is not handled properly. | i. The facility will operate strictly as per the guidelines of Central Pollution Control Board and State Pollution Control Board norms. |
|                  |                                                                                                                                                                                                                                                                                                                    | ii. All bio-medical waste will be segregated, stored, transported, treated, and disposed through scientific methods.                    |
|                  |                                                                                                                                                                                                                                                                                                                    | iii. Regular disinfection, fumigation, odour control systems, and pest control measures will be implemented.                            |
|                  |                                                                                                                                                                                                                                                                                                                    | iv. Continuous environmental monitoring for air quality, emissions, and hygiene conditions will be carried out.                         |

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| <b>Social Component</b>       | <b>Issues Raised / Problems in Surrounding Areas</b>                                                                                                                                                | <b>Mitigation / Enhancement Measures by Proposed Bio-Medical Treatment Facility Operator</b>                                                                       |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               |                                                                                                                                                                                                     | v. Health awareness and periodic medical camps will be organized for nearby communities.                                                                           |
| Drinking Water                | i. Concern about contamination of groundwater and nearby water bodies due to facility operations.<br>ii. Possibility of leachate or untreated wastewater affecting village water sources.           | i. A proper Effluent Treatment Plant (ETP) and sewage treatment system will be installed and maintained.                                                           |
|                               |                                                                                                                                                                                                     | ii. No untreated wastewater will be discharged outside the premises.                                                                                               |
|                               |                                                                                                                                                                                                     | iii. Impervious flooring, covered drainage systems, and leak-proof storage arrangements will be provided.                                                          |
|                               |                                                                                                                                                                                                     | iv. Periodic groundwater and surface water quality monitoring will be conducted in surrounding villages.                                                           |
| Education & Community Welfare | i. Local schools and institutions may require awareness regarding bio-medical waste hazards and safety practices.<br>ii. Need for support to nearby public infrastructure and community facilities. | i. The project proponent will undertake awareness programs in schools and villages regarding hygiene, sanitation, and safe waste management practices.             |
|                               |                                                                                                                                                                                                     | ii. Support under CSR activities may be provided for schools, sanitation facilities, solar lighting, drinking water, and educational materials in nearby villages. |
| Sanitation & Waste Management | i. Existing sanitation and solid waste management systems in nearby villages are inadequate.<br>ii. Concern regarding improper disposal during transportation or accidental spillage.               | i. The facility will use GPS-enabled covered vehicles for safe transportation of bio-medical waste.                                                                |
|                               |                                                                                                                                                                                                     | ii. Emergency response procedures and spill management systems will be implemented.                                                                                |
|                               |                                                                                                                                                                                                     | iii. Waste storage areas will be secured, ventilated, and regularly sanitized.                                                                                     |
|                               |                                                                                                                                                                                                     | iv. Coordination with local authorities and Panchayats will be maintained for sanitation improvement programs.                                                     |
| Employment                    | i. Expectation of employment opportunities for local population during construction and operation phases.<br>ii. Requirement for skill development and training for local youth.                    | i. Preference will be given to eligible local people for suitable employment opportunities.                                                                        |
|                               |                                                                                                                                                                                                     | ii. Training programs on safety, housekeeping, plant operations, and waste handling will be conducted for workers and local youth.                                 |

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| <b>Social Component</b>         | <b>Issues Raised / Problems in Surrounding Areas</b>                                                                                                              | <b>Mitigation / Enhancement Measures by Proposed Bio-Medical Treatment Facility Operator</b>                                    |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Transportation & Infrastructure | i. Increased movement of waste collection vehicles may affect local roads and traffic conditions.<br>ii. Concern about accidental spillage during transportation. | i. Dedicated transportation routes and timings will be followed to minimize public disturbance.                                 |
|                                 |                                                                                                                                                                   | ii. Vehicles will comply with authorized bio-medical waste transport regulations and safety standards.                          |
|                                 |                                                                                                                                                                   | iii. Regular vehicle maintenance and driver safety training will be ensured.                                                    |
|                                 |                                                                                                                                                                   | iv. Immediate response mechanisms will be maintained for any transportation-related emergency.                                  |
| Environmental Safety            | i. Concern regarding emissions from incineration and impact on surrounding environment.<br>ii. Noise and dust generation during construction activities.          | i. Air pollution control devices such as scrubbers, filters, and monitoring systems will be installed with the treatment units. |
|                                 |                                                                                                                                                                   | ii. Stack emissions will be maintained within prescribed environmental standards.                                               |
|                                 |                                                                                                                                                                   | iii. Greenbelt development around the project boundary will be carried out to minimize environmental impacts.                   |
|                                 |                                                                                                                                                                   | iv. Construction activities will be managed with dust suppression and noise control measures.                                   |



|                                                  |                                          |      |            |
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| Title                                            | Chapter 5: Analysis of Alternatives      | Date | 08/06/2026 |

## CHAPTER 5: ANALYSIS OF ALTERNATIVES

The analysis of alternatives is a critical component of the Environmental Impact Assessment process, aimed at evaluating feasible options in terms of site location, technology, design and project configuration that could minimize environmental and social impacts. This chapter presents a comparative assessment of various alternatives considered during the project planning phase, with the objective of identifying the most environmentally, technically and economically viable option. The selection of the proposed alternative is based on a holistic evaluation of environmental sensitivity, resource availability, regulatory compliance, operational feasibility and sustainability.

### 5.1 SITE ALTERNATIVES

M/s. Navabuddha Agencies Private Limited is proposing to establish a new Common Bio-Medical Waste Treatment Facility (CBMWTF) at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110 within a total plot area of 49,049.99 m<sup>2</sup>.

Location of the site was decided based on following criteria:

1. Ease of availability of fresh water.
2. Availability of uninterrupted power.
3. Availability of manpower from local area.
4. Good road connectivity.

**TABLE 5.1 - COMPLIANCE OF THE SITE AS PER CPCB GUIDELINES**

| Sr. No. | Parameter                                                  | Criteria                                  | Remarks                                          |
|---------|------------------------------------------------------------|-------------------------------------------|--------------------------------------------------|
| 1       | Preferable distance from Human Habitation (m)              | Preferably should not be within 500 m     | Kallai village at distance of around 1.09 km (E) |
| 2       | Distance from Highway(km)                                  | Ease of access to road for transportation | SH 71 at distance of around 7.0 km (W)           |
| 3       | Land Requirement                                           | 1 Acre = 4,046.8 m <sup>2</sup>           | Total Area: 49,049.99 m <sup>2</sup>             |
| 4       | Presence of monuments / religious structures               | Not suitable                              | Not within project site.                         |
| 5       | Protected Area / Sanctuaries / Ecologically Sensitive Area | Should not be Present within study area   | Not within 10 km radius of the project site.     |

(Ref: - CPCB Guidelines for Site Selection)

|                                                  |                                          |      |            |
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## 5.2 ANALYSIS OF ALTERNATIVE TECHNOLOGIES

While selecting technology for handling, segregation, transportation, storage and setting up of CBMWTF, CPCB guidelines will be followed. Well-established and proven technology is proposed to install for the facility.

For disinfection of Bio-Medical waste:

- Autoclave method is well established and proven and thus it is selected.
- Chemical disinfection method is rejected as it needs handling of hazardous chemicals.
- Microwave disinfection method is comparable with Autoclave technology for disinfection however, it will incur higher capital investment and operating cost. Hence, microwave technology is rejected.

For thermal destruction, comparison of two technologies were considered i.e. incineration and plasma gasification.

- Incineration is a controlled combustion process, where waste is completely oxidized and harmful microorganisms present in it are destroyed/denatured under high temperature.
- Plasma gasification is high temperature waste destruction technology, where waste is gasified and basic organic component of waste is converted to syngas consisting of CO and H<sub>2</sub>. Inorganic part of waste is converted to molten slag. This process operates at temperature as high as 1400 °C with plasma plume temperature as high as 5000 °C. Plasma gasification process operates under oxygen starved atmosphere and does not form dioxin and furan in destruction zone. Syngas thus formed is cleaned in air pollution control system consisting of venturi scrubber and packed bed scrubber for removal of particulate matter and acidic gases. Syngas after cleaning is used as fuel in hot water generator or for steam generator as a fuel. Technically plasma gasification scores over standard incineration technology. But considering the economic viability incineration technology is proposed.
- Capital cost and operating cost of plasma gasification unit is much higher than incineration system. Reliability of operation of plasma gasification unit is yet to establish over incineration system. Thus, on this ground plasma gasification technology is rejected and stationary & rotary incineration technology is selected.
- Air controlled fired incinerator is selected considering its techno-economic feasibility and viability amongst above mentioned alternative technologies.

Thus, at proposed CBMWTF, following technologies are selected

- Autoclave followed by shredding for metal sharps
- Autoclave for Glass and metal implants.

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- Stationary & Rotary Incinerator for Anatomical waste, solid waste and chemical waste etc. (Yellow waste)

❖ **Integrated Waste Management Using 4-R Principles (Reduce, Reuse, Recycle, Recover)**

The unit is well aware of the negative impacts of industrial activities on the environment. Therefore, it will make additional efforts to implement the 4-R principle (Reduce, Reuse, Recycle, Recover) wherever and whenever applicable, as it contributes to both environmental protection and economic feasibility.

**TABLE 5.2 - APPLICABILITY OF 4-R PRINCIPLES IN PLANT PREMISES**

| <b>Reduce</b>                                                                                                                                                                                                                                                                | <b>Reuse</b>                                                                                                                                                                                                              | <b>Recycle</b>                                                                                                                                                                                                                                                                                                                                                                 | <b>Recover</b>                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Industrial Effluent will be treated in effluent treatment plant having Primary Secondary and Tertiary Treatment by which fresh water requirement will be reducing to 94.7 KLD from total water requirement of 132.4 KLD.</li> </ul> | <ul style="list-style-type: none"> <li>• Unit has proposed to reuse rain water by rain water harvesting system.</li> <li>• Around 39 KLD rainwater will be stored and it will be reused within plant premises.</li> </ul> | <ul style="list-style-type: none"> <li>• Unit has proposed to recycle 37.7 KLD treated water from in house ETP having Primary, Secondary and Tertiary treatment units to reduce fresh water requirement.</li> <li>• Unit has proposed to send hazardous waste i.e., plastic waste, glass and metallic body, used batteries, waste oil etc. to authorized recyclers.</li> </ul> | <ul style="list-style-type: none"> <li>• Unit has proposed to send plastic waste, glass waste, metal waste to authorized recyclers after providing proper treatment for recovery.</li> </ul> |

Based on the above-mentioned criteria, the unit has conducted an analysis of alternatives, from which the proposed technologies, components, and methodologies have been selected for the establishment of the Common Bio-Medical Waste Treatment Facility (CBMWTF).

|                                                  |                                             |      |            |
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## CHAPTER 6: ENVIRONMENTAL MONITORING PROGRAM

### 6.1 ENVIRONMENTAL MONITORING PROGRAM AND SURVEILLANCE SYSTEM

Based on the baseline data collected on various environmental parameters in the study area and the prediction and assessment of impacts due to the proposed new project, a comprehensive Environmental Monitoring Program is required to be developed, to satisfy the various statutory requirements for discharge of effluent and gaseous emissions from the facility and also to identify the trend of various environmental pollutants.

Environmental monitoring program covers various areas like –

- Ambient air quality
- Water quality
- Effluent quality
- Noise
- Soil characteristics
- Ecology
- Hazardous waste management
- Safety/Health checkup.

Objectives of the Environmental Monitoring Program are given here under:

1. To confirm the statutory compliance.
2. To establish a database for future impact assessment studies.
3. Assessment of the changes in environmental conditions, if any, during the operational phase of the project.
4. Monitoring and tracking the effectiveness of the mitigation measures, which have been implemented.
5. Identification of any significant adverse transformation in environmental condition and plan any additional mitigation measures.

Moreover, the EIA study for any project is carried out over a short period and the data generated and analyzed is usually sufficient enough to predict all variations induced by natural or human activities but not suitable over a period of time. Hence, regular monitoring program is essential to take into account the changes in the environmental quality.

### 6.2 POST PROJECT ENVIRONMENTAL MONITORING PROGRAM

Post Project Environmental Monitoring (PPEM) is an essential mechanism to ensure that environmental safeguards recommended during the EIA process are effectively implemented throughout the **construction** and **operational** phases of the project. This program enables early detection of deviations, facilitates timely corrective actions, and ensures compliance with environmental regulations and commitments made in the Environmental Clearance (EC) and Consent conditions. Further details for the Environmental Monitoring Program is provided in below **TABLE 6.1** and **TABLE 6.2**.

|                                                  |                                             |      |            |
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**TABLE 6.1 – MONITORING POINTS/LOCATIONS & COMPONENTS  
(CONSTRUCTION PHASE)**

| <b>Sr. No.</b> | <b>Environmental Components</b> | <b>Monitoring Regime</b>                                                                                                                                                                                 | <b>Parameters to be monitored during construction phase</b>                                                              |
|----------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 1              | Ambient Air                     | Ambient air quality monitoring to be conducted quarterly at designated location within the plant premises and periphery                                                                                  | PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , CO, NO <sub>x</sub>                                             |
| 2              | Noise                           | At locations with ongoing pile-driving activities, noise levels will be checked regularly at least weekly.                                                                                               | Noise Level dB(A)                                                                                                        |
|                |                                 | In areas with direct contact to equipment usage, noise levels will be checked regularly at least quarterly.                                                                                              | Noise Level dB(A).                                                                                                       |
| 3              | Workplace Safety                | Records of all workplace accidents will be documented and archived. Periodic maintenance of workplace safety instruments.                                                                                | Fire safety equipment's (i.e. fire extinguisher), PPEs, Safety focused culture and Training related to workplace safety. |
| 4              | Hazardous/Solid/ C & D Waste    | A logbook will be kept and maintained on daily basis to record the quantities of any excavated material wastes exported from the project site, including transportation routes and final reuse/disposal. | Used concrete waste , broken bricks and unused steel, woods, Tiles, etc.                                                 |

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**TABLE 6.2 – MONITORING POINTS/LOCATIONS & COMPONENTS, PARAMETERS & FREQUENCY (OPERATION PHASE)**

| <b>Sr. No.</b> | <b>Environmental Components</b> | <b>Nos. of Samples</b> | <b>Monitoring Points/Location</b>                                                                             | <b>Parameters to be Monitored</b>                                                                  | <b>Frequency of Monitoring &amp; Responsible Party</b>                                                                                                                                                                                                          |
|----------------|---------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.             | Flue Gas Emissions              | 1                      | Stack of Incinerator 01 (250 kg/hr)                                                                           | PM, HCl, NO <sub>x</sub> , Hg & compounds, HF, Total Organic Carbon                                | Monitoring will be carried out by NABL accredited/MoEFCC recognized external monitoring agency quarterly.                                                                                                                                                       |
|                |                                 | 1                      |                                                                                                               | Dioxin and Furan                                                                                   | Monitoring will be carried out by NABL accredited/MoEFCC recognized external monitoring agency yearly.                                                                                                                                                          |
|                |                                 | 1                      | Stack of Incinerator 02 (300 kg/hr)                                                                           | PM, HCl, NO <sub>x</sub> , Hg & compounds, HF, Total Organic Carbon                                | Monitoring will be carried out by NABL accredited/MoEFCC recognized external monitoring agency quarterly.                                                                                                                                                       |
|                |                                 | 1                      |                                                                                                               | Dioxin and Furan                                                                                   | Monitoring will be carried out by NABL accredited/MoEFCC recognized external monitoring agency yearly.                                                                                                                                                          |
|                |                                 | 1                      | Stack of DG sets (250 KVA x 2 nos.)                                                                           | PM, SO <sub>2</sub> , NO <sub>x</sub>                                                              | Monitoring will be carried out by NABL accredited/MoEFCC recognized external monitoring agency quarterly.                                                                                                                                                       |
| 2.             | Ambient Air Monitoring          | 1                      | Near incinerator stack                                                                                        | PM <sub>2.5</sub> & PM <sub>10</sub> , SO <sub>2</sub> , HCl, NO <sub>x</sub> , CO, VOC and Odour. | Monitoring will be carried out by NABL accredited/MoEFCC recognized external monitoring agency every month.                                                                                                                                                     |
|                |                                 | 1                      | Near admin office                                                                                             |                                                                                                    |                                                                                                                                                                                                                                                                 |
|                |                                 | 1                      | Near Hazardous Waste Storage Area                                                                             |                                                                                                    |                                                                                                                                                                                                                                                                 |
|                |                                 | 3                      | Nearby 3 villages i.e., one in upwind direction and one in downwind direction and one in crosswind direction. |                                                                                                    | Monitoring will be carried out by NABL accredited/MoEFCC recognized external monitoring agency quarterly.<br><br>(Villages for monitoring are subjected to change and are selected based on the dispersion of pollutants or seasonal variation in wind pattern) |
| 3              | Ambient Noise                   | 6                      | Near Security Gate                                                                                            | Noise levels in dB (A)                                                                             | Monitoring will be carried out by NABL                                                                                                                                                                                                                          |

|                                                  |                                             |      |            |
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| Sr. No. | Environmental Components    | Nos. of Samples | Monitoring Points/Location                                                                                                  | Parameters to be Monitored                                                                                   | Frequency of Monitoring & Responsible Party                                                                                                                                                                                                                         |
|---------|-----------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | Levels                      |                 | Near Admin Office<br>Near DG set<br>Near ETP area<br>Near incinerator area<br>Near Parking area                             | (Day & Night)                                                                                                | accredited/MoEFCC recognized external monitoring agency quarterly for day & night.<br><b>OR</b><br>Inhouse Laboratory                                                                                                                                               |
| 4.1     | Ground Water Quality        | 1               | Kallai Village                                                                                                              | As per IS 10500:2012                                                                                         | Monitoring will be carried out by NABL accredited/MoEFCC recognized external monitoring agency twice in year.<br><br>(Villages for monitoring are subjected to change and are selected based on the dispersion of pollutants or seasonal variation in wind pattern) |
|         |                             | 1               | Perur Udayapatti Village                                                                                                    |                                                                                                              |                                                                                                                                                                                                                                                                     |
| 4.2     | Effluent Quality Monitoring | 1               | Inlet of ETP                                                                                                                | pH, Suspended solids, COD, BOD, TSS, Oil & Grease, Bio-Assay Test.                                           | On monthly basis by external MoEFCC recognized / NABL accredited laboratory.<br><b>OR</b><br>Inhouse Laboratory.                                                                                                                                                    |
|         |                             | 1               | Outlet of ETP                                                                                                               |                                                                                                              |                                                                                                                                                                                                                                                                     |
| 5       | Effluent Quantity           | 1               | Inlet of ETP                                                                                                                | Quantity in KL/day                                                                                           | Daily Monitoring of effluent quantity shall be measures through flow meters and records of the same shall be maintained on regular basis.                                                                                                                           |
|         |                             | 1               | Outlet of ETP                                                                                                               |                                                                                                              |                                                                                                                                                                                                                                                                     |
| 6       | Soil                        | 1               | At one location within premises i.e. from hazardous waste storage area.<br><br>In case of accidental spillage/leak, soil of | Texture Analysis, Sand, Silt, Clay, Porosity, SAR, CEC, pH Value, Electrical Conductivity, Moisture Content, | Once in year monitoring will be carried out by NABL accredited/MoEFCC recognized external monitoring agency.                                                                                                                                                        |

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| <b>Sr. No.</b> | <b>Environmental Components</b>  | <b>Nos. of Samples</b> | <b>Monitoring Points/Location</b>                                         | <b>Parameters to be Monitored</b>                                                                                                                                      | <b>Frequency of Monitoring &amp; Responsible Party</b>                                                                            |
|----------------|----------------------------------|------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|                |                                  |                        | the affected area from various spots & depth                              | Exchangeable Calcium,<br>Exchangeable Magnesium,<br>Exchangeable Sodium,<br>Exchangeable Potassium,<br>Water Holding Capacity, Bulk Density                            |                                                                                                                                   |
| 7              | Hazardous Waste                  | 1                      | ETP sludge                                                                | pH, moisture, Loss on ignition, inorganic solids, suspended solids, Oil & Grease, BOD, COD                                                                             | Once in year monitoring will be carried out by NABL accredited/MoEFCC recognized external monitoring agency.                      |
|                |                                  | 1                      | Incineration ash                                                          |                                                                                                                                                                        |                                                                                                                                   |
| 8              | Work Zone Environment            | 1                      | Near Incinerator area                                                     | SO <sub>2</sub> , NO <sub>x</sub> , HCl, TOC, VOC, CO, HF                                                                                                              | Monitoring will be carried out by NABL accredited/MoEFCC recognized external monitoring agency quarterly                          |
|                |                                  | 1                      | Waste Storage area                                                        |                                                                                                                                                                        |                                                                                                                                   |
| 9              | Employee Medical/Health Check-up | 50                     | All employees                                                             | As per statutory provision & requirement:<br><br>PFT, Urine and Blood examination, Liver Function tests, chest X-ray, Audiometry, Spirometry Vision testing, ECG, etc. | Yearly, through approved medical officer and doctor as per Occupational Health Safety (OHS) Plan                                  |
| 10             | Greenbelt                        | -                      | Effective green belt within the premises and on periphery of the premises | Survival rate of the trees                                                                                                                                             | Monitoring will be carried out by in house gardener quarterly.<br><br>Monitoring will be carried out by external expert annually. |



|                                                  |                                             |      |            |
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### 6.2.1 Reporting Schedule and Documentation

Records of the monitoring program will be kept on regular basis for all aspects of the monitoring. Separate records for water, wastewater, solid waste, air-emission, and soil sample analysis and occupational health records will be prepared and preserved regularly.

Immediately upon the completion of monitoring as per the planned schedule, report will be prepared and necessary documents will be forwarded to the concern person. Methodology of monitoring (Sampling and Analysis) will be prepared as separate documents as Standard Operating Procedure (SOP) wherever required.

Environmental statements and/or performance report/compliance report/audit report as per conditions of Environmental Clearance (EC) and Consolidated Consent to Authorization (CCA) will be prepared and submitted to the concern authority as per the guidelines provided by the authorities within the stipulated time frame. CCA and other statutory permission/consents must be obtained and renewed timely as per legal provision and guidelines in operation phase.

Reporting of accident and other requirements will be made in prescribed format well within stipulated time frame as per statutory requirements and guidelines.

### 6.2.2 Budgetary Provisions

To ensure effective implementation of the Environmental Monitoring Program, a dedicated budget will be allocated during both the construction and operational phases. This budget will cover expenses related to environmental monitoring, laboratory analysis, maintenance of pollution control systems, training, documentation and compliance reporting.

It will also include provisions for third-party monitoring, SOP development, environmental audits and statutory fees for obtaining and renewing consents and authorizations. The budget will be reviewed periodically to ensure alignment with regulatory requirements and site-specific needs.

Detailed Breakup for budgetary provision for the above-mentioned Environmental Monitoring Plan has been provided below in **TABLE 6.3** for construction phase.

|                                                  |                                             |      |            |
|--------------------------------------------------|---------------------------------------------|------|------------|
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**TABLE 6.3 - DETAILED BREAK UP OF BUDGET FOR ENVIRONMENTAL MONITORING PLAN (CONSTRUCTION PHASE)**

| Sr. No. | Environmental Components | No. of Location | Frequency                                                | Quantity per annum | Budget per Environmental Components (Rs.) | Total Budget (Rs./year) |
|---------|--------------------------|-----------------|----------------------------------------------------------|--------------------|-------------------------------------------|-------------------------|
| 1       | Ambient Air              | 2               | 2 Locations at Project site, Once in three months, 4*2=8 | 8                  | ₹ 5,000/-                                 | ₹ 40,000/-              |
| 2       | Noise                    | 2               | Weekly at 2 locations at Project site: 52*2=104          | 104                | ₹ 500/-                                   | ₹ 52,000/-              |
|         |                          | 2               | At 2 locations Once in 3 months 2*4=8                    | 8                  | 500/-                                     | 4,000/-                 |
| Total   |                          |                 |                                                          |                    |                                           | ₹ 96,000/-              |

**Note:** Above budget is tentative and subject to change on actual basis.

The environmental monitoring requirements during the construction phase are largely focused on short-term impacts such as dust generation, noise levels and solid waste handling. However, as the project progresses into the operational phase, the focus of monitoring shifts significantly towards process-related emissions, occupational health and long-term environmental sustainability. Hence, a separate and more comprehensive budgetary provision is required for the operational phase.

During the operational phase, continuous and comprehensive environmental monitoring is essential to ensure compliance with statutory norms, maintain environmental quality and manage potential environmental risks. Monitoring will include regular sampling, analysis and reporting of air emissions, water and wastewater parameters, hazardous and solid waste management and workplace health and safety. Further, budget allocation for post project environmental monitoring of operation phase is provided below in **TABLE 6.4**.

|                                                  |                                             |      |            |
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**TABLE 6.4 - DETAILED BREAK UP OF BUDGET FOR ENVIRONMENTAL MONITORING PLAN (OPERATION PHASE)**

| Sr. No. | Environmental Components | Nos. of Samples | Monitoring Points/Location                                                                                    | Frequency                         | Quantity per year | Budget Per Unit (Rs.) | Total Budget (Rs.) |
|---------|--------------------------|-----------------|---------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------|-----------------------|--------------------|
| 1.      | Flue Gas Emissions       | 1               | Stack of Incinerator 01<br>(250 kg/hr)                                                                        | 1 stack Quarterly<br>= 1 * 4      | 4                 | ₹ 3,500/-             | ₹ 14,000/-         |
|         |                          | 1               |                                                                                                               | 1 stack Yearly<br>= 1 * 1         | 1                 | ₹ 2,00,000/-          | ₹ 2,00,000/-       |
|         |                          | 1               | Stack of Incinerator 02<br>(300 kg/hr)                                                                        | 1 stack Quarterly<br>= 1 * 4      | 4                 | ₹ 3,500/-             | ₹ 14,000/-         |
|         |                          | 1               |                                                                                                               | 1 stack Yearly<br>= 1 * 1         | 1                 | ₹ 2,00,000/-          | ₹ 2,00,000/-       |
|         |                          | 1               | Stack of DG set-1 (250 KVA) &<br>DG set-2 (250 KVA)                                                           | 1 stack Quarterly<br>= 1 * 4      | 4                 | ₹ 3,500/-             | ₹ 14,000/-         |
| 2.      | Ambient Air Monitoring   | 1               | Near incinerator stack                                                                                        | 6 locations Quarterly<br>=6*4     | 24                | ₹ 5,000/-             | ₹ 1,20,000/-       |
|         |                          | 1               | Near admin office                                                                                             |                                   |                   |                       |                    |
|         |                          | 1               | Near Hazardous Waste Storage Area                                                                             |                                   |                   |                       |                    |
|         |                          | 3               | Nearby 3 villages i.e., one in upwind direction and one in downwind direction and one in crosswind direction. |                                   |                   |                       |                    |
| 3       | Ambient Noise Levels     | 6               | Near Security Gate                                                                                            | 6 locations Quarterly<br>=6*4     | 24                | ₹ 500/-               | ₹ 12,000/-         |
|         |                          |                 | Near Admin Office                                                                                             |                                   |                   |                       |                    |
|         |                          |                 | Near DG set                                                                                                   |                                   |                   |                       |                    |
|         |                          |                 | Near ETP area                                                                                                 |                                   |                   |                       |                    |
|         |                          |                 | Near incinerator area                                                                                         |                                   |                   |                       |                    |
|         |                          |                 | Near Parking area                                                                                             |                                   |                   |                       |                    |
| 4.1     | Ground Water Quality     | 1               | Kallai Village                                                                                                | 2 locations twice in year<br>=2*2 | 4                 | ₹ 3,500/-             | ₹ 14,000/-         |
|         |                          | 1               | Perur Udayapatti Village                                                                                      |                                   |                   |                       |                    |

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| Sr. No.      | Environmental Components         | Nos. of Samples | Monitoring Points/Location                                                                                                                                               | Frequency                              | Quantity per year | Budget Per Unit (Rs.) | Total Budget (Rs.)  |
|--------------|----------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------|-----------------------|---------------------|
| 4.2          | Effluent Quality Monitoring      | 1               | Inlet of ETP                                                                                                                                                             | 2 Locations Monthly<br>= 2 * 12        | 24                | ₹ 3,500/-             | ₹ 84,000/-          |
|              |                                  | 1               | Outlet of ETP                                                                                                                                                            |                                        |                   |                       |                     |
| 5            | Soil                             | 1               | At one location within premises i.e. from hazardous waste storage area.<br><br>In case of accidental spillage/leak, soil of the affected area from various spots & depth | 1 Location Yearly<br>= 1 * 1           | 1                 | ₹ 5,000/-             | ₹ 5,000/-           |
| 6            | Hazardous Waste                  | 1               | ETP sludge                                                                                                                                                               | 2 Location Yearly<br>= 2 * 1           | 2                 | ₹ 1,000/-             | ₹ 2,000/-           |
|              |                                  | 1               | Incineration ash                                                                                                                                                         |                                        |                   |                       |                     |
| 7            | Work Zone Environment            | 1               | Near Incinerator area                                                                                                                                                    | 2 locations Quarterly<br>=2*4          | 8                 | ₹ 1000/-              | ₹ 8,000/-           |
|              |                                  | 1               | Waste Storage area                                                                                                                                                       |                                        |                   |                       |                     |
| 8            | Employee Medical/Health Check-up | 50              | All employees                                                                                                                                                            | Twice in a year for 50 employees: 50*2 | 100               | ₹ 1000/-              | ₹ 1,00,000/-        |
| <b>Total</b> |                                  |                 |                                                                                                                                                                          |                                        |                   |                       | <b>₹ 7,87,000/-</b> |

**Note:** Above mentioned budget is tentative and subjected to change as per the actual scenario.

A Post-Project Environmental Monitoring Plan plays a vital role in ensuring continued compliance with statutory environmental conditions and maintaining ecological balance. It facilitates early detection of any deviations in environmental quality, enabling timely corrective actions. By providing consistent and reliable data on air, water, noise and soil, it supports informed decision-making and enhances operational efficiency. Moreover, it fosters transparency, strengthens stakeholder trust and ensures preparedness for regulatory audits. Ultimately, such a monitoring plan contributes to the project's long-term sustainability and reinforces its commitment to environmental stewardship.

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## CHAPTER 7: ADDITIONAL STUDIES

In order to support the Environment Impact Assessment and Environment Management Plan, following additional studies have been included in this report.

- **Risk Assessment**
- **Disaster Management Plan (On-Site Emergency Plan & Off-site Emergency Plan)**
- **Occupational Health Program**
- **Public Consultation**

### 7.1 INTRODUCTION TO RISK ASSESSMENT

This chapter presents the additional studies carried out as part of the Environmental Impact Assessment (EIA) for the proposed project of Common Bio-Medical Waste Treatment Facility (CBMWTF) of M/s. Navabuddha Agencies Private Limited. The studies include Risk Assessment, Disaster Management Plan (DMP), Occupational Health & Safety, and Public Consultation. The objective of these studies is to identify potential hazards, evaluate associated risks, and propose mitigation measures in line with guidelines of CPCB, MoEFCC, and international best practices such as CCPS (Purple Book). The findings of this chapter form the basis for emergency preparedness planning and risk minimization strategies to ensure protection of human health, environment, and property.

#### 7.1.1 Objective of Risk Assessment

The primary objective of the Risk Assessment study is to systematically identify, evaluate, and mitigate potential risks associated with the proposed project of the Common Bio-Medical Waste Treatment Facility (CBMWTF) of M/s. Navabuddha Agencies Private Limited.

The specific objectives are as follows:

- To identify potential hazards associated with handling, storage, transportation, and treatment of bio-medical waste.
- To evaluate the likelihood and consequences of accidental scenarios involving fire, explosion, and toxic releases.
- To assess potential impacts on plant personnel, surrounding population, property, and environment.
- To develop appropriate risk mitigation and control measures to reduce risk to acceptable levels.
- To provide inputs for preparation of On-site and Off-site Emergency Plans.

To comply the legal requirement by various safety and environment laws of the country like...

- The Factories Act, 1948
- The Environment Protection Act and Rules, 1986
- Hazardous waste (Management and Handling) Rules, 2016
- Public Liability Insurance Act and Rules, 1991
- Chemical Accident, (Emergency, planning, preparedness and response) Rules, 1996

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### 7.1.2 Plant Layout

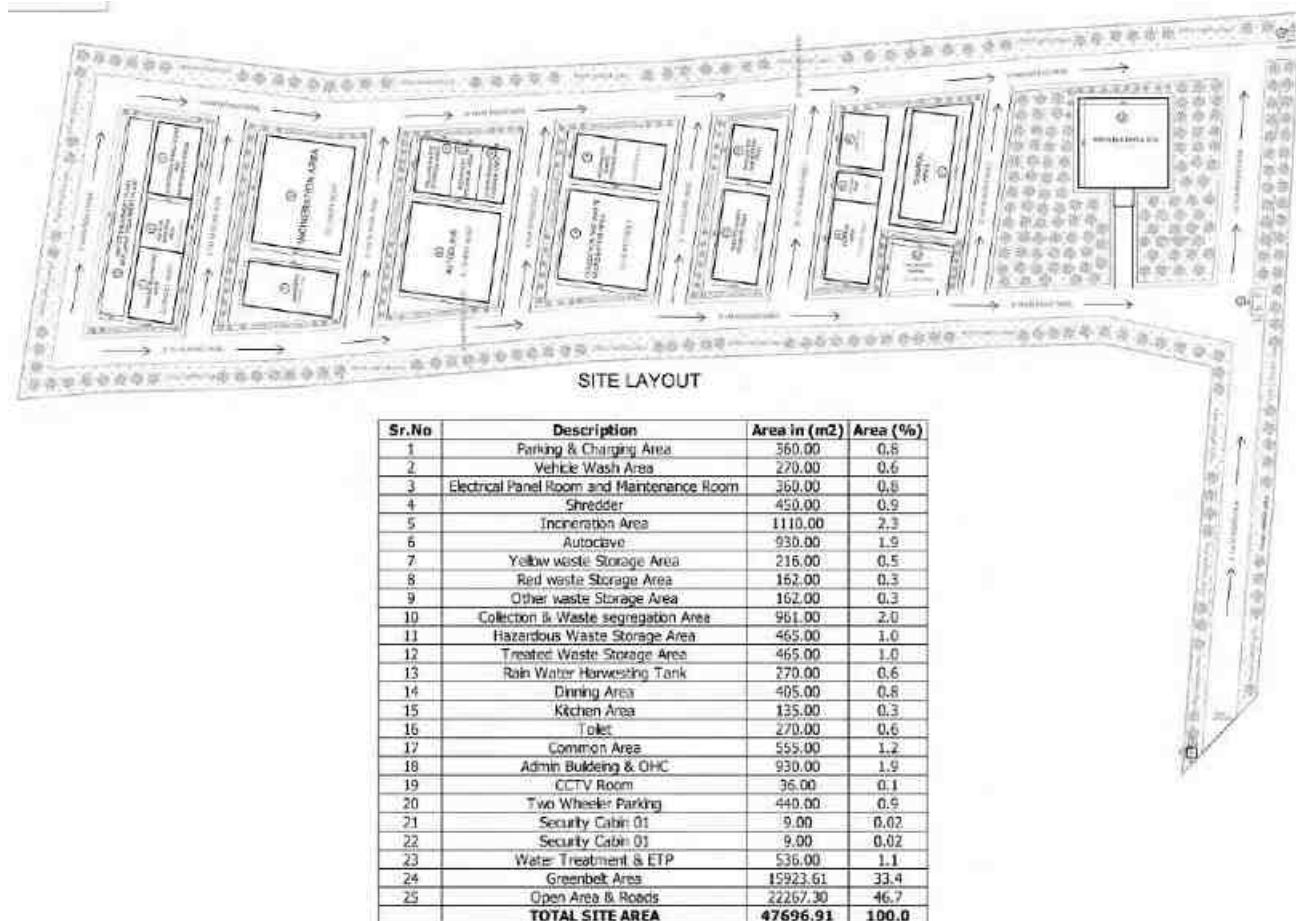


**FIGURE 7.1– PLANT LAYOUT OF M/S. NAVABUDDHA AGENCIES PRIVATE LIMITED**

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**TABLE 7.1 – LIST OF INVENTORIES**

| Sr. No. | Category of Waste | Dedicated Area for storage of waste upto 24 Hours                                                                                             | Method of disposal                                                                                                                                          |
|---------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Yellow            | Type: Storage Room Provided with Bottom RCC, Impervious Floor, Side Wall and Top Roof / Shed / Slab.<br>Dimension: 18 m x 12 m x 3.5 m Height | Incineration                                                                                                                                                |
| 2       | Red               | Type: Storage Room Provided with Bottom RCC, Impervious Floor, Side Wall and Top Roof / Shed / Slab.<br>Dimension: 18 m x 9 m x 3.5 m Height  | Autoclaving followed by shredding. Treated waste to be sent to registered or authorized recyclers                                                           |
| 3       | Other wastes      | Type: Storage Room Provided with Bottom RCC, Impervious Floor, Side Wall and Top Roof / Shed / Slab.<br>Dimension: 18 m x 9 m x 3.5 m Height  | Autoclaving followed by shredding. Sent to foundry for metal recovery / TSDF in case of White waste and sent to authorized recyclers in case of Blue waste. |

**TABLE 7.2 – COLOR-CODING AND SEGREGATION OF WASTE AS PER THE AREAS IN PLANT LAYOUT**

| Sr. No. | Category            | Type of waste                                                               | Collection Method                                    |
|---------|---------------------|-----------------------------------------------------------------------------|------------------------------------------------------|
| 1       | Yellow              | a Human Anatomical Waste                                                    | Yellow colored non-chlorinated plastic bags          |
|         |                     | b Animal Anatomical Waste                                                   |                                                      |
|         |                     | c Soiled Waste                                                              |                                                      |
|         |                     | d Expired Discarded Medicines                                               |                                                      |
|         |                     | e Chemical Waste                                                            |                                                      |
|         |                     | f Chemical Liquid Waste                                                     |                                                      |
|         |                     | g Discarded linen mattresses, Bedding contaminated with blood or body fluid |                                                      |
|         |                     | h Microbiology, Biotechnology and other clinical laboratory waste.          |                                                      |
| 2       | Red                 | Contaminated waste (Recyclable)                                             | Red colored non-chlorinated plastic bags             |
| 3       | White (translucent) | Waste sharps                                                                | Puncture proof, leak proof, temper proof containers. |
| 4       | Blue                | a Glass wares                                                               | Card board boxes with blue colored marking.          |
|         |                     | b Metallic body implants                                                    |                                                      |

|                                                  |                                          |      |            |
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## 7.2 RISK ASSESSMENT

### ❖ HAZARDS IDENTIFICATION

Identification of hazards at the project site indicates the characteristics of hazardous wastes that pose potential for an emergency situation. Hazard Identification involves systematic identification of all possible sources of hazards associated with handling, storage, transportation, treatment, and disposal of Bio-Medical Waste (BMW). The objective is to recognize conditions that may lead to accidents, emergency situations, or environmental and health impacts.

At the site of M/s. Navabuddha Agencies Private Limited, following type of hazardous wastes may be involved during the operation of facility, which can create potential emergency situation in the event of spillage and accidental release of hazardous wastes from the site:

- Waste generated from hospitals and healthcare units
- Waste from veterinary institutions
- Waste from medical and research laboratories

These wastes comprise:

- **Infectious waste** (e.g., contaminated dressings, cultures, blood samples)
- **Pathological waste** (human tissues, organs, body parts, placenta)
- **Sharps** (needles, syringes, scalpels)
- **Pharmaceutical waste** (expired drugs, cytotoxic/anti-neoplastic agents)
- **Chemical waste** (disinfectants, solvents, alcohols)
- **Heavy metals** (e.g., mercury-containing waste)
- **General non-hazardous waste**

### Hazard Characteristics

The above wastes possess one or more of the following hazardous properties:

- Infectious nature
- Toxicity
- Corrosivity
- Reactivity
- Flammability

Improper handling, storage, or accidental release (spill/leak/fire) of such wastes can lead to:

- Health hazards (infection, toxicity)
- Environmental contamination (air, soil, water)
- Fire and explosion risks



|                                                  |                                          |      |            |
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## ❖ RISK ASSESSMENT

Risk Assessment is a systematic process to evaluate:

- Likelihood of occurrence of hazardous events.
- Consequences/impacts arising from such events.
- Overall risk level associated with each activity.

The assessment considers:

- Inventory of bio-medical and hazardous waste
- Handling and storage practices
- Equipment and operational conditions
- Probability of spillage, leakage, fire, or exposure

The objective is to:

- Identify potential accident scenarios
- Evaluate risk levels
- Recommend mitigation measures
- Ensure risks are reduced to **acceptable levels (ALARP principle)**

Emergency preparedness and evacuation planning have been considered while interpreting risk scenarios.

## ❖ QUALITATIVE RISK ASSESSMENT

At **M/s. Navabuddha Agencies Private Limited** looking to the nature and types of activities, A **Hazard Identification and Risk Assessment (HIRA)** methodology will be adopted for qualitative evaluation.

Many times a Risk involved in various processes / process equipments cannot be addressed completely by Consequence Analysis. As a conservative approach, these risks have been considered separately under this topic. The approach is to identify hazards involved in operational activities like handling of wastes and related equipment, working in storage areas, working in incinerator area, transportation, loading and unloading of wastes, etc., assessing its impacts, ranking the risk posed by it and finally to propose remedial actions/mitigation measures such that the risk is minimized to tolerable level.

Qualitative Risk Assessment has been carried out for the following areas:

- Hazardous Solid Waste transportation from generation site to Bio-Medical Waste Treatment Facility (M/s. Navabuddha Agencies Private Limited)
- Weighing and Sampling of Waste
- Incineration
- Autoclave
- Shredding

The Risk Matrix presented below has been referred in evaluating this assessment.

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
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**TABLE 7.3 - RISK MATRIX FOR QUALITATIVE RISK ASSESSMENT**

| <b>LIKEHOOD/<br/>PROBABILITY</b> |   | <b>SEVERITY</b>                            |                                                |                                                     |                                                 |                                                        |
|----------------------------------|---|--------------------------------------------|------------------------------------------------|-----------------------------------------------------|-------------------------------------------------|--------------------------------------------------------|
|                                  |   | Catastrophic<br>(Death/<br>System<br>Loss) | Major/ Critical<br>(Serious<br>injury/Illness) | Moderate<br>(Less<br>Serious<br>Injury/<br>Illness) | Minor/<br>Marginal<br>(Minor<br>Injury/Illness) | Insignificant/<br>Negligible<br>(No<br>injury/illness) |
|                                  |   | <b>5</b>                                   | <b>4</b>                                       | <b>3</b>                                            | <b>2</b>                                        | <b>1</b>                                               |
| Almost<br>Certain                | 5 | <b>H</b>                                   | <b>H</b>                                       | <b>H</b>                                            | <b>M</b>                                        | <b>M</b>                                               |
| Likely                           | 4 | <b>H</b>                                   | <b>H</b>                                       | <b>M</b>                                            | <b>M</b>                                        | <b>L</b>                                               |
| Possible                         | 3 | <b>H</b>                                   | <b>M</b>                                       | <b>M</b>                                            | <b>M</b>                                        | <b>L</b>                                               |
| Unlikely                         | 2 | <b>M</b>                                   | <b>M</b>                                       | <b>M</b>                                            | <b>L</b>                                        | <b>L</b>                                               |
| Impossible                       | 1 | <b>M</b>                                   | <b>M</b>                                       | <b>L</b>                                            | <b>L</b>                                        | <b>L</b>                                               |

**TABLE 7.4 - RISK RANGE AND ITS ACCEPTABILITY CRITERIA**

| <b>Risk<br/>Range</b> | <b>Risk Acceptability<br/>Criteria</b> | <b>Remarks</b>                                                                                          |
|-----------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>H</b>              | Unacceptable/ High                     | Management's Decision/Action Plan Required. Potential off-site Impact.                                  |
| <b>M</b>              | Medium                                 | Generally Minor Impact. Acceptable with Management's Review. Specific monitoring or SOP to be followed. |
| <b>L</b>              | Low                                    | Acceptable without Review. Manage through Routine Procedure.                                            |

|                                                  |                                          |      |            |
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❖ **D.G. Set Area and Other Activity**

**TABLE 7.5 - RISKS AND RECOMMENDATIONS FOR DG SET AREA**

[√] **Risks and Recommendations:**

| SR. No. | PROCESS OR ACTIVITY      | ASSOCIATED HAZARDS       | HEALTH and SAFETY IMPACT (RISK)                                                                                                                                              | INITIAL RISK |            |          | PROPOSED MEASURES                                                                                                                                                                                                                                                               | RESIDUAL RISK |            |          | ADDITIONAL RECOMMENDATIONS                                                                                                                                                                                                              |
|---------|--------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                          |                          |                                                                                                                                                                              | SEVERITY     | LIKELIHOOD | RISK     |                                                                                                                                                                                                                                                                                 | SEVERITY      | LIKELIHOOD | RISK     |                                                                                                                                                                                                                                         |
| 1.      | Working near DG set area | • Apparently High noise. | <ul style="list-style-type: none"> <li>Noise induced hearing impairment or,</li> <li>Hearing loss.</li> <li>Increased stress, fatigue, and reduced concentration.</li> </ul> | 4            | 2          | <b>M</b> | <ul style="list-style-type: none"> <li>PPEs like ear plugs, ear muffs etc., will be used.</li> <li>Acoustic enclosures will be provided for working near DG set area OR,</li> <li>Generator will be used in open air, away from work area, where high noise will not</li> </ul> | 3             | 2          | <b>M</b> | <ul style="list-style-type: none"> <li>Only Trained Personnel to be allowed to work in this area.</li> <li>Audiometry test (periodic) and other relevant testing to be carried out for the personnel In-charge of this area.</li> </ul> |

|                                                  |                                          |      |            |
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| SR. No. | PROCESS OR ACTIVITY           | ASSOCIATED HAZARDS                                              | HEALTH and SAFETY IMPACT (RISK)                                                                                                                                  | INITIAL RISK |            |      | PROPOSED MEASURES                                                                                                                                                                                                                                    | RESIDUAL RISK |            |      | ADDITIONAL RECOMMENDATIONS                                                                                                                                                                                                                                              |
|---------|-------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                               |                                                                 |                                                                                                                                                                  | SEVERITY     | LIKELIHOOD | RISK |                                                                                                                                                                                                                                                      | SEVERITY      | LIKELIHOOD | RISK |                                                                                                                                                                                                                                                                         |
|         |                               |                                                                 |                                                                                                                                                                  |              |            |      | disturb the other facilities.<br><ul style="list-style-type: none"> <li>Display of "High Noise Area" signage</li> <li>Implementation of exposure time limits (job rotation)</li> </ul>                                                               |               |            |      |                                                                                                                                                                                                                                                                         |
| 2.      | Maintenance work (Electrical) | <ul style="list-style-type: none"> <li>Electrocution</li> </ul> | <ul style="list-style-type: none"> <li>Death, Fatal electrocution</li> <li>Burns, serious injury.</li> <li>Potential fire hazard due to short circuit</li> </ul> | 4            | 2          | M    | <ul style="list-style-type: none"> <li>No cables will be unplugged while unit is under operation.</li> <li>Shut down will be taken before carrying out any maintenance work.</li> <li>Use of flameproof and IP-rated electrical fittings.</li> </ul> | 3             | 2          | M    | <ul style="list-style-type: none"> <li>Work permit procedure to be given due importance.</li> <li>Hot Work and Electrical Work Permit to be followed before carrying out electrical work.</li> <li>Standard Operating Procedure to be prepared and followed.</li> </ul> |

|                                                  |                                          |  |      |            |
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| SR. No. | PROCESS OR ACTIVITY                                                        | ASSOCIATED HAZARDS                                                                                                                    | HEALTH and SAFETY IMPACT (RISK)                                                                                                                 | INITIAL RISK |            |      | PROPOSED MEASURES                                                                                                                                                                                                                                                                           | RESIDUAL RISK |            |      | ADDITIONAL RECOMMENDATIONS                                                                                                                                               |
|---------|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                                                                            |                                                                                                                                       |                                                                                                                                                 | SEVERITY     | LIKELIHOOD | RISK |                                                                                                                                                                                                                                                                                             | SEVERITY      | LIKELIHOOD | RISK |                                                                                                                                                                          |
|         |                                                                            |                                                                                                                                       |                                                                                                                                                 |              |            |      | <ul style="list-style-type: none"> <li>Access to unit will be restricted to authorized persons only.</li> <li>Strict Vigilance will be carried out during the work.</li> </ul>                                                                                                              |               |            |      | <ul style="list-style-type: none"> <li>Display of shock treatment procedures at site</li> </ul>                                                                          |
| 3.      | Maintenance work (Mechanical work like cleaning, Repairing Greasing, etc.) | <ul style="list-style-type: none"> <li>Slips, Trips and Falls while carrying out mechanical work.</li> <li>Rotating parts.</li> </ul> | <ul style="list-style-type: none"> <li>Fractures, cuts, crush injuries.</li> <li>Exposure to grease/oil causing minor health effects</li> </ul> | 4            | 3          | M    | <ul style="list-style-type: none"> <li>Access to maintenance parts will be made after performing complete safe checks only.</li> <li>PPEs will be used and Operators will wear suitable safety footwear at all times.</li> <li>Proper guards will be provided to rotating parts.</li> </ul> | 2             | 1          | L    | <ul style="list-style-type: none"> <li>Preventive maintenance schedule for all rotating equipment.</li> <li>Incident reporting and near-miss analysis system.</li> </ul> |

|                                                  |                                          |  |      |            |
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| SR. No. | PROCESS OR ACTIVITY                                               | ASSOCIATED HAZARDS                                                                                                                                                            | HEALTH and SAFETY IMPACT (RISK)                                                                                                              | INITIAL RISK |            |          | PROPOSED MEASURES                                                                                                                                                                                                                                                                                                                                                     | RESIDUAL RISK |            |          | ADDITIONAL RECOMMENDATIONS                                                                                                                                                                                                                                                                             |
|---------|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                                                                   |                                                                                                                                                                               |                                                                                                                                              | SEVERITY     | LIKELIHOOD | RISK     |                                                                                                                                                                                                                                                                                                                                                                       | SEVERITY      | LIKELIHOOD | RISK     |                                                                                                                                                                                                                                                                                                        |
|         |                                                                   |                                                                                                                                                                               |                                                                                                                                              |              |            |          | <ul style="list-style-type: none"> <li>Use of anti-skid flooring and proper housekeeping.</li> </ul>                                                                                                                                                                                                                                                                  |               |            |          |                                                                                                                                                                                                                                                                                                        |
| 4.      | In LDO Storage - Leakage, spillage of Hot Oil / Hot Fumes/Diesel. | <ul style="list-style-type: none"> <li>Spillage,</li> <li>Leakage,</li> <li>Fire.</li> <li>Severe burn</li> <li>Environmental contamination (soil and groundwater)</li> </ul> | <ul style="list-style-type: none"> <li>Risk of severe bodily injury,</li> <li>Possible fatal,</li> <li>Building/equipment damage.</li> </ul> | 4            | 2          | <b>M</b> | <ul style="list-style-type: none"> <li>Spillage will be cleaned with the help of suitable adsorbent and spill containment kit will be made available.</li> <li>Leakage and spillage sources will be identified and will be rectified immediately.</li> <li>Fuel will be stored in sealed containers, away from source of ignition and from generator also.</li> </ul> | 3             | 2          | <b>M</b> | <ul style="list-style-type: none"> <li>Fire Fighting facilities to be inspected on regular basis.</li> <li>Provision of bund wall/spill containment system.</li> <li>Installation of fire detection and alarm system</li> <li>Installation of fire extinguishers (foam/CO<sub>2</sub> type)</li> </ul> |

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| SR. No. | PROCESS OR ACTIVITY | ASSOCIATED HAZARDS | HEALTH and SAFETY IMPACT (RISK) | INITIAL RISK |            |      | PROPOSED MEASURES                                                                                                                                                                                                                                                                                                                                                                                   | RESIDUAL RISK |            |      | ADDITIONAL RECOMMENDATIONS |
|---------|---------------------|--------------------|---------------------------------|--------------|------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------|----------------------------|
|         |                     |                    |                                 | SEVERITY     | LIKELIHOOD | RISK |                                                                                                                                                                                                                                                                                                                                                                                                     | SEVERITY      | LIKELIHOOD | RISK |                            |
|         |                     |                    |                                 |              |            |      | <ul style="list-style-type: none"> <li>Storage area and related accessories will be inspected on regular basis for leakage/spillage/ damage conditions, if any.</li> <li>Storage will be labeled as "NO Smoking Area", "Dangerous ZONE", "Restricted Area", etc.</li> <li>Sources of ignition and combustibles will not be allowed inside the Bio-Medical waste treatment facility site.</li> </ul> |               |            |      |                            |

|                                                  |                                          |      |            |
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| SR. No. | PROCESS OR ACTIVITY | ASSOCIATED HAZARDS                                                                                                  | HEALTH and SAFETY IMPACT (RISK)                                                        | INITIAL RISK |            |          | PROPOSED MEASURES                                                                                                                                                                                                                                               | RESIDUAL RISK |            |          | ADDITIONAL RECOMMENDATIONS                                                                                                                        |
|---------|---------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------------|------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                     |                                                                                                                     |                                                                                        | SEVERITY     | LIKELIHOOD | RISK     |                                                                                                                                                                                                                                                                 | SEVERITY      | LIKELIHOOD | RISK     |                                                                                                                                                   |
|         |                     |                                                                                                                     |                                                                                        |              |            |          | <ul style="list-style-type: none"> <li>• Firefighting facilities are available all the times.</li> <li>• Only qualified and highly trained personnel will be allowed to work in this area.</li> </ul>                                                           |               |            |          |                                                                                                                                                   |
|         |                     | <ul style="list-style-type: none"> <li>• Hot Parts of Generator.</li> <li>• Inhalation of exhaust fumes.</li> </ul> | <ul style="list-style-type: none"> <li>• Severe burns, Injury, asphyxiation</li> </ul> | 3            | 3          | <b>M</b> | <ul style="list-style-type: none"> <li>• Proper insulation will be provided to hot parts.</li> <li>• Exhaust will be pointed away from public places.</li> <li>• PPEs like Heat – resistant clothing, face mask, goggles, gloves, etc. will be used.</li> </ul> | 2             | 2          | <b>L</b> | <ul style="list-style-type: none"> <li>• Periodic monitoring of DG emissions</li> <li>• Installation of CO detectors in enclosed areas</li> </ul> |



|                                                  |                                          |      |            |
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| SR. No. | PROCESS OR ACTIVITY | ASSOCIATED HAZARDS                                                        | HEALTH and SAFETY IMPACT (RISK) | INITIAL RISK |            |          | PROPOSED MEASURES                                                                                                                                                                                                         | RESIDUAL RISK |            |          | ADDITIONAL RECOMMENDATIONS |
|---------|---------------------|---------------------------------------------------------------------------|---------------------------------|--------------|------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|----------|----------------------------|
|         |                     |                                                                           |                                 | SEVERITY     | LIKELIHOOD | RISK     |                                                                                                                                                                                                                           | SEVERITY      | LIKELIHOOD | RISK     |                            |
|         |                     | <ul style="list-style-type: none"> <li>Dermatitis from diesel.</li> </ul> |                                 | 3            | 3          | <b>M</b> | <ul style="list-style-type: none"> <li>PPEs like safety shoes, helmets, face mask, hand gloves, ear plugs, etc. will be used.</li> <li>Spillages will be treated/adsorbed with suitable adsorbent immediately.</li> </ul> | 2             | 2          | <b>L</b> |                            |

## Operational Activities

|                                                  |                                          |  |      |            |
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**TABLE 7.6 - RISKS AND RECOMMENDATIONS FOR OPERATIONAL ACTIVITIES**

**[√] Risks and Recommendations:**

| SR. No. | PROCESS OR ACTIVITY                                                                                | ASSOCIATED HAZARDS                                                                                                       | HEALTH and SAFETY IMPACT (RISK)                                                                                                                                                                                                                               | INITIAL RISK |            |          | PROPOSED MEASURES                                                                                                                                                                                                                                                                                                                                                         | RESIDUAL RISK |            |          | ADDITIONAL RECOMMENDATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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|         |                                                                                                    |                                                                                                                          |                                                                                                                                                                                                                                                               | SEVERITY     | LIKELIHOOD | RISK     |                                                                                                                                                                                                                                                                                                                                                                           | SEVERITY      | LIKELIHOOD | RISK     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 1.      | Bio-Medical Waste transportation from generation site to Bio-Medical Waste Treatment Facility site | <ul style="list-style-type: none"> <li>Wastes Spillage,</li> <li>Leakage from Damage Container.</li> <li>Fire</li> </ul> | <ul style="list-style-type: none"> <li>Exposure to infectious agents and toxic fumes leads to infection (HIV, Hepatitis B/C) and respiratory problems.</li> <li>Health problem.</li> <li>Chronic and acute illness.</li> <li>Burn or may be fatal.</li> </ul> | 4            | 3          | <b>M</b> | <ul style="list-style-type: none"> <li>Vehicle used for carrying waste will be maintained properly, such that no leakage can happen on the way.</li> <li>Vehicle will be checked and inspected frequently, for its smooth functioning.</li> <li>Before starting the vehicle from generation site, client will educate the driver about the nature of waste and</li> </ul> | 2             | 2          | <b>L</b> | <ul style="list-style-type: none"> <li>Hazard Identification symbol/information and emergency telephone number to be displayed as per HAZCHEM CODE on the vehicle.</li> <li>Drivers to be instructed to carry necessary license, TREM cards, etc.</li> <li>Prior to taking up effective treatment, it is necessary to ensure proper and safe collection, segregation and storage of adequate quantity of waste in most scientific manner through safe</li> </ul> |

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| SR. No. | PROCESS OR ACTIVITY | ASSOCIATED HAZARDS | HEALTH and SAFETY IMPACT (RISK) | INITIAL RISK |            |      | PROPOSED MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                 | RESIDUAL RISK |            |      | ADDITIONAL RECOMMENDATIONS                                                                                                                                                                    |
|---------|---------------------|--------------------|---------------------------------|--------------|------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                     |                    |                                 | SEVERITY     | LIKELIHOOD | RISK |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | SEVERITY      | LIKELIHOOD | RISK |                                                                                                                                                                                               |
|         |                     |                    |                                 |              |            |      | <p>its preventive measures.</p> <ul style="list-style-type: none"> <li>• Client needs to store segregated waste as per CPCB guidelines</li> <li>• Care will be taken that the heat generation from the vehicle should not become the source of ignition.</li> <li>• Drivers will be trained for the consequences of hazardous wastes, its preventive and mitigative measures.</li> <li>• Training will be given on safe driving, hazards of chemicals,</li> </ul> |               |            |      | <p>transportation system and storage facility.</p> <ul style="list-style-type: none"> <li>• GPS-enabled vehicles for tracking.</li> <li>• Disinfection of vehicle after each trip.</li> </ul> |

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| SR. No. | PROCESS OR ACTIVITY | ASSOCIATED HAZARDS | HEALTH and SAFETY IMPACT (RISK) | INITIAL RISK |            |      | PROPOSED MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                         | RESIDUAL RISK |            |      | ADDITIONAL RECOMMENDATIONS |
|---------|---------------------|--------------------|---------------------------------|--------------|------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------|----------------------------|
|         |                     |                    |                                 | SEVERITY     | LIKELIHOOD | RISK |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | SEVERITY      | LIKELIHOOD | RISK |                            |
|         |                     |                    |                                 |              |            |      | <p>emergency handling, use of SCBA sets.</p> <ul style="list-style-type: none"> <li>• Drivers will be educated for not to travel and not to stop the vehicle in populated areas, only designated and isolated routes will be preferred for the same.</li> <li>• Unloading activity will be carried out in well-ventilated area under proper supervision.</li> <li>• The vehicles will be provided with an alarm system with signal and GPS tracking in case of</li> </ul> |               |            |      |                            |

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| SR. No. | PROCESS OR ACTIVITY | ASSOCIATED HAZARDS | HEALTH and SAFETY IMPACT (RISK) | INITIAL RISK |            |      | PROPOSED MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                          | RESIDUAL RISK |            |      | ADDITIONAL RECOMMENDATIONS |
|---------|---------------------|--------------------|---------------------------------|--------------|------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------|----------------------------|
|         |                     |                    |                                 | SEVERITY     | LIKELIHOOD | RISK |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | SEVERITY      | LIKELIHOOD | RISK |                            |
|         |                     |                    |                                 |              |            |      | any emergency in the transportation of Bio Medical Waste. <ul style="list-style-type: none"> <li>• Required safety measures like necessary first aid, fire extinguishers, PPEs, etc. will be kept available within the Vehicle.</li> <li>• Once it is received at Bio-Medical Waste Treatment Facility, sampling will be done to identify the severity of waste.</li> <li>• The truck will be weighed; sample will be collected for testing and verification of</li> </ul> |               |            |      |                            |

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| SR. No. | PROCESS OR ACTIVITY            | ASSOCIATED HAZARDS                                                                 | HEALTH and SAFETY IMPACT (RISK)                                                                       | INITIAL RISK |            |          | PROPOSED MEASURES                                                                                                                                                                                                                                                                                                                                                                    | RESIDUAL RISK |            |          | ADDITIONAL RECOMMENDATIONS                                                                                             |
|---------|--------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------|------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|----------|------------------------------------------------------------------------------------------------------------------------|
|         |                                |                                                                                    |                                                                                                       | SEVERITY     | LIKELIHOOD | RISK     |                                                                                                                                                                                                                                                                                                                                                                                      | SEVERITY      | LIKELIHOOD | RISK     |                                                                                                                        |
|         |                                |                                                                                    |                                                                                                       |              |            |          | parameters. Then after verification, the truck will be directed to an unloading area. <ul style="list-style-type: none"> <li>• All the trucks being used for transportation will be checked for "Pollution under Control" certificate prior to their entry to the plant premises.</li> <li>• Emergency vehicle will be kept available in case of fire or other emergency.</li> </ul> |               |            |          |                                                                                                                        |
| 2.      | Weighing and Sampling of Waste | <ul style="list-style-type: none"> <li>• Hazardous properties of wastes</li> </ul> | <ul style="list-style-type: none"> <li>• Direct exposure to wastes,</li> <li>• Toxication,</li> </ul> | 3            | 3          | <b>M</b> | <ul style="list-style-type: none"> <li>• Appropriate PPEs like full body suit, face mask, gloves,</li> </ul>                                                                                                                                                                                                                                                                         | 2             | 2          | <b>L</b> | <ul style="list-style-type: none"> <li>• Standard operating procedure to be prepared and followed strictly.</li> </ul> |

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| SR. No. | PROCESS OR ACTIVITY   | ASSOCIATED HAZARDS                                                                                                             | HEALTH and SAFETY IMPACT (RISK)                                                                                                                                           | INITIAL RISK |            |          | PROPOSED MEASURES                                                                                                                                                                                                                                         | RESIDUAL RISK |            |          | ADDITIONAL RECOMMENDATIONS                                                                                                                                                                                                                                                               |
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|         |                       |                                                                                                                                |                                                                                                                                                                           | SEVERITY     | LIKELIHOOD | RISK     |                                                                                                                                                                                                                                                           | SEVERITY      | LIKELIHOOD | RISK     |                                                                                                                                                                                                                                                                                          |
|         |                       |                                                                                                                                | <ul style="list-style-type: none"> <li>Irritation</li> <li>Risk of needle-stick injury (if sharps present)</li> </ul>                                                     |              |            |          | helmet, shoes, etc. will be used. <ul style="list-style-type: none"> <li>Will be performed under continuous vigilance.</li> <li>Concrete and leak-proof storage will be provided along with drainage line connected to ETP in case of leakage.</li> </ul> |               |            |          |                                                                                                                                                                                                                                                                                          |
| 3.      | Incineration activity | <ul style="list-style-type: none"> <li>Toxic pollutants like Ash,</li> <li>Emissions of heavy metals, dioxins, etc.</li> </ul> | <ul style="list-style-type: none"> <li>Exposure to Toxic fumes (Dioxin and furan) and pollutants may lead to carcinogenic effects.</li> <li>Health Effects and</li> </ul> | 3            | 2          | <b>M</b> | <ul style="list-style-type: none"> <li>Sampling and Testing will be done for the emitted gases.</li> <li>Gases/Ash or other pollutants will be treated before disposing off.</li> </ul>                                                                   | 2             | 1          | <b>L</b> | <ul style="list-style-type: none"> <li>Periodic Inspection of flanges/ferrule joints and other related accessories to be carried out.</li> <li>Efficiency of incineration will be checked i.e. 2 sec retention time and pressure and temperature in the primary and secondary</li> </ul> |

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| SR. No. | PROCESS OR ACTIVITY | ASSOCIATED HAZARDS | HEALTH and SAFETY IMPACT (RISK)                                 | INITIAL RISK |            |      | PROPOSED MEASURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | RESIDUAL RISK |            |      | ADDITIONAL RECOMMENDATIONS                                                                           |
|---------|---------------------|--------------------|-----------------------------------------------------------------|--------------|------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------|------------------------------------------------------------------------------------------------------|
|         |                     |                    |                                                                 | SEVERITY     | LIKELIHOOD | RISK |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | SEVERITY      | LIKELIHOOD | RISK |                                                                                                      |
|         |                     |                    | neurological damage.<br>• Inhalation with respiratory problems. |              |            |      | <ul style="list-style-type: none"> <li>• PLC system will be provided for safety purpose</li> <li>• Chimney will be made tall so as to emit the gases at a greater height.</li> <li>• PPEs will be used at all the time.</li> <li>• Adequate APCM will be provided along with OCEMS.</li> <li>• Only trained and qualified personnel will carry out this activity.</li> <li>• Personnel vigilance will be carried out on regular basis.</li> <li>• Efforts will be made to produce/recover</li> </ul> |               |            |      | chamber to ensure combustion of flue gas.<br>• Emergency vent will be provided to secondary chamber. |



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| SR. No. | PROCESS OR ACTIVITY  | ASSOCIATED HAZARDS                              | HEALTH and SAFETY IMPACT (RISK)                 | INITIAL RISK |            |          | PROPOSED MEASURES                                                                                                                                                                                 | RESIDUAL RISK |            |          | ADDITIONAL RECOMMENDATIONS                                                                                           |
|---------|----------------------|-------------------------------------------------|-------------------------------------------------|--------------|------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|----------|----------------------------------------------------------------------------------------------------------------------|
|         |                      |                                                 |                                                 | SEVERITY     | LIKELIHOOD | RISK     |                                                                                                                                                                                                   | SEVERITY      | LIKELIHOOD | RISK     |                                                                                                                      |
|         |                      |                                                 |                                                 |              |            |          | as much energy as possible from wastes.<br>• Regular 3 <sup>rd</sup> party monitoring will be carried out.                                                                                        |               |            |          |                                                                                                                      |
|         |                      | • Exposure to Hot surfaces (while working)      | • Burns<br>• Severe Injury                      | 3            | 2          | <b>M</b> | • Proper insulation will be provided to hot parts.<br>• Maintenance will be carried out under strict vigilance.<br>• Necessary work (Hot Work, etc.) permits will be followed, whenever required. | 2             | 2          | <b>L</b> |                                                                                                                      |
| 4.      | Autoclaving Activity | • Falling Hazards<br>• Exposure to Hot surfaces | • Infection risk.<br>• Burns<br>• Severe Injury | 3            | 2          | <b>M</b> | • Proper insulation will be provided to hot parts.<br>• The door/lid will only be opened once the                                                                                                 | 2             | 2          | <b>L</b> | • An interlocking arrangement, incorporating temperature-sensing devices will be installed at appropriate locations. |

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| SR. No. | PROCESS OR ACTIVITY | ASSOCIATED HAZARDS                                                                             | HEALTH and SAFETY IMPACT (RISK)                                                                                                                            | INITIAL RISK |            |          | PROPOSED MEASURES                                                                                                                                                                                        | RESIDUAL RISK |            |          | ADDITIONAL RECOMMENDATIONS                                                                                                                                                                |
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|         |                     |                                                                                                |                                                                                                                                                            | SEVERITY     | LIKELIHOOD | RISK     |                                                                                                                                                                                                          | SEVERITY      | LIKELIHOOD | RISK     |                                                                                                                                                                                           |
|         |                     | (while working)                                                                                |                                                                                                                                                            |              |            |          | autoclave contents have been reduced to a safe level.<br>• Temperature and pressure indicator will be calibrated                                                                                         |               |            |          | <ul style="list-style-type: none"> <li>Autoclave validation test has to be carried out as mentioned in CPCB Guideline.</li> <li>Ensure complete sterilization before shredding</li> </ul> |
| 5.      | Shredding Activity  | <ul style="list-style-type: none"> <li>Apparently High noise.</li> <li>Shear Blades</li> </ul> | <ul style="list-style-type: none"> <li>Noise induced hearing impairment or,</li> <li>Hearing loss</li> <li>Cut injury</li> </ul>                           | 3            | 2          | <b>M</b> | <ul style="list-style-type: none"> <li>In case of shock-loading, shredder should stop.</li> <li>Interlocks to avoid aerosolization</li> <li>Low Noise, Non-Ballistic.</li> <li>Auto Shut Off.</li> </ul> | 2             | 2          | <b>L</b> | Ensure rotation of not more than 50 rpm                                                                                                                                                   |
| 6.      | Cleaning sludge of  | <ul style="list-style-type: none"> <li>Release of chemical.</li> <li>Spillages.</li> </ul>     | <ul style="list-style-type: none"> <li>Skin/Eye irritation.</li> <li>Dermatological &amp; toxic effects.</li> <li>Contamination of soil and GW.</li> </ul> | 2            | 3          | <b>M</b> | <ul style="list-style-type: none"> <li>Pucca flooring has to be provided.</li> <li>In case of spill, ensure, leachate is sent to collection tank.</li> <li>PPEs will be used</li> </ul>                  | 1             | 3          | <b>L</b> | <ul style="list-style-type: none"> <li>SOPs to be prepared and followed.</li> <li>Checklist to be followed.</li> </ul>                                                                    |

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| SR. No. | PROCESS OR ACTIVITY                | ASSOCIATED HAZARDS                                                  | HEALTH and SAFETY IMPACT (RISK)                                                                 | INITIAL RISK |            |          | PROPOSED MEASURES                                                                                                                                                    | RESIDUAL RISK |            |          | ADDITIONAL RECOMMENDATIONS                                                                             |
|---------|------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------|------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|----------|--------------------------------------------------------------------------------------------------------|
|         |                                    |                                                                     |                                                                                                 | SEVERITY     | LIKELIHOOD | RISK     |                                                                                                                                                                      | SEVERITY      | LIKELIHOOD | RISK     |                                                                                                        |
| 7.      | Working/ cleaning over compartment | <ul style="list-style-type: none"> <li>Falling, slippery</li> </ul> | <ul style="list-style-type: none"> <li>Falling Drowning.</li> <li>Fatality accident.</li> </ul> | 2            | 3          | <b>M</b> | <ul style="list-style-type: none"> <li>Only trained operators will be allowed to work in this area.</li> <li>Safety Shower will be made available nearby.</li> </ul> | 1             | 3          | <b>L</b> | <ul style="list-style-type: none"> <li>Authorized person should be available at work place.</li> </ul> |

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**TABLE 7.7 – STORAGE AND HANDLING OF LIQUID CHEMICALS**

**[√] Risks and Recommendations:**

| Sr. No. | Process Or Activity           | Associated Hazards                                                                                                                                    | Health & Safety Impact (Risk)                                                                                | Initial Risk |            |          | Proposed Measures                                                                                                                                                                                                                                                                                                | Residual Risk |            |          | Additional Recommendations |
|---------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------|------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|----------|----------------------------|
|         |                               |                                                                                                                                                       |                                                                                                              | Severity     | Likelihood | Risk     |                                                                                                                                                                                                                                                                                                                  | Severity      | Likelihood | Risk     |                            |
| 1.      | Loading & Unloading of Acids. | <ul style="list-style-type: none"> <li>Exposure to Acid fumes due to leakage in pipe/container/valves etc.</li> <li>Spillage of liq. Acid.</li> </ul> | <ul style="list-style-type: none"> <li>Skin/Eye irritation.</li> <li>Toxic Vapour inhalation etc.</li> </ul> | 2            | 3          | <b>M</b> | <ul style="list-style-type: none"> <li>Loading &amp; Unloading activity to be carried out in well-ventilated area.</li> <li>Neutralization media to be made available in areas where acid is stored/handled/used.</li> <li>PPEs-RPES to be used as per PPE matrix.</li> <li>Spill clean-up procedure.</li> </ul> | 2             | 2          | <b>L</b> | --                         |
| 2.      | Working in Storage Area.      | <ul style="list-style-type: none"> <li>Exposure to acid fumes.</li> </ul>                                                                             | <ul style="list-style-type: none"> <li>Severe irritation to eyes, skin.</li> <li>Body burns.</li> </ul>      | 2            | 3          | <b>M</b> | <ul style="list-style-type: none"> <li>Storage area to be well ventilated.</li> <li>Dyke to be made.</li> <li>Neutralization to be done immediately with soda ash/lime or</li> </ul>                                                                                                                             | 2             | 1          | <b>L</b> |                            |

|                                                  |                                          |      |            |
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| Sr. No. | Process Or Activity                    | Associated Hazards                                                        | Health & Safety Impact (Risk)                                                      | Initial Risk |            |          | Proposed Measures                                                                                 | Residual Risk |            |          | Additional Recommendations                                                                                                                                                                                                                                                       |
|---------|----------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------|------------|----------|---------------------------------------------------------------------------------------------------|---------------|------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                                        |                                                                           |                                                                                    | Severity     | Likelihood | Risk     |                                                                                                   | Severity      | Likelihood | Risk     |                                                                                                                                                                                                                                                                                  |
|         |                                        |                                                                           |                                                                                    |              |            |          | spill to be absorbed in sand or by suitable adsorbent.<br>• PPE-RPE to be used as per PPE matrix. |               |            |          |                                                                                                                                                                                                                                                                                  |
| 3.      | Tank overflow/leakage from joints etc. | <ul style="list-style-type: none"> <li>Exposure to acid fumes.</li> </ul> | <ul style="list-style-type: none"> <li>Severe irritation to eyes, skin.</li> </ul> | 3            | 3          | <b>M</b> | <ul style="list-style-type: none"> <li>Same as Above.</li> </ul>                                  | 2             | 1          | <b>L</b> | <ul style="list-style-type: none"> <li>Work Instruction for checking tank level to be prepared and followed.</li> <li>Double check.</li> <li>Road tanker unloading checklist to be used.</li> <li>Flange guard to be used.</li> <li>Vehicle entry permits to be used.</li> </ul> |

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**TABLE 7.8 – STORAGE AND HANDLING OF SOLID CHEMICALS**

**[✓] Risks and Recommendations:**

| Sr. No. | PROCESS OR ACTIVITY    | ASSOCIATED HAZARDS                                                                                       | HEALTH & SAFETY IMPACT (RISK)                                                                                              | INITIAL RISK |            |      | PROPOSED MEASURES                                                                                                                                                                                                                                                                                                                              | RESIDUAL RISK |            |      | ADDITIONAL RECOMMENDATIONS                                                                                                                                                                                                                               |
|---------|------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------|------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                        |                                                                                                          |                                                                                                                            | SEVERITY     | LIKELIHOOD | RISK |                                                                                                                                                                                                                                                                                                                                                | SEVERITY      | LIKELIHOOD | RISK |                                                                                                                                                                                                                                                          |
| 1.      | Handling Chemical bags | <ul style="list-style-type: none"> <li>Chemical Exposure.</li> <li>Dusting.</li> <li>Spillage</li> </ul> | <ul style="list-style-type: none"> <li>Skin/Eye irritation.</li> <li>Ingestion &amp; Inhalation of dust powder.</li> </ul> | 2            | 3          | M    | <ul style="list-style-type: none"> <li>PPEs like suitable protective clothing, gloves, face shield, dust and splash proof safety goggles; chemically resistant safety shoes, etc. to be used. PPE -RPE to be used as per PPE Matrix.</li> <li>Standard Approved respirators to be used.</li> <li>Eyewash station and safety showers</li> </ul> | 2             | 2          | L    | <ul style="list-style-type: none"> <li>Operators/ Workers to be trained for Safe Work Practices.</li> <li>Chemical handling bags &amp; dusty area to be labelled properly for each chemical.</li> <li>Good housekeeping should be maintained.</li> </ul> |

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| Sr. No. | PROCESS OR ACTIVITY            | ASSOCIATED HAZARDS                                                                          | HEALTH & SAFETY IMPACT (RISK)                                                                           | INITIAL RISK |            |      | PROPOSED MEASURES                                                                                                                                                                                                                                                             | RESIDUAL RISK |            |      | ADDITIONAL RECOMMENDATIONS |
|---------|--------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------|------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------|----------------------------|
|         |                                |                                                                                             |                                                                                                         | SEVERITY     | LIKELIHOOD | RISK |                                                                                                                                                                                                                                                                               | SEVERITY      | LIKELIHOOD | RISK |                            |
|         |                                |                                                                                             |                                                                                                         |              |            |      | to be made available.<br>• Dust monitoring to be carried out periodically.<br>• Spill clean-up procedure.                                                                                                                                                                     |               |            |      |                            |
| 2.      | Cleaning of Chemical Spillage. | <ul style="list-style-type: none"> <li>Fumes Inhalation.</li> <li>Dust Exposure.</li> </ul> | <ul style="list-style-type: none"> <li>Severe irritation to eyes, skin.</li> <li>Inhalation.</li> </ul> | 3            | 3          | M    | <ul style="list-style-type: none"> <li>Certified Dust respirator to be used.</li> <li>PPEs are to be used.</li> <li>Chemicals should be stored in isolated storage rooms having provision for natural &amp; forced ventilation.</li> <li>Spillage to be cleaned or</li> </ul> | 2             | 2          | L    |                            |

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| Sr. No. | PROCESS OR ACTIVITY | ASSOCIATED HAZARDS | HEALTH & SAFETY IMPACT (RISK) | INITIAL RISK |            |      | PROPOSED MEASURES                                                                                                                                      | RESIDUAL RISK |            |      | ADDITIONAL RECOMMENDATIONS |
|---------|---------------------|--------------------|-------------------------------|--------------|------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------|----------------------------|
|         |                     |                    |                               | SEVERITY     | LIKELIHOOD | RISK |                                                                                                                                                        | SEVERITY      | LIKELIHOOD | RISK |                            |
|         |                     |                    |                               |              |            |      | neutralized with suitable media.<br>• Firefighting facilities to be made available near storage locations, if required.<br>• Spill clean-up procedure. |               |            |      |                            |



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**TABLE 7.9 – STORAGE AND HANDLING OF CAUSTIC LYE**

**[✓] Risks and Recommendations:**

| Sr. No. | Process Or Activity                             | Associated Hazards                                                                                                 | Health & Safety Impact (Risk)                                                                                         | Initial Risk |            |          | Proposed Measures                                                                                                                                                                                                                                                                  | Residual Risk |            |          | Additional Recommendations                                                                                                                                                                                                                                           |
|---------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------|------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                                                 |                                                                                                                    |                                                                                                                       | Severity     | Likelihood | Risk     |                                                                                                                                                                                                                                                                                    | Severity      | Likelihood | Risk     |                                                                                                                                                                                                                                                                      |
| 1       | Alkaline material handling /Loading & Unloading | <ul style="list-style-type: none"> <li>Exposure due to leakage from joints, corroded lines failure etc.</li> </ul> | <ul style="list-style-type: none"> <li>Skin burn.</li> <li>Eye irritation/damage and respiratory disorder.</li> </ul> | 4            | 3          | <b>M</b> | <ul style="list-style-type: none"> <li>Dyke to be made available.</li> <li>NaOH to be stored in well-ventilated area.</li> <li>Eye wash station to be available nearby.</li> <li>Maintenance to be carried as per schedule.</li> <li>PPEs as per PPE matrix to be used.</li> </ul> | 4             | 2          | <b>L</b> | <ul style="list-style-type: none"> <li>Proper trainings to be provided to the operators/workers.</li> <li>SOPs to be prepared and followed the same.</li> <li>Corroded lines to be painted/replaced.</li> <li>Ensure anti-skid flooring in handling area.</li> </ul> |

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| Sr. No. | Process Or Activity     | Associated Hazards                                                          | Health & Safety Impact (Risk)                                                                                                                                                             | Initial Risk |            |          | Proposed Measures                                                                                                                                                                                                                                                                                                              | Residual Risk |            |          | Additional Recommendations                                                                                                                                           |
|---------|-------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                         |                                                                             |                                                                                                                                                                                           | Severity     | Likelihood | Risk     |                                                                                                                                                                                                                                                                                                                                | Severity      | Likelihood | Risk     |                                                                                                                                                                      |
| 2       | Working in Storage Area | <ul style="list-style-type: none"> <li>Exposure due to spillage.</li> </ul> | <ul style="list-style-type: none"> <li>Severe irritation to eyes, skin etc.</li> <li>Internal body burns.</li> </ul>                                                                      | 4            | 3          | <b>M</b> | <ul style="list-style-type: none"> <li>Neutralization media to be kept available.</li> <li>PPEs like face mask, gloves etc. to be worn by concerned person.</li> <li>Eye wash station to be available nearby.</li> </ul>                                                                                                       | 4             | 2          | <b>L</b> | <ul style="list-style-type: none"> <li>Maintain Material Safety Data Sheets (MSDS) for all chemicals.</li> <li>Limit access to authorized personnel only.</li> </ul> |
| 3       | Tank overflow           | <ul style="list-style-type: none"> <li>Chemical Exposure</li> </ul>         | <ul style="list-style-type: none"> <li>Eyes and Skin irritation.</li> <li>Slip hazard leading to fall injuries.</li> <li>Possible equipment damage and operational disruption.</li> </ul> | 4            | 3          | <b>M</b> | <ul style="list-style-type: none"> <li>Level indicator to be available and the same is checked for proper operation.</li> <li>Dyke wall to be available to contain the spill.</li> <li>Installation of high-level alarm and automatic cut-off system (interlock).</li> <li>Regular calibration of level indicators.</li> </ul> | 4             | 2          | <b>L</b> | <ul style="list-style-type: none"> <li>Working of level gauge to be checked.</li> <li>Maintain logbook for tank level monitoring.</li> </ul>                         |

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| Sr. No. | Process Or Activity | Associated Hazards | Health & Safety Impact (Risk) | Initial Risk |            |      | Proposed Measures                                                                                  | Residual Risk |            |      | Additional Recommendations |
|---------|---------------------|--------------------|-------------------------------|--------------|------------|------|----------------------------------------------------------------------------------------------------|---------------|------------|------|----------------------------|
|         |                     |                    |                               | Severity     | Likelihood | Risk |                                                                                                    | Severity      | Likelihood | Risk |                            |
|         |                     |                    |                               |              |            |      | <ul style="list-style-type: none"> <li>Dedicated overflow line to safe collection tank.</li> </ul> |               |            |      |                            |

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### ❖ Quantitative Risk Assessment

Quantitative Risk Assessment (QRA) is a structured approach to identifying and understanding the hazards and risks associated with Storage and Handling of flammable/toxic chemicals. The assessment starts by taking into account an inventory of hazardous chemicals stored, likelihood of leakage/spillage associated with it and selecting the worst-case scenario for consequence estimation.

Finally, suggesting the measures to minimize or mitigate risks to meet appropriate acceptability criteria. The planning for emergency evacuation shall be borne in mind whilst interpreting the results.

### ❖ Consequence Analysis

In a plant handling hazardous substance, the main hazard arises due to storage and handling of LDO. If the same is released into the atmosphere, it may cause damage to health.

### ❖ Damage Criteria

In Consequence Analysis studies, in principle exposure to hazardous effects are distinguished as:

- Heat radiation, from an explosion, or a flash fire.

In the next three paragraphs, the chosen damage criteria are given and explained as per the Guidelines for QRA – Assess Risk software developed by M/s. Fluidyne Consultancy Private Limited and Purple Book for QRA released by Center for Chemical Process Safety (CCPS).

### ❖ Assumptions for Consequence analysis

For Consequence Analysis, assumptions regarding Meteorological, Pasquill Stability Classes, Wind velocity, Ambient Temperature, Relative Humidity, Inventory, Ground Roughness, Model used etc. are very important. In this report, the following assumptions have been considered.

#### i. Meteorological Data

- Atmospheric Conditions: No Inversion
- Ambient Temperature: 30°C has been considered as MCA approach.
- Relative Humidity: As the site is not in rainy zone RH of 75% has been considered.

#### ii. Pasquill Stability Classes

- Pasquill Stability Category D/F is considered as conservative approach.

#### iii. Other assumptions:

- Ground Roughness: Ground Roughness has been considered as 0.3 m.
- Dispersion model of both Heavy Model and also Gaussian distribution have been used as applicable/appropriate.
- Inventory: Release of 100% of the inventory has been considered. For this, failure of the container has been considered from the bottom.

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- Storage conditions: Storage conditions have been considered as they are practically stored at site.

Following Weather data has been used for the study:

**TABLE 7.10 - WEATHER DATA USED FOR THE STUDY**

| <b>WIND SPEED (m/s)</b> | <b>PASQUILL STABILITY</b> |
|-------------------------|---------------------------|
| 1.5                     | F                         |

#### ❖ **Software Used for Calculations**

- Fluidyne software used for the risk assess.

#### ❖ **Scenarios Considered for Consequence Analysis**

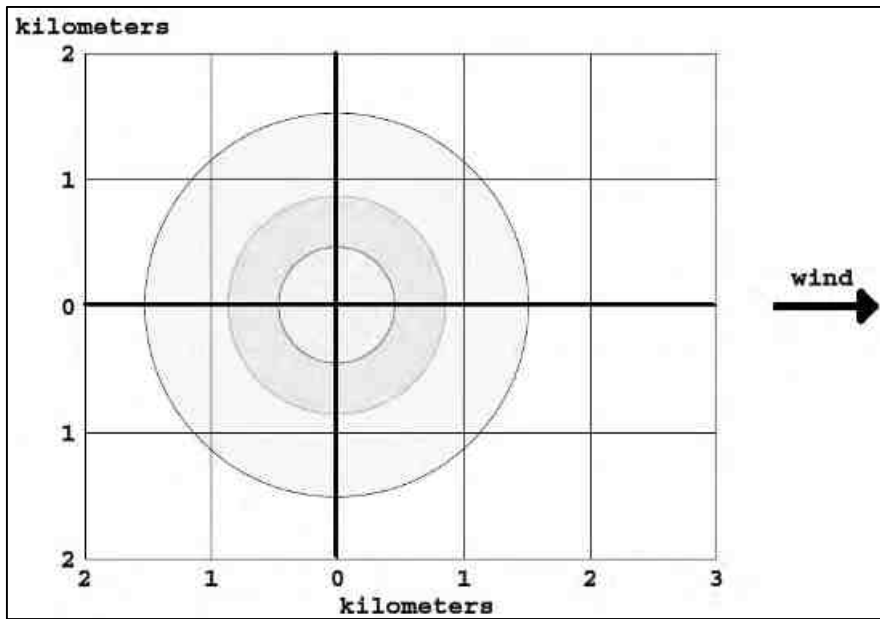
1. In this study, the scenarios for consequence analysis have been selected considering:
  - The physical and chemical properties of hazardous materials.
  - Storage conditions and Modes of Storage (Above ground Tanks).
  - Hazards ranking by National Fire Protection Association (NFPA).
  - Guidelines by OSHA Title 29 of the Code of Federal Regulations (29 CFR).
  - Operating and storage conditions of handling and storage of hazardous chemical.
2. This report considers the worst-case scenario which is possible during any set of operation variable and production methodologies. The objective of the study is emergency planning; hence only holistic and conservative assumptions are used for obvious reasons. Hence though the outcomes may look pessimistic, the planning for emergency concept should be borne in mind whilst interpreting the results.
3. Identification of solvents/chemicals to be considered for Consequence Modelling:
 

Based on the nature of the project and chemicals to be utilised for the different activities; the LDO is identified for the risk assessment.
4. In this study, results of consequence analysis shall be used for;
  - Emergency Planning
  - Deciding Evacuation Routes
  - Deciding Location of Assembly Points and ECC.
  - Resource Allocation for mitigation

|                                                  |                                          |      |            |
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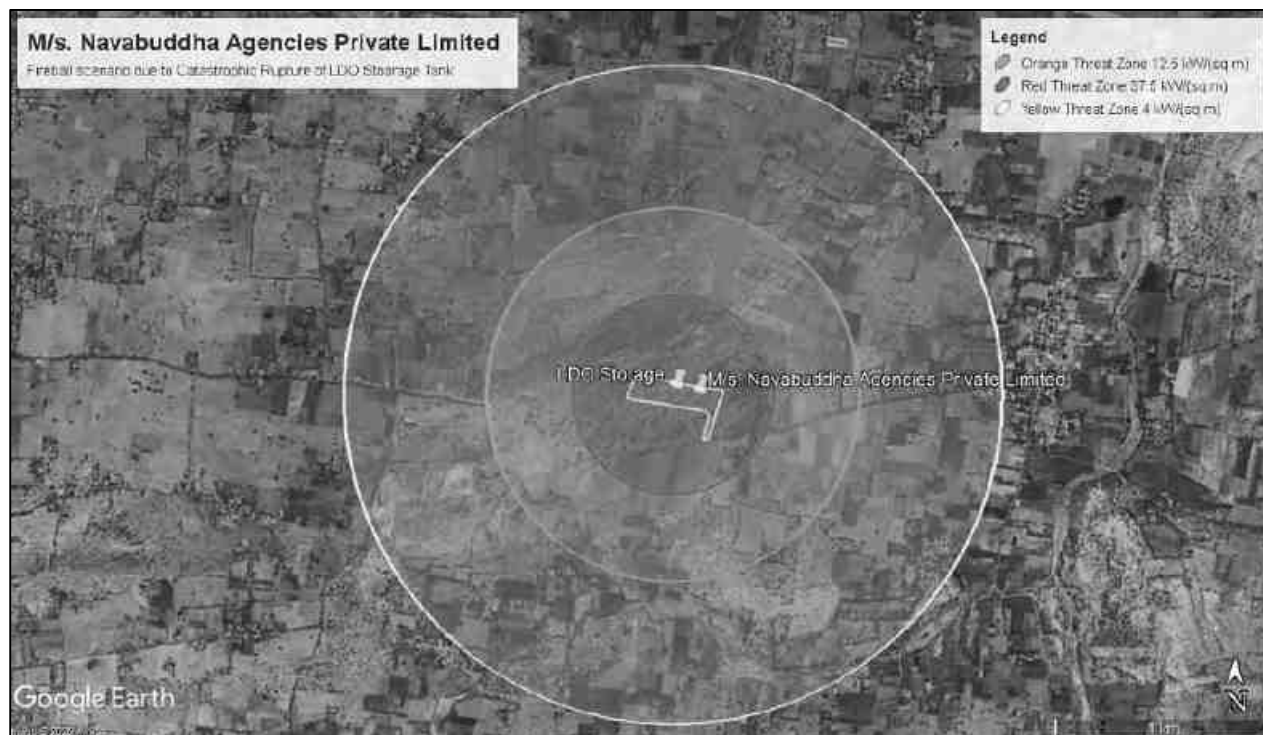
## 5. Scenarios Identified for consequence analysis.

### ❖ Release of LDO from Storage Tank at Incineration Area

| Basis: Release of LDO From storage Tank at Incineration Area                                                                                                                                                                 |                   |                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Data                                                                                                                                                                                                                   |                   |                                                                                                                                                                     |
| Pressure                                                                                                                                                                                                                     | Ambient           |                                                                                                                                                                     |
| Temperature                                                                                                                                                                                                                  | 30 °C             |                                                                                                                                                                     |
| Molecular Weight                                                                                                                                                                                                             | 250.00 g/mol      |                                                                                                                                                                     |
| FIREBALL SCENARIO                                                                                                                                                                                                            |                   |                                                                                                                                                                     |
| Radiation Level (KW/m2)                                                                                                                                                                                                      | Distance in meter | Effect if IHR at Height of simulation                                                                                                                               |
| 4                                                                                                                                                                                                                            | 1500              | This level is sufficient to cause personnel if unable to reach cover within 20s; however, blistering of the skin (second degree burn) is likely; 0: lethality       |
| 12.5                                                                                                                                                                                                                         | 861               | This level will cause extreme pain within 20 seconds and movement to a safer place is instinctive. This level indicates around 6% fatality for 20 seconds exposure. |
| 37.5                                                                                                                                                                                                                         | 460               | This level of radiation is assumed to give 100% fatality as outlined above.                                                                                         |
| FIREBALL SCENARIO                                                                                                                                                                                                            |                   |                                                                                                                                                                     |
| <div><div><div></div> greater than 37.5 kW/(sq m)<div></div> greater than 12.5 kW/(sq m)<div></div> greater than 4 kW/(sq m)</div></div> |                   |                                                                                                                                                                     |

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### FIREBALL SCENARIO ON GOOGLE EARTH



|                                                  |                                          |      |            |
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### 7.3 OTHER SAFETY PRECAUTIONS / RECOMMENDATIONS BASED ON CONSEQUENCE ANALYSIS

Following Safety Precautions shall be followed /practiced during storage, transportation, unloading and handling of Bio-Medical waste, in order to ensure safety and avoid the human health impacts.

#### 1. STORAGE AREA (STORAGE SHED)

- Infectious, ignitable, reactive and non-compatible wastes will be stored separately and will never store in the same storage shed.
- Storage area shall have different sheds for storing different kinds of incinerable hazardous wastes and sheds shall be provided with suitable openings.
- Storage area shall be designed to withstand the load of waste stocked and any damage from the hazardous waste spillage.
- Installation of a storage area with proper top covering and impervious flooring shall be done to avoid soil contamination due to leachate infiltration during rainy season.
- Hazardous waste storage area shall be provided with the flameproof electrical fittings and it shall be strictly adhered to.
- Automatic smoke, heat detection system shall be provided in the sheds.
- Adequate separation distance shall be maintained between each facility.
- Adequate fire break distance (minimum 4 m) shall be maintained between storage blocks.
- Doors and approaches of the storage area shall be of suitable sizes for entry of forklift and firefighting equipment;
- In order to have appropriate measures to prevent percolation of spills, leaks etc. to the soil and ground water, the storage area shall be provided with concrete floor or steel sheet depending on the characteristics of waste handled and the floor shall be structurally sound and chemically compatible with wastes.
- Measures shall be taken to prevent entry of runoff into the storage area. The Storage area shall be designed in such a way that the floor level is at least 150 mm above the maximum flood level.
- The storage area floor shall be provided with secondary containment such as proper slopes as well as collection pit so as to collect wash water and the leakages/spills etc.
- All the storage yards shall be provided with proper peripheral drainage system connected with the sump so as to collect any accidental spills in roads or within the storage yards as well as accidental flow due to firefighting.
- All care shall be taken so that infectious material shall not leak and spread the infection.
- Negative pressure system shall be provided in **yellow waste storage area**, connected to incinerator to control odour.
- Foam-based and portable firefighting systems (ABC/CO<sub>2</sub> extinguishers) shall be installed.



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### ❖ **Bio-Medical Waste Treatment and Disposal Facilities**

- It shall be ensured that handling of all spillages is done properly by introducing spill control procedures for various hazardous and toxic materials. Spill control procedures shall be followed strictly.
- **Interlocking system** shall be provided in incinerator to control feed based on temperature.
- Monitoring data shall be analyzed and reviewed at regular intervals and compared with the operating standards, so that necessary corrective actions can be taken, if any.
- **Online Continuous Emission Monitoring System (OCEMS)** shall be installed.
- Ground and surface Water use shall be monitored carefully.
- Waste minimization practices such as segregation, inventory control, and preventive maintenance shall be adopted.

### ❖ **Storage Drums/Containers (if required to use)**

- The container shall be made or lined with the suitable material, which will not react with, or in other words compatible with the biomedical wastes proposed to be stored.
- The stacking of drums in the storage area shall be restricted to three high on pallets (wooden frames). Necessary precautionary measures shall be taken so as to avoid stack collapse. However, for waste having flash point less than 65.5 °C, the drums shall not be stacked more than one height.
- No drums shall be opened in the storage sheds for sampling etc. and such activity shall be done in designated places outside the storage areas;
- Drums containing wastes stored in the storage area shall be labeled properly indicating mainly type, quantity, characteristics, source and date of storing etc.
- Containers shall comply with CPCB and Bio-Medical Waste Management Rules labeling requirements.

### ❖ **Spillage/Leakage Control Measures**

- The storage areas shall be inspected daily for detecting any signs of leaks or deterioration, if any. Leaking or deteriorated containers shall be removed and ensured that the contents from it are transferred to a sound container.
- **Spill kits with chemical-compatible absorbents (sand, vermiculite, neutralizers)** shall be available.
- Proper slope with collection pits shall be provided in the storage area so as to collect the spills/leakages.

## **2. CLOSURE AND POST CLOSURE MAINTENANCE PLAN**

The closure and post closure maintenance plan shall comprise of following components:

- Plan for management of surface water run off with an effective drainage system.
- Plan for periodical inspection and maintenance of site.
- Plan for post closure management of leachate and post closure environmental monitoring.
- Super fund for any unforeseen event.

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### **3. SAFE PRACTICES: Do's and Don'ts**

Following Do's and Don'ts shall be practiced for the expansion unit:

#### **❖ Do's:**

- Inspection of Storage Area, all Fire Fighting Facilities /Check Alarms operations.
- Ensuring that operators/workers etc. follows the SOPs, Safety procedures and standards, work permit system, etc.
- Make sure fire extinguishers are fully charged and ready for action.
- Inspections of plant, storage area, machinery, tools, equipment, premises, work practices, processes, procedures to be carried out for the health and safety of plant, people and surrounding.
- Correct or report unsafe conditions.
- Use prescribed protective equipment; keep them in good working conditions.
- Smoking shall be prohibited in and around the storage areas;
- Good housekeeping shall be maintained around the premises.
- Signboards showing precautionary measures to be taken, in case of normal and emergency situations shall be displayed at appropriate locations.
- To the extent possible, manual operations within storage area shall be avoided. In case of manual operation, proper precautions shall be taken, particularly during loading / unloading of wastes.
- Storage sites will have adequate and prompt emergency response equipment systems for the hazardous waste stored on-site. This will include firefighting arrangement based on the risk assessment, spill management, evacuation and first aid. On-site Plan shall be reviewed and updated, as per the requirement.
- Immediately on receipt of the waste, it shall be analyzed and depending upon its characteristics and storage and disposal shall be finalized.
- Mock drill for onsite emergency shall be conducted regularly and records will be maintained

#### **❖ Don'ts:**

- Don't allow anyone who hasn't received specific safety and operational training to get indulge in any site activity.
- Don't perform your own maintenance.
- Don't compromise on Design and Engineering part.
- Don't perform any activity without proper permit.

#### **❖ Hazard Analysis and Safety Audit**

During operation of waste treatment, a preliminary hazard analysis shall be conducted. Safety Audit shall be conducted internally by the operator every year and externally once in two years by a reputed expert agency. Conditions stipulated by SPCBs while granting authorization under Hazardous & other wastes (Management & Trans boundary Movement) Rules, 2016 to the Bio-Medical Waste Treatment Facility operation will be complied.

**Display of necessary information at bio-medical waste treatment facility site necessary information containing the following elements shall be displayed at the site.**

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- Waste type (infectious, ignitable, toxic, reactive, etc.)
- Approximately quantity of each type of wastes
- Generation location of waste

#### 4. MEASURES FOR FUGITIVE EMISSION CONTROL

- Regular monitoring of emissions shall be carried out and records maintained.
- Adequate ventilation with controlled exhaust systems shall be provided.
- Use of respiratory PPE (mask/respirator) shall be ensured where required.
- Safe operating and emergency procedures shall be strictly followed.

#### ❖ Fire Control Plan

**M/s. Navabuddha Agencies Private Limited**, has considered fire prevention measures at the project planning stage to avoid any outbreak of fire. By looking to the hazardous nature of wastes and the treatment chemicals that are handled and processed, the chances of outbreak of fire is very less which cannot be totally ignored. Hence to tackle such a situation, company will develop a well-resourced and adequate fire protection system/firefighting network.

Adequate firefighting systems shall be provided for the storage area and boundary of Bio-Medical waste treatment facility.

- Firefighting extinguishers will be provided as per the IS-2190.
- Flame detectors, smoke / temperature actuated heat detectors with alarms, shall be installed at conspicuous locations as per the requirements.
- Working staff will be trained to operate fire extinguishers.
- DG set will be made available as a separate power backup for fire network, in case of emergency or power failure.
- Company will do tie up with Fire Brigade and nearby companies, for handling emergency situations.
- Electric driven Alarms and Sirens shall be placed at the conspicuous locations. Hand Bell shall be used in case of power failure.

Fire load is calculated for the purpose of handling of emergency situation. It is based on the area and details of the floor. Also, types and numbers of the fire- extinguishers details are mentioned in the

**TABLE 7.11**

**TABLE 7.11 – FIRE LOAD CALCULATION**

| Sr. No. | Particular                  |   | Details                                                                                                                                             |
|---------|-----------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Name and Address of factory | : | <b>M/s. Navabuddha Agencies Private Limited</b><br>S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110 |
| 2       | Phone Number                | : | 91- 8160483760                                                                                                                                      |
| 3       | Name of Occupier            | : | <b>Mr. Pradipta Kumar Rath</b>                                                                                                                      |

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| Sr. No. | Particular                                                                                                                                                       |   | Details                                                                                              |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------|
| 4       | Total Floor of the factory                                                                                                                                       | : | May vary from Building to building. However, maximum 2 floors                                        |
| 5       | Detail of Combustible Area (In sq. Meter)                                                                                                                        |   |                                                                                                      |
| a)      | Total Floor Area                                                                                                                                                 | : | 9360 m <sup>2</sup>                                                                                  |
| b)      | Open Space Area in which Combustible Material stored                                                                                                             | : | 4265 m <sup>2</sup>                                                                                  |
| c)      | Area having more than 15-meter Height                                                                                                                            | : | 0.0 m <sup>2</sup>                                                                                   |
| d)      | Area having Wooden material                                                                                                                                      | : | 1860 m <sup>2</sup>                                                                                  |
|         | Total (a + b + c + d)                                                                                                                                            | : | 15485 m <sup>2</sup>                                                                                 |
| 6       | (a + b + c + d)/20                                                                                                                                               | : | 774.25 L/M                                                                                           |
| 7       | Total Requirement of Water (based on area in sr. no-6)                                                                                                           | : | 46455 m <sup>2</sup>                                                                                 |
| 8       | Current Water storage Capacity for fire hydrant                                                                                                                  | : | 46.5 KLD                                                                                             |
|         | Underground Tank + overhead tank + On ground Tank                                                                                                                | : | 150 KL                                                                                               |
| 9       | In case of Fire, Arrangement for water to be used in fire fighting                                                                                               |   |                                                                                                      |
| a)      | Is Hydrant Line available? If yes give dimension of Pipe.                                                                                                        | : | Dimension of Pipe:200 mm Dia of hydrant pipe                                                         |
| b)      | Which type of arrangement are available for Supply water on ground or upper floor i.e. Pipe line and it's Diameter (c.m.); Give detail                           | : | Water arrangement supply by hydrant line system to ground floor & upper floor 4 inch                 |
| c)      | Are Fire Water Pump Available or Not? Give detail                                                                                                                | : | Details of Fire Water Pump: Yes                                                                      |
| 10      | If the Value of Sr. 6 is more than 550, then requirement of trailer Pump is applicable. If it applicable, then what is the arrangement for the Same. Give detail | : | Details of Trailer Pump: Yes, Mainpump: 75 Hp , Jockipump: 15 Hp                                     |
| 11      | How many water buckets required?                                                                                                                                 | : | 94 Nos.                                                                                              |
| 12      | How Many 9 Litres water type Extinguisher required? (Water Bucket/6)                                                                                             | : | Six Bucket can be replaced by one fire extinguisher                                                  |
|         |                                                                                                                                                                  |   | Fire Extinguisher required = 94/6=16                                                                 |
|         |                                                                                                                                                                  |   | Bucket may be dispensed with provided supply of extinguisher is double than indicate above = 0+16=16 |
| 13      | Requirement of 5 Kg CO2 Type Fire Extinguisher for Class - E fire. Floor wise (1 for every 15 m length)                                                          | : | 44 Nos.                                                                                              |
|         | Total requirement of Fire extinguishers.                                                                                                                         | : | 16+44=60 Nos.                                                                                        |
| 14      | Additional Fire Extinguisher Required                                                                                                                            | : |                                                                                                      |

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| Sr. No. | Particular                                                                 |   | Details                                         |
|---------|----------------------------------------------------------------------------|---|-------------------------------------------------|
| 15      | Emergency Fire Exit provided to Each Floor? Ladder Provided to Each floor? | : | Yes                                             |
| 16      | Arrangement for Fire warning. i.e. Hooter / Ele. Bell / Other              | : | Yes                                             |
| 17      | Water Sprinkler Provided?                                                  | : | Yes                                             |
| 18      | Nearest Fire Station                                                       | : | Tiruchirappalli Fire and Rescue Service Station |
| 19      | Applicability of Off-site Emergency Plan                                   | : | No                                              |
| 20      | Fire Proximity Suits                                                       | : | 5 nos. (approx.)                                |

❖ **Other details on Fire Control Plan and same shall be proposed for CBWTF if required:**

- Firefighting facilities comprising shall be installed as per the MFR and TAC guidelines
- Working staff shall be given training to operate CO<sub>2</sub> extinguishers.
- Emergency Action Team members shall work round the clock in all shifts.
- First aid shall be available round the clock in all shifts of all plants/ sections.
- DG Set shall be available for power backup.

❖ **Fire Protective equipment's:**

- Fire Extinguishers like Foam Type & Carbon Dioxide shall be provided as per IS-2190, at conspicuous locations.
- Other Firefighting facilities like, fire hose boxes with hose pipe, sand buckets, fire blanket etc. shall be provided within the company at conspicuous locations.
- Various other fire protection equipment's like Smoke detector, heat detector, Fire doors, Safety signs and Fire sprinklers can be considered in the facility along with the above mentioned equipment's.

❖ **Fixed Fire Protection System:**

- Fixed fire extinguishing/suppression systems are commonly used to protect areas containing valuable or critical equipment such as data processing rooms, telecommunication switches, and process control rooms.
- Their main function is to quickly extinguish a developing fire and alert occupants before extensive damage occurs by filling the protected area with a gas or chemical extinguishing agent.

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### ❖ **Failure Mode Effect Analysis**

Failure mode and effects analysis is the process of analyzing as many components, assemblies, and subsystems as feasible in order to identify probable system failure modes, as well as their causes and consequences. Each component's failure modes and their consequences on the rest of the system are documented in a separate FMEA spreadsheet.

A few different types of FMEA analyses exist, such as:

- Functional
- Design
- Process

An effective FMEA activity aids in the identification of probable failure modes based on previous experience with similar products and processes or on common physics of failure logic. It is extensively utilized in the development and production industries at various stages of the product life cycle. The term "effects analysis" refers to the study of the repercussions of failures at various system levels.

The following covers some basic FMEA terminology.

### ❖ **Action priority (AP)**

The AP replaces the former risk matrix and RPN in the AIAG / VDA FMEA handbook 2019. It makes a statement about the need for additional improvement measures.

### ❖ **Failure**

The loss of a function under stated conditions.

### ❖ **Failure mode**

The precise process or means via which a malfunction of the apparatus, subsystem, system, portion, or function under examination takes place. The level of depth at which failure mode is defined varies depending on the type of FMEA that is conducted. The precise failure modes of a part or component, such as a fully broken axle or a deformed axle, or an electrical contact that is trapped open, jammed short, or intermittent, will be the main focus of a piece part FMEA. Functional failure modes will be the main emphasis of a functional FMEA. These could be more particular and unique to the equipment under study, or they could be more broad (like no function, over function, under function, intermittent function, or unintended function). Process failure modes (such inserting the incorrect drill bit) will be the main focus of a PFMEA.

### ❖ **Failure cause and/or mechanism**

Requirements, design, process, quality control, handling, and part application defects are the root cause, or series of root causes, that start a process (mechanism) that eventually results in a failure mode. Failure modes might have multiple root causes. For instance, "fretting corrosion in an electrical contact" or "fatigue or corrosion of a structural beam" are examples of failure mechanisms rather than failure modes per se. A "full fracture of structural beam" or "an open electrical contact" is the

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associated failure mode (final state). "Improper application of corrosion protection layer (paint)" and/or "(abnormal) vibration input from another (possibly failed) system" could have been the initial cause.

#### ❖ **Failure effect**

The effects of a malfunction on the function, or more broadly on the needs of the user or customer that the function is supposed to meet but isn't currently, or can't meet completely.

#### ❖ **Indenture levels (bill of material or functional breakdown)**

A system level identifier, which in turn indicates item complexity. In the neighborhood of unity, levels get more complex.

#### ❖ **Local effect**

The impact of failure on the object being examined.

#### ❖ **Next higher-level effect**

The impact of failure at the subsequent higher indenture level.

#### ❖ **End effect**

The impact of failure at the highest level of indenture or the entire system.

#### ❖ **Detection**

The methods used by the operator, maintenance, or built-in detection system to identify the failure mode, along with the expected dormancy period (if relevant).

#### ❖ **Probability**

The probability that the failure will transpire.

#### ❖ **Risk priority number (RPN)**

Event severity × likelihood of occurrence × detection (likelihood that the event would go undetected until the user became aware of it).

#### ❖ **Severity**

The effects of a method of failure. According to the degree of harm, property damage, system damage, and/or time lost to fix the failure, severity takes into account the worst-case scenario for a failure.

|                                                  |                                          |      |            |
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### ❖ **Remarks / mitigation / actions**

Extra information, such as the suggested risk mitigation or steps taken to reduce a risk or support a risk scenario or level. A spreadsheet is created for the standard biomedical waste treatment plant taking into account the aforementioned FMEA components for different operational scenarios.

### ❖ **Probability (P)**

Examining the root cause and probability of a failure mode is essential. This can be accomplished through analysis, computations, FEM, and a review of related products or procedures and the failure modes that have already been recorded for them. A design flaw is considered to be the root cause of a failure. Every possible reason why a failure mode could occur should be found and recorded. Technical words should be used for this. Examples of reasons include: handling errors made by humans; manufacturing-related defects; fatigue; creep; abrasive wear; incorrect algorithms; high voltage; or, depending on the ground rules in place, inappropriate operating circumstances or use. A Probability Ranking with a predetermined number of levels could be produced by a failure scenario.

**TABLE 7.12 – PROBABILITY RANKING**

| <b>Rating</b> | <b>Meaning</b>                                                                                                              |
|---------------|-----------------------------------------------------------------------------------------------------------------------------|
| 1             | Extremely unlikely (virtually impossible or No known occurrences on similar products or processes, with many running hours) |
| 2             | Remote (relatively few failures)                                                                                            |
| 3             | Occasional (occasional failures)                                                                                            |
| 4             | Reasonably possible (repeated failures)                                                                                     |
| 5             | Frequent (failure is almost inevitable)                                                                                     |

For a piece part FMEA, quantitative probability may be calculated from the results of a reliability prediction analysis and the failure mode ratios from a failure mode distribution catalog, such as RAC FMD-97. This method allows a quantitative FTA to use the FMEA results to verify that undesired events meet acceptable levels of risk.

### ❖ **Severity (S)**

Establish the Severity of the worst-case unfavorable outcome (state). It is convenient to describe these consequences in terms of potential user experiences or observations of functional errors. These consequences can include things like complete loss of function x, impaired performance, inverted functions, functioning too late, irregular functioning, etc. A Severity number (S) is assigned to each end result, ranging from I (no effect) to V (catastrophic), depending on the cost and/or the loss of life or quality of life. These figures rank the failure modes in order of priority (along with probability and detectability). A typical classification is provided below. It is possible to classify things differently.



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**TABLE 7.13 – SEVERITY RANKING**

| Rating | Meaning                                                                                                                                                           |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | No relevant effect on reliability or safety                                                                                                                       |
| 2      | Very minor, no damage, no injuries, only results in a maintenance action (only noticed by discriminating customers)                                               |
| 3      | Minor, low damage, light injuries (affects very little of the system, noticed by average customer)                                                                |
| 4      | Critical (causes a loss of primary function; loss of all safety margins, 1 failure away from a catastrophe, severe damage, severe injuries, max 1 possible death) |
| 5      | Catastrophic (product becomes inoperative; the failure may result in complete unsafe operation and possible multiple deaths)                                      |

#### ❖ Detection (D)

Detection (D) represents the ability of control measures to identify a failure mode or its cause before it leads to adverse effects. It indicates how effectively a failure can be detected through routine inspection, monitoring systems, or operational checks.

Detection is important for ensuring **system reliability and operational safety**, particularly in cases of latent or hidden failures, where the failure may not be immediately apparent during normal operation.

Detection may occur through:

- Operator observation during routine operation
- Preventive maintenance and inspection activities
- Instrumentation, alarms, and monitoring systems

Lower detection ratings indicate **higher likelihood of detecting failure**, whereas higher ratings indicate **lower detectability**.

**TABLE 7.14 – DETECTION RATING**

| Rating | Meaning                                         |
|--------|-------------------------------------------------|
| 1      | Certain – fault will be caught on test          |
| 2      | Almost certain                                  |
| 3      | High                                            |
| 4      | Moderate                                        |
| 5      | Low                                             |
| 6      | Fault is undetected by operators or maintainers |

#### ❖ Dormancy or latency period

Dormancy refers to the time interval during which a failure remains undetected before being identified through inspection or monitoring.

Typical examples include:

- Immediate (seconds): Automatically detected through alarms or control systems
- Short-term (hours): Detected during routine inspections
- Medium-term (weeks/months): Detected during scheduled maintenance
- Long-term (years): Detected during overhaul or major shutdown

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### ❖ Indication

A second failure scenario should be investigated to ascertain whether or not an indicator will be visible to all operators and what corrective action they may or should take, provided that the undetected failure permits the system to continue in a safe and functional state.

The operator should be given indications that are specified as follows:

- Normal: A signal that, in the event that the system or equipment is functioning normally, is visible to the operator.
- Abnormal: A signal that shows an operator exactly when a system failure or malfunction has occurred.

Wrong: An inaccurate signal provided to a user as a result of an indicator malfunctioning or failing (i.e., instruments, sensing devices, visual or audible warning devices, etc.).

### ❖ Perform Detection Coverage Analysis for Test Processes and Monitoring (From Arp 4761 Standard):

Detection coverage analysis is carried out to evaluate the effectiveness of monitoring systems, inspection procedures, and test methods in identifying failures, including latent and dormant faults. The analysis involves:

- Reviewing identified failure modes
- Assessing whether these failures can be detected through alarms, instrumentation, and inspection practices
- Evaluating the effectiveness and reliability of detection systems

It is recognized that detection systems themselves may fail or may not identify all failure modes. Therefore, detection coverage is considered as a limiting factor in risk evaluation, and conservative assumptions are adopted wherever necessary.

Improving detection coverage through:

- Regular inspection and maintenance
- Reliable instrumentation and alarm systems
- Periodic testing and calibration

Risk is assessed based on the combination of:

- **Probability (P)** – likelihood of occurrence of failure
- **Severity (S)** – consequence of failure
- **Detection (D)** – ability to detect failure

### Risk Priority Number (RPN) = P × S × D

Higher RPN values indicate higher risk and require priority mitigation measures. In cases involving complex systems or multiple failure scenarios, advanced techniques such as Fault Tree Analysis (FTA) or Event Tree Analysis (ETA) may be applied for detailed risk estimation.

A qualitative risk matrix is used for preliminary risk ranking, and risks categorized as high are addressed through appropriate control and mitigation measures.

|                                                  |                                          |      |            |
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**TABLE 7.15 – FMEA (FAILURE MODE EFFECT ANALYSIS) AND ACTION PLAN**

| Potential Failure Mode                                 | Potential Effect of the Failure                                                                                                     | Severity Rating (S) | Potential Cause of the Failure                                                          | Frequency of occurrence (O) | Detection Score (D) | Risk Priority Number (S*O* D) | Recommended Action                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------|-----------------------------|---------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Burner parts get damaged after running the incinerator | <ul style="list-style-type: none"> <li>Difficulty in restarting burner</li> </ul>                                                   | 5                   | Improper shutdown procedure leading to thermal stress                                   | 5                           | 1                   | 25                            | <ul style="list-style-type: none"> <li>Ensure gradual cooling using blower for minimum 3 hours after shutdown.</li> <li>Avoid sudden shutdown during operation</li> <li>Provide standby burner</li> </ul>                                                                                                                              |
| Cracks developed in incinerator refractory lining      | <ul style="list-style-type: none"> <li>Incinerator cannot be operated</li> </ul>                                                    | 4                   | Thermal shock due to rapid heating and cooling cycles                                   | 3                           | 1                   | 12                            | <p>The refractory that expansion joints are created to prevent its cracking because it has a very low linear expansion rate.</p> <ul style="list-style-type: none"> <li>Maintain controlled heating and cooling cycles.</li> <li>Avoid thermal shock conditions.</li> <li>Conduct periodic inspection of refractory lining.</li> </ul> |
| Correct temperature not achieved                       | <ul style="list-style-type: none"> <li>Incinerator cannot be operated</li> <li>Improper combustion and operation failure</li> </ul> | 4                   | Operational parameters not set Properly i.e. Incorrect burner settings (air-fuel ratio) | 3                           | 1                   | 12                            | <ul style="list-style-type: none"> <li>The burner setting must be proper.</li> <li>Calibrate burner settings (air damper, diffuser, fuel pressure)</li> <li>Monitor chamber temperature continuously</li> </ul>                                                                                                                        |
| Burner lock-out                                        | <ul style="list-style-type: none"> <li>Fuel tank empty</li> <li>Nozzle choking</li> <li>Improper air</li> </ul>                     | 4                   | Operation is not supervised                                                             | 1                           | 1                   | 4                             | <ul style="list-style-type: none"> <li>Maintain adequate fuel level</li> <li>Clean nozzle and filters regularly</li> <li>Inspect ignition system periodically</li> </ul>                                                                                                                                                               |

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| Potential Failure Mode                              | Potential Effect of the Failure                                   | Severity Rating (S) | Potential Cause of the Failure                                            | Frequency of occurrence (O) | Detection Score (D) | Risk Priority Number (S*O* D) | Recommended Action                                                                                                                                                                              |
|-----------------------------------------------------|-------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------|-----------------------------|---------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     | damper setting<br>• Ignition system failure<br>• Filters choking. |                     | properly                                                                  |                             |                     |                               | <ul style="list-style-type: none"> <li>Ensure proper air damper settings</li> </ul>                                                                                                             |
| Water leakage from scrubberregion                   | • Reduced pollution control efficiency                            | 4                   | Damage to saturator nozzle or refractory lining                           | 1                           | 1                   | 4                             | <ul style="list-style-type: none"> <li>Control water flow rate</li> <li>Inspect saturator nozzle and refractory</li> <li>Carry out periodic maintenance</li> </ul>                              |
| Leakage of smoke from charging door, ash door, etc. | • Air pollution and unsafe working conditions                     | 4                   | Excess waste loading or improper draft (negative pressure not maintained) | 1                           | 1                   | 4                             | <ul style="list-style-type: none"> <li>Maintain waste loading within design capacity.</li> <li>Ensure negative pressure using ID fan.</li> <li>Monitor draft and pressure regularly.</li> </ul> |

**Conclusion:** it is concluded from above risk priority number and recommended actions thereof that, there are three major risks to operation of incinerator  
i.e. failure modes.

- 1. Burner parts get damaged**
- 2. Cracks developed in incinerator refractory lining**
- 3. Correct temperature not achieved.**

However, there are solutions and preventive actions for each of the above failure modes as described below:

|                                                  |                                          |      |            |
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**TABLE 7.16 – FAILURE SCENARIO WITH PREVENTIVE ACTION REQUIRED**

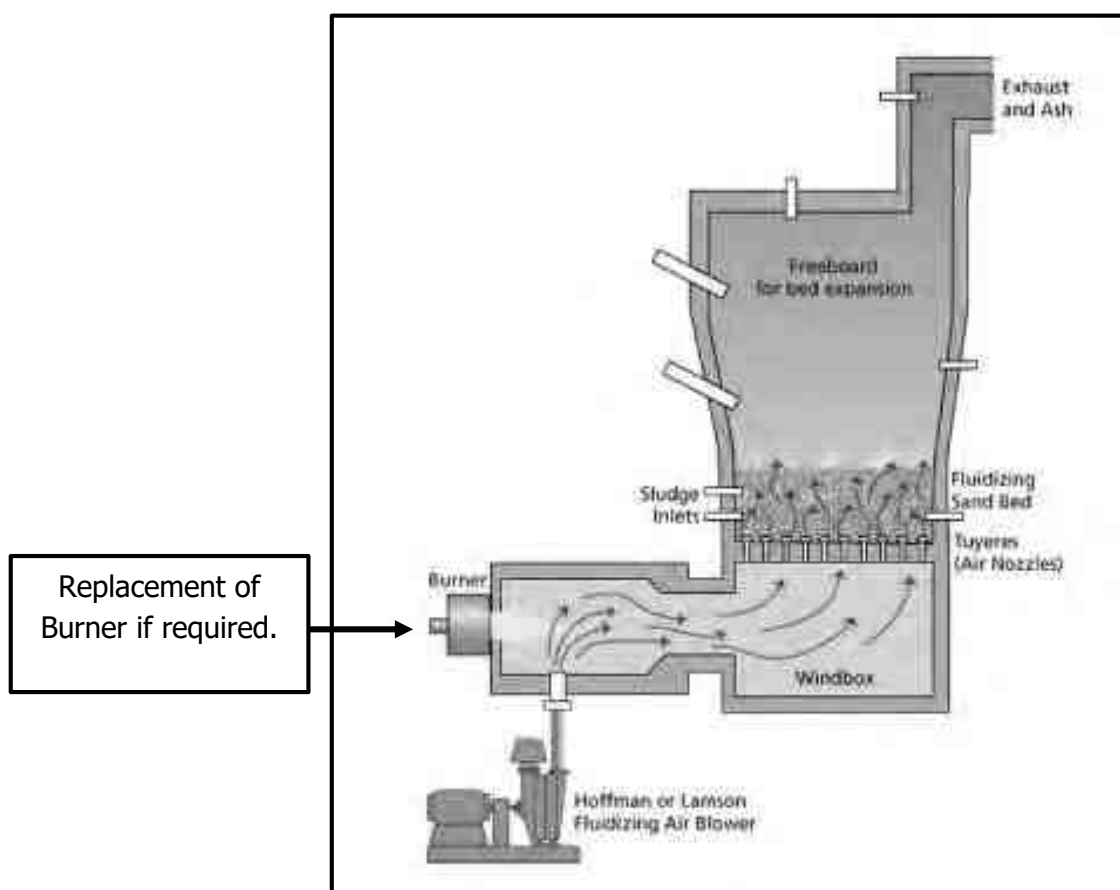
| Sr. No. | Failure Scenario                           | Preventive actions required to continue operations                                                                                                                                                                                                  |
|---------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Burner Parts get damaged                   | <ul style="list-style-type: none"> <li>• Provide standby burner to ensure uninterrupted operation.</li> <li>• Follow proper shutdown procedure with gradual cooling</li> </ul>                                                                      |
| 2       | Cracks developed in incinerator refractory | <ul style="list-style-type: none"> <li>• Maintain controlled heating and cooling cycles</li> <li>• Avoid thermal shock due to rapid temperature variation</li> <li>• Conduct periodic inspection and timely repair of refractory</li> </ul>         |
| 3       | Correct temperature not achieved           | <ul style="list-style-type: none"> <li>• Ensure proper burner settings (air damper, diffuser, fuel pressure)</li> <li>• Monitor temperature continuously during operation</li> <li>• Follow standard operating procedures (SOP) strictly</li> </ul> |

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### ❖ Contingency Plan

In order to ensure uninterrupted operation of the Bio-Medical Waste Treatment Facility and to address potential equipment failures, the following contingency measures shall be implemented:

- In case of burner malfunction or maintenance requirement, **standby burner(s)** shall be provided to avoid shutdown of the incinerator. Provision for **quick replacement of burner assembly** shall be ensured.
- Preventive and breakdown maintenance of critical components such as **rubber liners, air nozzles, and air blowers** shall be carried out by a dedicated technical team to ensure continuous and efficient operation.
- Adequate inventory of **critical spare parts** shall be maintained at site to minimize downtime during equipment failure.
- **Standard Operating Procedures (SOPs)** shall be followed for maintenance and troubleshooting activities.
- Trained personnel shall be available to handle emergency situations and carry out **immediate corrective actions**.



|                                                  |                                          |      |            |
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## 7.4 DISASTER MANAGEMENT PLAN (ON-SITE EMERGENCY PLAN)

M/s. Navabuddha Agencies Private Limited, shall prepare the Disaster Management Plan (On-Site Emergency Plan) which shall be followed from the project construction and erection phase to tackle any emergency situation for proposed plant.

The purpose of this plan is to provide Bio-Medical Waste Management with the means to effectively utilize all the resources at its disposal for the protection of life, environment and property. The details of the same are discussed in the following sections.

### 7.4.1 Defining the Nature/Level of Emergency

The level of emergency can be classified in three categories:

#### LEVEL - 1:

The leakage or emergency, which is confinable within the plant/area. It may be due to:

- Small pipe/valve rupture or similar leakages that do not affect outside premises.
- Release of toxic chemicals for short duration.
- Small fire in the plant.

Incident at the Bio-Medical Waste Treatment Facility confined to a small area and not posing an immediate threat to life or property, such as spillage of liquid or hazardous wastes or small fire in flammable wastes.

#### LEVEL - 2:

The emergency, which is confinable within the factory premises. It may arise due to -

- Leakage of toxic chemicals for long duration.
- Medium scale explosion confined to the factory premises.
- Medium scale fire inside the factory premises.
- Incident at the Bio-Medical Waste Treatment Facility involving a larger area and posing a potential threat to life or property (e.g., fire in flammable wastes, flooding of disposal pit due to heavy rain).

#### LEVEL - 3:

The emergency, which is not confinable within the factory premises and general public in the vicinity are likely to be affected. It may arise due to –

- Heavy / Profuse leakage of toxic / flammable gases for a long duration.
- Explosion of high magnitude affecting the adjacent area.
- Major fire inside the factory premises i.e. at flammable hazardous waste at Bio-Medical Waste Treatment Facility.
- An incident at Bio-Medical Waste Treatment Facility involving a severe hazard or a large area which poses an extreme threat to life or property. Breakage in slop and liner system due to de-settlement/earth quake, subsequently contamination of soil and ground water.

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#### **7.4.2 Objectives of Emergency Management System**

The objectives of the emergency management system are summarized as under.

- To identify and assess types of emergencies arising from different hazards.
- To develop a plan to handle emergencies and safeguard employees and nearby population.
- To ensure emergency preparedness and periodic mock drills.
- To establish proper communication systems during emergencies.
- To maintain all necessary information related to emergency response.
- To inform employees, public, and authorities about hazards and response actions.
- To minimize risks to personnel and surrounding community.
- To control and contain accidents effectively.
- To minimize environmental damage and property loss.
- To rescue and provide treatment to affected persons.
- To inform and assist relatives of affected persons.
- To restore normalcy and rehabilitate affected areas.
- To provide information to media and authorities.
- To preserve records for investigation.
- To coordinate mutual aid support.
- To maintain trained personnel for emergency response.

#### **7.4.3 Structure of Emergency Management System**

M/s. Navabuddha Agencies Private Limited, shall develop an Emergency Management Team. The management structure shall include the following personnel's;

- Crises Coordinator
- Chief Emergency Coordinator (CEC)
- Site Incident Controller
- Fire and Safety Function Coordinator
- Media Function Coordinator
- Communication Function Coordinator
- Medical Function Coordinator

The other elements of Emergency Plan shall be:

- Assembly points
- Emergency control center
- Fire control arrangements
- Medical arrangements
- Other arrangements

#### **Crises Coordinator**

The Head of Bio-Medical Waste Treatment Facility will work as Crisis Coordinator:

- He will assess the situation and instructs the Chief Emergency Coordinator to sound the siren.



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- This will inform the employee that an emergency situation has arisen and that the Bio-Medical Waste Treatment Facility should be shut down and evaluated.
- All the personnel/part of the Bio-Medical Waste Treatment Facility need to be evacuated and employees other than given responsibility assemble at the assembly points.
- He will approve release of information to press, TV and Government agencies as required.

### **Chief Emergency Coordinator (CEC)**

The General Manager of Bio-Medical Waste Treatment Facility will work as Chief Emergency Coordinator. He will report at the command post and will assume overall responsibility of the works and its personnel. His duties will be:

- To assess the magnitude of the situation and decide whether a major emergency exists or is likely to develop, requiring external assistance. To inform District Emergency Authority (DEA) (i.e. District Collector) in case on-site emergency escalates into off-site emergency.
- To contact Crisis Cell of the Ministry and inform about the incident, magnitude of disaster, combating operations and number of casualties, if any.
- To exercise direct operational control over areas in the Bio-Medical waste treatment facility other than those affected.
- To assess the magnitude of the situation and decide if personnel need to be evacuated to identify safe places.
- To continuously review in consultation with the other Coordinator.
- To liaise with senior officials of police, fire brigade and Factories Inspectorate and pass on information on possible effects to the surrounding areas outside the factory premises.
- To liaise with various Coordinators to ensure casualties are receiving adequate attention and traffic movement within the Bio-Medical waste is well regulated.
- To arrange for a log of the emergency to be maintained in control room.
- To release authorized information to press through the media officer designated.
- To control rehabilitation of the affected persons and the affected areas after the emergency.
- To obtain assistance from Mutual Aid partners.

### **❖ Site Incident Controller**

The In-charge of waste storage will work as Site Incident Controller.

He will take overall control of handling the emergency at the plant. His first task will be the isolation of the source of containment loss to the extent feasible. Simultaneously, in case of fire, he will organize appropriate fire response to get the situation under control and to prevent escalation.

On arrival at the site, he will assess the scale of emergency and judge if a major emergency exists or is likely to develop and will inform the control room accordingly asking for assistance and indicating the kind of support needed. His duties and responsibilities will include:

- To coordinate the activities of other key persons reporting at the incident site, under his overall command.
- To direct all operations within the affected areas giving due priorities for safety of personnel and to minimize damage to environment, Bio-Medical Waste Treatment Facility and property.

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- To provide advice and information to Fire and Safety personnel and other fire services as and when they arrive.
- To ensure that all non-essential workers and staff within the affected area are evacuated to appropriate assembly points and those areas are searched for casualties.
- To organize rescue teams for any casualties and to send them to safe areas/medical Centre for first aid and medical relief.
- To setup communication points and establish contact with control room.
- To seek additional support and resources as may be needed through the control room.
- To seek decision support from the control room for decisions such as activation of mutual aid plan etc.
- To preserve all evidence so as to facilitate any inquiry into the cause and circumstance.
- To arrange for a head count after the emergency is over with respect to the personnel on duty in the affected areas.

#### ❖ **Fire and Safety Function Coordinator**

The Manager-Fire and Safety along with firefighting team will work as fire and safety functionary. The main responsibilities of fire and safety functionary are:

- To immediately take charge of all firefighting operations upon sounding of the alarm.
- To instruct the telephone operator to immediately inform all essential personnel not residing within the audible range of the emergency siren.
- To guide firefighting crew and provide logistics support for effectively combating the fire.
- To barricade the area at appropriate locations in order to prevent the movement of vehicular traffic.
- To assist in rescue and first aid operations.
- To operate the Mutual Aid Scheme and call for additional external help in firefighting via the control room.
- To organize relieving groups for firefighting.
- To inform the Crises Controller and give "All Clear" signal when the fire emergency is over.

#### ❖ **Individual Role of Each Category:**

##### **A) Role of Manager (Fire and Safety) / Shift In-Charge (Fire and Safety)**

1. Site Incident Controller directs the firefighting and Emergency operation. His duties include...
2. Keep the constant touch with the CEC / In charge - EHS.
3. Direct the crew members to the scene of emergency and arrange replenishment of Manpower / equipment / extinguishing media etc.

##### **B) Role of EHS Representative:**

1. On being notified about the location of fire/ gas leakage, he immediately proceeds to the help.
2. Decides his line of action in consultation with Site Incident controller and takes appropriate measures to handle the emergency.
3. Assessing the severity of the incident, immediately report to emergency controller about the gravity of the situation.
4. He assess the extra requirement required if any, from the neighboring industry.

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### **C) Fire crew members**

1. On hearing fire alarm, emergency siren they immediately report to control room and proceed to the scene of emergency and work under the direction of SIC /CEC.
2. The personal availability at the scene of incident to be made optimize.

### **D) Emergency Squad Members**

1. On hearing Emergency Siren, they immediately report to site main controller, safety in charge or incident controller.
2. They shall combat the emergency situation as per the direction of site main controller, safety in charge or incident controller.
3. They help for safe evacuation.

### **❖ Media Function (if required) Coordinator**

The Human Resource Manager will work as Media Function. He will under the direction of the CEC, co-ordinate the following:

- To liaise with various media and release written statements to the press through prior concurrence of Crises Controller.
- To handle media interviews with various media. Make arrangements for televising the information about the incident, if public interest warrants.
- Inform State and Central Governments and statutory bodies of the nature and magnitude of the incident, the number of casualties, etc.
- To locate himself such that media personnel/third parties do not need to go past the Bio-Medical Waste Treatment Facility security gates and that adequate communication links exist.
- Media personnel often insist on visiting the incident scene.
- To escort media team(s) if the Crises Controller approves such visits.

### **❖ Communication Function Coordinator**

The Manger-Laboratory will work as communication functionary. He should perform the following duties:

- To ensure all available communication links remain functional.
- To quickly establish communication links between incident site and the control room
- To ensure that previously agreed inventory of various types of communication equipment is maintained in working condition and frequent checks carried out and records maintained.
- To maintain voice record of significant communications with timings received/passed from the primary control room.

### **❖ Medical Function Coordinator**

The Manger–Occupational Health will look after medical function. He will perform the following:

- To arrange for the First Aid team to treat the affected personnel.
- He will render necessary treatment, at Occupational Health Center.
- To liaise with the local medical authorities and hospitals, if the casualties are more and the situation demands treatment at more/other medical centers.
- To liaise with the transport Coordinator for transporting the victims to various hospitals.

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- He will arrange for Hospitalization and Treatment at outside hospitals, if required.
- He will mobilize in getting the services of External medical agencies, other Para –medical services etc. and transportation services etc.
- He will arrange for extra medical assistance/antidotes, from out, if required.
- He will arrange for first-aid trained volunteers for necessary help.
- He will liaise with the Government Health Authorities for treatment of the affected persons nearby.
- To arrange for ambulances.
- The Medical coordinator should ensure the upkeep of agreed medical supplies, antidotes and equipment that should always be kept in stock for treating victims of burns.
- To liaise with the Media coordinator for release of news to the press.

#### ❖ **Transport Function Coordinator**

The Waste Transportation Manger will work as Transport Function. He shall perform the following duties:

- Arrange for transport of victims to hospital/dispensaries.
- Mobilize all available vehicles available at the Bio-Medical Waste Treatment Facility for emergency use, along-with the drivers.
- Arrange for the duty rotation of the drivers to meet with the emergency situation.
- To direct refueling of vehicles, if not topped up.
- To arrange for vehicles from other sources.
- To liaise with the CEC for evacuation of personnel and transportation of victims.

#### **OTHER ELEMENTS OF DMP:**

##### ❖ **Assembly Point**

In affected and vulnerable plants, all nonessential workers (who are not assigned any emergency duty) will be evacuated from the area and they shall report to specified Assembly Points. Assembly Points shall be located at a safe place well away from area of risk and least affected by the down wind direction.

To ensure that workers do not have to approach the affected area to reach the Assembly Point, proper location and number shall be marked at Assembly Points. Each Assembly Point shall be manned by a nominated person to record the names and dept. At each Assembly Point, duties of Assembly Point In-charge are displayed in brief. Before reaching an Assembly Point or subsequently, if it is required to pass through an affected area or due to presence of toxic substances, suitable PPE's including respirators, helmet etc., shall be issued and made available with workers.

##### ❖ **Emergency Control Center (ECC)**

The Emergency Control Center (ECC) is the place or room from where the operations to handle the emergency are directed and coordinated. A safe room shall be earmarked/identified as the Emergency Control Room.

Telephone and other facilities required with necessary documents shall be displayed in ECC for ready reference. Designated trained personnel shall operate ECC. In case of Major Emergency, the Site Main Controller will operate from ECC.

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The ECC center shall be equipped with the following facilities.

1. Internal and external telephone including STD facility
2. Telephone directory/ Telephone nos. of mutual aid centers
3. Company layout showing all the locations
4. First Aid
5. Muster roll of Workers
6. Identity card register
7. Copy of On-Site Plan
8. Stationeries like- note book, pen, pencils etc.
9. Sand Buckets and Hydrant Network
10. Adequate numbers of PPE's

#### ❖ **Role of Security In-Charge (Security Officer)**

On hearing the emergency siren, he shall find out the location of the incident (fire / gas leak / spill / explosion) and inform the location of the same to the key personnel coming to the plant.

He will depute the security guards for managing gates and traffic control at the incident site and send remaining guards to the site of incident.

- He will prevent unauthorized entry in to the site
- He will render assistance as demanded by the safety in-charge.
- He will mobilize additional security force for help, if required.
- He will direct ambulance(s) and emergency vehicle(s) to the scene of incident.
- He will help evacuate persons within the scene of incident.
- As directed by the site main controller, he may be required to address the public of surrounding villages for warning / evacuation.

#### ❖ **Role of Mutual-Aid Members**

- Company will have Mutual Aid with various factories from nearby.
- On receiving the call, they shall proceed immediately with fire squad and fire tenders.
- They will be guided to the place of the incident by the main gate security guard.
- The fire squad in-charge will report to the safety in-charge of the unit in which the incident has occurred.

#### ❖ **Other Arrangements**

Other arrangements include external transport, heavy vehicles, lift/cranes, generator sets to supply emergency power, environment monitoring equipment, special instruments/equipment, rescue items etc. shall be made available (if required) from the nearby locations or Industries or local authorized bodies, when available resources do not meet the requirements.

### **INITIAL NOTIFICATION OF RELEASES**

In the event of emergency, alarm will be raised in control room.

Otherwise, any person noticing a fire, explosion or the release of hazardous materials should shout "spillage" or "Fire". He will also inform the control room on the nearest telephone and the panel officer

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will inform Site Incident Controller (SIC).

### **Action by Individual Employee at the time of emergency When You Notice Fire or Leakage**

#### **❖ Please DO (✓)**

- Immediately inform the control room.
- Act to control the incident as per the instructions.
- Reach the assembly point.

#### **❖ Please DO NOT (X)**

- Don't get panicky or spread rumors.
- Approach control room without work.
- Engage telephone or loud phone continuously.

#### **❖ Establishment and Staffing of Command Post**

- Quickly establish a command post near the scene of incident. The minimum that is necessary is a continuously manned communication system close to the incident site.
- It is the responsibility of the response personnel at the Command Post to restrict the entry or movement of people into the Hazard zone. The first step of a response action must be restriction of access to the leakage site and other hazardous areas.
- Security and access control at Command Post and Primary Command Post need to be provided.

#### **❖ Ensuring Health and Safety at Incident Scenes**

The results of hazard analysis will be used to identify the vulnerable zones. Based on incident-specific factors, the exact size and configuration of hazard control zones will be determined. The Hazard Control Zones have been defined below.

The CEC will formulate safe operating procedures for a site safety and health program that addresses the following.

- The use of appropriate protective gear and equipment
- Utilizing the most experienced personnel for the most hazardous tasks.
- Positioning a backup team to assist or rescue personnel.
- Providing medical surveillance for personnel.
- Monitoring (visually and through communications contact) the welfare of personnel operating within the emergency zones.
- Ensuring that all personnel understand their assignments.
- Ensuring that responders do not ingest contaminants through eating, drinking, or inhaling.
- Replacing fatigued personnel with "fresh" personnel.
- Adjusting hazard control zones to reflect changing conditions.

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#### ❖ **Standard Operating Procedure (Shall Be Followed During Emergency)**

- As soon as emergency alarm is heard, all essential workers shall report to Site Incident Controller (SIC) or Chief Emergency Coordinator (CEC).
- They shall carefully listen to the instructions given by SIC or CEC.
- According to the type of emergency/accident, they shall get equipped with PPE/Firefighting equipment and devices.
- The runner among the workers shall inform CEC /SIC and key personnel if they are not at site.
- The messenger amongst the workers shall deliver messages to nearby units as per the instructions of CEC /SIC.
- The in-charge of medical arrangements shall prepare first-aid and other required facilities for the injured.
- The other essential workers shall try to control the emergency as per the instructions given to SIC.
- SIC would keep CEC informed about the status of control measures being taken at the site and ask for other requirements e.g. Mutual aid, equipment etc. if he finds necessary.
- CEC would co-ordinate with outside agencies regarding control measures being taken, need for external help, evacuation, medical treatment etc.

#### **7.4.4 Communication System**

Communication system is a crucial factor while handling emergency. Company has quick and effective communication system through which, any situation, which can lead to emergency, can be informed or known to...

- All persons working inside the plant.
- Key Personnel outside during normal working hours and during off-duty hours.
- Outside emergency services, Statutory and Local Authorities and

Neighboring facilities and public leaving in vicinity.

Each and every section, Plant and Department of the Factory will be connected by internal telephones with CEC, Supervisor or SIC's. External Phone at Office and Residence and Mobile shall also be made available with Key Personnel and top executive of the factory. The Communication System shall begin with raising the alarm declaring the emergency, Telephone messages and Procedure to communicate the emergency to other persons and General Public.

#### ❖ **Raising the Alarm**

As soon as incident takes place inside the factory and is noticed by someone, the first step shall be to raise the nearest manual emergency bell to alert the nearby people. Next, he/she shall inform the security persons to raise the emergency siren located at the factory gate. The security personnel sound the siren.

The alarm sound informs the SIC and the CEC that an emergency has been created and emergency organization is to be activated. The SIC Rushes to the site and shall take charge of the scene.

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### ❖ **Declaring the Major Emergency**

Major emergency is declared after sufficient and thorough check because the declaration of major emergency puts many agencies on action and it may disturb the running system, which may be Costly at, time or its Consequence may be Serious. Therefore, major emergency must not be decided on whims or immature judgment or without proper thought. Looking to all the above, we have nominated the persons (may be CEC) who can declare the emergency; we have selected them on the basis of their knowledge and experience. These persons are technically qualified and experienced. The decision about major emergency is taken as early as possible and without wasting time so that control action can be started immediately.

### ❖ **Telephone Messages**

A Telephone operator who is precise, sharp, attentive and quick in receiving and noting the message and subsequently effective in further Communication, has been appointed. A form to record emergency telephone calls is available with telephone operator or Person available in Emergency Control Center, who records such calls during emergency. Telephonic messages are given out by the telephone operator to Site Main Controller and key personnel as per the instructions of the Incident Controller. Telephonic messages are also given to authorities and external agencies to describe the type of emergency. All details of emergency are collected/delivered according to this format, available with the telephone operator.

### ❖ **Communication of Emergency and Statutory Information**

#### **Communication of Emergency**

An effective system to communicate emergency shall be made to communicate about the emergency situation as mentioned below:

- Inside the factory i.e. workers including key personnel and essential workers, on duty and inside during normal working hours.
- To key personnel and essential workers not on duty and outside during normal working hours.
- To the outside emergency services and the Government authorities.
- To the neighboring factory and the General Public in the vicinity.

#### **Statutory Information**

##### **a) Information to Workers**

Set of Statutory information regarding types of hazards and their prevention and control as directed in the Factories Act is prepared by the unit. This information is printed in the local language and given in the form of booklet to all workers including contract workers.

##### **b) To the outside emergency services and authorities**

Statutory information in the form of booklet is given to outside emergency services and authorities, if required.



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### **c) To neighboring firms and the general public**

Statutory information in the form of booklet is given to neighboring units and the general public of the villages in the vicinity of the unit, if required.

## **7.5 OCCUPATIONAL HEALTH & SAFETY PROGRAM**

**M/s. Navabuddha Agencies Private Limited** will implement the Occupational Health Surveillance Program which shall be followed right from the project construction, erection and operational phases.

The details of the same are described in the following sections.

### **7.5.1 Occupational Health**

Occupational health needs attention both during construction and erection and operation and maintenance phases. However, the problem varies both in magnitude and variety in the above phases.

### **7.5.2 Hospital Facilities**

The Company shall enter into formal agreements with nearby hospitals having facilities to handle fire, toxic exposure, and emergency cases. A qualified doctor shall be appointed as Factory Medical Officer (FMO) on a retainer basis. In addition, required medical facilities as per State Factories Rules and the Factories Act shall also be made available.

All first aid accessories, medicines, and antidotes as prescribed by the FMO shall be made available at conspicuous locations.

### **❖ Ambulance Van and First Aid Box**

An emergency vehicle shall be made available round the clock for use as an ambulance during emergencies. First aid boxes shall be made available at different locations in the plant. Employees shall be trained in first aid.

### **7.5.3 Plan for Periodic Medical Checkup**

Periodic Medical Examination shall be conducted as per the following schedule; Workers employed will be examined by a Qualified Medical Practitioner/ Factory Medical Officer, in the following manner:

- (a) Before employment, to ascertain physical fitness of the person;
- (b) During employment, every six months (blood and physical examination) as per Factories Rules, to ascertain physical fitness of the person to do the particular job

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#### 7.5.4 Details of Occupational Health Impacts and Safety Hazards

- Exposure to Toxic wastes.
- Exposure to Corrosive, Medical, Flammable Wastes.
- Exposure to Incinerated Ash.
- Fire at flammable hazardous waste at Bio-Medical waste treatment facility, DG set, etc.

For details of occupational health impacts and mitigation measures, refer to Section 7.2 (Qualitative Risk Assessment).

#### 7.5.5 Work Zone Monitoring Arrangements

The action plan will be prepared to monitor the occupational injury to workers:

- Each workplace will be evaluated.
- Unsafe Act and Unsafe Practices will be identified.
- Unsafe equipment, unsafe areas, etc., will be identified.
- Area will be checked for proper Ventilation and Illumination.
- Air-borne concentration of toxic chemicals will be measured and records will be kept.
- Evaluation of training effectiveness and on-the-job practices

The impact of unsafe conditions shall be assessed, and appropriate remedial measures shall be implemented.

#### 7.5.6 Action Plan for Safety System

Following action plan shall be implemented for Safety System:

##### ❖ Safety Organization

A qualified and experienced safety officers shall be appointed. The responsibilities of the safety officer include identification of the hazardous conditions and unsafe acts of workers and advice on corrective actions, conduct safety audit, organize training programs and provide professional expert advice on various issues related to occupational safety and health. He shall be responsible to ensure compliance of Safety Rules/ Statutory Provisions.

##### ❖ Safety Circle

Safety circles shall be constituted to involve employees in identifying hazards and improving safety practices. Each group shall consist of 3–4 employees and meet weekly.

##### ❖ Safety Training

Safety training (including safe material handling, first aid, and general safety practices) shall be provided periodically by Safety Officers. Training shall also be provided to contract labour. Safety awareness shall be enhanced through training materials, safety films, and communication programs.

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### 7.5.7 Provision of Industrial Hygienist and Health Evaluation of Workers

1. It is proposed that management will devise a plan to check and evaluate the exposure specific health status evaluation of workers.
2. Workers will be checked for physical fitness with special reference to the possible health hazards likely to be present, where he/she is being expected to work before being employed for that purpose. Complete medical examinations including PFT, Urine and Blood examination, Liver Function tests, chest X-ray, Audiometry, Spirometry Vision testing, ECG, etc. shall be carried out. However, the parameters and frequency of such examination will be decided in consultation with Factory Medical Officer and Industrial Hygienists.
3. All employees will have routine health examinations while they are at work, with particular attention paid to the risks they may face there. Once more, the Factory Medical Officer and Industrial Hygienists will be consulted when deciding on the scope and frequency of such exams. The plan to keep monthly and annual reports on the health status of employees, with a focus on occupational health and safety, will be upheld.

### 7.5.8 Start Up and Shut Down Protocols

Start-up and shutdown operations are more hazardous than normal operations and require careful planning and execution. Employees shall be adequately trained and aware of associated risks. Start-up involves bringing a system from idle to operational state, while shutdown is the reverse process. These operations involve non-routine activities and higher risk levels.

#### ❖ Risks involved during Shutdown and Start-up

- Accidents due to failed isolation of the processed object when closing
- Accidents occurred in parts of the plant that were in operation during the shutdown.
- Exposure to dangerously high or low temperatures and pressures
- Arc flash from the equipment
- Fire incident due to electrical faults
- Unavailability of detection and protection equipment, including fire extinguishing equipment.
- Not keeping Maintenance program, safety programs and routine audits active to avoid accidents. Idle plants with small crews operating at a very relaxed tempo can be dangerous places.
- Accidents during the commissioning of part of the system.

#### ❖ Ways to Manage Shutdown and prestart up safely

- Effectively follow MOC to adequately handle changes due to operational variability.
- Use appropriate hazard analysis techniques to evaluate changes.
- Communicate the essential elements of temporary operating procedures in writing.
- The written operating instructions should be sufficiently detailed to avoid the possibility of valve misalignment during start-ups and shutdowns.
- If necessary, written checklists and diagrams should be provided to verify correct valve positioning.
- Ensure that the facility's **lockout / tag out program** requires the equipment to be secured before opening it for inspection or maintenance.

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- Process systems, pipes, valves, pumps and other machines must be safely and reliably emptied and cleaned.
- Pipelines that contain compressed air, inert gases, water or steam must be depressurized and flushed if they are not in use during shutdown.
- Devices and even entire systems that contain chemicals or operating materials must be reliably separated from the sections that are still working during the shutdown and the success of the separation must be proven.
- Conduct high level management review and approval when safe opening conditions, such as equipment depressurization, cannot be verified.
- Perform a daily inspection to make sure the locking program is in effect.
- Critical safety devices should not be overlooked while troubleshooting the start-up and shutdown of the unit.
- Make sure that the people responsible for the safety of the plant have the necessary skills to carry out their tasks.
- Make sure that the operators are supervised and supported by experienced and technically trained personnel during commissioning and shutdown of the unit.
- Crisis management and communication analyze the situation and inform employees, media, suppliers and customers about the crisis and the plant.
- Pumps, engines, compressors and machinery: To minimize internal corrosion, close off all vents and openings and completely fill the casing with the manufacturer's recommended lubricant.
- Motors and generators: clean exterior, grease and apply protective covering. Lift carbon brushes from commutators/slip rings. Include packets of desiccants if completely sealing a unit.
- Devices and management Maintain: By carefully positioning desiccant packages and sealing the enclosures, you can keep the electronics and external field devices—such as sensors, transmitters, and valves as dry as feasible.
- Instruments that are frequently in touch with process materials must to be taken out, cleaned, labeled, and stored locally right away.
- Electrical enclosures: Place wraps or bags inside and seal them. As an alternative, use built-in or separate strip heaters to provide heat.
- Exercise equipment that is rotated multiple times and left at a varied angle on a nominal monthly basis. If humidity controls are in place, make sure to check them at least once a week. If chemical controls are in place, make sure to check them every three months. Long-term layup also necessitates routinely checking the levels of humidity and oxygen in the tank, as well as the motor/generator internal resistance (meggar).
- Auxiliaries: Keep in mind that, in most situations, fire alarms and suppression systems still require maintenance, and that powered-up flames frequently occur in dehydrated wooden cooling towers. If batteries are typically used, unplug them and apply petroleum jelly on the terminals. Lead acid batteries of the vented kind should be fully charged before being drained and cleaned with purified water.

## **7.6 PUBLIC CONSULTATION**

### **7.6.1 Introduction**

Ministry of Environment, Forest and Climate Change (MoEFCC) notified an amendment to the EIA Notification, 2006 vide S.O.1142(E) dated 17/04/2015 to include Bio-Medical waste treatment facility as Item 7(da) - Category B in the Schedule as a project/activity requiring prior environmental clearance.

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As the part of EIA procedure, Public Hearing is also required to be carried out for proposed project as project site is located outside the notified industrial area as per subsection (i) of section III i.e., Public consultation under clause 7(i) of Paragraph 7 in EIA Notification dated 14<sup>th</sup> September 2006 and subsequent amendments. Accordingly, Draft Environmental Impact Assessment (EIA) report must be submitted to the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing as part of the Environmental Clearance process.

The proposed new project is located at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110. Project proponent has already obtained terms of reference from the Tamil Nadu State Environmental Impact Assessment Authority (SEIAA) vide file no. 12188 dated 14/07/2025.

Accordingly, The Draft EIA report has been prepared in line with approved Terms of Reference using Environmental baseline data generated during July 2025 to September 2025. The draft report is being submitted to state pollution Control board for conducting public hearing as per the Terms of Reference issued by SEIAA.

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## CHAPTER 8: PROJECT BENEFITS

In the process of treating patients, health care facilities (HCFs) generate considerable quantities of "Bio-Medical Wastes" (BMW) which may cause harm to the environment, if disposed in an unscientific manner. These class of waste wants skilled attention for effective management because the infectious nature of the waste will cause irreparable injury to the human health and therefore to the atmosphere. Hence, it is imperative to monitor and control the management and handling of these wastes.

Improper segregation of waste will result in mixing of bio-medical wastes with general waste and making the whole waste stream hazardous. Inappropriate segregation will ultimately result in an incorrect method of waste disposal. Various communicable diseases could spread through water, sweat, blood, body fluids and contaminated organs if not segregated.

The bio-medical waste spread in and around the HCFs calls flies, insects, rodents, cats and dogs that are responsible for the spread of communication diseases like plague and rabies. Rag pickers in the HCFs, sort out the garbage and hence are at a risk of getting tetanus and HIV infections. The recycling of disposable syringes, needles and other article like glass bottles without proper sterilization are responsible for Hepatitis, HIV, and other viral diseases. It is necessary to treat these BMW in scientific way as per defined guidelines which will not only improve hygienic conditions but also will minimize the disposal of same into landfilling site.

### 8.1 IMPROVEMENT IN PHYSICAL INFRASTRUCTURES

The proposed new project is expected to yield a positive impact on the socio economic environment. It helps sustain the development of this area including further development of physical infrastructural facilities. The basic requirement of the community needs will be strengthened by extending health care to the community, building / strengthening of existing roads in the area which will help in uplifting the living standards of local communities.

### 8.2 IMPROVEMENT IN SOCIAL INFRASTRUCTURES

The project will lead to direct and indirect employment opportunity. Employment is expected during construction and operation period, waste lifting and other ancillary services. A major part of this labour force will be mainly from local villagers. This project will help in improving income of local villagers who will get direct and indirect employment.

Proposed project will help in attaining better hygienic conditions, as Bio-Medical waste shall be disposed of in scientific manner instead of dumping along with solid waste.

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### 8.2.1 Corporate Environment Responsibility

M/s. Navabuddha Agencies Private Limited acknowledges its responsibility towards society and is committed to sustainable community development in line with guidelines issued by Ministry of Environment, Forest and Climate Change.

As per the MoEF&CC OM, issued vide F. No. 22-65/2017-IA.III dated 01/05/2018, the project proponent proposes to spend **₹14 Lakh** Budget (2 % of Additional Cost i.e., ₹ 7 Crore) for social development programs under Corporate Environment Responsibility (CER) activities over a period of five years. List of proposed activities for social welfares is given in below table:

**TABLE 8.1 – PROPOSED CER ACTIVITIES**

| Activities                                                      | 2026-2027             | 2027-2028             | 2029-2030             | 2023-2031             | 2031-2032             | Total                  | Responsibility                 |
|-----------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|--------------------------------|
| Funds allocation for Health                                     | ₹<br>90,000           | ₹<br>90,000           | ₹<br>90,000           | ₹<br>90,000           | ₹<br>90,000           | ₹<br>4,50,000          | <b>Management and EHS Head</b> |
| Funds allocation for Environment and Renewable Energy Resources | ₹<br>1,90,000         | ₹<br>1,90,000         | ₹<br>1,90,000         | ₹<br>1,90,000         | ₹<br>1,90,000         | ₹<br>9,50,000          |                                |
| <b>Total</b>                                                    | <b>₹<br/>2,80,000</b> | <b>₹<br/>2,80,000</b> | <b>₹<br/>2,80,000</b> | <b>₹<br/>2,80,000</b> | <b>₹<br/>2,80,000</b> | <b>₹<br/>14,00,000</b> |                                |

**TABLE 8.2 – FUNDS ALLOCATED FOR PROPOSED ACTIVITIES**

| Sr. No.      | Name of the Village                                             | Proposed Activity                                     | Unit Cost        | Total Units | Total Cost                |
|--------------|-----------------------------------------------------------------|-------------------------------------------------------|------------------|-------------|---------------------------|
|              |                                                                 |                                                       | (Rs.)            |             | (Rs.)                     |
| 1            | Funds allocation for Health                                     | Arrangement of Medical Health Camps in the village    | ₹<br>1,00,000.00 | 6           | ₹<br>4,50,000.00          |
| 2            | Funds allocation for Environment and Renewable Energy Resources | Providing Solar Panel at Kellapatti Government School | ₹<br>9,50,000.00 | 1           | ₹<br>9,50,000.00          |
| <b>Total</b> |                                                                 |                                                       |                  |             | <b>₹<br/>14,00,000.00</b> |

|                                                  |                                          |      |            |
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### 8.2.2 Employment Potential

Proposed new CBMWTF will generate direct as well as indirect employment. During operation phase it will need skilled, semi-skilled and unskilled workers which will be sourced from the local area on maximum basis based on merit.

There will be temporary employment generation during plant construction and installation work. There will be permanent employment generation of 50 employees during operation work. There will be indirect employment due to facility due to need of various plant consumables such as plastic bags and its distribution, generation of recyclable materials such as disinfected plastics and glass. First preference will give to localize people for all kind of required employment in the project and especially for unskilled employment the company will take localize people.



|                                                  |                                                |      |            |
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## CHAPTER 9: ENVIRONMENTAL COST BENEFIT ANALYSIS

### 9.1 ENVIRONMENTAL COST BENEFIT ANALYSIS

As per S.O. 1533 dated 14/09/2006 under the EIA Notification, preparation of Environmental Cost Benefit Analysis (ECBA) is required only if specifically prescribed during the scoping stage. In the present case, if mandated, the ECBA has been conceptualized to evaluate the environmental and socio-economic viability of the proposed project.

Environmental Cost Benefit Analysis is a systematic approach to assess the trade-offs between the environmental costs and the anticipated benefits associated with a project. It integrates environmental, economic and social considerations to ensure sustainable decision-making.

M/s. Navabuddha Agencies Pvt. Ltd. is proposing new CBMWTF at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110 having total plot area of 47,696.91 m<sup>2</sup>. The unit is proposing 1 Nos. of Incinerator (Stationary) having capacity of 250 kg/Hr, 1 Nos. of Incinerator (Rotary Kiln) having 300 kg/Hr capacity, 2 Nos. of Autoclave having capacity of 1000 L/batch and 2 Nos. of shredder each having capacity of 250 kg/Hr & 100 kg/h, Effluent Treatment Plant (ETP) having capacity of 40 KLD and Sewage Treatment Plant (STP) having capacity of 5 KLD.

#### ❖ Objective of Environmental Cost Benefit Analysis (ECBA)

- To assess whether the environmental investments lead to net benefits.
- To justify capital and operational expenditures on pollution control and mitigation.
- To compare alternatives in terms of economic and ecological sustainability.
- To support informed decision-making by stakeholders and regulators.

**TABLE 9.1 – KEY COMPONENTS OF ECBA**

| Component                     | Details                                                                                                                                    |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Costs</b>                  | Capital and operating costs for pollution control equipment (ETP, APCM, etc.), monitoring systems, resource recovery systems.              |
| <b>Environmental Benefits</b> | Reduction in air/water/soil pollution, improved public health, reduced treatment burden on municipal systems, compliance with regulations. |
| <b>Social Benefits</b>        | Employment generation, improved quality of life, reduced health costs, improved ecosystem services.                                        |
| <b>Long-Term Savings</b>      | Avoidance of environmental penalties, improved resource efficiency through recycling and reuse (where applicable).                         |

- Unit will generate direct as well as indirect employment, during construction and operation phase it will need skilled, semi-skilled and unskilled workers which will be sourced from the local area on maximum basis, based on merit. It is estimated that about 50 people will get employment opportunities during the operation phase of the plant.

|                                                  |                                                |      |            |
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- Separate fund has been allocated for social developmental activities under Corporate Environment Responsibility which is 14 Lakhs (i.e., 2% of Additional Cost of 7 Crore) same is mentioned in detailed in Chapter 8 of the EIA Report.

The Environmental Cost-Benefit Analysis indicates that while the proposed new project may result in certain environmental impacts - such as emissions, effluent generation, hazardous waste generation and consumption of natural resources - these impacts can be effectively controlled and minimized through the implementation of a comprehensive Environmental Management Plan (EMP). Mitigation measures including advanced treatment systems, air pollution control devices, greenbelt development and emergency preparedness plans will significantly reduce the potential for long-term environmental impacts.

On the other hand, the proposed project is expected to provide substantial environmental, social and economic benefits, including employment generation, infrastructure development, water conservation through reuse and recycling, adoption of cleaner technologies and proactive community engagement through CSR initiatives. Overall, when assessed holistically, the anticipated benefits of the project outweigh the associated environmental costs, thereby making the proposed project a positive contributor to sustainable industrial development in the Banaskantha region.

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# CHAPTER 10: ENVIRONMENTAL MANAGEMENT PLAN

## 10.1 INTRODUCTION

The Environmental Management Plan (EMP) is a key component of the Environmental Impact Assessment (EIA) process. It outlines the framework for managing, mitigating, and monitoring environmental impacts arising from the proposed new project. The EMP ensures that all activities related to the project are carried out in a manner that is environmentally sustainable, complies with statutory requirements and addresses the concerns raised during the environmental appraisal process.

## 10.2 OBJECTIVES OF EMP (ENVIRONMENTAL MANAGEMENT PLAN)

An Environmental Management Plan (EMP) serves as a comprehensive strategy to manage and mitigate the potential environmental impacts of a project throughout its life cycle. It acts as a practical guide for the implementation of environmentally sustainable practices during the construction, operation, and decommissioning phases of the project. The EMP translates the commitments made in the EIA into actionable measures that ensure regulatory compliance and promote responsible environmental stewardship.

The plan establishes a structured approach for identifying, monitoring, and minimizing adverse impacts on various environmental components such as air, water, soil, biodiversity, and public health. It also emphasizes the integration of pollution control strategies, resource conservation, occupational health & safety protocols and disaster preparedness into project operations. Furthermore, the EMP serves as a key management tool for the project proponent, enabling continuous environmental performance evaluation and facilitating transparent reporting to regulatory authorities and stakeholders.

The objectives of the EMP are formulated to align with national environmental regulations, best industrial practices, and the project's sustainability goals. These objectives are detailed as follows:

The long-term objectives of the EMP for all the environmental attributes are as under:

- 1. To identify and implement potential environmental impacts** arising from the project activities during construction, operation, and decommissioning phases.
- 2. To prescribe mitigation measures** for minimizing and controlling environmental pollution (air, water, soil, and noise) and ecological disturbance.
- 3. To outline an organizational framework** for implementing the proposed mitigation measures through well-defined roles, responsibilities, and accountability.
- 4. To develop an environmental monitoring mechanism** for tracking the effectiveness of mitigation measures and ensuring continuous environmental performance improvement.
- 5. To ensure compliance** with relevant environmental legislations, rules, and guidelines laid down by regulatory authorities (e.g., CPCB, SPCB, MoEFCC).
- 6. To promote occupational health and safety (OHS)** for workers and personnel involved in the project.

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- 7. To define emergency preparedness and response protocols** for dealing with environmental accidents, fire, spills, or natural disasters.
- 8. To incorporate sustainable practices** such as resource conservation, waste minimization, and greenbelt development into the project planning and execution.
- 9. To allocate appropriate financial and human resources** for effective implementation and periodic review of the EMP.
- 10. To support decision-making** for corrective actions based on monitoring and audit findings.

As Environment Management is continuous and cyclic process, following steps will be carried out for effective management. Diagram of the same is provided below as **FIGURE 10.1**.

1. Identification of Activities
2. Anticipation of Probable Impacts
3. Planning for mitigation measures and management Plan
4. Implementation of Environment Management Plan
5. Regular Monitoring of Environment Management Plan

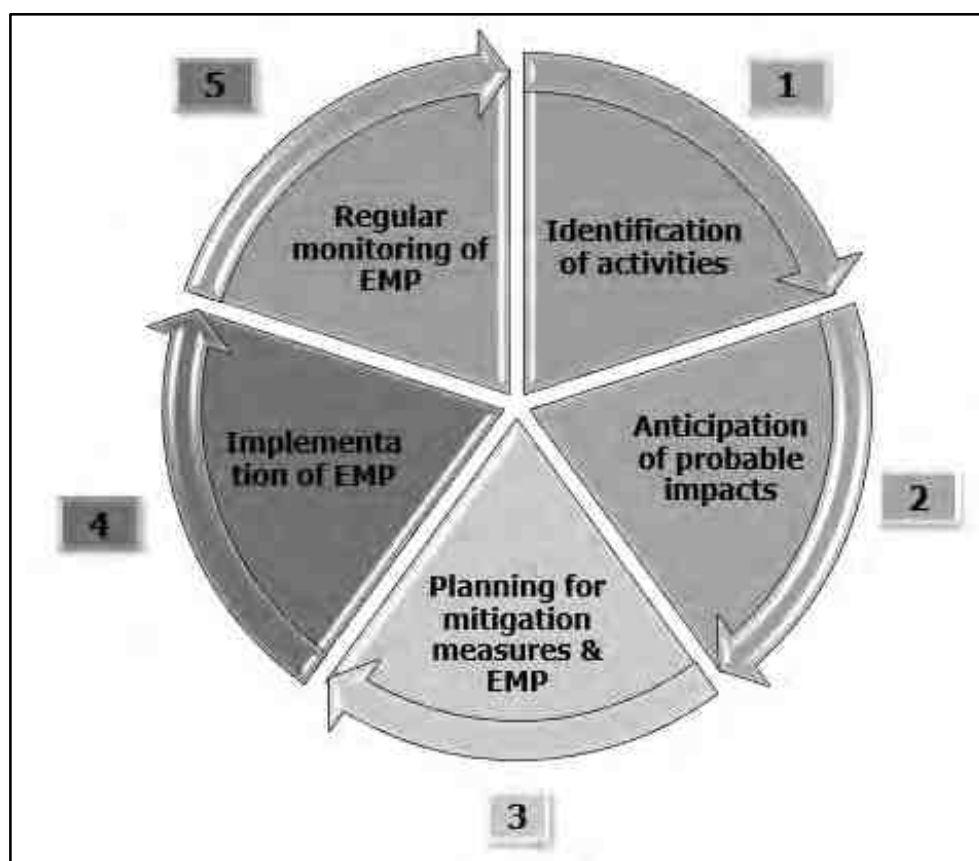


**FIGURE 10.1 – CYCLING PROCESS OF EMP**

As, proposed project is new, the present EMP has been prepared to meet requirements of pollution control from upcoming project activities as an integrated environment management plan.

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### **10.3 ADMINISTRATIVE ASPECT FOR EMP**

#### **10.3.1 Operational Philosophy**

The core philosophy behind designing the Environmental Management Plan (EMP) for the project is to ensure that all activities undertaken at the facility are in full compliance with applicable environmental laws, regulations, standards, and guidelines as stipulated by state and central authorities. To achieve this, the project management is committed to establishing a strong and dedicated resource base for the effective management of health, safety, environmental, and social aspects during the operational phase. The environmental cell will be led by technically qualified and experienced personnel, with provisions to recruit additional skilled staff as needed, especially in view of any future expansion. The success of the EMP will be driven by the following key aspects:

1. Management support;
2. Efficiency of Environment Management Cell;
1. Acceptability of resulting environmental quality.
2. Continuous Monitoring and Assessment of efficiency of Environment Management Plant.

#### **10.3.2 Management Support - Corporate Environment Policy**

The project management is fully committed to environmental protection and sustainable development. A Corporate Environment Policy will be implemented to ensure compliance with applicable environmental laws, minimize pollution, and promote efficient use of resources.

- Adherence to all environmental regulations and standards
- Integration of environmental aspects into operational planning
- Adoption of clean technologies and resource conservation
- Prevention of pollution through conservation of resources, careful handling and disposal of hazardous wastes in an eco-friendly manner and re-use / recycle of materials wherever possible;
- Providing periodical training to employees and associates for up gradation of awareness and skills for better implementation of EHS management system;
- Adherence to all legal requirements concerning environment and occupational health and safety.
- Promotion of awareness and training among employees
- Periodic review of environmental performance and policy updates

This policy will guide the organization's environmental efforts and will be communicated across all levels of the workforce.

The Environmental Policy reflects the project proponent's commitment to sustainable development and environmental protection. It serves as a guiding framework to ensure that all project activities are carried out in compliance with applicable environmental laws and regulations. The policy emphasizes pollution prevention, resource conservation, continuous improvement, and stakeholder engagement, aiming to minimize the project's environmental footprint while promoting responsible industrial growth.

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The unit is committed to conducting all operations in an environmentally responsible, sustainable, and legally compliant manner. The unit recognize that their activities may have an impact on the environment and accordingly unit is dedicated to minimizing these impacts through proactive environmental management practices.

### 10.3.3 Environment Management Cell

The company will formulate Environment Management Cell after inception of activities of proposed project and after completion of necessary employments. With vision to improve the efficiency of EMC and to operate the planned EMP requirements as suggested in the present chapter, Cell has to be formed for efficient and easy operation of environment management system and operations thereof. The illustrative presentation of the suggestive EMC is presented below in **FIGURE 10.2**.

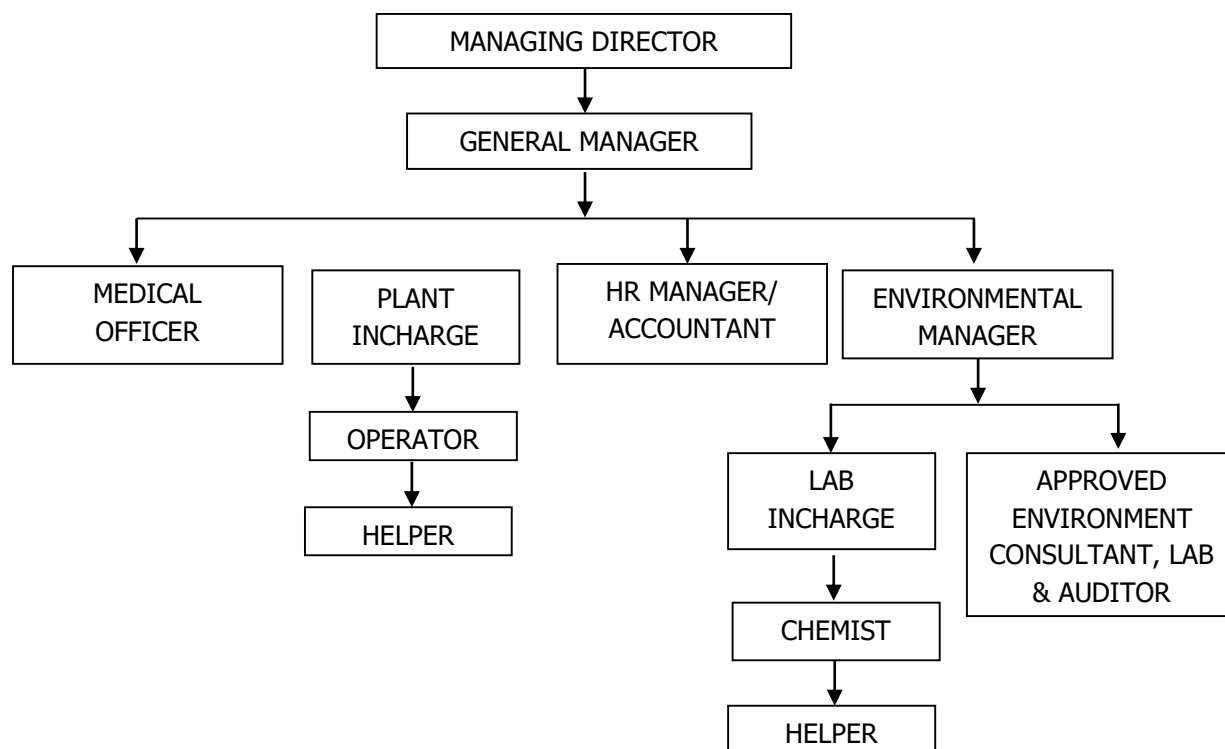


**FIGURE 10.2 – ENVIRONMENT MANAGEMENT CELL**

The major duties and responsibilities of Environmental Management Cell shall be as given below:

**TABLE 10.1 – DUTIES AND RESPONSIBILITIES OF ENVIRONMENT MANAGEMENT CELL**

| Sr. No. | Designation       | Roles & Responsibilities                                                                                                                               | Accident / Abnormality Reporting Responsibility                                                                                                                                         |
|---------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Managing Director | <ul style="list-style-type: none"> <li>Provides overall policy direction for environmental management and occupational health &amp; safety.</li> </ul> | <ul style="list-style-type: none"> <li>Ensures reporting of major accidents to statutory authorities.</li> <li>Reviews critical incidents and approves corrective/preventive</li> </ul> |

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| <b>Sr. No.</b> | <b>Designation</b>      | <b>Roles &amp; Responsibilities</b>                                                                                                                                                                                                            | <b>Accident / Abnormality Reporting Responsibility</b>                                                                                                                                          |
|----------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |                         | <ul style="list-style-type: none"> <li>Approves Environmental Management Plan (EMP) and resource allocation.</li> <li>Ensures compliance with statutory requirements.</li> </ul>                                                               | actions.                                                                                                                                                                                        |
| 2              | General Manager         | <ul style="list-style-type: none"> <li>Supervises overall plant operations and inter-departmental coordination.</li> <li>Ensures implementation of EMP and safety procedures.</li> <li>Monitors performance of all departments.</li> </ul>     | <ul style="list-style-type: none"> <li>Reports major accidents to top management.</li> <li>Ensures incident investigation and implementation of corrective actions.</li> </ul>                  |
| 3              | Plant In-charge         | <ul style="list-style-type: none"> <li>Responsible for day-to-day plant operations.</li> <li>Implements safety practices and operational controls.</li> <li>Supervises operators and helpers.</li> </ul>                                       | <ul style="list-style-type: none"> <li>Immediately reports accidents/abnormalities to General Manager.</li> <li>Initiates emergency response and ensures control measures.</li> </ul>           |
| 4              | Environmental Manager   | <ul style="list-style-type: none"> <li>Monitors environmental parameters and compliance with regulatory standards.</li> <li>Implements pollution control measures.</li> <li>Maintains environmental monitoring records and reports.</li> </ul> | <ul style="list-style-type: none"> <li>Reports environmental non-compliance to General Manager and authorities.</li> <li>Initiates corrective and preventive actions for deviations.</li> </ul> |
| 5              | Medical Officer         | <ul style="list-style-type: none"> <li>Conducts health surveillance of workers.</li> <li>Provides first aid and medical assistance.</li> <li>Maintains occupational health records.</li> </ul>                                                 | <ul style="list-style-type: none"> <li>Reports occupational injuries/illnesses to management.</li> <li>Maintains medical records of accidents and treatments.</li> </ul>                        |
| 6              | HR Manager / Accountant | <ul style="list-style-type: none"> <li>Manages manpower, training, and documentation.</li> <li>Maintains statutory and compliance records.</li> <li>Coordinates administrative functions.</li> </ul>                                           | <ul style="list-style-type: none"> <li>Maintains accident/incident records.</li> <li>Assists in statutory reporting and documentation.</li> </ul>                                               |
| 7              | Lab In-charge           | <ul style="list-style-type: none"> <li>Supervises laboratory operations and environmental monitoring.</li> <li>Ensures accuracy of analysis and reporting.</li> </ul>                                                                          | <ul style="list-style-type: none"> <li>Reports abnormal monitoring results to Environmental Manager.</li> <li>Ensures timely communication of deviations.</li> </ul>                            |

|                                                  |                                           |      |            |
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| Sr. No. | Designation                                            | Roles & Responsibilities                                                                                                                                                                      | Accident / Abnormality Reporting Responsibility                                                                                                 |
|---------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                                                        | <ul style="list-style-type: none"> <li>Maintains laboratory records.</li> </ul>                                                                                                               |                                                                                                                                                 |
| 8       | Chemist                                                | <ul style="list-style-type: none"> <li>Conducts analysis of air, water, and soil samples.</li> <li>Assists in environmental monitoring.</li> </ul>                                            | <ul style="list-style-type: none"> <li>Immediately reports abnormal readings to Lab In-charge.</li> </ul>                                       |
| 9       | Operator                                               | <ul style="list-style-type: none"> <li>Operates plant machinery as per SOPs.</li> <li>Ensures adherence to safety procedures.</li> </ul>                                                      | <ul style="list-style-type: none"> <li>Reports any process abnormality or incident to Plant In-charge immediately.</li> </ul>                   |
| 10      | Helper (Plant)                                         | <ul style="list-style-type: none"> <li>Assists operators in routine operations.</li> <li>Maintains housekeeping and supports safe operations.</li> </ul>                                      | <ul style="list-style-type: none"> <li>Reports unsafe conditions to Operator/Plant In-charge.</li> </ul>                                        |
| 11      | Helper (Laboratory)                                    | <ul style="list-style-type: none"> <li>Assists in laboratory work and sample handling.</li> <li>Maintains cleanliness of lab area.</li> </ul>                                                 | <ul style="list-style-type: none"> <li>Reports unsafe conditions to Chemist/Lab In-charge.</li> </ul>                                           |
| 12      | Approved Environment Consultant / Laboratory / Auditor | <ul style="list-style-type: none"> <li>Conducts environmental monitoring and audits.</li> <li>Provides expert guidance for compliance.</li> <li>Reviews environmental performance.</li> </ul> | <ul style="list-style-type: none"> <li>Reports non-compliance to management.</li> <li>Recommends corrective and preventive measures.</li> </ul> |

The major duties and responsibilities of Environmental Management Cell will be as given below:

- To ensure continuous compliance with Environmental Clearance (EC), Consent to Establish/Operate (CTE/CTO), and applicable environmental rules and regulations.
- To plan, implement, and monitor pollution control measures related to air emissions, wastewater, solid and hazardous waste, noise, and greenbelt development.
- To identify, record, investigate, and report all environmental accidents, near-miss incidents, abnormal emissions, effluent exceedances, spills, leakages, equipment failures, and unsafe environmental conditions within the plant premises.
- To conduct regular environmental monitoring, internal audits, and performance reviews, and implement corrective and preventive actions based on findings.
- To ensure timely reporting and coordination with statutory authorities, including submission of compliance reports, environmental statements, and incident notifications, wherever applicable.



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#### 10.4 DETAILS OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The probable impacts identified and the mitigation measures envisaged for protection of Environmental Components during the construction and operational phase are as tabulated in the table below.

**TABLE 10.2 – DETAILS OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES (CONSTRUCTION PHASE)**

| Environmental Component  | Source / Activity                                        | Type of Pollutant / Wastes                 | Impacts on Environment and Human Health                                                                                                               | Pollution Control / Mitigation Measures                                                                                                                                                                                                                                                                                        | Environmental Monitoring Plan (Parameters & Frequency)                                                                                                                                                                  |
|--------------------------|----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Air Quality</b>       | Site cleaning, excavation, and material handling.        | Particulate Matter (PM) and fugitive dust. | <b>Environment:</b> Dust coating on local vegetation inhibiting growth.<br><br><b>Health:</b> Respiratory issues and irritation from dust inhalation. | <b>Dust Suppression:</b> Regular water sprinkling on all dusty areas and internal roads.<br><br><b>Material Transport:</b> Use of tarpaulin sheets to cover materials; fixed piping for tanker transfers to prevent leaks.<br><br><b>Vehicle Compliance:</b> Only PUC-certified vehicles with spark arrestors allowed on-site. | <b>Monitoring:</b> Ambient Air Quality within plant premises at 2 locations.<br><br><b>Parameters:</b> PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , CO, NO <sub>x</sub> .<br><br><b>Frequency:</b> Monthly. |
| <b>Water Environment</b> | Runoff carrying silt/cement and domestic use by workers. | Increased turbidity and domestic sewage.   | <b>Environment:</b> Siltation of surface drains and potential water body contamination.<br><br><b>Health:</b> Risk of                                 | <b>Containment:</b> Runoff collected in settling pits and silt traps; no direct discharge to water bodies.<br><br><b>Sanitation:</b> Domestic                                                                                                                                                                                  | -                                                                                                                                                                                                                       |

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| <b>Environmental Component</b> | <b>Source / Activity</b>                           | <b>Type of Pollutant / Wastes</b>    | <b>Impacts on Environment and Human Health</b>                                                                                                          | <b>Pollution Control / Mitigation Measures</b>                                                                                                                                                   | <b>Environmental Monitoring Plan (Parameters &amp; Frequency)</b>                                                                  |
|--------------------------------|----------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
|                                |                                                    |                                      | waterborne diseases if sewage is unmanaged.                                                                                                             | wastewater treated in a temporary treatment plant/STP before disposal.                                                                                                                           |                                                                                                                                    |
| <b>Noise Quality</b>           | Digging, piling, and operation of concrete mixers. | Structure-borne and Air-borne noise. | <b>Environment:</b> Disturbance to local fauna and nearby residents.<br><br><b>Health:</b> Hearing discomfort, sleep disruption, and worker fatigue.    | <b>Enclosures:</b> Sound-producing equipment enclosed to maintain residual levels at 75 dB(A).<br><b>Maintenance:</b> Periodic checking of all vibrating parts to reduce noise generation.       | <b>Monitoring:</b> 2 locations within plant premises on monthly basis.<br><br><b>Parameters:</b> Day & Night noise levels [dB(A)]. |
| <b>Land &amp; Soil</b>         | Excavation for foundations and plinths.            | Loss of fertile topsoil and erosion. | <b>Environment:</b> Sterilization of soil and loss of micro-biological activity.<br><br><b>Health:</b> Inhalation of contaminated dust from loose soil. | <b>Soil Management:</b> Topsoil stored separately for later use in greenbelt development.<br><br><b>Reuse:</b> Excavated earth used for backfilling, levelling low-lying areas, and plinth work. | -                                                                                                                                  |
| <b>Health &amp; Safety</b>     | Welding, fabrication, and heights.                 | Physical hazards and chemical fumes. | <b>Health:</b> Risk of physical injuries, falls, and respiratory issues from welding fumes.                                                             | <b>PPE:</b> Provision of helmets, safety goggles, gumboots, and safety nets.<br><br><b>Training:</b> All workers trained in using welding shields and safe construction practices.               | -                                                                                                                                  |

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**TABLE 10.3 - DETAILS OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES (OPERATION PHASE)**

| Description            | Source / Activity                    | Type of Pollutant / Wastes                                                 | Impacts on environment and human health                                                                                                                                                                                    | Pollution Control / Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                   | Environmental Monitoring Plan (Parameters & Frequency)                                                                                                                                                                                                                                |
|------------------------|--------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Air Environment</b> | Incinerators & DG Sets               | PM, SO <sub>2</sub> , NO <sub>x</sub> & HCl.                               | <p><b>Environment:</b> Contribution to acid rain, hazy skies, and reduced photosynthesis in nearby farms.</p> <p><b>Health:</b> Chronic bronchitis, asthma, and reduced lung capacity in workers and nearby villagers.</p> | <p><b>Technical:</b> APC system consisting of Gas Quencher, High Pressure Drop Variable Throat Venturi Scrubber, Alkali Scrubber and Activated Carbon Adsorption System along with stack of 30 m Height each.</p> <p><b>Surroundings:</b> Greenbelt of 15,923.61 m<sup>2</sup> acts as a dust/gas sink.</p> <p><b>Workers:</b> Adequate stack heights are provided to ensure ground-level concentrations remain safe.</p> | <p><b>Monitoring:</b> All 2 flue gas stacks (except standby DG).</p> <p><b>Frequency:</b> Monitoring will be carried out by NABL accredited / MoEFCC / SPCB recognized external monitoring agency quarterly</p> <p><b>Note:</b> CEMS will be provided as per the CPCB guidelines.</p> |
|                        | <b>Ambient Air</b> (Within Premises) | PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> and NO <sub>x</sub> | <p><b>Environment:</b> Dust coating on leaves inhibiting photosynthesis.</p> <p><b>Health:</b> Deep lung penetration by fine</p>                                                                                           | Greenbelt development and regular water sprinkling for dust suppression.                                                                                                                                                                                                                                                                                                                                                  | <p><b>Monitoring:</b> 3 locations within plant premises.</p> <p><b>Frequency:</b> Monitoring will be carried out by NABL accredited/MoEFCC</p>                                                                                                                                        |

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| Description              | Source / Activity                       | Type of Pollutant / Wastes                                                 | Impacts on environment and human health                                                                                                                                              | Pollution Control / Mitigation Measures                                                                                                                                         | Environmental Monitoring Plan (Parameters & Frequency)                                                                                                                                                                                                                          |
|--------------------------|-----------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          |                                         |                                                                            | particulates causing systemic inflammation.                                                                                                                                          |                                                                                                                                                                                 | recognized external monitoring agency at 3 locations within plant premises                                                                                                                                                                                                      |
|                          | <b>Ambient Air</b><br>(Nearby Premises) | PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> and NO <sub>x</sub> | <b>Environment:</b> Dust coating on leaves inhibiting photosynthesis.<br><br><b>Health:</b> Deep lung penetration by fine particulates causing systemic inflammation.                | Greenbelt development and regular water sprinkling for dust suppression.                                                                                                        | <b>Monitoring:</b> 3 locations Nearby 3 villages i.e., one in upwind direction and one in downwind direction and one in crosswind direction.<br><br><b>Frequency:</b> Monitoring will be carried out by NABL accredited/MoEFCC recognized external monitoring agency quarterly. |
| <b>Water Environment</b> | <b>Domestic Activities</b> (2 KLD)      | Sewage wastewater                                                          | <b>Environment:</b> Discharge of untreated effluent and sewage can cause significant pollution of water and soil resources, adversely affecting human health and ecological systems. | <b>Resource:</b> Recycling 35.7 KLD to preserve local water tables.<br><br><b>Treatment:</b> Primary, Secondary and Tertiary Treatment.<br><br><b>Sanitation:</b> STP treated 2 | <b>Monitoring:</b> STP Inlet & Outlet.<br><br><b>Frequency:</b> Monthly.                                                                                                                                                                                                        |
|                          | <b>Industrial</b> (35.7 KLD)            | Industrial Effluent                                                        |                                                                                                                                                                                      |                                                                                                                                                                                 | <b>Monitoring:</b> ETP Inlet & Outlet.<br><br><b>Frequency:</b> Monthly.                                                                                                                                                                                                        |

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| Description              | Source / Activity                             | Type of Pollutant / Wastes                               | Impacts on environment and human health                                                                                                                                                     | Pollution Control / Mitigation Measures                                                                                                                                                                                                     | Environmental Monitoring Plan (Parameters & Frequency)                                                                                                             |
|--------------------------|-----------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          |                                               |                                                          | <b>Health:</b> Risk of waterborne disease                                                                                                                                                   | KLD water reused for domestic & gardening purpose.                                                                                                                                                                                          | <b>Note:</b> CEMS will be provided as per the CPCB guidelines.                                                                                                     |
| <b>Waste Management</b>  | <b>Hazardous Waste</b>                        | ETP Sludge & Incineration ash                            | <b>Environment:</b> Soil toxicity and groundwater leaching.<br><br><b>Health:</b> Long-term carcinogenic risks for waste handlers.                                                          | <b>Storage:</b> Dedicated areas with proper flooring/roofing and tarpaulin covers.<br><br><b>Disposal:</b> Sent to TSDF, incineration, or authorized recyclers /end users.                                                                  | <b>Monitoring:</b> Monitoring will be carried out by NABL accredited / MoEFCC / SPCB recognized external monitoring agency.<br><br><b>Frequency:</b> Once in year. |
| <b>Land Environment</b>  | Soil Quality (Storage areas) & Transportation | Accidental Spillage/Leakage & Transportation of Vehicles | <b>Environment:</b> Disturbance to local fauna and soil erosion.<br><br>Sterilization of soil and loss of micro-biological activity.<br><br><b>Health:</b> Inhalation of contaminated dust. | <b>Land:</b> Topsoil stored for greenbelt; excavated earth used for backfilling.<br><br>Proper paving, designated storage with roofing, and regular soil testing.<br><br><b>Vehicles:</b> PUC-certified vehicles with spark arrestors only. | <b>Monitoring:</b> Monitoring will be carried out by NABL accredited / MoEFCC / SPCB recognized external monitoring agency.<br><br><b>Frequency:</b> Once in year. |
| <b>Noise Environment</b> | Machinery, DG Sets, etc.                      | Structure-borne and Air-borne noise                      | <b>Environment:</b> Behavioral changes in local bird populations.                                                                                                                           | <b>Noise:</b> Acoustic enclosures for DG sets; vibration isolators.                                                                                                                                                                         | <b>Monitoring:</b> Monitoring will be carried out by NABL accredited / MoEFCC / SPCB                                                                               |

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| Description                   | Source / Activity     | Type of Pollutant / Wastes                            | Impacts on environment and human health                                                                                                      | Pollution Control / Mitigation Measures                                                                                                                                                                                                                                        | Environmental Monitoring Plan (Parameters & Frequency)                                                                                              |
|-------------------------------|-----------------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
|                               |                       |                                                       | <b>Health:</b> Permanent hearing loss, sleep disruption, and fatigue in workers.                                                             | <b>Vehicles:</b> Acoustic enclosures and earplugs/ earmuffs for workers.                                                                                                                                                                                                       | recognized external monitoring agency.<br><b>Frequency:</b> Quarterly.                                                                              |
| <b>Occupational Health</b>    | Daily Operations      | Workplace Health Risks from Physical/Chemical Hazards | <b>Health:</b> Occupational injuries, heat stress, or chronic illness.                                                                       | <b>Protection:</b> Provision of helmets, safety goggles, gum boots, ear muffs, safety nets, etc.<br><br><b>Medical:</b> Pre-medical and six monthly check-ups for all 50 employees.<br><br><b>SOPs:</b> Maintaining of MSDS and regular "Industrial Safety & Health" training. | <b>Monitoring:</b> Twice in a year, to ascertain physical fitness of the person to do the particular job.<br><br><b>Frequency:</b> Twice in a year. |
| <b>Biological Environment</b> | Industrial Activities | Industrial Pollutants                                 | <b>Environment:</b> Accumulation of chemicals in leaf tissue over time.<br><br><b>Health:</b> Acts as a buffer to reduce community exposure. | Maintenance and regular plantation as per CPCB guidelines.                                                                                                                                                                                                                     | <b>Monitoring:</b> Monitoring will be carried out by external expert annually.<br><br><b>Frequency:</b> Quarterly by in-house gardener.             |

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## 10.5 IN-HOUSE LABORATORY

M/s. Navabuddha Agencies Private Limited will develop an in-house laboratory facility for regular plant monitoring and to check efficiency. List of major instruments to be provided in laboratory are given below.

**TABLE 10.4 – LIST OF MAJOR LABORATORY INSTRUMENTS**

| Sr. No. | Name of Equipment                                       | Quantity (Nos.) |
|---------|---------------------------------------------------------|-----------------|
| 1       | pH meter                                                | 1               |
| 2       | COD Digester                                            | 1               |
| 3       | BOD Incubator                                           | 1               |
| 4       | Oven and Muffle Furnace                                 | 1               |
| 5       | Single Pan Analytical Balance                           | 1               |
| 6       | Digital balance                                         | 1               |
| 7       | Hot Plates                                              | 2               |
| 8       | Kjeldahl's digestion unit                               | 2               |
| 9       | Refrigerator                                            | 1               |
| 10      | Magnetic Stirrer                                        | 1               |
| 11      | Water Bath                                              | 1               |
| 12      | Required Laboratory Glass wares, chemicals and reagents | 1               |

## 10.6 BIOLOGICAL ENVIRONMENT

### 10.6.1 Greenbelt Management Plan

For the proposed project activities, total allocated land area will be 47967.91 m<sup>2</sup>. Out of which, 15923.67 m<sup>2</sup> area (33.4%) will be allocated for greenbelt development. There are 3981 trees to be grown in the greenbelt area. The planned greenbelt aims to achieve 80% canopy coverage using wide-canopy trees such as Mango, Sapota, Gulmohar, Palm, Ashoka, and Pongamia. Some areas will also include ornamental hedges and shrubs.

As per guidelines, 3981 trees need to be planted in the first year and shall be maintained till their survival. To optimize space and improve pollution mitigation (dust and noise reduction), it is recommended to plant tall, slender canopy species like *Polyalthia longifolia* and *Leucaena leucocephala*. Additionally, medium and small trees, including species with aromatic properties, will be planted to enhance biodiversity and aesthetic value. Native species will be prioritized, adhering to CPCB (Central Pollution Control Board) guidelines for greenbelt development. The layout will consider plant spacing, survival rate, and overall aesthetics. Species and quantity will be finalized based on budget and available space.

Greenbelt development is a key component of the Environmental Management Plan (EMP). Proper care and management will ensure a high survival rate. A diverse range of plant species is proposed, with a budget of ₹35.83 lakhs for the first five years, covering plantation, maintenance, and species replacement. The company is committed to maintaining a healthy, evergreen plantation throughout the project life.

|                                                  |                                           |      |            |
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### Species Survivability Strategy

Despite preventive measures, some species may fail to adapt. To address this, an additional 20% saplings will be planted to maintain an 80% survival rate.

### Guidelines for Greenbelt Development

- ❖ Greenbelt design will consider project-specific requirements and local climatic conditions, ensuring a dense and healthy plantation.
- ❖ The company will strictly follow CPCB guidelines for greenbelt development and maintenance.
- ❖ Regular irrigation and fertilization will be ensured.
- ❖ Replantation of the same species will be done as per survival observations.
- ❖ All plantations will be implemented strictly according to the approved greenbelt plan.

### Greenbelt Design Methodology

- ❖ Saplings (minimum 2–3 ft height) will be used for plantation.
- ❖ Spacing:
  - ❖ Medium canopy trees: 3 m × 3 m (9 m<sup>2</sup>/tree)
  - ❖ Small canopy trees: 2 m × 2 m (4 m<sup>2</sup>/tree)
- ❖ Staggered row orientation will be adopted for effective coverage.
- ❖ Pit size: 45 cm × 45 cm × 45 cm for all tree species.
- ❖ Irrigation systems will be installed and maintained regularly.
- ❖ Protection measures (tree guards, fencing) will be provided to improve survival rates.
- ❖ Replantation will be carried out periodically based on survival performance.
- ❖ Organic fertilizers (plant or animal-derived compost) will be used.
- ❖ Locally adapted species will be chosen, ensuring easy growth under site-specific conditions.
- ❖ Care shall be taken to plant ample trees along the road side, boundary wall as well as within the plant premises. It shall enable proper balance of atmosphere both outside the campus by absorbing noise and gaseous pollutants of the road side movement of vehicles and also absorption of noise and emissions within the premises of the plant.
- ❖ Company shall follow the following five-year comprehensive greenbelt development program after that the company shall keep following the prevailing practices of greenbelt management.
- ❖ Company shall maintain all necessary facilities for irrigation of greenbelt in good condition and necessary maintenance of irrigation facilities shall be done regularly
- ❖ For re-plantation, if required, company shall acquire saplings from local private/government (Forest & Other) nursery
- ❖ Company shall do fertilization as required for healthy & dense greenbelt development

### Management Period: (Five years)

The properly designed greenbelt area, irrigation facilities, Sapling storage & maintenance area and storage for greenbelt development resources/tools etc. shall be provided in construction phase prior to commissioning of plant operation. The necessary structural maintenance shall be done throughout the extent of operation phase. The greenbelt development guidelines and five-year program shall be initiated with inception of construction phase of project and shall be implemented & practiced as routine throughout the project life.



|                                                         |                                           |      |            |
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**TABLE 10.5 – LIST OF TREES RECOMMENDED FOR GREENBELT**

| Sr.No. | Botanical Name                                | Common Name        | Habit       | As per CPCB Manual | Site | No  | Space in m | Each | Area (m2) | 20% restore plants |
|--------|-----------------------------------------------|--------------------|-------------|--------------------|------|-----|------------|------|-----------|--------------------|
| 1      | <i>Bauhinia purpurea</i> L.                   | Purple Orchid Tree | Medium tree | B7                 | A    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 2      | <i>Ficus benjamina</i> L                      | Weeping Fig        | Small tree  | F2                 | A    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 3      | <i>Polyalthia longifolia</i> (Sonn.) Thwaites | Ashoka Tree        | Tall tree   | P9                 | B    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 4      | <i>Delonix regia</i> (Hook.) Raf.             | Gulmohar Tree      | Tall tree   | D3                 | B    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 5      | <i>Cassia siamea</i> Lam.                     | Siamese Cassia     | Tall tree   | C11                | B    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 6      | <i>Melia azadirach</i> L.                     | Persian Lilac      | Tall tree   | M7                 | B    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 7      | <i>Bauhinia racemosa</i> Lam.                 | Bidi Leaf Tree     | Tall tree   | B8                 | B    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 8      | <i>Samanea saman</i> (Jacq.) Merr.            | Rain Tree          | Tall tree   | S6                 | C    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 9      | <i>Alstonia scholaris</i> (L.) r. br.         | Devil Tree         | Tall tree   | A36                | C    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 10     | <i>Terminalia catappa</i> L.                  | Indian Almond      | Tall tree   | T8                 | C    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 11     | <i>Thespesia populneoides</i> (Roxb ) Kastel  | Portia Tree        | Tall tree   | T10                | C    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 12     | <i>Pongamia pinnata</i> (L.) Panigrahi        | Karanja            | Tall tree   | D5                 | C    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 13     | <i>Millingtonia hortensis</i> l.f.            | Indian Cork Tree   | Tall tree   | M9                 | D    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 14     | <i>Anthocephalus chinensis</i> (lamk).        | Kadamba Tree       | Tall tree   | A40                | D    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 15     | <i>Azadirachta indica</i> A.Juss.             | Neem               | Tall tree   | A44                | D    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 16     | <i>Tecoma stans</i> linn.                     | Yellow Bells       | Medium tree | T3                 | D    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 17     | <i>Casabela thevetia</i> (L.)                 | Yellow Oleander    | Medium tree | T11                | D    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 18     | <i>Acacia auriculiformis</i> Benth.           | Australian Acacia  | Tall tree   | A2                 | E    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 19     | <i>Collistemon citrinus</i> (Curtis) Stapf    | Lemon Bottlebrush  | Medium tree | C2                 | E    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 20     | <i>Cassia fistula</i> linn .                  | Golden Shower Tree | Medium tree | C7                 | E    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 21     | <i>Mimusops elangi</i> L                      | Spanish Cherry     | Medium tree | M10                | E    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 22     | <i>Erythrina variegata</i> linn.              | Indian Coral Tree  | Tall tree   | E3                 | E    | 100 | 2 X 2      | 4    | 400       | 20                 |
| 23     | <i>Nerium indicum</i> Lam.                    | Oleander           | Small tree  | N1                 | F    | 100 | 2 X 2      | 4    | 400       | 20                 |

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| Sr.No. | Botanical Name                         | Common Name             | Habit       | As per CPCB Manual | Site | No          | Space in m | Each | Area (m2)    | 20% restore plants |
|--------|----------------------------------------|-------------------------|-------------|--------------------|------|-------------|------------|------|--------------|--------------------|
| 24     | <i>Nyctanthes arbor-tristis</i> Linn.  | Night-flowering Jasmine | Small tree  | N2                 | F    | 100         | 2 X 2      | 4    | 400          | 20                 |
| 25     | <i>Tecoma stans</i> linn.              | Yellow bells            | Medium tree | T3                 | F    | 100         | 2 X 2      | 4    | 400          | 20                 |
| 26     | <i>Grevillea robusta</i> A cunn.       | Silver Oak              | Medium tree | G6                 | F    | 100         | 2 X 2      | 4    | 400          | 20                 |
| 27     | <i>Hibiscus rasa-sinencis</i> linn.    | Shoe Flower             | Small tree  | H3                 | F    | 100         | 2 X 2      | 4    | 400          | 20                 |
| 28     | <i>Ixora coccinea</i> L.               | Ixora                   | Small tree  | I3                 | F    | 100         | 2 X 2      | 4    | 400          | 20                 |
| 29     | <i>Phyllanthus acidus</i> (L).         | Star Gooseberry         | Tall tree   | P3                 | F    | 100         | 2 X 2      | 4    | 400          | 20                 |
| 30     | <i>Spathodea campanulata</i> beauv.    | African Tulip Tree      | Tall tree   | S14                | F    | 100         | 2 X 2      | 4    | 400          | 20                 |
| 31     | <i>Saraca asoca</i> Roxb De Wilde.     | Ashoka Tree             | Small tree  | S9                 | F    | 100         | 2 X 2      | 4    | 400          | 20                 |
| 32     | <i>Tabernaemontana divaricata</i> Linn | Crape Jasmine           | Small tree  | T1                 | F    | 100         | 2 X 2      | 4    | 400          | 20                 |
| 33     | <i>Cascabela thevetia</i> (L.)         | Yellow Oleander         | Medium tree | T11                | F    | 100         | 2 X 2      | 4    | 400          | 20                 |
| 34     | <i>Thuja occidentalis</i> linn.        | Tree of life            | Small tree  | T12                | F    | 100         | 2 X 2      | 4    | 400          | 20                 |
| 35     | <i>Trema orientalis</i> (L.) Bl.       | Morali                  | Medium tree | T14                | F    | 100         | 2 X 2      | 4    | 400          | 20                 |
| 36     | <i>Roystonea regia</i>                 | Royal palm tree         | Tall tree   |                    | F    | 120         | 2 X 2      | 4    | 480          | 24                 |
| 37     | <i>Terminalia mantaly</i>              | Madagascar Almand Tree  | Small tree  |                    | F    | 120         | 2 X 2      | 4    | 480          | 24                 |
| 38     | <i>Plumeria alba</i> L.                | White frangipani        | Medium tree |                    | F    | 120         | 2 X 2      | 4    | 480          | 24                 |
| 39     | <i>Syzygium myrtifolium</i>            | Red-Lip                 | Small tree  |                    | F    | 121         | 2 X 2      | 4    | 484          | 24                 |
|        | <b>Total</b>                           |                         |             |                    |      | <b>3981</b> |            |      | <b>15924</b> | <b>796</b>         |

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**TABLE 10.6 – FINANCIAL BUDGET FOR THE MAINTENANCE OF GREENBELT DEVELOPMENT (IN LAKHS)**

| Sr. No.            | Component                                                                    | Physical units | Approximate Unit Cost | Total cost     | First year   | Second year | Third year  | Fourth year | Fifth year  | Total estimate (Rs in Lakhs) |
|--------------------|------------------------------------------------------------------------------|----------------|-----------------------|----------------|--------------|-------------|-------------|-------------|-------------|------------------------------|
| 1                  | <b>Plantation of trees and ornamental plants 3981+796 trees = 4777 trees</b> | 4777           | 300                   | 1433100        | 14.30        | 0.00        | 0.00        | 0.00        | 0.00        | <b>14.30</b>                 |
| 2                  | <b>Soil</b>                                                                  | 40             | 2500                  | 100000         | 0.20         | 0.20        | 0.20        | 0.20        | 0.20        | <b>1.00</b>                  |
| 3                  | <b>Pit making and Landscaping</b>                                            | 4777           | 100                   | 477700         | 3.10         | 0.00        | 0.00        | 0.00        | 0.00        | <b>3.10</b>                  |
| 4                  | <b>Gardener's Cost</b>                                                       | 2              | 150000                | 300000         | 3.00         | 3.00        | 3.00        | 3.00        | 3.00        | <b>15.00</b>                 |
| 5                  | <b>Fertilizers cost</b>                                                      |                |                       |                |              |             |             |             |             |                              |
|                    | Vermicompost (tons)                                                          | 10             | 5000                  | 50000          | 0.25         |             | 0.25        | 0.00        | 0.00        | <b>0.50</b>                  |
|                    | Neem Cake Powder (Kg)                                                        | 100            | 200                   | 20000          | 0.05         | 0.05        | 0.05        | 0.00        | 0.05        | <b>0.20</b>                  |
|                    | Organic Manure (Kg)                                                          | 150            | 200                   | 30000          | 0.10         | 0.00        | 0.10        | 0.00        | 0.10        | <b>0.30</b>                  |
|                    | Bio-fertilizer (PSB/Azotobacter)                                             | 40             | 250                   | 10000          | 0.05         | 0.00        | 0.05        | 0.00        | 0.00        | <b>0.10</b>                  |
|                    | Liquid Organic Fertilizer (Seaweed extract)                                  | 30             | 100                   | 3000           | 0.01         | 0.00        | 0.01        | 0.00        | 0.01        | <b>0.03</b>                  |
|                    | Farm Yard Manure (FYM) (tons)                                                | 10             | 5000                  | 50000          | 0.25         | 0.00        | 0.25        | 0.00        | 0.00        | <b>0.50</b>                  |
| 6                  | <b>Water supply</b>                                                          |                |                       |                |              |             |             |             |             |                              |
|                    | HDPE/PVC pipeline for irrigation                                             | 50             | 200                   | 10000          | 0.10         | 0.00        | 0.00        | 0.00        | 0.00        | <b>0.10</b>                  |
|                    | Water storage tank (1000 L)                                                  | 1              | 10000                 | 10000          | 0.10         | 0.00        | 0.00        | 0.00        | 0.00        | <b>0.10</b>                  |
|                    | Water pump (1 HP)                                                            | 1              | 10000                 | 10000          | 0.10         | 0.00        | 0.00        | 0.00        | 0.00        | <b>0.10</b>                  |
|                    | Hose pipes and fittings                                                      | 1              | 10000                 | 10000          | 0.10         | 0.00        | 0.00        | 0.00        | 0.00        | <b>0.10</b>                  |
|                    | Watering cans / accessories                                                  | 1              | 5000                  | 5000           | 0.10         | 0.00        | 0.00        | 0.00        | 0.00        | <b>0.10</b>                  |
|                    | Power consumption charges                                                    | 1              | 10000                 | 10000          | 0.10         | 0.00        | 0.00        | 0.00        | 0.00        | <b>0.10</b>                  |
| 7                  | <b>Protection measures</b>                                                   |                |                       |                |              |             |             |             |             |                              |
|                    | Mulching material                                                            | -              | -                     | 10000          | 0.10         | 0.00        | 0.00        | 0.00        | 0.00        | <b>0.10</b>                  |
|                    | Plant support stakes                                                         | -              | -                     | 10000          | 0.10         | 0.00        | 0.00        | 0.00        | 0.00        | <b>0.10</b>                  |
| <b>Grand Total</b> |                                                                              | -              | -                     | <b>2548800</b> | <b>22.11</b> | <b>3.25</b> | <b>3.91</b> | <b>3.20</b> | <b>3.36</b> | <b>35.83</b>                 |

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- Care shall be taken to plant sample trees along the roadside, boundary wall as well as within the plant premises. It shall enable proper balance of atmosphere both outside the campus by absorbing noise and gaseous pollutants of the roadside movement of vehicles and also absorption of noise and emissions within the premises of the plant.
- Company shall follow the following five-year comprehensive greenbelt development program after that the company shall keep following the prevailing practices of greenbelt management.
- Company shall maintain all necessary facilities for irrigation of greenbelt in good condition and necessary maintenance of irrigation facilities shall be done regularly.
- For replantation, if required, company shall acquire saplings from local private/government (Forest & Other) nursery.
- Company shall do fertilization as required for healthy & dense greenbelt development.

**TABLE 10.7 – KEY COMPONENTS OF THE GREENBELT MANAGEMENT PLAN**

| <b>Sr. No.</b> | <b>Activity</b>                   | <b>Description</b>                                                                                | <b>Frequency</b>                       |
|----------------|-----------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------|
| 1              | Irrigation and Watering           | Regular watering using drip/sprinkler/manual systems based on plant needs and seasonal variation. | 2–3 times per week (or as per weather) |
| 2              | Pruning and Trimming              | Removing dead, diseased, or overgrown branches to promote healthy growth and aesthetics.          | Quarterly                              |
| 3              | Fertilization and Soil Enrichment | Application of organic manure, compost                                                            | Twice a year (Pre-monsoon & Winter)    |
| 4              | Pest and Disease Control          | Use of bio-pesticides or eco-friendly pest management practices to control infestations.          | As needed based on inspections         |
| 5              | Replacement Planting              | Replacing dead, damaged, or non-surviving plants with native species.                             | Half-yearly                            |
| 6              | Monitoring Survival Rate          | Physical inspection and documentation of plant growth, health, and survival percentage.           | Half-yearly                            |
| 7              | Seasonal Plantation Drives        | Additional plantation for enhancing biodiversity and density.                                     | Annually during monsoon                |
| 8              | Greenbelt Expansion (if feasible) | Utilize unused or vacant areas within premises for vertical greening or landscaping.              | Opportunistic                          |
| 9              | Record Keeping                    | Maintain logs of plantation, maintenance, survival rate, and species composition.                 | Ongoing                                |

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## **10.7 OCCUPATIONAL HEALTH AND SAFETY**

- Pre-medical examination and periodical examination will be carried out once in a year and record will be maintained in Form No-32 and 33 as per GFR. PFT, LFT, Cardiac as well as Haematological and Urine tests will be carried out during pre-placement and periodical examination.
- The health status of workers in the unit shall be regularly monitored under an occupational surveillance program under OHS Management. Medical check-up shall be done considering all the chemicals of the proposed project and suggestion in chapter 7 for such check-up programs shall be followed.
- Proponent shall make efforts to implement the ISO 9001:2015, ISO 14000:2015 and OHSAS 45001:2018 system.
- Provision of conveyance facilities like safe drinking water and dining rooms etc. and good sanitation including proper waste disposal.
- Isolation of drinking water and refreshment area including canteen etc. from the area of hazardous materials storage and handling.
- Chemical Safety Booklet/Documents for all hazardous chemicals shall be prepared and Safety Booklet/Documents thus prepared shall be made available well before commissioning of the proposed project to all employees working with chemicals.
- Chemical safety booklet shall include all necessary details like permissible exposure level/limit, health effect, symptoms of toxic effects on human health, on-site first aid and necessary medical treatment guidelines etc.
- All required and necessary health manual and procedures for all activities shall be developed and implemented. Such manual and procedures shall be made available to all concerned employees.
- Each worker shall be required to abide by a Code of Conduct which will limit activities in local towns and communities and restrict certain behaviours in the work sites and accommodation.
- Proponent shall ensure preparation and implementation of emergency action plan including on-site and off-site emergency management plan.
- Comprehensive risk assessment shall be conducted after commissioning of plant and necessary safety measures shall be implemented as suggested in chapter 7.
- Safety manual and procedures shall be prepared, implemented and made available to all concerned employees.
- Necessary emergency facilities including firefighting equipment, medical facilities, evacuation facilities etc. shall be provided within premises.
- Well planned transportation schedule to minimize unusual trips of vehicles, to reduce traffic and speed of vehicles on road especially in populated area and site.
- Strict prohibition of edibles and potables in the area of hazardous materials storage and handling.
- Strict prohibition of match box, lighters, clothes having potential of static charges as well as smoking in plant and storage area.
- Proponent shall plan for regular safety audit and necessary improvement as suggested by auditor shall be done on regular basis as required.
- Properly designed and designated storage area and provision of good handling equipment and procedures shall be ensured before commissioning.
- Proper shift planning of workers exposed to hazard prone areas to manage the total exposure level as per stipulated standards and / or statutory norms.

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- Medical and first-aid facilities within premises and in all departments. Company shall train a group of employees for comprehensive first-aid and basic first-aid training to all employees shall be imparted at regular intervals.
- Mechanical handling system and arrangement wherever possible to avoid manual handling and so as to avoid issues of Musculoskeletal Disorder (MSD). Wherever, automatic system is not possible, adequate manual handling facilities like trolley and crane to reduce the stress of pulling-pushing and lifting to prevent or minimize chances of issues related with MSD.
- Provision of ergonomic design of all facilities wherever possible (e.g. chairs, tables, working platforms, shelves and position and height of display screens and panel etc.) to prevent or minimize the chances of issues related with MSD.
- Management shall provide all necessary PPEs, safety equipment/materials to ensure healthy and safe work conditions. Regular inspection for the safety procedures and use of PPEs and safety equipment/material shall be done by management/safety officer.
- Workplace monitoring shall be carried out on regular basis. Necessary records and documents for such monitoring shall be maintained by the proponent on regular basis.
- Necessary training programs and audit shall be done on regular basis to prevent impacts of the operational activities on human health as well as to improve workplace condition and safe work system.
- Monthly training program will be arranged through medical associations in different area by the facility operator.

**TABLE 10.8 – FREQUENCY OF HEALTH MONITORING**

| <b>Occupation</b> | <b>Type of evaluation</b>                                                                                                                                         | <b>Frequency</b>              |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Process area      | Physical examination, complete blood picture, complete urine examination, ECG, random blood sugar, abdomen ultra sound scanning, treadmill test, spirometry test. | Yearly for regular employees. |
| Noise prone areas | Audiometry                                                                                                                                                        | Annually                      |

#### **Hazardous and Non-Hazardous Solid Waste**

- Separate designated storage area shall be allocated for storage of all different types of bio medical waste and hazardous wastes.
- Used oil shall be stored in distinctly labelled drums.
- The containers or bags shall be labelled properly as per Schedule-IV. Figure for same is mentioned:



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- The records related to waste generated, stored, transported, disposal etc. shall be maintained in relevant formats / log sheets for easy verification by the plant management and authority shall follow the same.

## **10.8 BUDGETARY ALLOCATION FOR ENVIRONMENT PROTECTION**

An environmental budget is essential for the effective implementation, monitoring, and continual improvement of the Environmental Management Plan (EMP). The budget includes both capital (one-time) and recurring (annual operational) costs for environmental protection measures across key areas such as air and water pollution control, waste management, monitoring, greenbelt maintenance, safety, and emergency preparedness. The following tables provide a detailed cost estimate for proposed environmental infrastructure and management activities. The unit will keep provision for adequate funds aside to meet with regular expenses for the environmental control measures. The unit will set aside enough money to cover ongoing costs for the environmental control measures. Recurring cost for environmental management for the proposed new project is given in **TABLE 10.19**.

|                                                  |                                           |      |            |
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**TABLE 10.9 – ENVIRONMENTAL BUDGET ALLOCATION**

| Sr. No. | Description             | Capital Cost |                                                                                                                                                                                  | Recurring Cost (Per annum) |                                                                                                                             | Reference                                                                                                                                                                                         |
|---------|-------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                         | Rs. In Lakhs | Basis of Cost Estimation                                                                                                                                                         | Rs. In Lakhs               | Basis of Cost Estimation                                                                                                    |                                                                                                                                                                                                   |
| 1       | Air Pollution Control   | 53.0         | Installation of Air Pollution Control System for 2 Nos. of incinerators (i.e., Gas Quencher, High PD, Variable Throat Venturi Scrubber Alkali Scrubber, activated carbon column) | 214.1                      | Power consumption and maintenance of APMC (Considering APCM failure and start-up and shut-down scenario)                    | Detailed anticipated impacts and mitigation measures are provided in section 4.5 & 4.6 of chapter 4.<br><br>Management aspects of Air pollution are provided in section 10.4.1 in this chapter    |
| 2       | Water Pollution Control | 47.5         | Construction, Installation and erection with commissioning of 40 KLD ETP and 5 KLD STP                                                                                           | 27.1                       | Cost of chemicals, power consumption, maintenance cost of ETP (Considering ETP failure and start-up and shut-down scenario) | Detailed anticipated impacts and mitigation measures are provided in section 4.5 & 4.6 of chapter 4.<br><br>Management aspects of Water pollution are provided in section 10.4.3 in this chapter. |
| 3       | Noise Pollution         | 1.0          | Providing the Additional Acoustic Area (Acoustic Shed) for D.G. Set                                                                                                              | 0.5                        | Maintenance cost as per AMC                                                                                                 | Detailed anticipated impacts and mitigation measures are provided in section 4.5 & 4.6 of Chapter 4.                                                                                              |



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| Sr. No. | Description                    | Capital Cost |                                                                                                                                             | Recurring Cost (Per annum) |                                                                                                      | Reference                                                                                                                                                                                         |
|---------|--------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                                | Rs. In Lakhs | Basis of Cost Estimation                                                                                                                    | Rs. In Lakhs               | Basis of Cost Estimation                                                                             |                                                                                                                                                                                                   |
|         |                                |              |                                                                                                                                             |                            |                                                                                                      | Management aspects of Noise pollution is provided in section 10.4.2 in this chapter                                                                                                               |
| 4       | Fire and Safety                | 78.5         | Upgradation of Fire Hydrant Pipelines and pumps, Automatic alarm system, tripping system, Fire extinguisher, CEMS and also PLC-SCADA System | 3.9                        | Maintenance cost of fire equipment                                                                   | Details regarding fire control plan are provided in section 7.3 of chapter 7.                                                                                                                     |
| 5       | Hazardous waste                | 5.0          | Membership Certificate of TSDF/CHWIF is available                                                                                           | 17.4                       | Transportation and disposal cost                                                                     | Detailed anticipated impacts and mitigation measures are provided in section 4.5 & 4.6 of chapter 4.<br><br>Management aspects of Hazardous waste are provided in section 10.4.5 in this chapter. |
| 6       | Environmental Monitoring/Audit | 5.8          | Establishment of In-house lab with monitoring and testing facilities                                                                        | 7.9                        | Third party cost for environmental monitoring/audit and Statutory compliance and chartered services. | Details regarding post project environmental monitoring/audit plan are provided in section 6.2 of chapter 6.                                                                                      |
| 7       | Occupational Health            | 2.0          | Establishment of Occupational Health Facilities / First Aid Centre                                                                          | 1.0                        | Hiring of panel doctors, medical examiners and expenses                                              | Details regarding occupational health & safety                                                                                                                                                    |

|                                                  |                                           |      |            |
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| Sr. No. | Description                | Capital Cost |                                                                                                                                           | Recurring Cost (Per annum) |                                | Reference                                                                                        |
|---------|----------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------|--------------------------------------------------------------------------------------------------|
|         |                            | Rs. In Lakhs | Basis of Cost Estimation                                                                                                                  | Rs. In Lakhs               | Basis of Cost Estimation       |                                                                                                  |
|         |                            |              |                                                                                                                                           |                            |                                | program are provided in section 7.5 of chapter 7.                                                |
| 8       | Greenbelt Development Plan | 18.4         | Development Green Belt in an area of 15923.61 m <sup>2</sup> (33.4 % of the total plot area) by planting 4777 nos. of native tree species | 3.91                       | Maintenance cost for Greenbelt | Details regarding Green Belt Development Plan is provided in section 10.7.1. in this chapter.    |
| 9       | CER Activities             | 14.0         | Fund allocation for Corporate Environmental Responsibility (2 % of the total project cost of 7 crores)                                    | --                         | --                             | Details regarding fund allocation for CER Activities are provided in section 8.2.1 of Chapter 8. |
|         | <b>Total</b>               | <b>225.2</b> |                                                                                                                                           | <b>275.81</b>              |                                |                                                                                                  |

**\*The above cost is on tentative basis and is subject to change on actual basis.**

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## 10.9 PREVENTION, MAINTENANCE AND OPERATION OF ENVIRONMENT CONTROL SYSTEM

The pollution control equipment, and the effluent treatment systems and effluents will be monitored periodically and will be checked for its performance and pro-active maintenance will be adopted. The environmental monitoring results will be evaluated to identify the problems/under performance of the equipment. Necessary steps will be taken to rectify the identified problems/defects. The management shall regularly evaluate performance of pollution control measures and occupational safety measures to arrive at their efficiency and propose to adopt new measures for efficient pollution control, as and when required.

Monitoring method and frequency of operating conditions of bio medical waste-treatment facility is presented in **TABLE 10.22**.

**TABLE 10.10 – MONITORING OF OPERATING CONDITIONS OF CBMWTF**

| Sr. No | Name of Facility   | Type of Test          | Frequency         | Procedure                                                                                                                                                                                   | Method                                                            |
|--------|--------------------|-----------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1      | Incinerator        | Combustion efficiency | Once in a 3 month | Combustion Efficiency calculated using formula prescribed in Schedule II of BMW Rules, 2016 – Standards for Incinerator (%CO <sub>2</sub> )<br>C.E. =----- X 100<br>(%CO <sub>2</sub> +%CO) | Schedule II of BMW Rules, 2016 – Standards for Incinerator        |
| 2      | Autoclave          | a. Validation test    | Once in a 3 month | A chemical indicator strip or tape                                                                                                                                                          | Schedule II of BMW Rules, 2016 – Standards for Autoclave          |
|        |                    | b. Routine Test       | Every Batch       |                                                                                                                                                                                             |                                                                   |
|        |                    | c. Spore Testing      | Once in a 3 month | Biological indicator strips or vials (Geobacillus stearothermophilus spores with at least 1X10 <sup>6</sup> spores)                                                                         |                                                                   |
| 3      | Heat Sterilization | a. Validation test    | Once in a 3 month | Biological indicator (Geobacillus stearothermophilus or Bacillus Atropheaus spores using vials with at least log <sub>10</sub> 6 spores per ml.)                                            | Schedule II of BMW Rules, 2016 – Standards for Heat Sterilization |
|        |                    | b. Routine Test       | After each batch  | A chemical indicator strip or tape                                                                                                                                                          |                                                                   |

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### ❖ **Good House Keeping**

Good housekeeping means general care, cleanliness, orderliness and maintenance of entire premises including inside and outside plant area, machinery, equipment etc. Good housekeeping can prevent accidents, spillages and leakages. For good housekeeping following practices will be adopted.

- All pits, sumps will be properly covered or securely fenced.
- Appropriate tools will be provided for handling of all the materials.
- Regular training will be given to all work forces.
- All the passages, floors and stairways will be maintained in good condition. The system will be made available to deal with any spillage at the plant.
- Sufficient disposable bins will be clearly marked and suitably located in the plant.
- In the plant, precaution and instructions will be displayed at strategic locations.
- Roads/walkway within the plant will be maintained neat and clean and shall be kept free from obstructions.

### ❖ **Duties of Operator of Common Bio-medical Waste Treatment Facility**

- Operator shall lay down an SOP mentioning operation of bio-medical waste facility.
- Operator shall inform prescribed authority about occupiers who are not sending segregated Bio-Medical Waste as per Rules.
- Occupiers who are giving waste, will be allowed to inspect site and see whether operator is carrying out treatment properly or not.
- Facility shall develop website of the facility mentioning treatment details, annual report etc.
- Facility shall supply non-chlorinated plastic-coloured bags to authorized occupier, if required on chargeable basis.
- Facility shall collect bio-medical waste during holiday period as well.
- Operator should maintain all the records for operation of incinerator, shredder and autoclaving at least for a period of 5 years.
- The operator of common bio-medical waste treatment facility shall transport the bio-medical waste from the premises of occupier to the facility only in the vehicles having label.
- The occupier must be educated to take the required precautions to ensure that the waste does not negatively impact the environment or human health in the event that it becomes necessary to keep trash for an extended length of time. The occupier must notify the appropriate authorities and provide justification for their actions.
- Before packing and delivering to the shared biomedical waste treatment facility, the operator must instruct and train the occupier on how to pre-treat microbiology waste and all other clinical laboratory waste by sterilizing to log 6 or disinfecting to log 4, in accordance with WHO guidelines.
- On or before June 30<sup>th</sup> of each year, every operator or occupier of a shared biomedical waste treatment facility is required to submit an Associate in Nursing annual report in Form-IV to the designated authority. Information on all incidents and corrective actions conducted must be included in the occupier's annual report in compliance with rule thirteen.
- The occupier or operator shall notify the prescribed authority of any modification or variation within the activity and shall submit a current type II application for modification of the conditions of authorization in the event that the biomedical waste generation, handling, treatment, or disposal for which authorization was previously granted is altered.

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- Record of the water usage shall be unbroken on regular basis. Printed logbooks, records shall be maintained for effluent treatment plant operation.
- Keep track of the weight of the batch, the types of waste treated, the time, date, and length of the treatment cycle, as well as the total number of operating hours, for every piece of equipment used for treatment.
- Record shall be maintained for generation, storage and disposal of hazardous waste and recyclable waste being sent to authorized recycler.
- Copies of such records shall be regularly submitted to State Pollution Control Board (SPCB) in prescribed format as per Hazardous Waste Rules.

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# CHAPTER 11: SUMMARY AND CONCLUSION

## 11.1 INTRODUCTION

1. M/s. Navabuddha Agencies Private Limited proposing new project of Common Bio-Medical Waste Treatment Facility (CBMWTF) at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110.
2. Treatment includes stationary incineration, autoclave and shredding along with ETP for treatment of wastewater generated during process and STP for treatment of wastewater (sewage) generated from domestic activities.
3. The proposed Bio-Medical Waste Treatment Facility falls under Item 7(da), Category 'B1'. Since the project site is located outside the notified industrial area, a Public Hearing is required to be conducted in accordance with Sub-section (i) of Section III (Public Consultation) under Clause 7(i) of Paragraph 7 of the EIA Notification dated 14th September 2006 and subsequent amendments.
4. In order to assess the potential environmental impacts arising due to proposed new project, the promoter has assigned the work of EIA to M/s. ENPRO Enviro Tech & Engineers Pvt. Ltd. (ENPRO), Surat for collecting the information on existing environmental conditions and assess the impacts on environment due to proposed new project and suggest the environmental safeguards and mitigation measures.

## 11.2 PROJECT DESCRIPTION

1. The facility will have different components as mentioned below. Capacity of each unit is provided in **TABLE 11.1**.

**TABLE 11.1- COMPONENTS FOR THE PROPOSED EXPANSION PROJECT**

| Sr. No. | Equipment                 | Individual Capacity | Quantity (Nos.) | Total Treatment |
|---------|---------------------------|---------------------|-----------------|-----------------|
| 1       | Incinerator (Stationary)  | 250 kg/h            | 1               | 550 kg/hr.      |
| 2       | Incinerator (Rotary Kiln) | 300 kg/h            | 1               |                 |
| 3       | Autoclave                 | 1000 lit./batch     | 2               | 2000 lit./batch |
| 4       | Shredder                  | 250 kg/h            | 1               | 350 kg/hr.      |
| 5       | Shredder                  | 100 kg/h            | 1               |                 |
| 6       | Effluent Treatment Plant  | 40 KL/Day           | 1               | 40 KL/Day       |
| 7       | Sewage Treatment Plant    | 5 KL/Day            | 1               | 5 KL/Day        |

2. Total cost of the project is Rs. 7.0 Crores.

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- For the proposed project, total water requirement will be 132.4 KLD and wastewater generation will be 37.7 (35.7 KLD industrial + 2.0 KLD domestic). Out of total water requirement of 132.4 KLD, 37.7 KLD treated waste water will be recycled after treatment of waste water from ETP and STP, rest 94.7 KLD fresh water will be sourced from Local Panchayat Water Supply. Necessary permissions shall be obtained from the concerned authorities. Effluent generated from facility will be treated in Effluent Treatment Plant consisting of primary, Secondary and Tertiary units.
- Total Power requirement for project will be 500 KVA sourced from Tamil Nadu Electricity Board (TNEB). 2 no. of 250 KVA capacity D.G. set will be installed as back up supply and used only during emergency power backup. HSD/LDO (~55 Liters/Hr each) will be used in D.G. set.
- Proposed Project will generate direct and indirect employment during construction and operation phase. It is estimated to generate nearly 50 employments on temporary basis during construction phase and 50 employments on permanent basis during operation phase. Preference will be given to candidates from nearby areas.
- Details of Pollution potential/Sources is given below in **TABLE 11.2**.

**TABLE 11.2- POLLUTION POTENTIAL/ IDENTIFIED SOURCES**

| <b>Sr. No.</b> | <b>Pollution potential/ Identified sources</b> | <b>Total Proposed after Expansion</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1              | Wastewater generation                          | Total –37.7 KL/day<br>Industrial –35.7 KL/day<br>Domestic –2.0 KL/day                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 2              | Air Emission                                   | <b>Stack-1:</b> Incinerator (250 kg/h)<br>(Ht. - 30 m)<br><b>Stack-2:</b> Incinerator (300 kg/h)<br>(Ht. 30 m)<br><b>Stack-3:</b> DG set (250 KVA x 2 nos.)<br>(Ht. 20 m)                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3              | Solid Hazardous Waste                          | <b>Incineration Ash:</b> 481.8 MT/Annum<br><b>Disposal:</b> Collection, Storage, Transportation, send to CHWTSDF site for secured land filling.<br><br><b>ETP Sludge:</b> 21.9 MT/Annum<br><b>Disposal:</b> Collection, Storage, Transportation, send to CHWTSDF site for secured land filling.<br><br><b>Plastic Waste after Autoclave and shredding:</b> 949 MT/Annum<br><b>Disposal:</b> Collection, Storage Transportation and send to authorized recyclers.<br><br><b>Glass and metallic body implants After Autoclave:</b> 2080.5 MT/Annum<br><b>Disposal:</b> Collection, Storage Transportation and send |

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| Sr. No. | Pollution potential/<br>Identified sources | Total Proposed after Expansion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                                            | <p>to authorized recyclers.</p> <p><b>Metal Sharps after Autoclave and Shredding:</b> 160.6 MT/Annum<br/> <b>Disposal:</b> Collection, Storage Transportation and Sent to foundry for metal recovery / TSDF site for secured land filling.</p> <p><b>Waste oil:</b> As generated<br/> <b>Disposal:</b> Collection, Storage Transportation and send to authorized recyclers.</p> <p><b>Used batteries:</b> As generated<br/> <b>Disposal:</b> Collection, Storage Transportation and send to authorized recyclers</p> <p><b>Non-Hazardous Waste</b></p> <p><b>C&amp;D Waste:</b> As generated<br/> <b>Disposal:</b> Recyclable waste will be reused within plant premises for construction purpose and non-recyclable waste will be sent to MSW Landfill Site.</p> <p><b>Municipal Solid Waste -:</b> 21.9 MT/Year<br/> <b>Disposal:</b> Segregation, Collection, Storage and used as manure for gardening.</p> |

### 11.3 BASELINE ENVIRONMENTAL STATUS

1. Environmental scenario has been described for the specific environmental components as delineated in ToR for study area of plant.
2. Baseline monitoring has been carried out by in-house laboratory of M/s. **Pollucare Engineers India Private Limited**, Chennai, NABL Accredited Lab in accordance with the Guidelines for EIA issued by the Ministry of Environment Forests and Climate Change, Govt. of India and CPCB, New Delhi.
3. Ambient air quality data for the proposed new project has been generated during the study period starting from 1<sup>st</sup> July, 2025 to 17<sup>th</sup> September, 2025 at eight locations within study area of 10 km.
4. The average concentration of all pollutants at all ambient air locations are found to be varying in the following range: However, all the parameters are found within permissible limit as per NAAQS.  
PM<sub>10</sub>: 42.50–73.30 µg/m<sup>3</sup>  
PM<sub>2.5</sub>: 21.38–45.70 µg/m<sup>3</sup>



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SO<sub>2</sub>: 8.77-19.64 µg/m<sup>3</sup>

NO<sub>x</sub>: 14.11-33.80 µg/m<sup>3</sup>

NH<sub>3</sub>: 3.8-9.6 µg/m<sup>3</sup>

O<sub>3</sub>: 9.60-19.99 µg/m<sup>3</sup>

5. Based on meteorological data, wind roses have been prepared for July 2025 to September 2025. As per meteorological data, it shows that average wind speed in this season is 9.7 m/s. It can be observed that in this season, wind blows mostly from W to E.
6. Surface Water: Surface water quality assessment indicates that locations SW5 and SW8 meet CPCB Class B criteria, reflecting comparatively good water quality suitable for outdoor bathing, with dissolved oxygen levels above 5 mg/L, low BOD concentrations, and controlled coliform counts. Locations SW1, SW2, SW3, SW4, SW6, and SW7 fall under CPCB Class D, indicating water quality suitable for propagation of wildlife and fisheries. The classification is primarily influenced by relatively higher BOD levels and lower dissolved oxygen concentrations at some locations, suggesting the presence of moderate organic pollution. The observed organic load may be attributed to domestic runoff, agricultural activities, and natural decomposition of organic matter. However, no evidence of industrial contamination was observed, and the overall water quality remains adequate for supporting aquatic ecosystems and designated Class D uses.
7. Ground Water: The groundwater quality results (GW1–GW8) indicate that the groundwater is generally free from toxic metal and organic contamination; however, certain physico-chemical parameters exceed desirable drinking water limits. The pH (7.22–7.91) remains within the acceptable range prescribed under IS 10500:2012. Total Dissolved Solids (1200–1382 mg/L) and Total Hardness (850–983 mg/L) are elevated, indicating highly mineralized and very hard groundwater, although values remain within the permissible limits in the absence of an alternate source. Chloride (355–479 mg/L), sulphate (118–160 mg/L), nitrate (10.1–12.4 mg/L), and fluoride (0.11–0.16 mg/L) are within permissible limits, suggesting no significant contamination from anthropogenic sources. Heavy metals such as arsenic, lead, mercury, chromium, selenium, nickel, and other trace elements were below detectable limits in all samples, indicating the absence of industrial pollution. However, microbiological analysis revealed the presence of E. coli (22–70 CFU/100 mL) and total coliforms (40–90 CFU/100 mL) in all samples, indicating bacteriological contamination and rendering the groundwater unsuitable for direct drinking without disinfection. Overall, the groundwater quality is characterized by high hardness and TDS of geogenic origin, with no evidence of heavy metal contamination, but requires appropriate treatment prior to potable use due to microbial contamination.
8. Overall, the soil quality in the study area is satisfactory, with good physicochemical characteristics and no evidence of heavy metal contamination. The baseline soil conditions are suitable for supporting vegetation growth and do not indicate any significant environmental concerns.
9. The monitored ambient noise levels in the study area ranged from **60.7–71.6 dB(A)** during daytime and **47.8–59.8 dB(A)** during nighttime. Most locations exhibited noise levels within the CPCB prescribed standards. Marginal exceedances were noted at the project site and Thalinji, reflecting the influence of existing transportation corridors, and localized human activities. The noise environment in the remaining locations was found to be satisfactory, indicating that ambient noise conditions are generally under control within the study area.

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10. Land Use Land Cover classification is clearly that the area is covered with Agricultural Cultivable land around 28 % respectively of the total area. which is taken up for cultivation but is temporarily allowed to rest, cropped for one or more season, but not less than one year. Thus, total cultivable land is 28 %. Other class is Roads within the study area 18%, Around the Fallow edges the Settlement (Built-up area) is located and occupies around 10%, and. It is an area of human habitation developed due to non-agricultural use and that has a cover of buildings, transport and communication, utilities in association with water, vegetation and plantation. The proposed project is on Agricultural Cultivable land and does not have any significant impact on the surrounding villages and habitation. The water bodies cover 12% of the total area. The water bodies cover Napali River etc.
11. The base line study for evaluation of the flora and fauna biodiversity of the terrestrial environment of the study area was carried out within 10 km radius of the project site. The core zone habitat upto 5km area is mostly covered with semi urban and rural vegetation. The predominant trees in the study area is primarily characterized by tropical dry thorn and dry deciduous forest types, with a mix of native and invasive species. This zone is having good number of trees, shrubs and herbs in open vegetation. The predominant species present in the open vegetation area are *Leucaena leucocephala*, *Azadirachta indica*, *Mimosops elengi*, *Pithecellobium dulce*, *Samanea saman*, *Alstonia scholaris*, *Millettia pinnata*, *Tectona grandis*, *Dendrocalamus strictus*, *Dalbergia sissoo* are mainly restricted to waste and cultivable waste lands. The faunal composition generally with arboreal and semi arboreal based animals. Within the core zone common mongoose, Squirrels are sighted apart from few reptilian species. From the secondary source (local people working in the plant), it is also revealed that presence of common snakes exists here.
12. In collaboration with the state departments, Central Ground Water Board (CGWB) carried out ground water resource estimation and categorization studies for the Karur District for the year 2008-09. The CGWB has categorized the area as 'over exploited' with the stage of ground water utilization of 63 %, indicating further scope for further ground water development. These details are applicable to the study area also, as it is forms part of this district. There is notable canal command irrigation in the area. The irrigation is carried through the use of water from percolation tanks, water bodies, and bore wells. The area is regionally characterised by dendritic drainage, with a general slope towards Cauvery River. Major part of the pediment-inselberg-hilly complex in the area is dissected by streamlets flowing towards the ponds or gradually joining the Cauvery River. Out of the small and medium size tanks and water bodies situated in the area have seasonal and limited irrigation facilities.
13. The socio-economic assessment indicates that the study area is predominantly rural with agriculture-based livelihoods and gradually improving infrastructure facilities.

The proposed CBMWTF project is expected to:

- Improve scientific biomedical waste management
- Generate direct and indirect employment
- Support local economic growth
- Enhance community infrastructure through CER activities

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With proper environmental safeguards, regulatory compliance, and implementation of mitigation measures, the project is not expected to cause any significant adverse socio-economic impacts in the surrounding villages.

#### **11.4 IMPACT ASSESSMENT AND MITIGATIONS**

1. Impact identification matrix has been developed by establishing cause-effect relationship between activities of project and environmental attributes.
2. The waste water from the CBMWTF is collected in effluent collection tank cum equalization tank and subjected to flash mixer and flocculator followed by primary settling tank. Waste water from primary settling tank subjected to biological treatment. Treated waste water reused is passed through pressure sand filter and activated carbon filter and the filtered water to be reused as scrubbing media in incinerator scrubber. Sludge from effluent treatment plant will be sent to TSDF site.
1. Incinerator gas emissions will be treated in Air Pollution Control System consisting of Gas quencher, High PD Variable Throat Venturi Scrubber and Packed Bed Scrubber for removal of Particulate Matter (PM). Carbon adsorption column is also proposed to capture any unwanted gases like dioxin and furan. Modelling of pollutant emission (PM, HCl, NO<sub>x</sub>) was carried out using AERMOD to assess incremental ground level concentration within 10 km radius study area. Incremental ground concentration was found insignificant in study area after implementation of mitigation measures. Incremental Maximum Ground Level Concentration for each parameter along with distance and direction are mentioned below:

**TABLE 11.3 - INCREMENTAL MAXIMUM GROUND LEVEL CONCENTRATION**

| <b>Sr. No.</b> | <b>Parameters</b> | <b>Maximum GLC (µg/m<sup>3</sup>)</b> | <b>Distance and Direction</b>          |
|----------------|-------------------|---------------------------------------|----------------------------------------|
| 1              | PM                | 0.38                                  | 400 m away in E direction from Project |
| 2              | HCl               | 0.38                                  | 400 m away in E direction from Project |
| 3              | NO <sub>x</sub>   | 3.19                                  | 400 m away in E direction from Project |

2. Incinerator Ash and ETP sludge are hazardous solid waste generated from plant. They will be stored in packed form in dedicated hazardous waste storage area and then disposed to TSDF site. Disinfected plastic and glass will be sent to authorized recyclers. Disinfected and shredded sharps shall be sent to metal recovery or to TSDF site for disposal. Used oil and used batteries will be sent to recyclers. Recyclable portion of C&D waste will be reused within plant premises for construction purpose and non-recyclable part of waste will be sent to MSW Landfill Site). Thus, there is negligible impact on soil.
3. There are no reserved forests within the study area.
4. Insignificant effect on ecological environmental and geology and hydro-geology aspects is predicted due to adequate control measures for effluent management, emission control and solid waste management.
5. DG Sets is provided for power failure condition. All utilities will be provided with acoustic enclosure to mitigate noise generation during operation. ETP blowers will be provided with

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acoustic enclosure to mitigate noise generation during operation. The health impacts of increased noise level on workers within plant premises will be further mitigated by provision of PPEs and shift management.

- Risk assessment study has been conducted for the proposed new project and the suggestions made in the report shall be implemented strictly to prevent any chances of environmental contamination and employee health and safety. By the efficient implementation of Hazard/Risk control/Prevention measures the negative impacts would be avoided.

### **11.5 ENVIRONMENT MONITORING PROGRAMME**

The environmental monitoring program is prepared for Ambient Air, Stack Gas, Effluent, Soil, ground water and Surface water, Noise for effective monitoring of the environmental conditions to ensure that EMP is implemented efficiently to prevent/minimize the anticipated impacts.

### **11.6 ENVIRONMENT MANAGEMENT CELL**

- Qualified and experienced personnel in the field of environment pollution control shall be recruited as plant in-charge for overall responsibility, for the management of all the issues related to Environment, Health and Safety within the plant and responsible person will be directly reporting to the Director of the plant management for issues related to the Environment Management System.
- Account and Administration staff will report to Plant in charge and will support for better implementation of EMP. They will be responsible for collection, transportation and receipt of waste at site. Plant In-Charge who is also responsible for Environment, Health and Safety will look after all statutory compliances associated with plant operation. Lab In-charge will be reporting plant in charge. Lab In-charge will be responsible for implementation of Environmental Monitoring Plan.
- Plant Operators will be reporting to plant in charge and will be responsible for operation and maintenance of the facility in each shift of operation.
- Guidelines for Management, Operation and Maintenance of plant issued by Central Pollution Control Board will be followed to operate plant effectively and efficiently. Maintenance schedule of plant will be planned, considering stand by storage facility, availability of manpower, availability of maintenance tools, safety equipment and other required facilities.
- Preventive maintenance schedule for plant machineries will be prepared and strictly followed on regular basis for effective and efficient operation of plant.
- Training will be imparted to plant operating staff as well as waste transporters on regular basis.
- All personnel working at plant will be provided with Personnel Protective Equipment's (PPEs).
- Adequate number of fire extinguishers will be provided in the plant as described in risk assessment study.

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### 11.7 PROJECT BENEFITS

1. Project will provide direct and indirect employment to local people.
2. Project proponent has committed for Economic and social development through CER activities equivalent to 2% of additional project cost in local area.
3. The proposed new project will improve Bio-Medical Waste disposal status in the district and will lead to better hygienic condition in area.
4. The proposal itself is for betterment of environment through scientific disposal of Bio Medical Waste. It will also serve as savior facility to handle any of the situation like COVID-19 pandemic in future.

### 11.8 CONCLUSION

Considering the potential impacts of the proposed new project, M/s. Navabuddha Agencies Private Limited has prepared adequate remedial measures and an Environmental Management Plan for their implementation. Overall, the proposed new project will generate employment opportunities as well as increase in physical resources. Similarly, M/s. Navabuddha Agencies Private Limited has planned to implement various CER activities such as Provision of Providing Solar Panel at Kellapatti Government School to create a thriving environment. It can be concluded that strict adherence to mitigation measures during the construction and operational phases will result in negligible impact on the environment. Proposed new project will be helpful to maintain hygienic conditions in the surrounding region by treating BMW in scientific way as per BMW guidelines.

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## CHAPTER 12: DISCLOSURE OF CONSULTANT

### 12.1 NAMES OF THE CONSULTANTS ENGAGED WITH THEIR BRIEF RESUME AND NATURE OF CONSULTANCY RENDERED

|                                                                         |                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                  |
|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (A)                                                                     | Name                                                                                                                                                                                                                                                                                                                                                                       | M/s. ENPRO Enviro Tech and Engineers Pvt. Ltd. (ENPRO)                                                                                                                                           |
| (B)                                                                     | Address                                                                                                                                                                                                                                                                                                                                                                    | Plot No. D/29/16-17, Road No. 17, Hojiwala Industrial Estate, Gate No.3, Sachin Palsana Road, Sachin, Surat - 394230.                                                                            |
|                                                                         | Telephone                                                                                                                                                                                                                                                                                                                                                                  | 91-81604-83760                                                                                                                                                                                   |
|                                                                         | Fax                                                                                                                                                                                                                                                                                                                                                                        | 91-261-2786129                                                                                                                                                                                   |
|                                                                         | E-mail address                                                                                                                                                                                                                                                                                                                                                             | <a href="mailto:rushabh@enpro.co.in">rushabh@enpro.co.in</a><br><a href="mailto:enpro.eia@enpro.co.in">enpro.eia@enpro.co.in</a><br><a href="mailto:enpro.eia@gmail.com">enpro.eia@gmail.com</a> |
|                                                                         |                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                  |
| (C)                                                                     | Company's Capabilities                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                  |
|                                                                         | ENPRO deals with the issues related to environmental pollution control and also provide better options/ solutions for effective control of environmental pollution i.e., air, water and solid waste disposal. ENPRO has sufficing infrastructure of its technical staff and has its own laboratory for analysis of water, waste water, solid wastes and gaseous emissions. |                                                                                                                                                                                                  |
|                                                                         |                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                  |
| (D)                                                                     | Company's Work area                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                  |
| At present ENPRO is capable to undertake following type of assignments: |                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                  |
| 1.                                                                      | To design the water, waste water and sewage treatment plant.                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                  |
| 2.                                                                      | To carry out rapid as well comprehensive Environment Impact Assessment study and report preparation.                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                  |
| 3.                                                                      | To undertake work related Environment Clearance from Ministry of Environment, Forest and Climate Change (MoEFCC).                                                                                                                                                                                                                                                          |                                                                                                                                                                                                  |
| 4.                                                                      | To carry out Environment audits.                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                  |
| 5.                                                                      | To provide advice in respect of statutory obligations related environmental pollution control (Form-V, Form-IV, Water Cess returns) which is required to be complied by industries as well as techno-legal consultation related to environmental issues.                                                                                                                   |                                                                                                                                                                                                  |
| 6.                                                                      | To carry out Treatability studies for evolving effluent treatment system.                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                  |
| 7.                                                                      | To carry out analysis of water, wastewater, hazardous waste & gaseous emission.                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                  |
| 8.                                                                      | To operate or assist for efficient operation of effluent/ sewage treatment plants.                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                  |
| 9.                                                                      | To design secured landfill site for hazardous waste, bio-medical waste disposal and to prepare techno economic feasibility report.                                                                                                                                                                                                                                         |                                                                                                                                                                                                  |
| 10.                                                                     | To carry out waste minimization study for the industrial pollution control.                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                  |

|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | Chapter 12: Disclosure of Consultant     | Date | 08/06/2026 |

| <b>(E) Accreditation &amp; Recognition</b> |                                                                                                                |                                                                                                                                                  |  |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>1.</b>                                  |                               | QCI-NABET Accredited EIA Consultant,<br>(Certificate No. NABET/EIA/25-28/RA 0388<br>(Valid till 11/01/2028)                                      |  |
| <b>2.</b>                                  | <br>Certificate No. TC- 5885  | ENPRO Enviro Tech and Engineers Pvt. LTD.<br>NABL Accredited Environment Testing Laboratory,<br>(Certificate No. TC- 5885 Valid till 31/05/2026) |  |
| <b>3</b>                                   | <br>Certificate No. TC- 7446 | Pollucare Engineers India Pvt. Ltd.<br>NABL Accredited Environment Testing Laboratory,<br>(Certificate No. TC- 7446 Valid till 21/06/2026)       |  |
| <b>3.</b>                                  | <br>ISO 9001: 2015          | Certificate No. IN240423007 Valid till 22/04/2027                                                                                                |  |
| <b>4.</b>                                  | <br>ISO 14001: 2015         | Certificate No. IN240829004<br>Valid till 28/08/2027                                                                                             |  |
| <b>5.</b>                                  | <br>ISO 45001: 2018         | Certificate No. IN240829005<br>Valid till 28/08/2027                                                                                             |  |

| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | Chapter 12: Disclosure of Consultant     | Date | 08/06/2026 |

|           |                                                                                   |                                                                                                                                                |
|-----------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>6.</b> |  | SS.O.388(E), Sr. No. 147<br>Valid till 24/06/2027                                                                                              |
| <b>7</b>  |  | <b>Confederation of Indian Industry (CII)</b><br>CII Certified GreenCo Facilitator                                                             |
| <b>8</b>  |  | <b>Gujarat Pollution Control Board</b><br>GPCB Approved Schedule II Environmental Auditor<br>Recognition letter no.: GPCB/EAC/SCH-II/51/811833 |

**(F) Analytical capability**

The existing laboratory facilities are capable of estimation of following pollutants.

**(1). For water and wastewater**

|                                 |                                       |
|---------------------------------|---------------------------------------|
| 1). pH                          | 2). Suspended Solids                  |
| 3). Total Dissolved Solids      | 4). Total Solids                      |
| 5). Acidity                     | 6). Alkalinity                        |
| 7). Hardness                    | 8). Chlorides                         |
| 9). Sulphate                    | 10). Dissolved Oxygen                 |
| 11). Bio Chemical Oxygen Demand | 12). Chemical Oxygen demand           |
| 13). Phenol                     | 14). Heavy Metals Like CU, Ni, Zn etc |
| 15). Residual Chlorine          | 16). Ammonical Nitrogen               |
| 17). Oil and grease             | 18). Sodium                           |
| 19). Potassium                  | 20). Color                            |
| 21). Conductivity               | 22). Turbidity                        |
| 23). Volatile & Fixes Solids    | 24). Reactive Silica                  |
| 25). Cr+6, Total Cr, Fe, B      | 26). Sulphide                         |
| 27). Fluoride                   | 28). Phosphate                        |
| 29). Nitrate                    | 30). Temperature                      |

**(2). For Process/ Flue gas emission**

|                                 |
|---------------------------------|
| 1. Suspended particulate matter |
| 2. Sulphur dioxide              |
| 3. Oxides of nitrogen           |



|                                                  |                                          |      |            |
|--------------------------------------------------|------------------------------------------|------|------------|
| <b>ENPRO Enviro Tech and Engineers Pvt. Ltd.</b> |                                          |      |            |
| Client                                           | M/s. Navabuddha Agencies Private Limited |      |            |
| Project                                          | Draft EIA Report                         |      |            |
| Report No                                        | EP/EIA/76                                | Rev. | 00         |
| Title                                            | Chapter 12: Disclosure of Consultant     | Date | 08/06/2026 |

|         |                                                                         |                                    |                        |                                 |                  |
|---------|-------------------------------------------------------------------------|------------------------------------|------------------------|---------------------------------|------------------|
|         | 4. other process gases like HCl, Cl <sub>2</sub> , NH <sub>3</sub> etc. |                                    |                        |                                 |                  |
|         |                                                                         |                                    |                        |                                 |                  |
| (3).    | For Ambient Air                                                         |                                    |                        |                                 |                  |
|         | 1. Sulphur dioxide                                                      |                                    |                        |                                 |                  |
|         | 2. Oxides of nitrogen                                                   |                                    |                        |                                 |                  |
|         | 3. PM <sub>2.5</sub> , PM <sub>10</sub>                                 |                                    |                        |                                 |                  |
|         | 4. Other gases like HCl, Cl <sub>2</sub> etc.                           |                                    |                        |                                 |                  |
|         | 5. Ground level ozone concentration                                     |                                    |                        |                                 |                  |
|         |                                                                         |                                    |                        |                                 |                  |
| (G)     | Details of Technical Persons                                            |                                    |                        |                                 |                  |
| Sr. No. | Name of Experts                                                         | Qualification                      | Designation            | Working tenure with the company | Total Experience |
| 1.      | Mr. Paresh Mevawala                                                     | M. Tech. (Chem.)                   | Director               | Since 1998                      | 28               |
| 2.      | Dr. Dhaval Naik                                                         | Ph. D. with Water Pollution        | Sr. Scientist          | Since 2001                      | 25               |
| 3.      | Ms. Nirupam Patnaik                                                     | B.E. Civil (Elective – Env. Engg.) | Environmental engineer | Since 2001                      | 25               |
| 4.      | Mr. Rushabh Mevawala                                                    | M. Tech. (Chem. Engg.)             | Director               | Since 2016                      | 10               |

# **Annexure 1**

## **Plant Layout**



# **Annexure 2**

## **Land Documents**

3864 / 2023



தமிழ்நாடு தமிழ்நாடு TAMILNADU

20.09.2023.

மெத்தனார் தத்  
தஞ்சி

BC 487262

R. PADMANABAN  
ம.நி. மருதுர் L.No. 3/2000  
குளித்தலை Tk., கருச்சி

கிரையப்பத்திரம்

2023-ம் ஆண்டு செப்டம்பர் மாதம் 21-ம் தேதி திருச்சிராப்பள்ளி மாவட்டம், திருச்சிராப்பள்ளி வட்டம், உறையூர், நாச்சியார் கோவில் தெரு, கதவு எண் : 41 என்ற முகவரியில் இயங்கி வரும் NAVABUDDHA AGENCIES PRIVATE LIMITED (CIN : U74999TN2017PTC119997) என்ற நிறுவனத்திற்காக (நிறுவனத்தின் PAN NO: AAFCN8733P)

(கிரையம் பெறுபவர்கள்)

(கிரையம் எழுதிக்கொடுப்பவர்)

For Navabuddha Agencies Private Limited

Managing Director

For Navabuddha Agencies Private Limited

Joint Managing Director

|    |             |             |             |
|----|-------------|-------------|-------------|
| 1  | புத்தகம்    | 2023        | 3864        |
| 17 | ம.வருடத்திய | ம.வருடத்திய | ம.வருடத்திய |
| 1  | தான்        | தான்        | தான்        |
| 1  | வது தான்    | வது தான்    | வது தான்    |



தமிழ்நாடு தமிழ்நாடு TAMILNADU

BC 487263



20.9.2023

மருத்துவ சேவை நிறுவனம்  
சென்னை.

R. PADMANABAN  
மு.மி. மருத்துர் L.No. 3/2000  
குளித்தலை Tk., சென்னை

-2-

மேற்படி நிறுவனத்தின் நிர்வாக இயக்குநரும், திருச்சிராப்பள்ளி மாவட்டம், திருச்சிராப்பள்ளி - 620021, சுந்தர் நகர், 6-வது குறுக்கு தெரு, கதவு எண் : 11/2 என்ற முகவரியில் வசிக்கும் உமாகாந்த் ரத் அவர்களின் மகன் பிரதீப்தகுமார் ரத்-1 (ஆதார் எண்: 3722 0686 6459 / வயது: 56 PAN: AFWPP8660C செல் : 9894254124)

(கிரையம் பெறுபவர்கள்)

(கிரையம் எழுதிக்கொடுப்பவர்)

For Navabuddha Agencies Private Limited

Managing Director

S. Prasad

For Navabuddha Agencies Private Limited

Joint Managing Director

|          |                  |      |               |
|----------|------------------|------|---------------|
| புத்தகம் | 2023             | 3864 | மேலவணம்       |
| 17       | தாள்களைக் கொண்டு |      |               |
| 2        | வது நாள்         |      | பதிவு அலுவலர் |



மேற்படி நிறுவனத்தின் நிர்வாக இணை இயக்குநரும், மேற்படி திருச்சிராப்பள்ளி மாவட்டம், NH 45B, திருச்சி - மதுரை நெடுஞ்சாலை, நாகமங்கலம், மாத்தூர் பஞ்சாயத்து ரோடு, ஜங்சன், 101/4A, ஹர்ஷமித்ரா ஆன்காலஜி பிரைவேட் லிமிடெட் என்ற முகவரியில் வசித்து வரும் கணேசன் அவர்களின் மகன் G.கோவிந்தராஜ் வர்தனன்-2 (ஆதார் எண்: 6428 4179 6146 / வயது: 53 PAN: AEZPG8663G / செல்: 9444014312) ஆகிய தங்களுக்கு (மேற்படி NAVABUDDHA AGENCIES PRIVATE LIMITED நிறுவனத்தின் நிர்வாக இயக்குநர்களுக்கும், பின்னிட்டு இப்பதவியை வகிப்பவர்களுக்கும்),

மதுரை மாவட்டம், மதுரை மாநகரம், ஆளவந்தான், கே.கே.நகர், மேற்கு 2-வது தெரு. கதவு எண் : 520 என்ற முகவரியில் வசிக்கும் சுப்பையா அவர்களின் மகன் S.ஆனந்த் (ஆதார் எண்: 6385 6766 2275 / வயது : 48 PAN : AHLPA8150F) ஆகிய நான் எழுதிக்கொடுத்த கிரையப்பத்திரம் என்னவென்றால்,

கடந்த 13.07.2016-ம் தேதியில் கருர் மாவட்டம், குளித்தலை வட்டம், கள்ளை கிராமம், கஸ்பாவில் வசிக்கும் சீரங்க ரெட்டியார், சிவபாலன், மணிமன்னன், என்பவர்களின் பொது அதிகார முகவரான செல்லக்கனி என்பவரிடமிருந்து நான் கிரையம் பெற்று அப்பத்திரம் குளித்தலை சார்பதிவாளர் அலுவலக 1 புத்தகம் 2016-ம் ஆண்டின் 1507-ம் ஆவண எண்ணாக பதிவாகியுள்ளது-

(கிரையம் பெறுபவர்கள்)

(கிரையம் எழுதிக்கொடுப்பவர்)

For Navabuddha Agencies Private Limited

Managing Director

For Navabuddha Agencies Private Limited

Joint Managing Director

|    |                      |      |             |       |         |
|----|----------------------|------|-------------|-------|---------|
| 1  | புத்தகம்             | 2023 | ம.வருடத்திய | 3864  | ம.ஆவணம் |
| 17 | தள்ளுபடிக்கப்பட்டது. |      |             |       |         |
| 3  | வது நாள்             |      |             |       |         |
|    |                      |      |             | பதிவு | அலுவலர் |





மேற்சொன்ன இரு ஆவணங்களின் படி நான் கிரையம் பெற்று சர்வ சுதந்திர பாத்தியங்களுடன் ஆண்டு அனுபவித்து வருவதும், கிராம வருவாய் ஏடுகளில் என் பெயரில் பட்டா ஏற்பட்டுள்ளதுமான சொத்துக்களை நான் தங்களது NAVABUDDHA AGENCIES PRIVATE LIMITED நிறுவனத்திற்கு கிரையத்திற்கு கொடுப்பதாக பேசி நிச்சயித்த கிரைய தொகை ரூபாய் : 4,01,550/- முழுவதும் மேற்படி நிறுவனத்தின் வங்கி கணக்கில் இருந்து எனது வங்கி கணக்கிற்கு RTGS (UTR NO : 2023092035392118) செய்த வகையில் தொகை ரூபாய் : 4,01,550/- (ரூபாய் நான்கு லட்சத்து ஆயிரத்து ஐநூற்று ஐம்பது) தங்கள் NAVABUDDHA AGENCIES PRIVATE LIMITED நிறுவனத்தின் சார்பாக எனக்கு வரவு வந்து பற்றாகி விட்ட படியால், இனி நாளது தேதி முதல் இதனடியில் கண்ட சொத்தை மேற்படி NAVABUDDHA AGENCIES PRIVATE LIMITED-நிறுவனமே எல்லாவித உரிமைகளுடன் தானாதி, விநிமய, விற்கிரையங்கள், செய்யவும், சகல விதமான சர்வ சுதந்திர பாத்தியங்களுடன் ஆண்டு அனுபவித்து கொள்ளவும் சம்மத்திகிறேன்.

இனி நாளது தேதி முதல், இதனடியில் கண்ட சொத்துக்களுக்கும், எனக்கும், எவ்விதமான, உரிமை பாத்திய சம்மந்தமும், பின் தொடர்ச்சியும், கிடையாது எனவும், தங்களுக்கு உறுதியாக கூறுகிறேன். இதனடியில் கண்ட சொத்துக்களின் பேரில் எவ்விதமான, முன் வில்லங்கம், விவகாரம், சொத்து, வாரிசு, டைட்டில், பாத்தியக்குறைவு, வகையறா, எதுவும் இல்லை என்று தங்களை நம்பும் படி உண்மையாகவும், உறுதியாகவும், கூறுகிறேன்.

(கிரையம் பெறுபவர்கள்)

(கிரையம் எழுதிக்கொடுப்பவர்)

For Navabuddha Agencies Private Limited

Managing Director

For Navabuddha Agencies Private Limited

Joint Managing Director

|          |                   |            |      |         |
|----------|-------------------|------------|------|---------|
| புத்தகம் | 2023              | ம.வருடததிய | 3854 | ம.ஆவணம் |
| 17       | தாள்களைக்கொண்டது. |            |      |         |
| 4        | வது தாள்          |            |      |         |
|          |                   | பதிவு      |      | அலுவலர் |





பின்னிட்டு, ஏதேனும், முன் வில்லங்கம், விவகாரம், சொத்து, வாரிசு டைட்டில், பாத்தியக்குறைவு, வகையறாக்கள் இருந்து பின்னிட்டு அவைகள் வெளியாகி இன்று என்னிடம் தங்கள் நிறுவனத்திற்காக கிரையம் பெறும் சொத்துக்களுக்கு ஏற்படும் சகல விதமான நஷ்டங்களுக்கும், நானும் எனது வாரிசுகளும், எனக்கு பாத்தியப்பட்ட சகல ஸ்தாவர, ஜங்கம், சொத்துக்களும், ஜவாப்தாரியாய் இருந்து எனது சொந்த செலவிலும், பொறுப்பிலும், தீர்த்து கொடுப்பேன் என தங்கள் நிறுவனத்திற்கு உறுதி அளிக்கிறேன்.

இனி நாளது தேதி முதல் இதனடியில் கண்ட சொத்துக்களுக்கான சகல வரிகளையும் தாங்களே தங்கள் நிறுவனத்தின் பெயரில் செலுத்திக்கொள்ளவேண்டியது. இதனடியில் கண்ட சொத்துக்களின் முழு சுவாதீனங்களையும் தங்கள் வசம் விட்டு விட்டேன்.

இதனடியில் கண்ட சொத்துக்களுக்குரிய அனைத்து முன் ஆவணங்களையும், தங்கள் வசம் கொடுத்து விட்டேன். இந்தப்படிக்கு என்னுடைய முழு மன சம்மந்ததின் பேரில் இந்த கிரையப்பத்திரத்தை NAVABUDDHA AGENCIES PRIVATE LIMITED நிறுவனத்திற்காக தங்களுக்கு எழுதி கொடுத்துள்ளேன்.

(கிரையம் பெறுபவர்கள்)

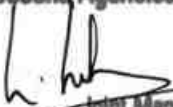
(கிரையம் எழுதிக்கொடுப்பவர்)

For Navabuddha Agencies Private Limited

  
Managing Director



For Navabuddha Agencies Private Limited

  
Joint Managing Director

|    |                    |      |      |
|----|--------------------|------|------|
| 1  | புத்தகம்           | 2023 | 3864 |
| 17 | தாங்களாகக்கொண்டது. |      |      |
| 5  | வது தாள்           |      |      |

பதிவு அலுவலர்



சொத்து விபரம்

கரூர் மாவட்டம், கரூர் பதிவு மாவட்டம், குளித்தலை வட்டம், குளித்தலை சார்பதிவகம், கள்ளை கிராமம், அயன் புஞ்சை சர்வே எண் : 246-க்கு ஹெக் 1.42.5-க்கு ஏக் 3.52-ல் கீழ்ப்புறம், ஹெக் 0.32.50-க்கு ஏக் 0.80 செண்ட் இதற்கு எல்லைகள் விபரம் :

மேற்கில் : கிருஷ்ணா ரெட்டியார் நிலம் (A ஷெட்டியூல்)

கிழக்கில் : தென்வடல் பொது பாதை

தெற்கில் : ரோடு

வடக்கில் : சர்வே எண் 248 நிலம்

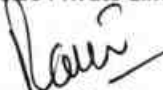
இதற்குட்பட்டது மேற்படி நிலமும் (இது புதிய உட்பிரிவு படி 246/3A ஹெக் 0.32.50-க்கு ஏக் 0.80 செண்டில் கட்டுப்பட்டது)

மேற்படி நிலங்களுக்குண்டான சகல மாமூல் வழி தட நடை பாதை பாத்தியங்கள் உள்படவும் இந்த கிரையத்திற்கு கட்டுப்பட்டது.

தற்கால சந்தை மதிப்பு ரூபாய் : 4,01,550/-

(கிரையம் பெறுபவர்கள்)

For Navabuddha Agencies Private Limited

  
Managing Director

(கிரையம் எழுதிக்கொடுப்பவர்)



For Navabuddha Agencies Private Limited

  
Joint Managing Director

|    |                       |                                                                                     |               |
|----|-----------------------|-------------------------------------------------------------------------------------|---------------|
| 1  | புத்தகம் 2023         | ம.வருடத்திய 3864                                                                    | ம.ஆவணம்       |
| 17 | தாள்நாள்வாங்கியவருடது |                                                                                     |               |
| 6  | வது தாள்              |                                                                                     |               |
|    |                       |  | பதிவு அலுவலர் |



சொத்தானது நீர்நிலை பகுதியில் அமையப் பெறவில்லை என்பதற்கான  
சான்று/உறுதிமொழி (Declaration) (நீதிபேராணைஎண் 22163/2018-ல்  
வழங்கப்பட்டதீர்ப்புரையைகாண்க)

இந்த ஆவணத்தில் கண்ட சொத்தானது நீர் நிலைகள், 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.

(கிரையம் பெறுபவர்கள்)

(கிரையம் எழுதிக்கொடுப்பவர்)

For Navabuddha Agencies Private Limited

Managing Director

For Navabuddha Agencies Private Limited

Joint Managing Director

சாட்சிகள் :-

- 1) மனோஜ்குமார், த/பெ பனையடியான், 5/86,  
பள்ளப்படிகாலனி, ஸ்ரீரங்கம், அம்மாபேட்டை, திருச்சிராப்பள்ளி (ஆதார்  
எண் : 8261 1530 4727 வயது : 31)
- 2) R. R. திருக்குமார், த/பெ ரெங்கசாமி, 352/39, ராஜ் நகர்,  
14-வது குறுக்கு தெரு, மணப்பாறை, திருச்சி (ஆதார் எண் : 8382 4117  
1946 வயது : 42)

சான்று செய்தவர் :-



ஆவண எழுத்தர் பெயர் : உறுதிபாஸ்கர்.

முகவரி : 1, கம்மாளர் தெரு, கடம்பர் கோவில், குளித்தலை.

கைபேசி எண் : 99942 77896.

ஆவண எழுத்தர் உரிமம் எண் : B.308/KUR/91.

|    |                   |               |
|----|-------------------|---------------|
| 1  | பத்தகம் 2023      | 3864          |
| 17 | தாஸ்கணைக்கொண்டது. |               |
| 7  | வது தாள்          | பதிவு அலுவலர் |



R/குளித்தலை/புத்தகம்-1/3864/2023

1899ம் ஆண்டு இந்திய முத்திரைச் சட்டம் 42வது பிரிவின் கீழான சான்று

2023ம் ஆண்டு வரிசை எண் 2602

திருச்சிராப்பள்ளி மாவட்டம், திருச்சிராப்பள்ளி - 620021, சுந்தர் நகர், 6-வது குறுக்கு தெரு, கதவு எண் : 11/2, திருச்சிராப்பள்ளி, தமிழ்நாடு, இந்தியா, 620021-ல் வசிக்கும் திரு பிரதீப்தகுமார் ரத் என்பவரிடமிருந்து ₹ 26,111/- (ரூபாய் இருபத்தாறாயிரத்து நூற்று பதினொன்று மட்டும்) இந்த ஆவணத்திற்காக இந்திய முத்திரைச் சட்டம் 41வது பிரிவின் படி குறைவாயிருந்த முத்திரைக் கட்டணம் வசூலிக்கப்பட்டது என நான் இதன் மூலம் சான்றளிக்கிறேன்.

சார்பதிவாளர் : குளித்தலை  
நாள்: 21/09/2023

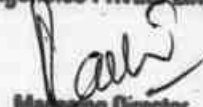
  
சார்பதிவாளர் மற்றும் இந்திய முத்திரைச் சட்டம் பிரிவு  
41ன் படி ஆட்சியர்

2023 ஆம் ஆண்டு செப்டம்பர் மாதம் 21ம் தேதி பி.ப. 12:16 மணியளவில் குளித்தலை சார்பதிவாளர் அலுவலகத்தில் தாக்கல் செய்து கட்டணம் ₹ 8,842/- செலுத்தியவர்.

இடது பெருவிரல்



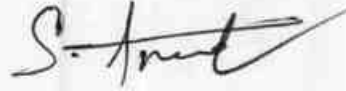
For Navabuddha Agencies Private Limited

  
Managing Director

கூடுதல் விவரங்கள் ஆவண வாசகத்தில்  
உள்ளபடி

எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர்  
இடது பெருவிரல்

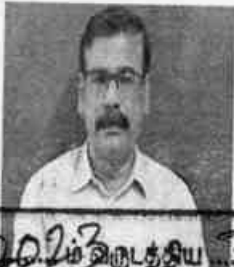




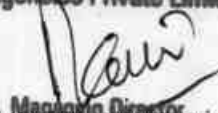
"சம்மதத்துடன் கூடிய ஆதார் அங்கீகாரம்" என்ற  
வழி இந்த நபரின் அடையாளம் விரல் ரேகை  
மூலம் ஆதார் ஆணையத்துடன்  
சரிபார்க்கப்பட்டது. ஒப்பீட்டு எண் :  
UKC:6329514d979db333874b4a96e104c9b58f9755  
(Details from UIDAI : Anand S S/O: Subbiah, 24-05-1975,  
xxxxxxxxx2275)



எழுதி வாங்கியதாக ஒப்புக் கொண்டவர்  
இடது பெருவிரல்



For Navabuddha Agencies Private Limited

  
Managing Director

"சம்மதத்துடன் கூடிய ஆதார் அங்கீகாரம்" என்ற  
வழி இந்த நபரின் அடையாளம் விரல் ரேகை  
மூலம் ஆதார் ஆணையத்துடன்  
சரிபார்க்கப்பட்டது. ஒப்பீட்டு எண் :  
UKC:6329514d979db333874b4a96e104c9b58f9755  
(Details from UIDAI : Pradipta Kumar Rath S/O:

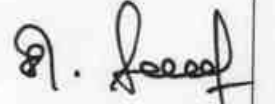


புத்தகம் 2023ம் ஆண்டு 3864  
17  
8  
வது தாள்  
பதிவு அலுவலர்

R/குளித்தலை/புத்தகம்-1/3864/2023

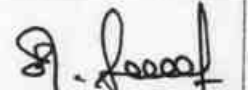
|                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                     |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|
|                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Umakanta Rath, 07-07-1961, xxxxxxxx6459)                                            |  |
| <p>எழுதி வாங்கியதாக ஒப்புக் கொண்டவர்<br/>இடது பெருவிரல்</p>   | <p><b>For Navabuddha Agencies Private Limited</b></p>  <p>“சம்மதத்துடன் கூடிய ஆதார் அங்கீகாரம்” என்ற<br/>வழி இந்த நபரின் அடையாளம் விரல் நேகை<br/>மூலம் ஆதார் ஆணையத்துடன்<br/>சரிபார்க்கப்பட்டது. ஒப்பீட்டு எண் :<br/>UKC:45643063e92d01f53a4f4c9d95cb3cb18503fc<br/>(Details from UIDAI : G Govindaraj Vardhanan C/O:<br/>Ganesan, 04-05-1970, xxxxxxxx6146)</p> |  |  |

2023 ஆம் ஆண்டு செப்டம்பர் மாதம் 21ம் நாள்

  
சுருதி சி  
சார்பதிவாளர்  
குளித்தலை

R/குளித்தலை/புத்தகம்-1/3864/2023 எண்ணாகப் பதிவு செய்யப்பட்டது.

நாள்: 21/09/2023  
குளித்தலை

  
சுருதி சி  
சார்பதிவாளர்



|               |                    |
|---------------|--------------------|
| புத்தகம் 2023 | 3864               |
| 17            | தாள்களைக் கொண்டது. |
| 9             | வது தாள்           |
|               | பதிவு அலுவலர்      |



 **இந்திய அரசாங்கம்**  
Government of India

 **ஆனந்த் சு**  
Anand S  
தந்தை : சுப்பையா  
Father : Subbiah  
பிறந்த நாள் / DOB : 24/05/1975  
ஆண்/Little / Male



**6385 6766 2275**

**ஆதார் - சாதாரண மனிதனின் அதிகாரம்**

 **இந்திய தனிப்பட்ட அடையாள ஆணைய அமைப்பு**  
Unique Identification Authority of India

**முகவரி: தந்தை / தாய் பெயர்:** Address: S/O: Subbiah, 520, K K  
சுப்பையா, 520, கே கே நகர் NAGAR WEST 2ND STREET,  
மேற்கு 2வது தெரு. Alavandan, Madurai, Gandhi  
ஆளவந்தான், மதுரை, காந்தி Nagar (ma), Tamil Nadu, 625020  
நகர் (மா), தமிழ் நாடு. 625020

**6385 6766 2275**

 1947  
800 300 1947

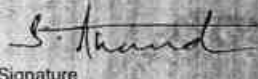
 help@uidai.gov.in

 www.uidai.gov.in

**आयकर विभाग**  
INCOME TAX DEPARTMENT

 **भारत सरकार**  
GOVT. OF INDIA

**ANAND S**  
**THEVAR SUBBAIAH**  
**24/05/1975**  
Permanent Account Number  
**AHLPA8150F**

  
Signature



*In case this card is lost / found, kindly inform / return to :*  
Income Tax PAN Services Unit, UTITSL  
Plot No. 3, Sector 11, CBD Belapur,  
Navi Mumbai - 400 614.

*यह कार्ड खो जाने पर कृपया सूचित करें/लीटार :*  
आयकर पैन सेवा यूनिट, UTITSL  
प्लॉट नं: 3, सेक्टर 11, सी.बी.डी. बेलपुर,  
नवी मुंबई-400 614.

புத்தகம் 2023-24 3864  
17 தாள்களைக் கொண்டு  
10 வது தாள்  
பதிவு அலுவலர்





 भारत सरकार  
GOVERNMENT OF INDIA



பிரதீப்த் குமார் ரத்  
Pradipta Kumar Rath  
பிறந்த நாள்/ DOB: 07/07/1961  
ஆண் / MALE



3722 0686 6459

எனது ஆதார், எனது அடையாளம்.

 Unique Identification Authority of India

முகவரி:  
S/O: உமகாந்த் ரத், 11/2, 6வது  
கிராஸ், சுந்தர் நகர்,  
திருச்சிராப்பள்ளி,  
திருச்சிராப்பள்ளி,  
தமிழ் நாடு - 620021

Address:  
S/O: Umakanta Rath, 11/2, 6TH  
CROSS, SUNDAR NAGAR,  
Tiruchirappalli, Tiruchirappalli,  
Tamil Nadu - 620021



1947  help@uidai.gov.in  www.uidai.gov.in

आयकर विभाग  
INCOME TAX DEPARTMENT

 भारत सरकार  
GOVT. OF INDIA

PRADIPTA KUMAR RATH  
UMAKANTA RATH  
07/07/1961  
Permanent Account Number  
AFWPP8660C



Signature



इस कार्ड के खाने / पाने पर कृपया सूचित करें / लौटाने /  
आयकर पैन सेवा इकाई, एन एस डी एल  
तीसरी मंजिल, साफायर चेंबर,  
बानेर टेलिफोन एक्चेंज के नजदीक,  
बानेर, पुना - 411 045

If this card is lost / someone's lost card is found,  
please inform / return to :  
Income Tax PAN Services Unit, NSDL  
3rd Floor, Sapphire Chambers,  
Near Baner Telephone Exchange,  
Baner, Pune - 411 045

Tel: 91-20-2721 8080, Fax: 91-20-2721 8081  
e-mail: tininfo@nsdl.co.in

For Navabuddha Agencies Private Limited

Managing Director

17 புத்தம் 2023 ம் ஆண்டு 3864 ஆவணம்

17 துவக்கம் 2023 ம் ஆண்டு 3864 ஆவணம்

11 வது தாள்

பதிவு அலுவலர்





இந்திய அரசு  
Government of India



க. கோவிந்தராஜ் வர்தனன்  
G Govindaraj Vardhanan  
பிறந்த நாள்/DOB: 04/05/1970  
ஆண்/MALE

6428 4179 6146

VID : 9110 1384 7543 2839

எனது ஆதார். எனது அடையாளம்



இந்திய அடையாள அமைப்பு  
Unique Identification Authority of India

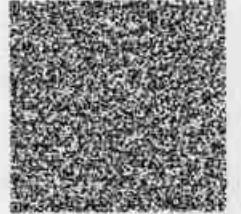


முகவரி:

பெர். ஆப்: கணேசன், ஹர்ஷமித்ரா  
ஆன்காண்டி பிரைவேட் லிமிடெட், 101/4A,  
மாத்தூர் பஞ்சாயத்து ரோடு ஹவுஸ், என்எல்  
45B திருச்சி - மதுரை வழியில், நாகமங்கலம்,  
திருச்சிராப்பள்ளி,  
பெர். நாடு - 620012

Address:

C/O: Ganesan, Harshamitra Oncology Private  
Limited, 101/4A, Mathur Panchayat Road  
Junction, NH 45B Trichy - Madurai Highway,  
Nagamangalam, Tiruchirappalli,  
Tamil Nadu - 620012



6428 4179 6146

VID : 9110 1384 7543 2839

☎ 1047

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आयकर विभाग  
INCOME TAX DEPARTMENT

भारत सरकार  
GOVT. OF INDIA

ई-पारमैन्ट अकाउन्ट नंबर कार्ड  
e-Permanent Account Number Card

AEZPG8663G

नाम / Name  
G GOVINDARAJ VARDHANAN

पिता का नाम / Father's Name  
GANESAN

जन्म तिथि / Date of Birth  
04/05/1970

हस्ताक्षर / Signature

For Navabuddha Agencies Private Limited

Joint Managing Director

புத்தகம் 2023 3864 மாவணம்  
தாள்களைக் கொண்டது.  
12 வது தாள்  
பதிவு அலுவலர்







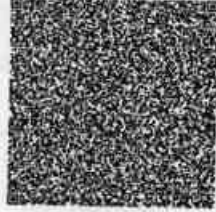
இந்திய அரசாங்கம்  
Government of India

இந்திய தனிப்பட்ட அடையாள ஆணைய அமைப்பு  
Unique Identification Authority of India

பதிவேட்டு எண்/ Enrolment No.: 2007/20334/36566

To  
மனோகுமார் பனையடியான்  
Manojkumar Panaiyadiyan  
S/O: Panaiyadiyan  
NO 5/86  
PALLAPATTICOLONY  
SRIRANGAM TALUK  
Ammapettai  
Pulangulathupatti  
Tiruchirappalli Tamil Nadu - 620009  
9865829838

Download Date: 16/05/2021  
Issue Date: 16/07/2013



உங்கள் ஆதார் எண் / Your Aadhaar No. :

8261 1530 4727  
VID : 9119 8872 9207 5906

எனது ஆதார், எனது அடையாளம்



இந்திய அரசாங்கம்  
Government of India



மனோகுமார் பனையடியான்  
Manojkumar Panaiyadiyan  
பிறந்த நாள்/DOB: 27/08/1992  
ஆண்/ MALE

Download Date: 16/05/2021

Issue Date: 16/07/2013

8261 1530 4727

VID : 9119 8872 9207 5906

எனது ஆதார், எனது அடையாளம்



Government of India



AADHAAR

தகவல்

- ஆதார் அடையாளத்திற்கான சான்று, குடியுரிமைக்கு அல்ல.
- பாதுகாப்பான QR குறியீடு ஆப்லைன் XML / ஆன்லைன் அங்கீகாரத்தைப் பயன்படுத்தி அடையாளத்தை சரிபார்க்கவும்
- இது எலக்ட்ரானிக் செயல்முறை மூலம் தயாரிக்கப்பட்ட கடிதமாகும்.

INFORMATION

- Aadhaar is a proof of identity, not of citizenship.
- Verify identity using Secure QR Code/ Offline XML/ Online Authentication.
- This is electronically generated letter.

- ஆதார் நாடு முழுவதிலும் செல்லுபடியாகும்.
- பல்வேறு அரசு மற்றும் அரசு சாரா சேவைகளை எளிதில் பெற ஆதார் உதவுகிறது.
- உங்கள் மொபைல் எண் மற்றும் மின்னஞ்சல் ஐடியை ஆதாரில் புதுப்பிக்கவும்
- mAadhaar செயலியைப் பயன்படுத்தி உங்கள் ஸ்மார்ட் போனில் ஆதாரை எடுத்துச் செல்லுங்கள்

- Aadhaar is valid throughout the country.
- Aadhaar helps you avail various Government and non-Government services easily.
- Keep your mobile number & email ID updated in Aadhaar.
- Carry Aadhaar in your smart phone – use mAadhaar App.



இந்திய அரசாங்கம்  
Unique Identification Authority of India

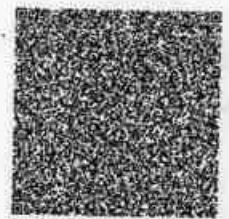


முகவரி:

S/O: பனையடியான், எண் 5/86,  
பள்ளப்பட்டிகாவணி, பூதூரங்கம் தாலுகா,  
அம்மாபேட்டை, திருச்சிராப்பள்ளி,  
தமிழ் நாடு - 620009

Address:

S/O: Panaiyadiyan, NO 5/86,  
PALLAPATTICOLONY, SRIRANGAM  
TALUK, Ammapettai, Tiruchirappalli,  
Tamil Nadu - 620009



8261 1530 4727

VID : 9119 8872 9207 5906

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பத்திரம் 9023 மருத்துவ 3864  
17  
13  
சிக் துள்  
மதுவ அலுவலர்





இந்திய அரசாங்கம் / Government of India

**இந்திய அரசாங்கம்**  
**Unique Identification Authority of India**  
**Government of India**

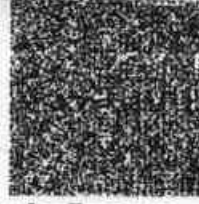
பதிவு அடையாளம் / Enrollment No.: 2192/50132/51313

To,  
திருக்குமார் ரெங்கசாமி  
Thirukumar Rengasamy  
C/O Rengasamy  
352/39  
Rajiv Nagar  
14th cross Manapparai  
Manapparai Manapparai Tiruchirappalli  
Tamil Nadu 621306  
9843161433

Ref: 1450 / 30Q / 112119 / 112157 / P



SB941931235FH



உங்கள் ஆதார் எண் / Your Aadhaar No. :

**8382 4117 1946**

எனது ஆதார், எனது அடையாளம்

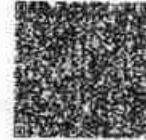


இந்திய அரசாங்கம்

Government of India



திருக்குமார் ரெங்கசாமி  
Thirukumar Rengasamy  
பிறந்த நாள் / DOB : 09/05/1981  
ஆண்பால் / Male



**8382 4117 1946**

எனது ஆதார், எனது அடையாளம்

R. R

புத்தகம் ... 2023 ... 3864 ...  
17 தூவணம் ...  
14 ...  
பதிவு அலுவலர்





सत्यमेव जयते

**GOVERNMENT OF INDIA  
MINISTRY OF CORPORATE AFFAIRS**

Central Registration Centre

**Certificate of Incorporation**

[Pursuant to sub-section (2) of section 7 of the Companies Act, 2013 (18 of 2013) and rule 18 of the Companies (Incorporation) Rules, 2014]

I hereby certify that NAVABUDDHA AGENCIES PRIVATE LIMITED is incorporated on this Fifteenth day of December Two thousand seventeen under the Companies Act, 2013 (18 of 2013) and that the company is limited by shares.

The Corporate Identity Number of the company is U74999TN2017PTC119997.

The Permanent Account Number (PAN) of the company is AAFCN8733P \*

Given under my hand at Manesar this Fifteenth day of December Two thousand seventeen .



Digital Signature Certificate  
Keerthi Thej N

For and on behalf of the Jurisdictional Registrar of Companies  
Registrar of Companies  
Central Registration Centre

Disclaimer: This certificate only evidences incorporation of the company on the basis of documents and declarations of the applicant(s). This certificate is neither a license nor permission to conduct business or solicit deposits or funds from public. Permission of sector regulator is necessary wherever required. Registration status and other details of the company can be verified on [www.mca.gov.in](http://www.mca.gov.in)

Mailing Address as per record available in Registrar of Companies office:

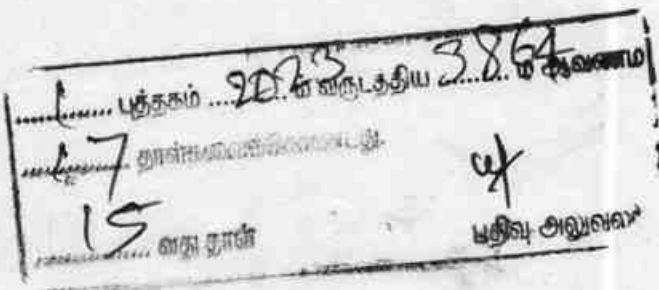
NAVABUDDHA AGENCIES PRIVATE LIMITED

NO.41, NACHIYAR KOIL STREET, WORAIYUR, TRICHY, Chennai,

Tamil Nadu, India, 620003



\* as issued by the Income Tax Department







தமிழ்நாடு அரசு

வருவாய்த் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

மாவட்டம் : கரூர்

வட்டம் : குளித்தலை

வருவாய் கிராமம் : கள்ளை

பட்டா எண் : 1964

உரிமையாளர்கள் பெயர்

| 1.      | சுப்பையா  | மகன்          |         |               |         | ஆனந்த்        |         | -                                                                 |
|---------|-----------|---------------|---------|---------------|---------|---------------|---------|-------------------------------------------------------------------|
| புல எண் | உட்பிரிவு | புன்செய்      |         | நன்செய்       |         | மற்றவை        |         | குறிப்புரைகள்                                                     |
|         |           | பரப்பு        | தீர்வை  | பரப்பு        | தீர்வை  | பரப்பு        | தீர்வை  |                                                                   |
|         |           | ஹெக்டர் - ஏர் | ரூ - பை | ஹெக்டர் - ஏர் | ரூ - பை | ஹெக்டர் - ஏர் | ரூ - பை |                                                                   |
| 246     | 3A        | 0 - 32.50     | 0.40    | --            | --      | --            | --      | 2016/0105<br>/14/005862--2017<br>/14/03/000024SD<br>-- 13-02-2017 |
|         |           | 0 - 32.50     | 0.40    |               |         |               |         |                                                                   |

குறிப்பு2 :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 14/03/045/01964/30570 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 21-09-2023 அன்று 09:44:54 AM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

புத்தகம் 2023 3864  
17 தாள்களைக் கொண்டது.  
17 வது தாள்  
பதிவு அலுவலர்



21-09-2023, 09:





தமிழ்நாடு தமிழ்நாடு TAMILNADU

ஆயத்தம்

ஆயத்தம், மதம்.

1000/- AU 808524

J. சிமத்

J. சமத்

முத்திரை தான் விற்பனையாளர்  
குளித்தலை, கருர் மாவட்டம்

LNo: 49/1997.

3679

12.7.16



### கிரயப் பத்திரம்

2016 ஆம் ஆண்டு ஜூலை மாதம் 13 ஆம் தேதி மதுரை மாவட்டம், மதுரை மாநகரம், ஆளவந்தான், கே.கே. நகர், மேற்கு, 2-வது தெரு, கதவு எண் 520 என்ற முகவரியில் வசிக்கும் சுப்பையா குமாரர் ஆனந்த் (ஆதார் எண்: 6385 6766 2275), (PAN: AHLPA8150F) அவர்களுக்கு,

கருர் மாவட்டம், குளித்தலை வட்டம், கள்ளை கிராமம், கஸ்பாவில் வசிக்கும் மும்மாச்சி ரெட்டியார் குமாரர் சீரங்க ரெட்டியார்-1, மேற்படி 1 நபர் மக்கள் சிவபாலன்-2, மணிமன்னன்-3 இவர்களின் பொது அதிகார முகவருமான மதுரை மாவட்டம், மேலூர் வட்டம், சந்தை பேட்டை, PPL டவர் முன்புரம் நைனார் ஊரணி தெரு, கதவு எண் 17/11 என்ற முகவரியில் வசிக்கும் பழனிச்சாமி குமாரர் செல்லக்கனி (ஆதார் எண்: 9009 3583 8328) ஆகிய நான் எழுதிக் கொடுத்த சுத்தக் கிரய சாசனம் என்னவென்றால்:-

(கிரயம் வாங்குபவர்)

(கிரயம் கொடுப்பவர்)

பவர்ஜெண்ட் ஹோதாவில்

*[Signature]*

*[Signature]*



1507  
2016



..... புத்தகம் 2016... ஆண்டின்  
..... 1507... ஆண்டின்... 10.....  
தமிழ்நாட்டின் சிவசுந்தரி து.  
விடுதலை





**பதிவுத்துறை**  
**இரசீது - ஆவணப்பதிவு**

இரசீது எண் : 6277/2023  
ஆவண எண் : R/ குளித்தலை/ புத்தகம்-1/ 3864 / 2023

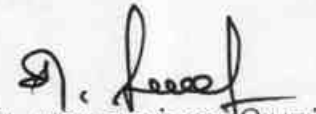
திரு பிரதீப்தகுமார் ரத் அவர்களிடமிருந்து ₹ 34,953 (ரூபாய் முப்பத்து நான்காயிரத்து தொள்ளாயிரத்து ஐம்பத்து மூன்று மட்டும்) [இணைய வழி: REG202309216067042 ₹ 34953] கீழ்க்கண்ட விவரப்படி பெற்றுக் கொள்ளப்பட்டது.

| வ.எண் | விவரம்                                               | தொகை (₹) |
|-------|------------------------------------------------------|----------|
| 1     | முத்திரைத்தீர்வை (முத்திரைச் சட்டம் பிரிவு 41ன் படி) | 26,111   |
| 2     | பதிவுக் கட்டணம்                                      | 8,032    |
| 3     | கணினிக் கட்டணம்                                      | 700      |
| 4     | குறுந்தகடுக் கட்டணம்                                 | 100      |
| 5     | ஆவண எழுத்தர் நலநிதி                                  | 10       |
|       | செலுத்தப்பட்ட மொத்தத் தொகை                           | 34,953   |

**குறிப்பு:** இந்த அசல் ஆவணம் உடனடியாக பக்க சான்று இடப்பட்டு ஒளி வருடல் செய்யப்பட்டு திரும்ப வழங்கப்படும். ஆகவே அசல் ஆவணத்தைத் திரும்பப் பெற தகுதி பெற்ற திரு / திருமதி /செல்வி திரு மனோஜ்குமார் இது தொடர்பாக குறுஞ்செய்தி பெற்றவுடன் அசல் ரசீதை அளித்து அசல் ஆவணத்தை திரும்ப பெற்றுக்கொள்ளலாம். இதில் ஏதேனும் இடர்பாடுகள் இருப்பின் கட்டணமில்லா தொலைபேசி எண் 1800-102-5174 - ஐ தொடர்பு கொள்ளவும்.

குளித்தலை அலுவலகம்

நாள்: 21/09/2023

  
பதிவு அலுவலர் கையொப்பம்

உருவாக்கப்பட்ட ஆவண/ வரைவு ஆவணச் சுருக்க விவரங்கள்

| பயனர் பெயர்                  | முழுப் பெயர் | கைப்பேசி எண் | உருவாக்கப்பட்ட நாள்  |
|------------------------------|--------------|--------------|----------------------|
| HARIBASKARKLT (ஆவண எழுத்தர்) | HARI BASKAR  | 9994277896   | 20-09-23 01:02:31 PM |

1. அசல் ஆவணத்தைத் திரும்பப் பெரும்போது உரிய நபரின் விரல் ரேகை பெறப்படுகிறதா என உறுதிசெய்து கொள்ளவும்.
2. ஆவணதாரர்கள் தங்களின் சரியான கைபேசி எண்ணைப் பதிவுக்கு தாக்கலாகும் ஆவணத்தில் தெரிவித்தால் ஆவணம்/சொத்தின் நிலை குறித்த குறுஞ்செய்தியை பெறலாம்.
3. ஆவணத்தை குறித்த காலத்தில் திரும்பப் பெற்றுக்கொள்ளத் தவறும் பட்சத்தில் பாதுகாப்பு கட்டணம் வசூலிக்கப்படும்.
4. பட்டா மாற்றம் தேவைப்படும் ஆவணங்களுக்கு பட்டா மாற்றம் செய்யக் கோரும் படிவம் இவ்வலுவலகத்தில் இருந்து இணையதளம் வழியாகவே வருவாய்த்துறைக்கு அனுப்பப்பட்டுள்ளது. அதன் ஒப்புக்கைச் சீட்டை தங்களின் அசல் ஆவணத்தைத் திரும்பப் பெறும்போது கேட்டுப் பெற்றுக்கொள்ளவும்.

<https://tnreginet.gov.in> என்ற இணைய தளம் மூலம் வழங்கப்படும் சேவைகள்

- கட்டணமின்றி வில்லங்க விவரம் தரவிறக்கம் செய்யும் வசதி
- சார் பதிவாளர் அலுவலகம் நேரில் வராமல் இணையதளம் மூலம் சான்றிட்ட நகல்கள், வில்லங்க சான்று விபரங்கள் விண்ணப்பித்து மின்னஞ்சல் மூலம் சான்று பெரும் வசதி
- இணையதளம் மூலம் பொது மக்களே ஆவணம் உருவாக்கும் வசதி
- இணையதளம் மூலம் வழிகாட்டி மதிப்பை அறியும் வசதி, கட்டிட மதிப்பை கணக்கிடும் வசதி
- இணையதளம் மூலம் முத்திரைத் தீர்வை, பதிவுக் கட்டணம் உள்ளிட்ட கட்டணங்கள் செலுத்தும் வசதி
- பொதுமக்கள் நலன் சார்ந்த சுற்றறிக்கைகள்/அரசாணைகள் பதிவுத்துறையின் இணையதளத்தில் பார்வையிடும் வசதி





**தமிழ்நாடு அரசு  
பதிவுத்துறை  
முன்பதிவு செய்ததற்கான ஒப்புகைச்சீட்டு**

**முன்பதிவு விவரம்**

|                     |                   |
|---------------------|-------------------|
| பதிவு செய்த நாள்    | 21/09/2023        |
| முன்பதிவு நாள்      | 21/09/2023        |
| முன்பதிவு நேரம்     | 10:00 - 11:00     |
| முன்பதிவு வரிசை எண் | 5 [D105]          |
| பதிவு வகை           | ஆவணப் பதிவு       |
| தற்காலிக எண்        | TP/160127668/2023 |

*18 pwy*  
*15 pwy*

**விண்ணப்பதாரர் விவரம்**

|                           |                           |
|---------------------------|---------------------------|
| விண்ணப்பதாரர் பெயர்       | திரு. கோவிந்தராஜ் வர்தனன் |
| தந்தை / கணவர் பெயர்       | திரு. கணேசன்              |
| சார்பதிவாளர் அலுவலகம்     | குளித்தலை                 |
| சொத்து அமைந்துள்ள கிராமம் | கள்ளை                     |

*4*

**குறிப்பு:**

1. முன்பதிவு செய்த நபர் அவருக்காக ஒதுக்கப்பட்ட நேரத்திற்கு தவறாமல் அலுவலகத்திற்கு வந்து ஆவணத்தை பதிவுக்கு தாக்கல் செய்ய கோரப்படுகிறார்.
2. முன்பதிவு செய்த நபர் குறித்த நேரத்தில் வரவில்லையெனில் அடுத்த முன்பதிவு செய்த நபரின் ஆவணம் பதிவுக்கு எடுத்துக்கொள்ளப்படும். தவறவிட்டவரின் முன்பதிவு அடுத்த முன்பதிவு நேரத்தில் கடைசியாக வைக்கப்படும்.
3. முன்பதிவு நேரத்தில் ஒதுக்கப்பட்ட அனைத்து வரிசை எண்களுக்கான பதிவு மேற்கொண்ட பின்பே அடுத்த முன்பதிவு நேரத்தின் வரிசை எண்களுக்கான பதிவு தொடங்கும்.
4. ஆவணப்பதிவிற்கான அனைத்து ஆதாரங்களும் தாக்கல் செய்யப்படும் நிலையில் ஆவணம் பதிவு செய்யப்படும். ஆவணப்பதிவிற்கு தேவையான ஆதாரங்கள் ஏதும் இல்லாத நிலை மற்றும் பதிவுக்கு ஏதும் தடையிருப்பின் பதிவு மறுப்புச் சீட்டு உருவாக்கப்பட்டு சார்பதிவாளரால் கையொப்பமிடப்பட்டு வழங்கப்படும்.
5. பதிவு செய்யப்பட்ட ஆவணம், தாக்கல் செய்தவருக்கு திரும்ப வழங்கப்படும். தாக்கல் செய்தவர் வர இயலாத நிலையில் ஆவணப்பதிவின் போதே வேறொரு நபரை ஆவணம் திரும்ப பெற நியமிக்கலாம். ஆவணப்பதிவின் போது நியமனம் செய்யப்பட்டவரின் விரல் ரேகை கவரப்படும். ஆவணம் திரும்ப அளிக்கும் போது அவரின் விரல் ரேகை மீண்டும் கவரப்பட்டு ஒப்பிட்டு சரிபார்த்தபின்பே ஆவணம் திரும்ப வழங்கப்படும்.

**ஏதேனும் சந்தேகங்கள்/குறைகள் இருப்பின் கீழ்க்கண்ட வழிமுறைகளில் தெரிவிக்கலாம்**

|                          |                        |
|--------------------------|------------------------|
| கட்டணமில்லா தொலைபேசி எண் | 1800 102 5174          |
| மாற்று மின்னஞ்சல் முகவரி | helpdesk@tnreginet.net |



**தமிழ்நாடு அரசு  
பதிவுத்துறை  
ஒப்புகைச்சீட்டு**

**பார்வைக்குறிப்பு விவரங்கள்**

|                             |                          |
|-----------------------------|--------------------------|
| சார்பதிவாளர் அலுவலகப் பெயர் | குளித்தலை                |
| விண்ணப்ப எண்                | S01LANDVV202309218963443 |
| பரிவர்த்தனை எண்             | REG202309216067042       |
| பரிவர்த்தனை நாள்            | 21/09/2023               |

**விண்ணப்ப விவரங்கள்**

|                          |                                                 |
|--------------------------|-------------------------------------------------|
| விண்ணப்பதாரர் பெயர்      | PRADIPTA KUMAR RATH                             |
| சேவை வகை                 | சார்பதிவாளர் அலுவலகத்தில் ஆவணப் பதிவு (புதியது) |
| முத்திரைத்தீர்வை (₹)     | 26111/-                                         |
| பதிவுக் கட்டணம் (₹)      | 8032/-                                          |
| கணினிக் கட்டணம் (₹)      | 700/-                                           |
| குறுந்தகடுக் கட்டணம் (₹) | 100/-                                           |
| ஆவண எழுத்தர் நலநிதி (₹)  | 10/-                                            |

**தொகை செலுத்திய விவரங்கள்**

|                            |                         |
|----------------------------|-------------------------|
| வங்கியின் பெயர்            | இந்தியன் ஓவர்சீஸ் வங்கி |
| வங்கிக்குறிப்பு எண்        | 202309210544540         |
| பணம் செலுத்திய விதம்       | இணைய வழி                |
| செலுத்தப்பட்ட தொகை (₹)     | 34953/-                 |
| தொகை செலுத்தும் நிலைப்பாடு | வெற்றி                  |
| தொகை செலுத்திய நாள்        | 21/09/2023              |

**ஏதேனும் சந்தேகங்கள்/குறைகள் இருப்பின் கீழ்க்கண்ட வழிமுறைகளில் தெரிவிக்கலாம்**

கட்டணமில்லா தொலைபேசி எண்

1800 102 5174

மின்னஞ்சல் முகவரி

helpdesk@tnreginet.net

3863/2023



தமிழ்நாடு தமிலநாடு TAMILNADU

20.9.2023.

பிரதீப்தகனார் ரத்

தஞ்சை.

Z 996616

R. PADMANABAN

மு.அ. யருதுர் L.NO. 3/2000  
தஞ்சை மாவட்டம் T.N. கருதி



கிரையப்பத்திரம்

2023-ம் ஆண்டு செப்டம்பர் மாதம் 21-ம் தேதி திருச்சிராப்பள்ளி மாவட்டம், திருச்சிராப்பள்ளி வட்டம், உறையூர், நாச்சியார் கோவில் தெரு, கதவு எண் : 41 என்ற முகவரியில் இயங்கி வரும் NAVABUDDHA AGENCIES PRIVATE LIMITED (CIN : U74999TN2017PTC119997) என்ற நிறுவனத்திற்காக (நிறுவனத்தின் PAN NO: AAFCN8733P) மேற்படி நிறுவனத்தின் நிர்வாக இயக்குநரும்,

(கிரையம் பெறுபவர்கள்)

(கிரையம் எழுதிக்கொடுப்பவர்)

For Navabuddha Agencies Private Limited

Managing Director



For Navabuddha Agencies Private Limited

Joint Managing Director

|          |                   |          |       |             |
|----------|-------------------|----------|-------|-------------|
| பத்திரம் | 2023              | வருத்திய | 3863  | ம.அ.யருதுர் |
| 17       | தாள்களைக்கொண்டது. |          |       |             |
| 1        | வது தான்          |          |       |             |
|          |                   |          | பதிவு | சுருவன்     |



தமிழ்நாடு தமிழ்நாடு TAMILNADU

Z 996617



20.9.2023

அரசியல் குற்றம்  
குற்றம்.

*R. Padmanaban*  
**R. PADMANABAN**  
கு.உ. மருது L.No. 3/2000  
குளிக் குளிக் T.K., கருதி

-2-

திருச்சிராப்பள்ளி மாவட்டம், திருச்சிராப்பள்ளி - 620021, சுந்தர் நகர், 6-  
வது குறுக்கு தெரு, கதவு எண் : 11/2 என்ற முகவரியில் வசிக்கும்  
உமாமகாந்த் ரத் அவர்களின் மகன் பிரதீப்தகுமார் ரத்-1 (ஆதார் எண்:  
3722 0686 6459 / வயது: 56 PAN: AFWPP8660C செல் : 9894254124)

(கிரையம் பெறுபவர்கள்)

(கிரையம் எழுதிக்கொடுப்பவர்)

For Navabuddha Agencies Private Limited

Managing Director

*S. Anand*

For Navabuddha Agencies Private Limited

*L. L. L.*  
Joint Managing Director

|    |                  |      |      |
|----|------------------|------|------|
| 1  | புத்தகம்         | 2023 | 3863 |
| 17 | தாள்களைக் கொண்டு |      |      |
| 2  | வது தாள்கள்      |      |      |

பதிவு அலுவலர்





மேற்படி நிறுவனத்தின் நிர்வாக இணை இயக்குநரும், மேற்படி திருச்சிராப்பள்ளி மாவட்டம், NH 45B, திருச்சி - மதுரை நெடுஞ்சாலை, நாகமங்கலம், மாத்தூர் பஞ்சாயத்து ரோடு, ஜங்சன், 101/4A, ஹர்ஷமித்ரா ஆன்காலஜி பிரைவேட் லிமிடெட் என்ற முகவரியில் வசித்து வரும் கணேசன் அவர்களின் மகன் G.கோவிந்தராஜ் வர்தனன்-2 (ஆதார் எண்: 6428 4179 6146 / வயது: 53 PAN: AEZPG8663G / செல்: 9444014312) ஆகிய தங்களுக்கு (மேற்படி NAVABUDDHA AGENCIES PRIVATE LIMITED நிறுவனத்தின் நிர்வாக இயக்குநர்களுக்கும், பின்னிட்டு இப்பதவியை வகிப்பவர்களுக்கும்),

மதுரை மாவட்டம், மதுரை மாநகரம், ஆளவந்தான், கே.கே.நகர், மேற்கு 2-வது தெரு, கதவு எண் : 520 என்ற முகவரியில் வசிக்கும் சுப்பையா அவர்களின் மகன் S.ஆனந்த் (ஆதார் எண்: 6385 6766 2275 / வயது: 48 PAN : AHLPA8150F) ஆகிய நான் எழுதிக்கொடுத்த கிரையப்பத்திரம் என்னவென்றால்,

கடந்த 13.07.2016-ம் தேதியில் கருர் மாவட்டம், குளித்தலை வட்டம், கள்ளை கிராமம், கஸ்பாவில் வசிக்கும் சீரங்க ரெட்டியார், மது, என்பவர்களின் பொது அதிகார முகவரான செல்லக்கனி என்பவரிடமிருந்து நான் கிரையம் பெற்று அப்பத்திரம் குளித்தலை சார்பதிவாளர் அலுவலக 1 புத்தகம் 2016-ம் ஆண்டின் 1506-ம் ஆவண எண்ணாக பதிவாகியுள்ளதுமற்றும்,

(கிரையம் பெறுபவர்)

(கிரையம் எழுதிக்கொடுப்பவர்)

For Navabuddha Agencies Private Limited

Managing Director

For Navabuddha Agencies Private Limited

Joint Managing Director



|    |                    |      |               |         |
|----|--------------------|------|---------------|---------|
| 1  | புத்தகம் 2023      | 3863 | ம.வருடத்திய   | ம.ஆவணம் |
| 17 | பதிவு எண்ணுள்ளதது. |      |               |         |
| 3  | வது தான்           |      |               |         |
|    |                    |      | பதிவு அலுவலர் |         |

மேற்சொன்ன இரு ஆவணங்களின் படி நான் கிரையம் பெற்று சர்வ சுதந்திர பாத்தியங்களுடன் ஆண்டு அனுபவித்து வருவதும், கிராம வருவாய் ஏடுகளில் என் பெயரில் பட்டா ஏற்பட்டுள்ளதுமான சொத்துக்களை நான் தங்களது NAVABUDDHA AGENCIES PRIVATE LIMITED நிறுவனத்திற்கு கிரையத்திற்கு கொடுப்பதாக பேசி நிச்சயித்த கிரைய தொகை ரூபாய் : 56,64,800/- முழுவதும் மேற்படி நிறுவனத்தின் வங்கி கணக்கில் இருந்து எனது வங்கி கணக்கிற்கு RTGS (UTR NO : 2023092035392008) செய்த வகையில் தொகை ரூபாய் : 56,64,800/- (ரூபாய் ஐம்பத்து ஆறு லட்சத்து அறுபத்து நான்காயிரத்து எண்ணூறு) தங்கள் NAVABUDDHA AGENCIES PRIVATE LIMITED நிறுவனத்தின் சார்பாக எனக்கு வரவு வந்து பற்றாகி விட்ட படியால், இனி நாளது தேதி முதல் இதனடியில் கண்ட சொத்தை மேற்படி NAVABUDDHA AGENCIES PRIVATE LIMITED-நிறுவனமே எல்லாவித உரிமைகளுடன் தானாதி, விநிமய, விற்கிரையங்கள், செய்யவும், சகல விதமான சர்வ சுதந்திர பாத்தியங்களுடன் ஆண்டு அனுபவித்து கொள்ளவும் சம்மத்திகிறேன்.

இனி நாளது தேதி முதல், இதனடியில் கண்ட சொத்துக்களுக்கும், எனக்கும், எவ்விதமான, உரிமை பாத்திய சம்மந்தமும், பின் தொடர்ச்சியும், கிடையாது எனவும், தங்களுக்கு உறுதியாக கூறுகிறேன். இதனடியில் கண்ட சொத்துக்களின் பேரில் எவ்விதமான, முன் வில்லங்கம், விவகாரம், சொத்து, வாரிசு, டைட்டில், பாத்தியக்குறைவு, வகையறா, எதுவும் இல்லை என்று தங்களை நம்பும் படி உண்மையாகவும், உறுதியாகவும், கூறுகிறேன்.

(கிரையம் பெறுபவர்)

(கிரையம் எழுதிக்கொடுப்பவர்)

For Navabuddha Agencies Private Limited

Managing Director

For Navabuddha Agencies Private Limited

Joint Managing Director

|    |                   |      |    |           |      |    |       |
|----|-------------------|------|----|-----------|------|----|-------|
| 1  | புத்தகம்          | 2023 | 17 | வருடத்திய | 3863 | 17 | ஆவணம் |
| 17 | தூள்களைக்கொண்டது. |      |    |           |      |    |       |
| 4  | வது தூள்          |      |    |           |      |    |       |



பின்னிட்டு, ஏதேனும், முன் வில்லங்கம், விவகாரம், சொத்து, வாரிசு டைட்டில், பாத்தியக்குறைவு, வகையறாக்கள் இருந்து பின்னிட்டு அவைகள் வெளியாகி இன்று என்னிடம் தங்கள் நிறுவனத்திற்காக கிரையம் பெறும் சொத்துக்களுக்கு ஏற்படும் சகல விதமான நஷ்டங்களுக்கும், நானும் எனது வாரிசுகளும், எனக்கு பாத்தியப்பட்ட சகல ஸ்தாவர, ஜங்கம், சொத்துக்களும், ஜவாப்தாரியாய் இருந்து எனது சொந்த செலவிலும், பொறுப்பிலும், தீர்த்து கொடுப்பேன் என தங்கள் நிறுவனத்திற்கு உறுதி அளிக்கிறேன்.

இனி நாளது தேதி முதல் இதனடியில் கண்ட சொத்துக்களுக்கான சகல வரிகளையும் தாங்களே தங்கள் நிறுவனத்தின் பெயரில் செலுத்திக்கொள்ளவேண்டியது. இதனடியில் கண்ட சொத்துக்களின் முழு சுவாதீனங்களையும் தங்கள் வசம் விட்டு விட்டேன்.

இதனடியில் கண்ட சொத்துக்களுக்குரிய அனைத்து முன் ஆவணங்களையும், தங்கள் வசம் கொடுத்து விட்டேன். இந்தப்படிக்கு என்னுடைய முழு மன சம்மந்ததின் பேரில் இந்த கிரையப்பத்திரத்தை NAVABUDDHA AGENCIES PRIVATE LIMITED நிறுவனத்திற்காக தங்களுக்கு எழுதி கொடுத்துள்ளேன்.

(கிரையம் பெறுபவர்கள்)

(கிரையம் எழுதிக்கொடுப்பவர்)

For Navabuddha Agencies Private Limited

Managing Director

For Navabuddha Agencies Private Limited

Joint Managing Director

|    |                     |      |               |
|----|---------------------|------|---------------|
| 1  | பத்தகம்             | 2023 | 3863          |
| 17 | தாள்களைக்கொடுத்தது. |      |               |
| 5  | வதுதான்             |      |               |
|    |                     |      | பதிவு அலுவலர் |



சொத்து விபரம்

கரூர் மாவட்டம், கரூர் பதிவு மாவட்டம், குளித்தலை வட்டம், குளித்தலை சார்பதிவகம், கள்ளை கிராமம், அயன் புஞ்சை சர்வே எண் : 248-க்கு ஹெக் 4.64.0-க்கு ஏக் 1.46-ல் கீழ்புறம் பாதை நிலம் சுமார் ஏக் 0.14 செண்ட் நீங்கலாக மீதமுள்ள ஏக் 11.32 செண்ட் நிலம் முழுவதும். (ஆவண எண் : 1506/2016-ன் படி)

இதற்கு எல்லைகள் விபரம் :-

மேற்கில் : திருப்பதி செட்டியார் வகையறா நிலம்

கிழக்கில் : 5 மீட்டர் அகலமுள்ள தென்வடல் பொது பாதை

வடக்கில் : சீனிவாசன், சிவசங்கர் இவர்கள் நிலம்

தெற்கில் : கிருஷ்ணா ரெட்டியார் வகையறா நிலம் (சர்வே எண் 246(1), ராஜாராம் வகையறா நிலம் (சர்வே எண் 247/1)

மேற்படி நிலம் தற்போது புதிய சர்வே எண் : 248/1-க்கு கட்டுப்பட்டது. மேற்படி நிலத்திற்குண்டான சகல மாமூல் வழி தட நடை பாதை பாத்தியங்கள் உள்படவும்.

தற்கால சந்தை மதிப்பு ரூபாய் :56,64,800/-

(கிரையம் பெறுபவர்கள்)

(கிரையம் எழுதிக்கொடுப்பவர்)

For Navabuddha Agencies Private Limited

Managing Director

For Navabuddha Agencies Private Limited

Joint Managing Director

|          |                            |           |       |         |
|----------|----------------------------|-----------|-------|---------|
| புத்தகம் | 2023                       | வருடத்திய | 3863  | ஆவணம்   |
| 17       | தான் பதிவு செய்து கொண்டது. |           |       |         |
| 6        | வது தான்                   |           |       |         |
|          |                            |           | பதிவு | அலுவலர் |





சொத்தானது நீர்நிலை பகுதியில் அமையப் பெறவில்லை என்பதற்கான  
சான்று/உறுதிமொழி (Declaration) (நீதிபேராணைஎண் 22163/2018-ல்  
வழங்கப்பட்டதீர்ப்புரையைகாண்க)

இந்த ஆவணத்தில் கண்ட சொத்தானது நீர் நிலைகள், 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.

(கிரையம் பெறுபவர்கள்)

(கிரையம் எழுதிக்கொடுப்பவர்)

For Navabuddha Agencies Private Limited

Managing Director

For Navabuddha Agencies Private Limited

Joint Managing Director

சாட்சிகள் :-

- 1) மனோஜ்குமார், த/பெ பனையடியான், 5/86,  
பள்ளப்படிகாலனி, ஸ்ரீரங்கம், அம்மாபேட்டை, திருச்சிராப்பள்ளி (ஆதார்  
எண் : 8261 1530 4727 வயது : 31)
- 2) திருக்குமார், த/பெ ரெங்கசாமி, 352/39, ராஜா நகர்,  
14-வது குறுக்கு தெரு, மணப்பாறை, திருச்சி (ஆதார் எண் : 8382 4117  
1946 வயது : 42)

சான்று செய்தவர் :-



P. Hariharasakar

ஆவண எழுத்தர் பெயர் : P.ஹரிபாஸ்கர்.

முகவரி : 1, கம்மாளர் தெரு, கடம்பர் கோவில், குளித்தலை.

கைபேசி எண் : 99942 77896.

ஆவண எழுத்தர் உரிமம் எண் : B.308/KUR/91.

|    |                    |               |
|----|--------------------|---------------|
| 1  | பத்தகம் 2023       | 3863          |
| 17 | தாவுபணங்க்கொண்டது. |               |
| 7  | வதுதான்            | பதிவு அலுவலர் |



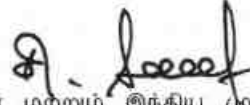
R/குளித்தலை/புத்தகம்-1/3863/2023

1899ம் ஆண்டு இந்திய முத்திரைச் சட்டம் 42வது பிரிவின் கீழான சான்று

2023ம் ஆண்டு வரிசை எண் 2601

திருச்சிராப்பள்ளி மாவட்டம், திருச்சிராப்பள்ளி - 620021, சுந்தர் நகர், 6-வது குறுக்கு தெரு, கதவு எண் 11/2, திருச்சிராப்பள்ளி, தமிழ்நாடு, இந்தியா, 620021-ல் வசிக்கும் திரு பிரதீப்தகுமார் ரத் என்பவரிடமிருந்து ₹ 3,86,536/- (ரூபாய் மூன்று இலட்சத்து எண்பத்தாறாயிரத்து ஐந்துநூற்று முப்பத்தாறு மட்டும்) இந்த ஆவணத்திற்காக இந்திய முத்திரைச் சட்டம் 41வது பிரிவின் படி குறைவாயிருந்த முத்திரைக் கட்டணம் வசூலிக்கப்பட்டது என நான் இதன் மூலம் சான்றளிக்கிறேன்.

சார்பதிவாளர் : குளித்தலை  
நாள்: 21/09/2023

  
சார்பதிவாளர் மற்றும் இந்திய முத்திரைச் சட்டம் பிரிவு  
41ன் படி ஆட்சியர்

2023 ஆம் ஆண்டு செப்டம்பர் மாதம் 21ம் தேதி மு.ப. 11:45 மணியளவில் குளித்தலை சார்பதிவாளர் அலுவலகத்தில் தாக்கல் செய்து கட்டணம் ₹ 1,14,106/- செலுத்தியவர்.

இடது பெருவிரல்



For Navabuddha Agencies Private Limited

Managing Director

கூடுதல் விவரங்கள் ஆவண வாசகத்தில்  
உள்ளபடி

எழுதிக் கொடுத்ததாக ஒப்புக் கொண்டவர்  
இடது பெருவிரல்





"சம்மதத்துடன் கூடிய ஆதார் அங்கீகாரம்" என்ற  
வழி இந்த நபரின் அடையாளம் விரல் ரேகை  
மூலம் ஆதார் ஆணையத்துடன்  
சரிபார்க்கப்பட்டது. ஒப்பீட்டு எண் :  
UKC:4428297969416ba3f54a77a85761e352e6d097  
(Details from UIDAI : Anand S S/O: Subbiah, 24-05-1975,  
xxxxxxxxx2275)



எழுதி வாங்கியதாக ஒப்புக் கொண்டவர்  
இடது பெருவிரல்



For Navabuddha Agencies Private Limited

Managing Director

"சம்மதத்துடன் கூடிய ஆதார் அங்கீகாரம்" என்ற  
வழி இந்த நபரின் அடையாளம் விரல் ரேகை  
மூலம் ஆதார் ஆணையத்துடன்  
சரிபார்க்கப்பட்டது. ஒப்பீட்டு எண் :  
UKC:263859203fa47bfd224a0887c7440a070e4c2



8

வது நாள்

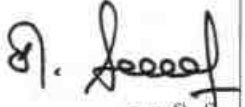
பதிவு அலுவலர்

1 / 1

R/குளித்தலை/புத்தகம்-1/3863/2023

|                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                 | <p>(Details from UIDAI : Pradipta Kumar Rath S/O:<br/>Umakanta Rath, 07-07-1961, xxxxxxxx6459)</p>                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                     |
| <p>எழுதி வாங்கியதாக ஒப்புக் கொண்டவர்<br/>இடது பெருவிரல்</p>   | <p><b>For Navabuddha Agencies Private Limited</b></p>  <p><b>Joint Managing Director</b></p> <p>‘சம்மதத்துடன் கூடிய ஆதார் அங்கீகாரம்’ என்ற<br/>வழி இந்த நபரின் அடையாளம் விரல் டேரகை<br/>மூலம் ஆதார் ஆணையத்துடன்<br/>சரிபார்க்கப்பட்டது. ஒப்பீட்டு எண்<br/>UKC:1019382e241752fb4f4d88bc2f4f17c9ffb9d1<br/>(Details from UIDAI : G Govindaraj Vardhanan C/O:<br/>Ganesan, 04-05-1970, xxxxxxxx6146)</p> |  |

2023 ஆம் ஆண்டு செப்டம்பர் மாதம் 21ம் நாள்

  
சுருதி சி  
சார்பதிவாளர்  
குளித்தலை

R/குளித்தலை/புத்தகம்-1/3863/2023 எண்ணாகப் பதிவு செய்யப்பட்டது.

நாள்: 21/09/2023  
குளித்தலை

  
சுருதி சி  
சார்பதிவாளர்



புத்தகம் 2023 3863 ம.ஆ.வணம்  
17 தாள்களைக் கொண்டது.  
9 வது தாள்  
பதிவு அலுவலர்



 **இந்திய அரசாங்கம்**  
Government of India

 **ஆனந்த் ச**  
Anand S  
தந்தை : சுப்பையா  
Father : Subbiah  
பிறந்த நாள் / DOB : 24/05/1975  
ஆண்பால் / Male



**6385 6766 2275**

**ஆதார் - சாதாரண மனிதனின் அதிகாரம்**

 **இந்திய தனித்தனி அடையாள ஆணையர் அமைப்பு**  
Unique Identification Authority of India

**முகவரி: தந்தை / தாய் பெயர்** Address: S/O. Subbiah, 520, K K  
சுப்பையா, 520, கே கே நகர் NAGAR WEST 2ND STREET,  
மேற்கு 2வது தெரு. Alavandan, Madurai, Gandhi  
ஆளவந்தான், மதுரை, காந்தி Nagar (ma), Tamil Nadu, 625020  
நகர் (மா), தமிழ் நாடு. 625020

**6385 6766 2275**

 1947  
800 303 1947

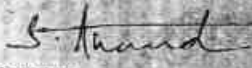
 help@uidai.gov.in

 www.uidai.gov.in

**आयकर विभाग**  
INCOME TAX DEPARTMENT

 **भारत सरकार**  
GOVT. OF INDIA

**ANAND S**  
**THEVAR SUBBIAH**  
**24/05/1975**  
Permanent Account Number  
**AHLP8150F**

  
Signature



*In case this card is lost / found, kindly inform / return to :*  
Income Tax PAN Services Unit, UTISI,  
Plot No. 3, Sector 11, CBD Belapur,  
Navi Mumbai - 400 614.

*यह कार्ड खो जाने पर कृपया सूचित करें/लौटाएं :*  
आयकर पैन सेवा यूनिट, UTISI,  
प्लॉट नं. 3, सेक्टर 11, सी.बी.डी.बेलापुर,  
नवी मुंबई-400 614.



1 புத்தகம் 2023 மீ வருடத்திய 3863 வணம்  
17 தாள்களைக் கொண்டது  
10 வது தாள்  
பதிவு அலுவலர்



 भारत सरकार  
GOVERNMENT OF INDIA



பிரதீப்த குமார் ரத்  
Pradipta Kumar Rath  
பிறந்த நாள்/ DOB: 07/07/1961  
ஆண் / MALE



3722 0686 6459

எனது ஆதார், எனது அடையாளம்.

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முகவரி:  
S/O: உமகாந்த் ரத், 11/2, 6வது  
கிராஸ், சுந்தர் நகர்,  
திருச்சிராப்பள்ளி,  
திருச்சிராப்பள்ளி,  
தமிழ் நாடு - 620021

Address:  
S/O: Umakanta Rath, 11/2, 6TH  
CROSS, SUNDAR NAGAR,  
Tiruchirappalli, Tiruchirappalli,  
Tamil Nadu - 620021



 1947  [unique@nic.gov.in](mailto:unique@nic.gov.in)  [www.unic.gov.in](http://www.unic.gov.in)

आयकर विभाग  
INCOME TAX DEPARTMENT

 भारत सरकार  
GOVT. OF INDIA

PRADIPTA KUMAR RATH  
UMAKANTA RATH  
07/07/1961  
Permanent Account Number  
AFWPP8660C



Signature



17052010

इस कार्ड के खोने / होने पर कृपया सूचित करें / लौटाना -  
आयकर पैन सेवा इकाई, एन एस डी एल  
सौसरी मंजील, सफ़ायर चैंबर,  
बानेर टेलिफोन एक्चेंज के गजटीक,  
बानेर, पुणे - 411 045

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please inform / return to :  
Income Tax PAN Services Unit, NSDL,  
3rd Floor, Sapphire Chambers,  
Near Baner Telephone Exchange,  
Baner, Pune - 411 045

Tel: 91-20-2721 8080, Fax: 91-20-2721 8081  
e-mail: tininfo@nsdl.co.in

For Navabuddha Agencies Private Limited



Managing Director

1 பத்தகம் 2023 ம வருடத்திய 3863 ம ஆவணம்

17 துள்ளைக்கொண்டது.

11 வது தாள்



பதிவு அலுவலர்



Issue Date: 01/02/2014



भारत सरकार  
Government of India



சு. கோவிந்தராஜ் வர்தனன்  
G Govindaraj Vardhanan  
பிறந்த நாள்/DOB: 01/05/1970  
ஆண்/ MALE

6428 4179 6146  
VID : 9110 1384 7543 2839

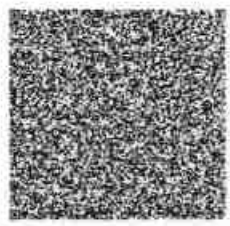
எனது ஆதார், எனது அடையாளம்



भारत सरकार  
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முகவரி:  
பெர். ஆர். கணேசன், ஹர்ஷமித்ரா  
ஆன்காலஜி பிரைவேட் லிமிடெட், 101/4A,  
மாதுர் பஞ்சாயத்து ரோடு துங்கன், என்எச்  
45B திருச்சி - மதுரை கன்னியா, நாகமங்கலம்,  
திருச்சிராப்பள்ளி,  
தமிழ்நாடு - 620012  
Address:  
C/O: Ganesan, Harshmitra Oncology Private  
Limited, 101/4A, Mathur Panchayat Road  
Junction, NH 45B Trichy - Madurai Highway,  
Nagamangalam, Tiruchirappalli,  
Tamil Nadu - 620012



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VID : 9110 1384 7543 2839

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INCOME TAX DEPARTMENT

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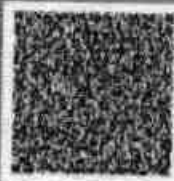
Permanent Account Number Card  
AEZPG8663G

नाम / Name  
G GOVINDARAJ VARDHANAN

पिता का नाम / Father's Name  
GANESAN

जन्म तिथि / Date of Birth  
01/05/1970

हस्ताक्षर / Signature



For Navabuddha Agencies Private Limited

  
Joint Managing Director

1. பத்தகம் 2023 ம. கருடதீய 3863  
17. குளிகன்கொண்டி  
12. ஆண்  
பதிவு அலுவலர்







இந்திய அரசாங்கம்  
Government of India

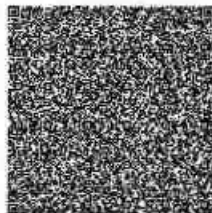
இந்திய தனிப்பட்ட அடையாள ஆணைய அமைப்பு  
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பதிவேட்டு எண்/ Enrolment No.: 2007/20334/36566

Download Date: 19/05/2021

To  
மனோஜ்குமார் பனையடியான்  
Manojkumar Panaiyadiyan  
S/O: Panaiyadiyan  
NO 5/86  
PALLAPATTICOLONY  
SRIRANGAM TALUK  
Ammapettai  
Pulangulathupatti  
Tiruchirappalli Tamil Nadu - 620009  
9865829838

Issue Date: 16/07/2013



உங்கள் ஆதார் எண் / Your Aadhaar No. :

8261 1530 4727

VID : 9119 8872 9207 5906

எனது ஆதார். எனது அடையாளம்



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Download Date: 19/05/2021



மனோஜ்குமார் பனையடியான்  
Manojkumar Panaiyadiyan  
பிறந்த நாள்/DOB: 27/08/1992  
ஆண்/ MALE

Issue Date: 16/07/2013

8261 1530 4727

VID : 9119 8872 9207 5906

எனது ஆதார். எனது அடையாளம்



Government of India



AADHAAR

தகவல்

- ஆதார் அடையாளத்திற்கான சான்று. குடியுரிமைக்கு அல்ல.
- பாதுகாப்பான QR குறியீடு/ ஆப்லைன் XML / ஆன்லைன் அங்கீகாரத்தைப் பயன்படுத்தி அடையாளத்தை சரிபார்க்கவும்
- இது எலக்ட்ரானிக் செயல்முறை மூலம் தயாரிக்கப்பட்ட கடிதமாகும்.

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- பல்வேறு அரசு மற்றும் அரசு சாரா சேவைகளை எளிதில் பெற ஆதார் உதவுகிறது.
- உங்கள் மொபைல் எண் மற்றும் மின்னஞ்சல் ஐடியை ஆதாரில் புதுப்பிக்கவும்
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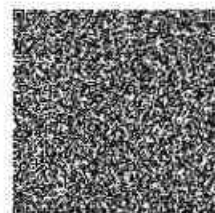


முகவரி:

S/O: பனையடியான், எண் 5/86,  
பள்ளப்பட்டிகளாலனி, புதிர்ங்கம் தாலுகா,  
அம்மாபேட்டை, திருச்சிராப்பள்ளி,  
தமிழ் நாடு - 620009

Address:

S/O: Panaiyadiyan, NO 5/86,  
PALLAPATTICOLONY, SRIRANGAM  
TALUK, Ammapettai, Tiruchirappalli,  
Tamil Nadu - 620009



8261 1530 4727

VID : 9119 8872 9207 5906

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பத்தகம் 2023, செப்டம்பர் 3863  
17  
13  
வது தாள்  
பதிவு அலுவலர்





இந்திய அரசாங்கம்  
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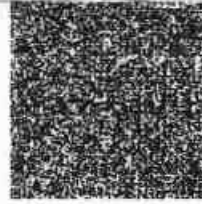
பதிவு அடையாளம் / Enrollment No.: 2192/50132/51313

To,  
திருக்குமார் ரெங்கசாமி  
Thirukumar Rengasamy  
C/O Rengasamy  
352/39  
Rajiv Nagar  
14th cross Manapparai  
Manapparai Manapparai Tiruchirappalli  
Tamil Nadu 621306  
9843161433

Ref: 1450 / 30Q / 112119 / 112157 / P



SB941931235FH



உங்கள் ஆதார் எண் / Your Aadhaar No. :

**8382 4117 1946**

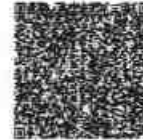
எனது ஆதார், எனது அடையாளம்



இந்திய அரசாங்கம்  
Government of India



திருக்குமார் ரெங்கசாமி  
Thirukumar Rengasamy  
பிறந்த நாள் / DOB : 09/05/1981  
ஆண்பால் / Male



**8382 4117 1946**

எனது ஆதார், எனது அடையாளம்

புத்தகம் 2023 3863

17

14

பதிவு அலுவலர்







GOVERNMENT OF INDIA  
MINISTRY OF CORPORATE AFFAIRS

Central Registration Centre

## Certificate of Incorporation

[Pursuant to sub-section (2) of section 7 of the Companies Act, 2013 (18 of 2013) and rule 18 of the Companies (Incorporation) Rules, 2014]

I hereby certify that NAVABUDDHA AGENCIES PRIVATE LIMITED is incorporated on this Fifteenth day of December Two thousand seventeen under the Companies Act, 2013 (18 of 2013) and that the company is limited by shares.

The Corporate Identity Number of the company is U74999TN2017PTC119997.

The Permanent Account Number (PAN) of the company is AAFCN8733P \*

Given under my hand at Manesar this Fifteenth day of December Two thousand seventeen .



Digital Signature Certificate  
Keerthi Thej N

For and on behalf of the Jurisdictional Registrar of Companies  
Registrar of Companies  
Central Registration Centre

Disclaimer: This certificate only evidences incorporation of the company on the basis of documents and declarations of the applicant(s). This certificate is neither a license nor permission to conduct business or solicit deposits or funds from public. Permission of sector regulator is necessary wherever required. Registration status and other details of the company can be verified on [www.mca.gov.in](http://www.mca.gov.in)

Mailing Address as per record available in Registrar of Companies office:

NAVABUDDHA AGENCIES PRIVATE LIMITED  
NO.41, NACHIYAR KOIL STREET, WORAIYUR, TRICHY, Chennai,  
Tamil Nadu, India, 620003



\* as issued by the Income Tax Department

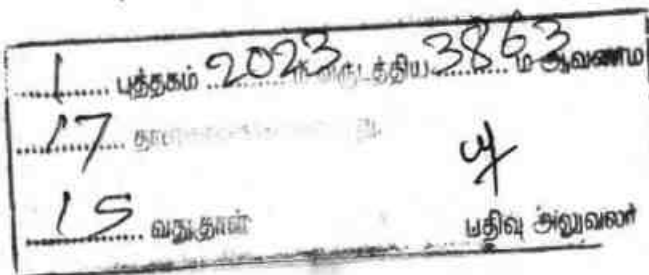


Figure 1



भारत  
सर्वकार

नाम / Name  
NAVABUDDHA AGENCIES PRIVATE LIMITED

15122017

Tel: 91-20-2721 8080, Fax: 91-20-2721 8081  
e-mail: tininfo@nsdl.co.in

17  
16





தமிழ்நாடு அரசு

வருவாய்த் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

மாவட்டம் : கரூர்

வட்டம் : குளித்தலை

வருவாய் கிராமம் : கள்ளை

பட்டா எண் : 1963

உரிமையாளர்கள் பெயர்

| 1.      | சுப்பையா  | மகன்       |         |            |         | ஆனந்த்     |         | -                                                                 |
|---------|-----------|------------|---------|------------|---------|------------|---------|-------------------------------------------------------------------|
| புல எண் | உட்பிரிவு | புன்செய்   |         | நன்செய்    |         | மற்றவை     |         | குறிப்புரைகள்                                                     |
|         |           | பரப்பு     | தீர்வை  | பரப்பு     | தீர்வை  | பரப்பு     | தீர்வை  |                                                                   |
|         |           | ஹெக் - ஏர் | ரூ - பை | ஹெக் - ஏர் | ரூ - பை | ஹெக் - ஏர் | ரூ - பை |                                                                   |
| 248     | 1         | 4 - 58.00  | 5.68    | --         | --      | --         | --      | 2016/0105<br>/14/005863--2017<br>/14/03/000023SD<br>-- 13-02-2017 |
|         |           | 4 - 58.00  | 5.68    |            |         |            |         |                                                                   |

குறிப்பு2 :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 14/03/045/01963/30569 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 21-09-2023 அன்று 09:46:25 AM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

புத்தகம் 2023 ம் ஆண்டு 3863  
17 நாள் காலம் வரையில்  
17 வது தாள்  
பதிவு அலுவலர்



21-09-2023, 09:



தமிழ்நாடு தமிழ்நாடு TAMILNADU

3673

12.7.16



ரூ 25,000/- B 593960

J. சிமத்  
J. சுகமதி

முத்திரை தாள் விற்பனையாளர்  
குளித்தலை, கரூர் மாவட்டம்  
L.No: 49/1997.

கிரயப் பத்திரம்

2016 ஆம் ஆண்டு ஜூலை மாதம் 13 ஆம் தேதி மதுரை மாவட்டம், மதுரை மாநகரம், ஆளவந்தான், கே.கே. நகர், மேற்கு, 2-வது தெரு, கதவு எண் 520 என்ற முகவரியில் வசிக்கும் கப்பையா குமார் ஆனந்த் (ஆதார் எண்: 6385 6766 2275), (PAN: AHLPA8150F) அவர்களுக்கு, கரூர் மாவட்டம், குளித்தலை வட்டம், கள்ளை கிராமம், கஸ்பாவில் வசிக்கும் மும்மாச்சி ரெட்டியார் குமார் சீரங்க ரெட்டியார்-1, ரெத்தினவேல் குமார் மது-2 இவர்களின் பொது அதிகார முகவருமான மதுரை மாவட்டம், மேலூர் வட்டம், சந்தை பேட்டை, PPL டவர் முன்புரம் நைனார் ஊரணி தெரு, கதவு எண் 17/11 என்ற முகவரியில் வசிக்கும் பழனிச்சாமி குமார் செல்லக்கனி (ஆதார் எண்: 9009 3583 8328) ஆகிய நான் எழுதிக் கொடுத்த சுத்தக் கிரய சாசனம் என்னவென்றால்:-  
(கிரயம் வாங்குபவர்)

(கிரயம் கொடுப்பவர்)

பவர் ஏஜெண்ட் ஹோதாவில்

*[Signature]*

*[Signature]*





**பதிவுத்துறை**  
**இரசீது - ஆவணப்பதிவு**

இரசீது எண்

6276/2023

ஆவண எண்

: R/ குளித்தலை/ புத்தகம்-1/ 3863 / 2023

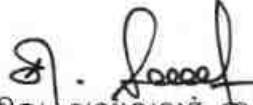
திரு பிரதீப்குமார் ரத் அவர்களிடமிருந்து ₹ 5,00,642 (ரூபாய் ஐந்து இலட்சத்து அறுநூற்று நாற்பத்திரண்டு மட்டும்) இணைய வழி. REG202309216065585 ₹ 500642] கீழ்க்கண்ட விவரப்படி பெற்றுக் கொள்ளப்பட்டது

| வ.எண் | விவரம்                                               | தொகை (₹) |
|-------|------------------------------------------------------|----------|
| 1     | முத்திரைத்தீர்வை (முத்திரைச் சட்டம் பிரிவு 41ன் படி) | 3,86,536 |
| 2     | பதிவுக் கட்டணம்                                      | 1,13,296 |
| 3     | கணினிக் கட்டணம்                                      | 700      |
| 4     | குறுந்தகடுக் கட்டணம்                                 | 100      |
| 5     | ஆவண எழுத்தர் நலநிதி                                  | 10       |
|       | செலுத்தப்பட்ட மொத்தத் தொகை                           | 5,00,642 |

**குறிப்பு:** இந்த அசல் ஆவணம் உடனடியாக பக்க சான்று இடப்பட்டு ஒளி வருடல் செய்யப்பட்டு திரும்ப வழங்கப்படும். ஆகவே அசல் ஆவணத்தைத் திரும்பப் பெற தகுதி பெற்ற திரு / திருமதி /செல்வி திரு மனோஜ்குமார் இது தொடர்பாக குறுஞ்செய்தி பெற்றவுடன் அசல் ரசீதை அளித்து அசல் ஆவணத்தை திரும்ப பெற்றுக்கொள்ளலாம். இதில் ஏதேனும் இடர்பாடுகள் இருப்பின் கட்டணமில்லா தொலைபேசி எண் 1800-102-5174 - ஐ தொடர்பு கொள்ளவும்.

குளித்தலை அலுவலகம்

நாள்: 21/09/2023

  
பதிவு அலுவலர் கையொப்பம்

உருவாக்கப்பட்ட ஆவண/ வரைவு ஆவணச் சுருக்க விவரங்கள்

| பயனர் பெயர்                  | முழுப் பெயர் | கைப்பேசி எண் | உருவாக்கப்பட்ட நாள்  |
|------------------------------|--------------|--------------|----------------------|
| HARIBASKARKLT (ஆவண எழுத்தர்) | HARI BASKAR  | 9994277896   | 20-09-23 01:19:36 PM |

1. அசல் ஆவணத்தைத் திரும்பப் பெறும்போது உரிய நபரின் விரல் ரேகை பெறப்படுகிறதா என உறுதிசெய்து கொள்ளவும்.

2. ஆவணதாரர்கள் தங்களின் சரியான கைபேசி எண்ணைப் பதிவுக்கு தாக்கலாகும் ஆவணத்தில் தெரிவித்தால் ஆவணம்/சொத்தின் நிலை குறித்த குறுஞ்செய்தியை பெறலாம்

3. ஆவணத்தை குறித்த காலத்தில் திரும்பப் பெற்றுக்கொள்ளத் தவறும் பட்சத்தில் பாதுகாப்பு கட்டணம் வசூலிக்கப்படும்.

4. பட்டா மாற்றம் தேவைப்படும் ஆவணங்களுக்கு பட்டா மாற்றம் செய்யக் கோரும் படிவம் இவ்வலுவலகத்தில் இருந்து இணையதளம் வழியாகவே வருவாய்த்துறைக்கு அனுப்பப்பட்டுள்ளது. அதன் ஒப்புக்கைச் சீட்டை தங்களின் அசல் ஆவணத்தைத் திரும்பப் பெறும்போது கேட்டுப் பெற்றுக்கொள்ளவும்.

<https://tnreginet.gov.in> என்ற இணைய தளம் மூலம் வழங்கப்படும் சேவைகள்

- கட்டணமின்றி வில்லங்க விவரம் தரவிறக்கம் செய்யும் வசதி
- சார் பதிவாளர் அலுவலகம் நேரில் வராமல் இணையதளம் மூலம் சான்றிட்ட நகல்கள் வில்லங்க சான்று விபரங்கள் விண்ணப்பித்து மின்னஞ்சல் மூலம் சான்று பெறும் வசதி
- இணையதளம் மூலம் பொது மக்களே ஆவணம் உருவாக்கும் வசதி
- இணையதளம் மூலம் வழிகாட்டி மதிப்பை அறியும் வசதி, கட்டிட மதிப்பை கணக்கிடும் வசதி
- இணையதளம் மூலம் முத்திரைத் தீர்வை, பதிவுக் கட்டணம் உள்ளிட்ட கட்டணங்கள் செலுத்தும் வசதி
- பொதுமக்கள் நலன் சார்ந்த சுற்றறிக்கைகள்/அரசாணைகள் பதிவுத்துறையின் இணையதளத்தில் பார்வையிடும் வசதி





**தமிழ்நாடு அரசு  
பதிவுத்துறை  
முன்பதிவு செய்ததற்கான ஒப்புகைச்சீட்டு**

**முன்பதிவு விவரம்**

|                     |                   |
|---------------------|-------------------|
| பதிவு செய்த நாள்    | 21/09/2023        |
| முன்பதிவு நாள்      | 21/09/2023        |
| முன்பதிவு நேரம்     | 10:00 - 11:00     |
| முன்பதிவு வரிசை எண் | 4 [D104]          |
| பதிவு வகை           | ஆவணப் பதிவு       |
| தற்காலிக எண்        | TP/160130074/2023 |

*15 Pw*

**விண்ணப்பதாரர் விவரம்**

|                           |                          |
|---------------------------|--------------------------|
| விண்ணப்பதாரர் பெயர்       | திரு. பிரதீப்தகுமார் ரத் |
| தந்தை / கணவர் பெயர்       | திரு. உமாகாந்த் ரத்      |
| சார்பதிவாளர் அலுவலகம்     | குளித்தலை                |
| சொத்து அமைந்துள்ள கிராமம் | கள்ளை                    |

**குறிப்பு:**

- முன்பதிவு செய்த நபர் அவருக்காக ஒதுக்கப்பட்ட நேரத்திற்கு தவறாமல் அலுவலகத்திற்கு வந்து ஆவணத்தை பதிவுக்கு தாக்கல் செய்ய கோரப்படுகிறார்.
- முன்பதிவு செய்த நபர் குறித்த நேரத்தில் வரவில்லையெனில் அடுத்த முன்பதிவு செய்த நபரின் ஆவணம் பதிவுக்கு எடுத்துக்கொள்ளப்படும். தவறவிட்டவரின் முன்பதிவு அடுத்த முன்பதிவு நேரத்தில் கடைசியாக வைக்கப்படும்.
- முன்பதிவு நேரத்தில் ஒதுக்கப்பட்ட அனைத்து வரிசை எண்களுக்கான பதிவு மேற்கொண்ட பின்பே அடுத்த முன்பதிவு நேரத்தின் வரிசை எண்களுக்கான பதிவு தொடங்கும்.
- ஆவணப்பதிவிற்கான அனைத்து ஆதாரங்களும் தாக்கல் செய்யப்படும் நிலையில் ஆவணம் பதிவு செய்யப்படும். ஆவணப்பதிவிற்கு தேவையான ஆதாரங்கள் ஏதும் இல்லாத நிலை மற்றும் பதிவுக்கு ஏதும் தடையிருப்பின் பதிவு மறுப்புச் சீட்டு உருவாக்கப்பட்டு சார்பதிவாளரால் கையொப்பமிடப்பட்டு வழங்கப்படும்.
- பதிவு செய்யப்பட்ட ஆவணம், தாக்கல் செய்தவருக்கு திரும்ப வழங்கப்படும். தாக்கல் செய்தவர் வர இயலாத நிலையில் ஆவணப்பதிவின் போது வேறொரு நபரை ஆவணம் திரும்ப பெற நியமிக்கலாம். ஆவணப்பதிவின் போது நியமனம் செய்யப்பட்டவரின் விரல் ரேகை கவரப்படும். ஆவணம் திரும்ப அளிக்கும் போது அவரின் விரல் ரேகை மீண்டும் கவரப்பட்டு ஒப்பிட்டு சரிபார்த்தபின்பே ஆவணம் திரும்ப வழங்கப்படும்.

**ஏதேனும் சந்தேகங்கள்/குறைகள் இருப்பின் கீழ்க்கண்ட வழிமுறைகளில் தெரிவிக்கலாம்**

|                          |                        |
|--------------------------|------------------------|
| கட்டணமில்லா தொலைபேசி எண் | 1800 102 5174          |
| மாற்று மின்னஞ்சல் முகவரி | helpdesk@tnreginet.net |



தமிழ்நாடு அரசு

வருவாய் மற்றும் பேரிடர் மேலாண்மைத் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

மாவட்டம் : கரூர்

வட்டம் : குளித்தலை

வருவாய் கிராமம் : கள்ளை

பட்டா எண் : 1964

உரிமையாளர்கள் பெயர்

1. .... ... நவபுத்தா ஏஜென்சிஸ் பிரைவேட் லிமிடெட்



| புல எண் | உட்பிரிவு | புன்செய்   |         | நன்செய்    |         | மற்றவை     |         | குறிப்புரைகள்                                                                                                                             |
|---------|-----------|------------|---------|------------|---------|------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------|
|         |           | பரப்பு     | தீர்வை  | பரப்பு     | தீர்வை  | பரப்பு     | தீர்வை  |                                                                                                                                           |
|         |           | ஹெக் - ஏர் | ரூ - பை | ஹெக் - ஏர் | ரூ - பை | ஹெக் - ஏர் | ரூ - பை |                                                                                                                                           |
| 246     | 3A        | 0 - 32.50  | 0.40    | --         | --      | --         | --      | 2024/0103/14/295926-2017/14/03/000024SD<br>-----<br>Digitally<br>signed:CHITHIRA S<br>Zonal Deputy Tahsildar<br>01/02/2024<br>05:56:08:PM |
|         |           | 0 - 32.50  | 0.40    |            |         |            |         |                                                                                                                                           |

குறிப்பு :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 14/03/045/01964/30570 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 24-01-2025 அன்று 01:24:33 PM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்



தமிழ்நாடு அரசு

வருவாய் மற்றும் பேரிடர் மேலாண்மைத் துறை

நில உரிமை விபரங்கள் : இ. எண் 10(1) பிரிவு

மாவட்டம் : கரூர்

வட்டம் : குளித்தலை

வருவாய் கிராமம் : கள்ளை

பட்டா எண் : 2558

உரிமையாளர்கள் பெயர்

1. ... நவபுத்தா ஏஜென்சிஸ் பிரைவேட் லிமிடெட்



| புல எண் | உட்பிரிவு | புன்செய்   |         | நன்செய்    |         | மற்றவை     |         | குறிப்புரைகள்                                                                                                                          |
|---------|-----------|------------|---------|------------|---------|------------|---------|----------------------------------------------------------------------------------------------------------------------------------------|
|         |           | பரப்பு     | தீர்வை  | பரப்பு     | தீர்வை  | பரப்பு     | தீர்வை  |                                                                                                                                        |
|         |           | ஹெக் - ஏர் | ரூ - பை | ஹெக் - ஏர் | ரூ - பை | ஹெக் - ஏர் | ரூ - பை |                                                                                                                                        |
| 248     | 1         | 4 - 58.00  | 5.68    | --         | --      | --         | --      | 2024/0103/14/295931-2017/14/03/000023SD<br>-----<br>Digitally signed:CHITHIRA S<br>Zonal Deputy Tahsildar<br>01/02/2024<br>06:02:55:PM |
|         |           | 4 - 58.00  | 5.68    |            |         |            |         |                                                                                                                                        |

குறிப்பு :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 14/03/045/02558/40510 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 24-01-2025 அன்று 01:21:48 PM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்



நாள் 10.07.2024

குளித்தலை

சான்று

திருச்சி மாவட்டம், நாகமங்கலம் கிராமம், விஜயலட்சுமி நகர் என்ற முகவரியில் செயல்பட்டு கொண்டு இருக்கும் நவபுத்தா ஏஜென்சீஸ் பிரைவேட் நிறுவனத்திற்கு சொந்த இடமான கரூர் மாவட்டம், குளித்தலை வட்டம், கள்ளை கிராம புல எண் ,248/1ஆனது யுடிஆர் அ பதிவேட்டின்படி, பட்டா எண் 2558 இல் ஹெக் 04.58.00 ஏர்ஸ் மற்றும் புலஎண். 246/3A யுடிஆர் பதிவேட்டின்படி பட்டா எண். 1964 ல் ஹெக் 00.32.50 ஏர்ஸ் நிலம் அமைந்துள்ளது. மேற்படி பிரைவேட் நிறுவனம் அமைந்துள்ள புலங்களுக்கு அருகில் குடியிருப்பு ஏதுமில்லை எனவும், விவசாய நிலங்கள் அருகில் உள்ளது எனவும், மேற்படி புலங்களுக்கு அருகில் மற்றும் மேற்படி புலஎண்களில் கோயில், மசூதி கிறிஸ்துவ மத வழிபாட்டு தலங்கள் புராதன சின்னங்கள் மற்றும் உயர் மற்றும் தாழ்வழுத்த மின்னழுத்த கம்பிகள் ஏதும் செல்லவில்லை, உயர்மின் கோபுரங்கள் ஏதும் இல்லை. மேற்படி கள்ளை கிராம புல எண் ,248/1ஆனது யுடிஆர் அ பதிவேட்டின்படி, பட்டா எண் 2558 இல் ஹெக் 04.58.00 ஏர்ஸ் மற்றும் புலஎண். 246/3A யுடிஆர் பதிவேட்டின்படி பட்டா எண். 1964 ல் ஹெக் 00.32.50 ஏர்ஸ் உள்ள நிலத்தினில் விலையுயர்ந்த மரங்கள் ஏதுமில்லை எனவும், மேற்படி நிலங்கள் தரிசாக உள்ளது எனச் சான்றளிக்கப்படுகிறது.



வட்டாட்சியர்  
குளித்தலை  
10/7/24

பெறுநர்

நவபுத்தா ஏஜென்சீஸ் பிரைவேட் நிறுவனம்

விஜயலட்சுமி நகர்

நாகமங்கலம் கிராமம்

திருச்சி மாவட்டம்

10/7/24

## கள்ளை ஊராட்சி மன்றம்

அனுப்புநர் :-

**K. கருப்பையா** தலைவர்,

கள்ளை ஊராட்சி மன்றம்.

தோகைமலை ஊராட்சி ஒன்றியம்,

குளித்தலை வட்டம், கருர் மாவட்டம் - 639 120.

செல் : 96555 37831.

பெறுநர் :-

திரு. தலைவர் தலைவர்

பிரதமர்,

கள்ளை ஊராட்சி மன்றம், குளித்தலை

வட்டம், கருர் மாவட்டம்.

தேதி 10-12-2024

சான்று

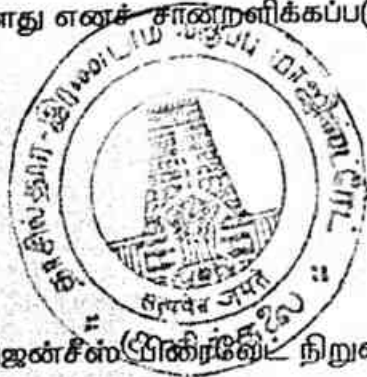
திருச்சி மாவட்டம், நாகமங்கலம் கிராமம், விஜயலட்சுமி நகர் என்ற முகவரியில் செயல்பட்டு கொண்டு இருக்கும் நவபுத்தா ஏஜென்சீஸ் பிரைவேட் நிறுவனத்திற்கு சொந்த இடமான கருர் மாவட்டம், குளித்தலை வட்டம், கள்ளை கிராம புல எண், 248/1 ஆனது யுடிஆர் பதிவேட்டின்படி, பட்டா எண் 2558 இல் ஹெக் 04.58.00 ஏர்ஸ் மற்றும் புலஎண் 246/3 A யுடிஆர் பதிவேட்டின்படி பட்டா எண்.1964 ல் ஹெக் 00.32.50 ஏர்ஸ் நிலம் அமைந்துள்ளது. மேற்படி பிரைவேட் நிறுவனம் அமைந்துள்ள புலங்களுக்கு அருகில் குடியிருப்பு ஏதாமில்லை எனவும், விவசாய நிலங்கள் அருகில் உள்ளது எனவும், மேற்படி புலங்களுக்கு அருகில் மற்றும் மேற்படி புலஎண்களில் கோயில், மசூதி கிறிஸ்துவ மத வழிபாட்டு தலங்கள் புராதன சின்னங்கள் மற்றும் உயர் மற்றும் தாழ்வழுத்த மின்னழுத்த கம்பிகள் ஏதும் செல்லவில்லை, உயர்மின் கோபுரங்கள் ஏதும் இல்லை. மேற்படி கள்ளை கிராம புல எண், 248/1 ஆனது யுடிஆர் பதிவேட்டின்படி, பட்டா எண் 2558 இல் ஹெக் 04.58.00 ஏர்ஸ் மற்றும் புலஎண் 246/3 A யுடிஆர் பதிவேட்டின்படி பட்டா எண்.1964 ல் ஹெக் 00.32.50 ஏர்ஸ் உள்ள தரிசு நிலத்தினில் தொழில் துவங்குவதற்கு கள்ளை ஊராட்சி மன்ற சார்பில் ஆட்சயபனை ஏதும் இல்லை என சான்றளிக்கப்படுகிறது.

K. கருப்பையா  
தலைவர்  
கள்ளை ஊராட்சி  
தோகைமலை ஒன்றியம்  
10/12/2024



சான்று

திருச்சி மாவட்டம், நாகமங்கலம் கிராமம், விஜயலட்சுமி நகர் என்ற முகவரியில் செயல்பட்டு கொண்டு இருக்கும் நவபுத்தா ஏஜென்சீஸ் பிரைவேட் நிறுவனத்திற்கு சொந்த இடமான கரூர் மாவட்டம், குளித்தலை வட்டம், கள்ளை கிராம புல எண் ,248/1ஆனது யுடிஆர் அ பதிவேட்டின்படி, பட்டா எண் 2558 இல் ஹெக் 04.58.00 ஏர்ஸ் மற்றும் புலஎண். 246/3A யுடிஆர் பதிவேட்டின்படி பட்டா எண். 1964 ல் ஹெக் 00.32.50 ஏர்ஸ் நிலம் அமைந்துள்ளது. மேற்படி பிரைவேட் நிறுவனம் அமைந்துள்ள புலங்களுக்கு அருகில் குடியிருப்பு ஏதுமில்லை எனவும், விவசாய நிலங்கள் அருகில் உள்ளது எனவும், மேற்படி புலங்களுக்கு அருகில் மற்றும் மேற்படி புலஎண்களில் கோயில், மசூதி கிறிஸ்துவ மத வழிபாட்டு தலங்கள் புராதன சின்னங்கள் மற்றும் உயர் மற்றும் தாழ்வழுத்த மின்னழுத்த கம்பிகள் ஏதும் செல்லவில்லை, உயர்மின் கோபுரங்கள் ஏதும் இல்லை. மேற்படி கள்ளை கிராம புல எண் ,248/1ஆனது யுடிஆர் அ பதிவேட்டின்படி, பட்டா எண் 2558 இல் ஹெக் 04.58.00 ஏர்ஸ் மற்றும் புலஎண். 246/3A யுடிஆர் பதிவேட்டின்படி பட்டா எண். 1964 ல் ஹெக் 00.32.50 ஏர்ஸ் உள்ள நிலத்தினில் விலையுயர்ந்த மரங்கள் ஏதுமில்லை எனவும், மேற்படி நிலங்கள் தரிசாக உள்ளது எனச் சான்றளிக்கப்படுகிறது.



வட்டாட்சியர்  
குளித்தலை  
10/7/24

பெறுநர்

நவபுத்தா ஏஜென்சீஸ் பிரைவேட் நிறுவனம்

விஜயலட்சுமி நகர்

நாகமங்கலம் கிராமம்

திருச்சி மாவட்டம்

10/7/24

**DOCUMENT No.3863/2023**

**SALE DEED**

**THIS SALE DEED** executed on the 21<sup>st</sup> day of September, 2023, TO AND IN FAVOUR OF **M/s NAVABUDDHA AGENCIES PRIVATE LIMITED (CIN: U74999TN2017PTC119997) (Company's PAN No.AAFCN8733P)**, having office at Door No.41, Natchiar Kovil Street, Woraiyur, Tiruchirapalli Taluk, Tiruchirapalli District, represented by its **Managing Director (1) Mr.PRADIPTA KUMAR RATH (Aadhaar No.3722 0686 6459) (aged 56 years) (PAN : AFWPP8660C - Cell No.98942 54124)**, S/o Mr.Umakhanath Rath, residing at Door No.11/2, 6<sup>th</sup> Cross Street, Tiruchirapalli-620 021, Tiruchirapalli District and its **Joint Managing Director (2) Mr.G.GOVINDARAJ VARDHANAN (Aadhaar No.6428 4179 6146 / Aged 53 years: PAN: AEZPG8663G / Cell No.94440 14312)** Son of Mr.Ganesan, residing at No.101/4A, Harshamithra Ancology Private Limited, Mathur Panchayath Road Junction, Nagamangalam, NH 45B Trichy-Madurai Highway, Tiruchirapalli District (the aforesaid NAVABUDDHA AGENCIES PRIVATE LIMITED Company's Managing Directors and those who hold this position thereafter) (hereinafter called the **PURCHASERS**)

Executed by **Mr.S.ANAND, (Aadhaar No.6385 6766 2275 / Age 48 years, PAN : AHLPA8150F)**, Son of Mr.Subbiah, residing at Door No.520, West Second Street, K.K.Nagar, Alavandhan, Madurai Town, Maduri District (hereinafter called as **VENDOR**);

**WHEREAS** the Vendor has purchased the property from one Seerenga Reddiar, Sivabalan, Manimannan represented by their Power Agent Chellakani by way of a registered Sale Deed dated 13.07.2016 in Book-1, in the year 2016 as Document No.1506 registered at the Sub-Registrar's Office, Kulithalai.



**CERTIFIED THIS IS THE TRUE AND  
CORRECT ENGLISH TRANSLATION OF  
THE ORIGINAL TAMIL DOCUMENT**

As per the above two documents, the Vendor has been enjoying the property under the Patta and the property in my name in the village revenue records and the Vendor has agreed to give the property to your company NAVABUDDHA AGENCIES PRIVATE LIMITED for the sale consideration of Rs.56,64,800/- (Rupees Fifty Six lakhs Sixty Four thousand Eight hundred only) has been transferred from the bank account of the above compny to the vendor's bank account by way of RTGS (UTR No.2023092035392008) and the said amount of Rs.56,64,800/- (Rupees Fifty Six lakhs Sixty Four thousand Eight hundred only) has been credited to me on behalf of your company NAVABUDDHA AGENCIES PRIVATE LIMITED, and from the date of this date onwards, the property under this sale deed is owned and transferred by the said company NAVABUDDHA AGENCIES PRIVATE LIMITED with full rights, and today onwards the Vendor has handed over to the possession as per sale versions to you of the undermentioned property.

I hereby declare to you that from the date hereof, there is no rightful relationship or succession between me and the properties herein. I hereby declare to you, with all due respect, that there is no prior lien, matter, property, heir, title, deficiency, or any other thing whatsoever in respect of the properties herein.

Moreover, the Vendor assure that there are no encumbrances over the undermentioned property and the Vendor confirm that he had not entered into any legal heir title, possession, etc. other than this sale deed I am writing to you today onwards in respect of this sale deed. If any encumbrances or legal disputes have arised, the vendor will be liable for all damages, losses and court expenses incurred by the Purchasers, and the vendor will be obligated to settle them with their other assets.

CERTIFIED THIS IS THE TRUE AND  
CORRECT ENGLISH TRANSLATION OF  
THE ORIGINAL TAMIL DOCUMENT



This day onwards, you have paid the taxes in your company's name and I have been given title, possession to your in respect of the undermentioned property.

As parent documents of title and all other relevant records are handed over to you.

As it is, I am agreed and executed this Sale Deed as per my own Will to the company of M/s NAVABUDDHA AGENCIES PRIVATE LIMITED.

### **DESCRIPTION OF PROPERTY**

In Karur District, Karur Registration District, Kulithalai Taluk, Kulithalai Sub-Registrar's Office, Kallai Village, Ayan Punjai Survey No.248 an extent of Hec.4.64.0 ares equivalent to Ac.1.46 cents on the eastern portion, out of which Ac.11.32 cents of land (As per Doc.No.1506/2016) within the following four boundaries:-

**West by** – Land belonging to Tirupathi Chettiar and others;

**East by** – 5 meter wide North South Public Pathway;

**North by** – Land belonging to Srinivasan, Sivasankar;

**South by** – Land belonging to Krishna Reddiar (Survey No.246(1) and land belonging to Rajaram (Survey No.247/1);

Within this aforesaid land in now New Survey No.248/1. Together with pathway rights and easementary rights thereon.

Market Value of the property is Rs.56,64,800/-.

Affidavit/Declaration that the property is not located in a waterbodies area (Dourt Order No.22163/2018 see the judgement rendered).



CERTIFIED THIS IS THE TRUE AND  
CORRECT ENGLISH TRANSLATION OF  
THE ORIGINAL TAMIL DOCUMENT



We hereby certify that this property shown in this document is not bounded by water bodies, waterways, or water catchment areas. We further hereby confirm that both we, the understand are aware that if it is later discovered that we have been given false information or evidence in this document, we will be subject to legal action.

**Purchasers**

For Navabuddha Agencies Private Limited  
Sd/- Pradipta Kumar Rath  
Managing Director

**Vendor**

Sd/- S.Anand

For Navabuddha Agencies Private Limited  
Sd/- G.Govindaraj Vardhanan.  
Joint Managing Director

**Witnesses**

- 1) Sd/- (Manojkumar) S/o Panaiyadiyan, 5/86, Pallappadi Colony, Srirangam, Ammapettai, Tiruchirapalli (Aadhaar No.8261 1530 4727 - Age 31)
- 2) Sd/- (R.Thirukumar) S/o. Rengasamy, 352/39, Raju Nagar, 14<sup>th</sup> Cross Street, Manapparai, Trichy (Aadhaar No.8382 4117 1946 - Age 42).

**Drafted by:**

Name of Document Writer: (Sd/-) P.Hari Baskar  
Address: 1, Kammalar Street, Kadambarkoil, Kulithalai.  
Mobile No.: 99942 77896  
Document Licence No.B308/KUR/91.

Subjected to interpreted Tamil Version to English Version.



S.SENTHILKUMAR, M.A. 9  
ADVOCATE & NOTARY PUBLIC  
No:1, Alagar Street  
Santhandherpuram, Trichy - 620 006

CERTIFIED THIS IS THE TRUE AND  
CORRECT ENGLISH TRANSLATION OF  
THE ORIGINAL TAMIL DOCUMENT

NOTARY PUBLIC  
GOVT. OF INDIA  
REGN No: 6167

**SALE DEED**

**THIS SALE DEED** executed on the 21<sup>st</sup> day of September, 2023, TO AND IN FAVOUR OF **M/s NAVABUDDHA AGENCIES PRIVATE LIMITED (CIN: U74999TN2017PTC119997) (Company's PAN No.AAFCN8733P)**, having office at Door No.41, Natchiar Kovil Street, Woraiyur, Tiruchirapalli Taluk, Tiruchirapalli District, represented by its **Managing Director (1) Mr.PRADIPTA KUMAR RATH (Aadhaar No.3722 0686 6459) (aged 56 years) (PAN : AFWPP8660C – Cell No.98942 54124)**, S/o Mr.Umakhanth Rath, residing at Door No.11/2, 6<sup>th</sup> Cross Street, Tiruchirapalli-620 021, Tiruchirapalli District and its **Joint Managing Director (2) Mr.G.GOVINDARAJ VARDHANAN (Aadhaar No.6428 4179 6146 / Aged 53 years: PAN: AEZPG8663G / Cell No.94440 14312)** Son of Mr.Ganesan, residing at No.101/4A, Harshamithra Ancology Private Limited, Mathur Panchayath Road Junction, Nagamangalam, NH 45B Trichy-Madurai Highway, Tiruchirapalli District (the aforesaid NAVABUDDHA AGENCIES PRIVATE LIMITED Company's Managing Directors and those who hold this position thereafter) (hereinafter called the **PURCHASERS**)

Executed by **Mr.S.ANAND, (Aadhaar No.6385 6766 2275 / Age 48 years, PAN : AHLPA8150F)**, Son of Mr.Subbiah, residing at Door No.520, West Second Street, K.K.Nagar, Alavandhan, Madurai Town, Maduri District (hereinafter called as **VENDOR**);

**WHEREAS** the Vendor has purchased the property from one Seerenga Reddiar, Sivabalan, Manimannan represented by their Power Agent Chellakani by way of a registered Sale Deed dated 13.07.2016 in Book-1, in the year 2016 as Document No.1507 registered at the Sub-Registrar's Office, Kulithalai.



CERTIFIED THIS IS THE TRUE AND  
CORRECT ENGLISH TRANSLATION OF  
THE ORIGINAL TAMIL DOCUMENT



As per the above two documents, the Vendor has been enjoying the property under the Patta and the property in my name in the village revenue records and the Vendor has agreed to give the property to your company NAVABUDDHA AGENCIES PRIVATE LIMITED for the sale consideration of Rs.4,01,550/- (Rupees Four lakhs one thousand five hundred and fifty only) has been transferred from the bank account of the above compny to the vendor's bank account by way of RTGS (utr No.2023092035392118) and the said amount of Rs. 4,01,550/- (Rupees Four lakhs one thousand five hundred and fifty only) has been credited to me on behalf of your company NAVABUDDHA AGENCIES PRIVATE LIMITED, and from the date of this date onwards, the property under this sale deed is owned and transferred bythe said company NAVABUDDHA AGENCIES PRIVATE LIMITED with full rights, and today onwards the Vendor has handed over to the possession as per sale versions to you of the undermentioned property.

I hereby declare to you that from the date hereof, there is no rightful relationsip or succession between me and the properties herein. I hereby declare to you, with all due respect, that there is no prior lien, matter, property, heir, title, deficiency, or any other thing whatsoever in respect of the properties herein.

Moreover, the Vendor assure that there are no encumbrances over the undermentioned property and the Vendor confirm that he had not entered into any legal heir title, possession, etc. other than this sale deed I am writing to you today onwards in respect of this sale deed. If any encumbrances or legal disputes have arised, the vendor will be liable for all damages, losses and court expenses incurred by the Purchaser, and the vendor will be obligated to settle them with their other assets.



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This day onwards, you have paid the taxes in your company's name and I have been given title, possession to your in respect of the undermentioned property.

As parent documents of title and all other relevant records are handed over to you.

As it is, I am agreed and executed this Sale Deed as per my own Will to the company of M/s NAVABUDDHA AGENCIES PRIVATE LIMITED.

**DESCRIPTION OF PROPERTY**

In Karur District, Karur Registration District, Kulithalai Taluk, Kulithalai Sub-Registrar's Office, Kallai Village, Ayan Punjai Survey No.246 an extent of Hec.1.42.5 ares equivalent to Ac.3.52 cents on the eastern portion, out of which Hec.0.32.50 ares equivalent to Ac.0.80 cents of land within the following four boundaries:-

**West by** – Land belonging to Krishna Reddiar (A-Schedule)

**East by** – North South Public Pathway;

**South by** – Road;

**North by** – Land in Survey No.248

Within this aforesaid land (New New Sub-Division as 246/3A – Hec.0.32.50 equivalent to Ac.0.80 cents of land) together with pathway rights and easementary rights thereon.

Market Value of the property is Rs.4,01,550/-.

Affidavit/Declaration that the property is not located in a waterbodies area (Dourt Order No.22163/2018 see the judgement rendered).



CERTIFIED THIS IS THE TRUE AND  
CORRECT ENGLISH TRANSLATION OF  
THE ORIGINAL TAMIL DOCUMENT

We hereby certify that this property shown in this document is not bounded by water bodies, waterways, or water catchment areas. We further hereby confirm that both we, the understand are aware that if it is later discovered that we have been given false information or evidence in this document, we will be subject to legal action.

**Purchasers**

For Navabuddha Agencies Private Limited  
Sd/- Pradipta Kumar Rath  
Managing Director

For Navabuddha Agencies Private Limited  
Sd/- G.Govindaraj Vardhanan.  
Joint Managing Director

**Vendor**

Sd/- S.Anand

**Witnesses**

- 1) Sd/- (Manojkumar) S/o Panaiyadiyan, 5/86, Pallappadi Colony, Srirangam, Ammapettai, Tiruchirapalli (Aadhaar No.8261 1530 4727 - Age 31)
- 2) Sd/- (R.Thirukumar) S/o Rengasamy, 352/39, Raju Nagar, 14<sup>th</sup> Cross Street, Manapparai, Trichy (Aadhaar No.8382 4117 1946 - Age 42).

**Drafted by:**

Name of Document Writer: (Sd/-) P.Hari Baskar  
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Mobile No.: 99942 77896  
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Subjected to interpreted Tamil Version to English Version.



S.SENTHILKUMAR M.A.B.L.  
ADVOCATE & NOTARY PUBLIC  
No:1, Alagar Street  
Senthanneerapuram, Trichy - 620 006

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THE ORIGINAL TAMIL DOCUMENT

NOTARY PUBLIC  
GOVT. OF INDIA  
REGN No:6161

# **Annexure 3**

## **ENPRO NABET Certificate**

## National Accreditation Board for Education and Training

# Certificate of Accreditation

### Enpro Enviro Tech and Engineers Pvt Ltd, Surat

Plot no. D/29/16-17, Road No. 17, Hojiwala Industrial Estate, Gate No. 3, Sachin Palsana Road, Sachin, Surat- 394 230

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.    | Cements Plants                                                                                                                    | 9               | 3 (b)   | B    |
| 3.    | Chlor-alkali industry                                                                                                             | 13              | 4 (d)   | B    |
| 4.    | Pesticides industry and pesticide specific intermediates                                                                          | 17              | 5 (b)   | A    |
| 5.    | Synthetic organic chemicals industry                                                                                              | 21              | 5 (f)   | A    |
| 6.    | Integrated paint industry                                                                                                         | 23              | 5 (h)   | B    |
| 7.    | Pulp & paper industry excluding manufacturing of paper from wastepaper and manufacture of paper from ready pulp without bleaching | 24              | 5 (i)   | B    |
| 8.    | Common hazardous waste treatment, storage and disposal facilities (TSDFs)                                                         | 32              | 7 (d)   | A    |
| 9.    | Bio-medical waste treatment facilities                                                                                            | 32A             | 7 (d a) | B    |
| 10.   | Common Effluent Treatment Plants (CETPs)                                                                                          | 36              | 7 (h)   | B    |
| 11.   | Common Municipal Solid Waste Management Facility                                                                                  | 37              | 7 (i)   | B    |

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated March 04, 2025 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/25/3574 dated March 25, 2025. The accreditation needs to be renewed before the expiry date by Enpro Enviro Tech and Engineers Pvt Ltd, Surat following due process of assessment.

Valid up to  
Jan 11, 2028

Issue Date  
March 25, 2025



Certificate No.  
NABET/EIA/25-28/RA 0388

  
 Prof (Dr) Varinder S Kanwar  
 CEO - NABET

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

**Annexure 4**  
**Pollucare NABL & MOEFCC**  
**Certificates**



National Accreditation Board for  
Testing and Calibration Laboratories

**CERTIFICATE OF ACCREDITATION**

**POLLUCARE ENGINEERS INDIA 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

HIG 6152, KAMARAJAR SALAI, TNHB PHASE I & II, AYAPAKKAM, CHENNAI, TAMIL NADU, INDIA

in the field of

**TESTING**

Certificate Number: TC-7446

Issue Date: 22/06/2024

Valid Until: 21/06/2026

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: POLLUCARE ENGINEERS INDIA PRIVATE LIMITED

Signed for and on behalf of NABL



N. Venkateswaran  
Chief Executive Officer





केन्द्रीय प्रदूषण नियंत्रण बोर्ड

CENTRAL POLLUTION CONTROL BOARD

पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार.

MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE, GOVT. OF INDIA.

01<sup>st</sup> August 2025

CPCB/LB/99/7/2021-INST LAB-HO-CPCB-HO/Pvt./

Recognition Letter

To,

The Head of Laboratory,  
M/s Pollucare Engineers India Private Limited,  
HIG 6152, TNHB Phase I & II,  
Kamarajar Road, Ayapakkam,  
Chennai-600077, Tamil Nadu.

**Subject: Recognition of M/s Pollucare Engineers India Private Limited, HIG 6152, TNHB Phase I & II, Kamarajar Road, Avapakkam, Chennai-600077, Tamil Nadu as Environmental laboratory under the Environmental (Protection) Act- 1986- reg.**

Sir,

With reference to your application dated 20/04/2025 along with acceptance of the terms & conditions of the guidelines for recognition of environmental laboratories under the Environmental (Protection) Act, 1986, submitted to Central Pollution Control Board (CPCB), the Competent Authority of CPCB has accorded approval for recognition of Environmental laboratory and Govt. Analysts. Subsequently, **M/s Pollucare Engineers India Private Limited, HIG 6152, TNHB Phase I & II, Kamarajar Road, Ayapakkam, Chennai-600077, Tamil Nadu** shall be notified considering the current requirement of mandatory accreditation / certifications of the laboratory **with a validity up to 30/07/2028(for three years), subject to validity of ISO/IEC 17025 and IS/ISO 45001.**

2. The following analysts have been approved as Government Analysts:

1. Dr. Saibabu Sundrapandiyar
2. Sh. Krishnan G.
3. Dr. Elaya Raju

3. The laboratory should compulsorily follow the accepted terms and conditions and may undertake the following tests:

- a) **Physical Tests:** Conductivity, Colour, pH, Fixed & Volatile Solids, Total Solids, Total Dissolved Solids, Total Suspended Solids, Turbidity, Temperature, Velocity & Discharge Measurement of Industrial Effluent Stream, Odour, Salinity, Settleable Solids and Sludge Volume Index(SVI).
- b) **Inorganic (General and Non-metallic):** Acidity, Alkalinity, Ammonical Nitrogen, Chloride, Chlorine Residual, Dissolved Oxygen, Fluoride, Total Hardness, Total Kjeldahl Nitrogen (TKN), Nitrite Nitrogen, Nitrate Nitrogen, Phosphate, Sulphate, Carbon Dioxide, Cyanide, Silica, Sulphide and Sulphite.
- c) **Inorganic (Trace Metals):** Boron, Cadmium, Calcium, Total Chromium, Chromium Hexavalent, Copper, Iron, Lead, Magnesium, Mercury, Nickel, Potassium, Sodium, Sodium Absorption Ratio(SAR), Zinc, Arsenic, Aluminium, Barium, Manganese, Selenium and Silver.
- d) **Organics (General) and Trace Organics:** Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Oil and Grease, Phenolic Compounds, Pesticides (each) (Organo-Chlorine and Organo Nitrogen-Phosphorus), Carbon/Nitrogen Ratio, Surfactants and Total Organic Carbon (TOC).
- e) **Microbiological Test:** Total Coliform, Faecal Coliform, *E. coli*, Faecal Streptococci and Total Plate Count.
- f) **Toxicological Tests:** Bioassay Method for Evaluation of Toxicity Using Fish (90% survival of fish after 96 hrs in 100% effluent) and Measurement of toxicity factor using Zebra fish (dimensionless toxicity test).

contd.

‘परिवेश भवन’ पूर्वी अर्जुन नगर, दिल्ली - 110032.

Parivesh Bhawan, East Arjun Nagar, Delhi - 110 032.

दूरभाष /Tel : 43102030, 22305792, वेबसाइट/Website: www.cpcb.nic.in



- g) **Characterization of Hazardous Waste:** Corrosivity, Reactivity and Measurement of Heavy Metals/Pesticides in the Waste/Leachate.
  - h) **Soil/Sludge/Sediment and Solid Waste:** Boron, Cation Exchange Capacity (CEC), Electrical Conductivity, Nitrogen (Available), Organic Carbon/Matter (Chemical Method), pH, Phosphorous (Available), Phosphate (Ortho), Phosphate (Total), Potassium, SAR in Soil Extract, Sodium, Soil Moisture, TKN, Calorific Value, Ammonia, Bicarbonate, Calcium, Chloride, Heavy Metal, Magnesium, Nitrate, Nitrite, Sulphate, Total Organic Carbon (TOC) and Water Holding Capacity.
  - i) **Ambient Air/ Fugitive Emissions:** Nitrogen Dioxide (NO<sub>2</sub>), Sulphur Dioxide (SO<sub>2</sub>), Total Suspended Particulate Matter, Respirable Suspended Particulate Matter (PM<sub>10</sub>), Ammonia, Carbon monoxide, Lead, Ozone, Benzene Toluene Xylene (BTX), Polycyclic Aromatic Hydrocarbon (PAH) Benzo-a-Pyrene & others, PM<sub>2.5</sub> and Volatile Organic Carbon.
  - j) **Stack Gases/ Source Emission:** Particulate Matter, Sulphur Dioxide, Velocity & Flow, Carbon Dioxide, Carbon Monoxide, Temperature, Oxygen, Oxides of Nitrogen, Acid Mist, Ammonia, Fluoride (Gaseous), Total Hydrocarbon and Hydrogen Sulphide.
  - k) **Noise Level:** Noise level measurement (20 to 140 dba) and Ambient Noise & Source Specific Noise.
  - l) **Meteorological:** Ambient Temperature, Wind Direction, Wind Speed, Relative Humidity and Rain Fall.
4. The laboratory shall compulsorily participate in the Analytical Quality Control (AQC) Exercise conducted by the CPCB to ascertain the capability of the laboratory and analysts. The lab shall submit quarterly progress report on the sample analysis carried out to CPCB.
  5. The surprise inspection / periodic surveillance of the recognized environment laboratory will be undertaken to assess its proper functioning systematic operation and reliability of data generated at the laboratory by a Joint Team as per the Notification.
  6. The laboratory should have the mandatory requisite accreditation and certificate of the ISO: 17025 and ISO: 45001 as per rules. This recognition is subject to such accreditations and renewals as applicable and in case of serious non-compliance of any of the terms and conditions, the laboratory may be black listed for a minimum period of two years and civil/criminal proceedings, as applicable, may be initiated for performing functions on behalf of the Government in an unauthorized manner.
  7. **M/s Pollucare Engineers India Private Limited, Chennai, Tamil Nadu** is required to apply for further renewal of recognition through online using CPCB web portal ([https:// epalab.cpcb.gov.in](https://epalab.cpcb.gov.in)) before expiry of recognition with mandatory accreditation / certification concerned.

Yours faithfully,

(Namita Mishra)

Scientist-E & In-Charge  
Instrumentation Laboratory

मान्यता पत्र

सेवा में,

प्रयोगशाला प्रमुख,  
मैसर्स पोलुकेयर इंजीनियर्स इंडिया प्राइवेट लिमिटेड,  
एचआईजी 6152, टीएनएचबी चरण I और II,  
कामराजार रोड, अयापक्कम,  
चेन्नई-600077, तमिलनाडु।

**विषय:** पर्यावरण (संरक्षण) अधिनियम, 1986 के अंतर्गत पर्यावरणीय प्रयोगशाला के रूप में मैसर्स पोलुकेयर इंजीनियर्स इंडिया प्राइवेट लिमिटेड, एचआईजी 6152, टीएनएचबी चरण I और II, कामराजार रोड, अयापक्कम, चेन्नई-600077, तमिलनाडु की मान्यता के बारे में।

महोदय,

केंद्रीय प्रदूषण नियंत्रण बोर्ड (के.प्र.नि.बोर्ड) को पर्यावरण (संरक्षण) अधिनियम, 1986 के अंतर्गत पर्यावरण प्रयोगशालाओं की मान्यता के लिए दिशानिर्देशों के निबंधन और शर्तों की स्वीकृति के साथ आपके दिनांक 20/04/2025 के प्रस्तुत आवेदन के संदर्भ में, के.प्र.नि.बोर्ड के सक्षम प्राधिकारी ने पर्यावरण प्रयोगशाला और सरकार के विश्लेषक की मान्यता को अनुमोदन प्रदान किया है। तत्पश्चात, मैसर्स पोलुकेयर इंजीनियर्स इंडिया प्राइवेट लिमिटेड, एचआईजी 6152, टीएनएचबी चरण I और II, कामराजार रोड, अयापक्कम, चेन्नई-600077, तमिलनाडु को भारत की राजपत्र अधिसूचना में प्रयोगशाला की अनिवार्य प्रत्यायन/प्रमाणन की वर्तमान अपेक्षा को ध्यान में रखते हुए दिनांक 30/07/2028 (तीन साल) तक आईएसओ/ आईईसी 17025 और आईएस/आईएसओ 45001 की वैधता के साथ अधिसूचित किया जाएगा।

2. निम्नलिखित विश्लेषकों को सरकारी विश्लेषक के रूप में अनुमोदित किया गया है:

1. डॉ. साईबाबू सुंदरपांडियन
2. श्री कृष्णन.जी
3. डॉ. इलाया राजू

3. प्रयोगशाला अनिवार्य रूप से स्वीकृत निबंधन और शर्तों का पालन करते हुए निम्नलिखित परीक्षणों करेगी:

- क. **भौतिक परीक्षण:** चालकता, रंग, पीएच, स्थिर और वाष्पशील ठोस, कुल ठोस, कुल विलीन ठोस, कुल निलंबित ठोस, आविलता, तापमान, वेग एवं निर्वहन औद्योगिक बहिःस्राव धारा का विसर्जन मापन, गंध, लवणता, निपटान योग्य ठोस और आपंक वॉल्यूम इंडेक्स (एसवीआई)।
- ख. **अकार्बनिक (सामान्य और गैर-धात्विक):** अम्लता, क्षारीयता, अमोनिकल नाइट्रोजन, क्लोराइड, क्लोरीन अवशिष्ट, विलीन ऑक्सीजन, फ्लोराइड, कुल कठोरता, कुल केजेल्डहल नाइट्रोजन (टीकेएन), नाइट्राइट नाइट्रोजन, नाइट्रेट नाइट्रोजन, फॉस्फेट, सल्फेट, कार्बन डाइऑक्साइड, साइनाइड, सिलिका, सल्फाइड और सल्फाइट।
- ग. **अकार्बनिक (सूक्ष्म मात्रिक धातु):** बोरॉन, कैडमियम, कैल्शियम, टोटल क्रोमियम, क्रोमियम हेक्सावैलेंट, तांबा, लोहा, सीसा, मैग्नीशियम, पारा, निकल, पोटेशियम, सोडियम, सोडियम अवशोषण अनुपात (एसएआर), जिंक, आर्सेनिक, एल्युमीनियम, बेरियम, मैंगनीज, सेलेनियम और सिल्वर।
- घ. **ऑर्गेनिक्स (सामान्य) और ट्रेस ऑर्गेनिक्स:** बायोकेमिकल ऑक्सीजन डिमांड (बीओडी), रासायनिक ऑक्सीजन डिमांड (सीओडी), तेल और ग्रीस, फेनोलिक यौगिक, कीटनाशक (प्रत्येक) (ऑर्गेनो-क्लोरीन और ऑर्गेनो नाइट्रोजन-फॉस्फोरस), कार्बन/नाइट्रोजन अनुपात, सर्फेक्टेंट और टोटल ऑर्गेनिक कार्बन (टीओसी)।
- ड. **सूक्ष्म जीवविज्ञान परीक्षण:** टोटल कोलीफॉर्म, फीकल कोलीफॉर्म, ई.कोली, फीकल स्ट्रेप्टोकोक्की और टोटल प्लेट काउंट।
- च. **आविष विज्ञानी परीक्षण:** मछली का उपयोग करके विषाक्तता के मूल्यांकन के लिए जैव परख विधि (100% प्रवाह में 96 घंटे के बाद मछली का 90% जीवित रहना) और ज़ेबरा मछली (आयाम रहित विषाक्तता परीक्षण) का उपयोग करके विषाक्तता कारक का मापन।

जारी..

- छ. परिसंकटमय अपशिष्ट का लक्षण वर्णन: संक्षारकता, प्रतिक्रियाशीलता और अपशिष्ट & निक्षालक में भारी धातुओं/पीड़कनाशियों का मापन।
- ज. मृदा/आपंक/तलछट और ठोस अपशिष्ट: बोरॉन, कटियन एक्सचेंज क्षमता (सीईसी), विद्युत चालकता, नाइट्रोजन (उपलब्ध), कार्बनिक कार्बन/पदार्थ (रासायनिक विधि), पीएच, फास्फोरस (उपलब्ध), फॉस्फेट (ऑर्थो), फॉस्फेट (कुल), पोटेशियम, मृदा के अर्क में एसएआर, सोडियम, मृदा की नमी, टीकेएन, कैलोरी मान, अमोनिया, बाइकार्बोनेट, कैल्शियम, क्लोराइड, भारी धातु, मैग्नीशियम, नाइट्रेट, नाइट्राइट, सल्फेट, कुल कार्बनिक कार्बन (टीओसी) और जल धारण क्षमता।
- झ. परिवेशी वायु/पलायक उत्सर्जन: नाइट्रोजन डाइऑक्साइड (एनओ<sub>2</sub>), सल्फर डाइऑक्साइड (एसओ<sub>2</sub>), कुल निलंबित विविक्त कण, श्वसन योग्य निलंबित कण पदार्थ (पीएम<sub>10</sub>), अमोनिया, कार्बन मोनोऑक्साइड, सीसा, ओजोन, बेंजीन टोल्यूनि ज़ाइलीन (बीटीएक्स), पॉलीसाइक्लिक एरोमैटिक हाइड्रोकार्बन (पीएच), बेंजो-ए-पाइरिन और अन्य, पीएम<sub>2.5</sub> और वाष्पशील कार्बनिक कार्बन।
- ञ. चिमनी गैसें/स्रोत उत्सर्जन: पार्टिकुलेट मैटर, सल्फर डाइऑक्साइड, वेग और प्रवाह, कार्बन डाइऑक्साइड, कार्बन मोनोऑक्साइड, तापमान, ऑक्सीजन, नाइट्रोजन के ऑक्साइड, एसिड धुंध, अमोनिया, फ्लोराइड (गैसीय), कुल हाइड्रोकार्बन और हाइड्रोजन सल्फाइड।
- ट. रव (शोर) स्तर: शोर स्तर माप (20 से 140 डीबीए) और परिवेश रव & स्रोत विशिष्ट रव।
- ठ. मौसम संबंधी: परिवेश का तापमान, हवा की दिशा, हवा की गति, सापेक्ष आर्द्रता और वर्षा।
4. प्रयोगशाला और विश्लेषकों की क्षमता का पता लगाने के लिए प्रयोगशाला को के.प्र.नि.बोर्ड द्वारा आयोजित विश्लेषणात्मक गुणवत्ता नियंत्रण एक्जूसी (अभ्यास में अनिवार्य रूप से भाग लेना होगा। प्रयोगशाला किए गए नमूना विश्लेषण पर के.प्र.नि.बोर्ड को तिमाही प्रगति रिपोर्ट प्रस्तुत करेगी।
5. अधिसूचना के अनुसार, एक संयुक्त दल द्वारा मान्यता प्राप्त पर्यावरण प्रयोगशाला का औचक निरीक्षण/आवधिक निगरानी उस के उचित कामकाज, व्यवस्थित प्रचालन और प्रयोगशाला में तैयार किए गए आंकड़ों की विश्वसनीयता का निर्धारण करने के लिए की जाएगी।
6. प्रयोगशाला के पास नियमानुसार ISO/IEC: 17025)2017। और IS/ ISO: 45001 का अपेक्षित प्रत्यायन और प्रमाण पत्र होना चाहिए। यह मान्यता यथा लागू प्रत्यायन और नवीनीकरण के अधीन है और किसी भी निबंधन और शर्तों के गंभीर गैर-अनुपालन के मामले में, प्रयोगशाला को न्यूनतम दो साल की अवधि के लिए ब्लैकलिस्ट किया जा सकता है और सरकार की ओर से अनधिकृत तरीके से कार्य करने के लिए, यथा लागू सिविल/आपराधिक कार्यवाही शुरू की जा सकती है।
7. मैसर्स पोलुकेयर इंजीनियर्स इंडिया प्राइवेट लिमिटेड, चेन्नई, तमिलनाडु को संबंधित अनिवार्य प्रत्यायन/प्रमाणीकरण के साथ मान्यता की समाप्ति से पूर्व केंद्रीय प्रदूषण नियंत्रण बोर्ड के वेबपोर्टल ([https:// epalab.cpcb.gov.in](https://epalab.cpcb.gov.in)) का उपयोग कर के ऑनलाइन मान्यता के नवीनीकरण के लिए आवेदन करना अपेक्षित है।

भवदीय,

(नमिता मिश्रा)

वैज्ञानिक-ई एवं प्रभारी  
उपकरणीय प्रयोगशाला

# **Annexure 5**

## **Site Specific Met Data**

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 1    | 0    | 11      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.1      |
| 2025 | 7     | 1    | 1    | 13      | 260       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 1    | 2    | 10      | 260       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 1    | 3    | 12      | 260       | 32.0 | 62.78      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 1    | 4    | 16      | 280       | 33.0 | 55.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 1    | 5    | 15      | 280       | 34.0 | 52.85      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 1    | 6    | 17      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 1    | 7    | 15      | 260       | 36.0 | 47.33      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 1    | 8    | 15      | 250       | 37.0 | 42.18      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 1    | 9    | 14      | 270       | 37.0 | 44.81      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 1    | 10   | 15      | 270       | 37.0 | 42.18      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 1    | 11   | 13      | 270       | 36.0 | 44.54      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 1    | 12   | 10      | 270       | 36.0 | 47.33      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 1    | 13   | 8       | 260       | 34.0 | 49.74      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 1    | 14   | 10      | 280       | 33.0 | 52.59      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 1    | 15   | 12      | 270       | 32.0 | 52.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 1    | 16   | 16      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 1    | 17   | 12      | 270       | 31.0 | 55.39      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 1    | 18   | 13      | 280       | 30.0 | 55.13      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 1    | 19   | 12      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 1    | 20   | 12      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 1    | 21   | 12      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 1    | 22   | 10      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 1    | 23   | 8       | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 2    | 0    | 8       | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 2    | 1    | 12      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 2    | 2    | 12      | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 2    | 3    | 15      | 270       | 31.0 | 66.44      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 2    | 4    | 15      | 260       | 32.0 | 62.78      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 2    | 5    | 14      | 290       | 34.0 | 56.13      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 2    | 6    | 19      | 270       | 35.0 | 53.11      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 2    | 7    | 15      | 270       | 36.0 | 50.27      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 2    | 8    | 18      | 260       | 35.0 | 50         | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 2    | 9    | 18      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 2    | 10   | 17      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 2    | 11   | 18      | 260       | 34.0 | 52.85      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 2    | 12   | 14      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 2    | 13   | 18      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 2    | 14   | 14      | 260       | 31.0 | 58.88      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 2    | 15   | 15      | 260       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 2    | 16   | 15      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 2    | 17   | 13      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 2    | 18   | 15      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 2    | 19   | 15      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 2    | 20   | 11      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 2    | 21   | 10      | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 2    | 22   | 8       | 260       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 2    | 23   | 8       | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 3    | 0    | 12      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 3    | 1    | 14      | 260       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 3    | 2    | 10      | 260       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 3    | 3    | 8       | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 3    | 4    | 12      | 270       | 32.0 | 62.78      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 3    | 5    | 12      | 270       | 34.0 | 52.85      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 3    | 6    | 10      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 3    | 7    | 15      | 280       | 36.0 | 47.33      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 3    | 8    | 13      | 290       | 36.0 | 50.27      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 3    | 9    | 16      | 270       | 37.0 | 44.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 3    | 10   | 16      | 280       | 37.0 | 44.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 3    | 11   | 13      | 290       | 34.0 | 52.85      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 3    | 12   | 14      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 3    | 13   | 13      | 280       | 32.0 | 55.64      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 3    | 14   | 9       | 270       | 32.0 | 55.64      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 3    | 15   | 10      | 270       | 32.0 | 55.64      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 3    | 16   | 10      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 3    | 17   | 8       | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 3    | 18   | 14      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 3    | 19   | 14      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 3    | 20   | 12      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 3    | 21   | 8       | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 3    | 22   | 8       | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 3    | 23   | 12      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 4    | 0    | 8       | 270       | 28.0 | 65.82      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 4    | 1    | 10      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 4    | 2    | 10      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 4    | 3    | 16      | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 4    | 4    | 14      | 260       | 33.0 | 55.88      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 4    | 6    | 12      | 290       | 35.0 | 53.11      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 4    | 7    | 19      | 270       | 36.0 | 47.33      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 4    | 8    | 12      | 250       | 36.0 | 44.54      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 4    | 9    | 10      | 270       | 36.0 | 44.54      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 4    | 10   | 10      | 270       | 36.0 | 41.9       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 4    | 11   | 8       | 250       | 36.0 | 47.33      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 4    | 12   | 8       | 250       | 35.0 | 47.06      | 0.0      | 10.0  | 1006.096469 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 4    | 13   | 10      | 260       | 34.0 | 52.85      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 4    | 14   | 14      | 260       | 32.0 | 55.64      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 4    | 15   | 15      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 4    | 16   | 14      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 4    | 17   | 12      | 280       | 31.0 | 58.88      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 4    | 18   | 11      | 290       | 31.0 | 58.88      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 4    | 19   | 10      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 4    | 20   | 11      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 4    | 21   | 12      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 4    | 22   | 13      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 4    | 23   | 12      | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 5    | 0    | 11      | 290       | 29.0 | 66.03      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 5    | 1    | 10      | 260       | 29.0 | 66.03      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 5    | 2    | 11      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 5    | 3    | 8       | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 5    | 4    | 10      | 290       | 34.0 | 56.13      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 5    | 5    | 14      | 280       | 36.0 | 50.27      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 5    | 6    | 15      | 290       | 36.0 | 50.27      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 5    | 7    | 17      | 270       | 37.0 | 44.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 5    | 8    | 19      | 270       | 39.0 | 35.62      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 5    | 9    | 15      | 270       | 39.0 | 35.62      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 5    | 10   | 20      | 270       | 38.0 | 39.95      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 5    | 11   | 20      | 270       | 37.0 | 39.67      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 5    | 12   | 18      | 270       | 36.0 | 47.33      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 5    | 13   | 17      | 260       | 34.0 | 49.74      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 5    | 14   | 15      | 280       | 32.0 | 55.64      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 5    | 15   | 10      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 5    | 16   | 10      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |



| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 5    | 17   | 10      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 5    | 18   | 14      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 5    | 19   | 10      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 5    | 20   | 14      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 5    | 21   | 10      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 5    | 22   | 11      | 280       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 5    | 23   | 12      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 6    | 0    | 12      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 6    | 1    | 11      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 6    | 2    | 11      | 280       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 6    | 3    | 12      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 6    | 4    | 15      | 270       | 34.0 | 56.13      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 6    | 5    | 15      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 6    | 6    | 20      | 270       | 36.0 | 44.54      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 6    | 7    | 21      | 270       | 38.0 | 37.58      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 6    | 8    | 20      | 280       | 38.0 | 39.95      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 6    | 9    | 18      | 270       | 38.0 | 39.95      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 6    | 10   | 19      | 260       | 38.0 | 37.58      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 6    | 11   | 15      | 270       | 38.0 | 37.58      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 6    | 12   | 18      | 270       | 36.0 | 41.9       | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 6    | 13   | 15      | 270       | 34.0 | 49.74      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 6    | 14   | 15      | 280       | 33.0 | 55.88      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 6    | 15   | 11      | 280       | 32.0 | 55.64      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 6    | 16   | 14      | 280       | 31.0 | 62.56      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 6    | 17   | 15      | 280       | 31.0 | 62.56      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 6    | 18   | 13      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 6    | 19   | 14      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 6    | 20   | 13      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 6    | 21   | 11      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 6    | 22   | 11      | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 6    | 23   | 8       | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 7    | 0    | 12      | 290       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 7    | 1    | 13      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 7    | 2    | 10      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 7    | 3    | 8       | 270       | 31.0 | 66.44      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 7    | 4    | 14      | 280       | 33.0 | 59.35      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 7    | 5    | 15      | 270       | 34.0 | 56.13      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 7    | 6    | 16      | 270       | 34.0 | 56.13      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 7    | 7    | 15      | 290       | 36.0 | 50.27      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 7    | 8    | 15      | 270       | 37.0 | 47.6       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 7    | 9    | 16      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 7    | 10   | 20      | 280       | 36.0 | 47.33      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 7    | 11   | 18      | 280       | 35.0 | 50         | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 7    | 12   | 17      | 270       | 34.0 | 49.74      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 7    | 13   | 19      | 270       | 33.0 | 52.59      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 7    | 14   | 18      | 270       | 32.0 | 55.64      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 7    | 15   | 12      | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 7    | 16   | 10      | 280       | 31.0 | 62.56      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 7    | 17   | 14      | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 7    | 18   | 15      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 7    | 19   | 14      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 7    | 20   | 13      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 7    | 21   | 14      | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 7    | 22   | 11      | 280       | 29.0 | 79.1       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 7    | 23   | 9       | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 8    | 0    | 12      | 290       | 28.0 | 74.34      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 8    | 1    | 12      | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 8    | 2    | 12      | 280       | 29.0 | 74.51      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 8    | 3    | 12      | 270       | 31.0 | 70.53      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 8    | 4    | 14      | 280       | 33.0 | 63.01      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 8    | 5    | 19      | 280       | 35.0 | 53.11      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 8    | 7    | 16      | 280       | 37.0 | 44.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 8    | 8    | 18      | 270       | 37.0 | 44.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 8    | 9    | 16      | 270       | 38.0 | 42.45      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 8    | 10   | 15      | 270       | 38.0 | 39.95      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 8    | 11   | 14      | 280       | 38.0 | 37.58      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 8    | 12   | 12      | 250       | 36.0 | 41.9       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 8    | 13   | 10      | 260       | 35.0 | 47.06      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 8    | 14   | 10      | 280       | 34.0 | 49.74      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 8    | 15   | 12      | 270       | 33.0 | 52.59      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 8    | 16   | 12      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 8    | 17   | 8       | 260       | 31.0 | 62.56      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 8    | 18   | 8       | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 8    | 19   | 12      | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 8    | 20   | 12      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 8    | 21   | 13      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 8    | 22   | 10      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 8    | 23   | 16      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 9    | 0    | 11      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 9    | 1    | 10      | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 9    | 2    | 14      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 9    | 3    | 12      | 270       | 32.0 | 62.78      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 9    | 4    | 14      | 260       | 33.0 | 59.35      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 9    | 5    | 9       | 290       | 35.0 | 53.11      | 0.0      | 10.0  | 1008.128303 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 9    | 6    | 12      | 270       | 36.0 | 50.27      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 9    | 7    | 12      | 290       | 37.0 | 47.6       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 9    | 8    | 8       | 290       | 38.0 | 45.09      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 9    | 9    | 12      | 270       | 38.0 | 42.45      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 9    | 10   | 11      | 270       | 38.0 | 39.95      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 9    | 11   | 9       | 290       | 38.0 | 37.58      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 9    | 12   | 8       | 270       | 37.0 | 42.18      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 9    | 13   | 14      | 260       | 36.0 | 44.54      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 9    | 14   | 10      | 280       | 33.0 | 52.59      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 9    | 15   | 12      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 9    | 16   | 15      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 9    | 17   | 13      | 280       | 31.0 | 62.56      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 9    | 18   | 12      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 9    | 19   | 10      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 9    | 20   | 10      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 9    | 21   | 12      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 9    | 22   | 12      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 9    | 23   | 12      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 10   | 0    | 12      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 10   | 1    | 15      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 10   | 2    | 10      | 260       | 30.0 | 70.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 10   | 3    | 14      | 270       | 31.0 | 66.44      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 10   | 4    | 15      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 10   | 5    | 15      | 290       | 34.0 | 56.13      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 10   | 6    | 11      | 270       | 35.0 | 53.11      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 10   | 7    | 13      | 260       | 37.0 | 44.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 10   | 8    | 15      | 290       | 38.0 | 45.09      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 10   | 9    | 10      | 270       | 38.0 | 42.45      | 0.0      | 10.0  | 1004.064635 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 10   | 10   | 8       | 270       | 39.0 | 37.86      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 10   | 12   | 10      | 270       | 38.0 | 42.45      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 10   | 13   | 10      | 290       | 36.0 | 50.27      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 10   | 14   | 12      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 10   | 15   | 10      | 230       | 32.0 | 59.12      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 10   | 16   | 12      | 260       | 32.0 | 59.12      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 10   | 17   | 12      | 250       | 31.0 | 62.56      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 10   | 18   | 13      | 270       | 30.0 | 70.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 10   | 19   | 14      | 270       | 30.0 | 70.35      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 10   | 20   | 11      | 270       | 30.0 | 70.35      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 10   | 21   | 11      | 260       | 30.0 | 70.35      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 10   | 22   | 12      | 270       | 30.0 | 70.35      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 10   | 23   | 10      | 280       | 29.0 | 74.51      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 11   | 0    | 10      | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 11   | 1    | 9       | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 11   | 2    | 10      | 280       | 30.0 | 70.35      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 11   | 3    | 12      | 270       | 32.0 | 66.65      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 11   | 4    | 12      | 280       | 34.0 | 59.59      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 11   | 5    | 15      | 290       | 35.0 | 53.11      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 11   | 6    | 10      | 290       | 36.0 | 50.27      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 11   | 7    | 10      | 280       | 37.0 | 47.6       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 11   | 8    | 11      | 290       | 38.0 | 42.45      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 11   | 9    | 15      | 290       | 39.0 | 40.23      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 11   | 10   | 12      | 280       | 39.0 | 40.23      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 11   | 11   | 15      | 280       | 39.0 | 40.23      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 11   | 12   | 15      | 270       | 37.0 | 39.67      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 11   | 13   | 10      | 280       | 34.0 | 56.13      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 11   | 14   | 14      | 270       | 34.0 | 52.85      | 0.0      | 10.0  | 1005.080552 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 11   | 15   | 10      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 11   | 16   | 9       | 260       | 32.0 | 59.12      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 11   | 17   | 12      | 270       | 32.0 | 62.78      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 11   | 18   | 10      | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 11   | 19   | 8       | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 11   | 20   | 11      | 260       | 30.0 | 70.35      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 11   | 21   | 10      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 11   | 22   | 12      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 11   | 23   | 11      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 12   | 0    | 13      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 12   | 1    | 11      | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 12   | 2    | 16      | 280       | 30.0 | 70.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 12   | 3    | 20      | 270       | 31.0 | 66.44      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 12   | 4    | 18      | 280       | 32.0 | 62.78      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 12   | 5    | 15      | 290       | 34.0 | 59.59      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 12   | 6    | 18      | 270       | 35.0 | 56.38      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 12   | 7    | 14      | 290       | 36.0 | 50.27      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 12   | 8    | 15      | 280       | 37.0 | 44.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 12   | 9    | 10      | 320       | 39.0 | 35.62      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 12   | 10   | 8       | 300       | 39.0 | 37.86      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 12   | 11   | 10      | 300       | 39.0 | 37.86      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 12   | 13   | 8       | 280       | 37.0 | 42.18      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 12   | 14   | 8       | 260       | 36.0 | 44.54      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 12   | 15   | 12      | 280       | 34.0 | 46.79      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 12   | 16   | 9       | 260       | 33.0 | 52.59      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 12   | 17   | 8       | 280       | 33.0 | 52.59      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 12   | 18   | 12      | 290       | 32.0 | 55.64      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 12   | 19   | 8       | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 12   | 20   | 8       | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 12   | 21   | 10      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 12   | 22   | 10      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 12   | 23   | 8       | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 13   | 0    | 11      | 290       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 13   | 1    | 11      | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 13   | 2    | 13      | 280       | 30.0 | 70.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 13   | 3    | 15      | 270       | 32.0 | 62.78      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 13   | 4    | 10      | 280       | 33.0 | 59.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 13   | 5    | 12      | 270       | 35.0 | 53.11      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 13   | 7    | 10      | 270       | 37.0 | 47.6       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 13   | 8    | 10      | 280       | 37.0 | 44.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 13   | 9    | 15      | 270       | 38.0 | 39.95      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 13   | 10   | 16      | 280       | 39.0 | 35.62      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 13   | 11   | 15      | 270       | 38.0 | 37.58      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 13   | 12   | 15      | 270       | 37.0 | 42.18      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 13   | 13   | 15      | 260       | 36.0 | 44.54      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 13   | 14   | 12      | 270       | 34.0 | 52.85      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 13   | 15   | 10      | 290       | 32.0 | 55.64      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 13   | 16   | 10      | 280       | 31.0 | 62.56      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 13   | 17   | 11      | 290       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 13   | 18   | 11      | 290       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 13   | 19   | 15      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 13   | 20   | 11      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 13   | 21   | 10      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 13   | 22   | 14      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 13   | 23   | 11      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 14   | 0    | 10      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.096469 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 14   | 1    | 9       | 250       | 29.0 | 62.11      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 14   | 2    | 12      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 14   | 3    | 15      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 14   | 4    | 15      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 14   | 5    | 15      | 280       | 34.0 | 56.13      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 14   | 6    | 20      | 250       | 36.0 | 47.33      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 14   | 7    | 18      | 290       | 37.0 | 42.18      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 14   | 8    | 18      | 270       | 38.0 | 39.95      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 14   | 9    | 18      | 280       | 38.0 | 37.58      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 14   | 10   | 16      | 300       | 38.0 | 37.58      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 14   | 11   | 15      | 280       | 37.0 | 42.18      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 14   | 12   | 11      | 290       | 35.0 | 47.06      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 14   | 13   | 10      | 280       | 34.0 | 49.74      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 14   | 14   | 15      | 260       | 33.0 | 55.88      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 14   | 15   | 14      | 270       | 32.0 | 55.64      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 14   | 16   | 16      | 280       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 14   | 17   | 13      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 14   | 18   | 14      | 270       | 30.0 | 58.64      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 14   | 19   | 11      | 270       | 29.0 | 62.11      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 14   | 20   | 10      | 280       | 29.0 | 62.11      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 14   | 21   | 10      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 14   | 22   | 10      | 280       | 28.0 | 69.97      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 14   | 23   | 13      | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 15   | 0    | 10      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 15   | 1    | 10      | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 15   | 2    | 11      | 290       | 30.0 | 70.35      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 15   | 3    | 13      | 290       | 30.0 | 74.68      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 15   | 4    | 17      | 290       | 32.0 | 62.78      | 0.0      | 10.0  | 1007.112386 |



| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 15   | 5    | 16      | 280       | 34.0 | 56.13      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 15   | 6    | 18      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 15   | 7    | 18      | 290       | 35.0 | 53.11      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 15   | 8    | 15      | 280       | 37.0 | 44.81      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 15   | 9    | 16      | 270       | 37.0 | 39.67      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 15   | 10   | 18      | 280       | 37.0 | 39.67      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 15   | 11   | 13      | 280       | 37.0 | 42.18      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 15   | 12   | 15      | 270       | 36.0 | 47.33      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 15   | 13   | 17      | 260       | 34.0 | 52.85      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 15   | 14   | 16      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 15   | 15   | 10      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 15   | 16   | 12      | 260       | 32.0 | 59.12      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 15   | 17   | 10      | 270       | 31.0 | 55.39      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 15   | 18   | 10      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 15   | 19   | 12      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 15   | 20   | 9       | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 15   | 21   | 10      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 15   | 22   | 8       | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 15   | 23   | 8       | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 16   | 0    | 9       | 290       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 16   | 1    | 11      | 260       | 29.0 | 74.51      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 16   | 2    | 13      | 260       | 31.0 | 70.53      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 16   | 3    | 10      | 270       | 32.0 | 62.78      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 16   | 4    | 13      | 260       | 34.0 | 56.13      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 16   | 5    | 17      | 270       | 35.0 | 53.11      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 16   | 6    | 10      | 270       | 36.0 | 50.27      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 16   | 7    | 14      | 260       | 37.0 | 47.6       | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 16   | 8    | 14      | 270       | 37.0 | 47.6       | 0.0      | 10.0  | 1003.048718 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 16   | 9    | 10      | 250       | 39.0 | 70.16      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 16   | 10   | 8       | 320       | 39.0 | 42.73      | 0.0      | 10.0  | 1001.016884 |
| 2025 | 7     | 16   | 11   | 13      | 280       | 38.0 | 42.45      | 0.0      | 10.0  | 1001.016884 |
| 2025 | 7     | 16   | 12   | 10      | 230       | 35.0 | 53.11      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 16   | 13   | 15      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 16   | 14   | 10      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 16   | 15   | 10      | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 16   | 16   | 12      | 260       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 16   | 18   | 10      | 290       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 16   | 19   | 18      | 270       | 28.0 | 65.82      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 16   | 20   | 15      | 270       | 28.0 | 65.82      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 16   | 21   | 15      | 270       | 28.0 | 65.82      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 16   | 22   | 16      | 270       | 28.0 | 65.82      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 16   | 23   | 13      | 280       | 28.0 | 69.97      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 17   | 0    | 12      | 270       | 27.0 | 74.17      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 17   | 1    | 10      | 280       | 27.0 | 74.17      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 17   | 2    | 13      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 17   | 3    | 10      | 270       | 30.0 | 70.35      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 17   | 4    | 15      | 290       | 31.0 | 62.56      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 17   | 5    | 13      | 290       | 34.0 | 52.85      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 17   | 6    | 12      | 270       | 35.0 | 53.11      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 17   | 7    | 14      | 280       | 36.0 | 47.33      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 17   | 8    | 13      | 290       | 37.0 | 44.81      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 17   | 9    | 14      | 290       | 37.0 | 39.67      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 17   | 10   | 14      | 270       | 37.0 | 42.18      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 17   | 11   | 13      | 270       | 36.0 | 44.54      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 17   | 12   | 12      | 270       | 35.0 | 47.06      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 17   | 13   | 13      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1003.048718 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 17   | 14   | 15      | 260       | 32.0 | 59.12      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 17   | 15   | 19      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 17   | 16   | 15      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 17   | 17   | 14      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 17   | 18   | 13      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 17   | 19   | 15      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 17   | 20   | 11      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 17   | 21   | 11      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 17   | 22   | 12      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 17   | 23   | 11      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 18   | 0    | 6       | 290       | 29.0 | 66.03      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 18   | 1    | 7       | 280       | 29.0 | 66.03      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 18   | 2    | 8       | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 18   | 3    | 6       | 290       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 18   | 5    | 13      | 270       | 32.0 | 62.78      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 18   | 6    | 14      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 18   | 7    | 14      | 250       | 34.0 | 56.13      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 18   | 8    | 13      | 270       | 34.0 | 56.13      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 18   | 9    | 10      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 18   | 10   | 8       | 250       | 35.0 | 50         | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 18   | 11   | 10      | 260       | 34.0 | 52.85      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 18   | 12   | 12      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 18   | 13   | 8       | 300       | 27.0 | 78.81      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 18   | 14   | 10      | 260       | 27.0 | 83.7       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 18   | 15   | 12      | 260       | 28.0 | 78.96      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 18   | 16   | 9       | 260       | 27.0 | 83.7       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 18   | 17   | 12      | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 18   | 18   | 13      | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1005.080552 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 18   | 19   | 9       | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 18   | 20   | 10      | 290       | 28.0 | 74.34      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 18   | 21   | 4       | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 18   | 22   | 8       | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 18   | 23   | 9       | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 19   | 0    | 6       | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 19   | 1    | 9       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 19   | 2    | 11      | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 19   | 3    | 10      | 270       | 30.0 | 70.35      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 19   | 4    | 12      | 260       | 32.0 | 66.65      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 19   | 5    | 10      | 280       | 33.0 | 59.35      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 19   | 6    | 8       | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 19   | 7    | 11      | 280       | 33.0 | 59.35      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 19   | 8    | 10      | 290       | 34.0 | 59.59      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 19   | 9    | 10      | 290       | 35.0 | 53.11      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 19   | 10   | 8       | 320       | 35.0 | 53.11      | 0.0      | 10.0  | 1001.016884 |
| 2025 | 7     | 19   | 11   | 15      | 250       | 33.0 | 55.88      | 0.0      | 10.0  | 1001.016884 |
| 2025 | 7     | 19   | 12   | 19      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1001.016884 |
| 2025 | 7     | 19   | 13   | 15      | 260       | 31.0 | 58.88      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 19   | 14   | 18      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 19   | 15   | 18      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 19   | 16   | 15      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 19   | 17   | 15      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 19   | 18   | 12      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 19   | 19   | 12      | 280       | 29.0 | 66.03      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 19   | 20   | 12      | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 19   | 21   | 8       | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 19   | 22   | 8       | 280       | 28.0 | 69.97      | 0.0      | 10.0  | 1002.032801 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 19   | 23   | 10      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 20   | 0    | 12      | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 20   | 1    | 11      | 280       | 28.0 | 69.97      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 20   | 2    | 15      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 20   | 3    | 16      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 20   | 4    | 15      | 280       | 31.0 | 62.56      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 20   | 5    | 14      | 260       | 32.0 | 59.12      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 20   | 6    | 15      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 20   | 7    | 14      | 270       | 34.0 | 52.85      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 20   | 8    | 13      | 260       | 35.0 | 50         | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 20   | 9    | 8       | 250       | 35.0 | 50         | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 20   | 10   | 12      | 250       | 35.0 | 50         | 0.0      | 10.0  | 1001.016884 |
| 2025 | 7     | 20   | 11   | 14      | 260       | 34.0 | 52.85      | 0.0      | 10.0  | 1001.016884 |
| 2025 | 7     | 20   | 12   | 8       | 250       | 32.0 | 59.12      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 20   | 13   | 14      | 250       | 32.0 | 55.64      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 20   | 14   | 10      | 260       | 30.0 | 62.34      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 20   | 15   | 13      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 20   | 16   | 12      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 20   | 17   | 9       | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 20   | 18   | 11      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 20   | 19   | 10      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 20   | 20   | 13      | 260       | 29.0 | 66.03      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 20   | 21   | 11      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 20   | 22   | 12      | 280       | 29.0 | 66.03      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 20   | 23   | 8       | 250       | 28.0 | 69.97      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 21   | 0    | 9       | 250       | 28.0 | 69.97      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 21   | 1    | 10      | 280       | 28.0 | 69.97      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 21   | 2    | 10      | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 21   | 3    | 8       | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 21   | 4    | 10      | 270       | 31.0 | 66.44      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 21   | 5    | 15      | 280       | 33.0 | 63.01      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 21   | 6    | 17      | 270       | 34.0 | 56.13      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 21   | 7    | 15      | 290       | 35.0 | 53.11      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 21   | 8    | 13      | 280       | 35.0 | 50         | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 21   | 9    | 20      | 270       | 36.0 | 41.9       | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 21   | 10   | 20      | 280       | 34.0 | 49.74      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 21   | 11   | 15      | 280       | 34.0 | 49.74      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 21   | 12   | 13      | 270       | 34.0 | 49.74      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 21   | 13   | 12      | 280       | 32.0 | 55.64      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 21   | 14   | 14      | 290       | 31.0 | 58.88      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 21   | 15   | 10      | 290       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 21   | 16   | 11      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 21   | 17   | 9       | 290       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 21   | 18   | 9       | 290       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 21   | 19   | 6       | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 21   | 20   | 9       | 260       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 21   | 21   | 10      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 21   | 22   | 8       | 260       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 21   | 23   | 5       | 230       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 22   | 0    | 6       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 22   | 1    | 10      | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 22   | 2    | 8       | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 22   | 3    | 12      | 270       | 30.0 | 70.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 22   | 4    | 8       | 250       | 31.0 | 66.44      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 22   | 5    | 10      | 260       | 33.0 | 63.01      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 22   | 6    | 18      | 270       | 34.0 | 56.13      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 22   | 7    | 15      | 260       | 36.0 | 50.27      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 22   | 8    | 12      | 270       | 36.0 | 47.33      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 22   | 9    | 10      | 290       | 36.0 | 50.27      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 22   | 10   | 11      | 250       | 37.0 | 47.6       | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 22   | 11   | 9       | 280       | 36.0 | 47.33      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 22   | 12   | 11      | 290       | 35.0 | 50         | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 22   | 13   | 8       | 280       | 33.0 | 55.88      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 22   | 14   | 12      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 22   | 15   | 11      | 270       | 32.0 | 55.64      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 22   | 16   | 13      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 22   | 17   | 15      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 22   | 18   | 12      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 22   | 19   | 14      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 22   | 20   | 11      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 22   | 21   | 10      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 22   | 22   | 9       | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 22   | 23   | 7       | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 23   | 0    | 6       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 23   | 1    | 9       | 260       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 23   | 2    | 8       | 230       | 29.0 | 74.51      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 23   | 3    | 11      | 250       | 31.0 | 66.44      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 23   | 4    | 12      | 280       | 33.0 | 63.01      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 23   | 5    | 15      | 280       | 35.0 | 56.38      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 23   | 6    | 18      | 290       | 35.0 | 50         | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 23   | 7    | 17      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 23   | 8    | 16      | 270       | 35.0 | 53.11      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 23   | 9    | 18      | 270       | 36.0 | 47.33      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 23   | 10   | 18      | 290       | 36.0 | 47.33      | 0.0      | 10.0  | 1002.032801 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 23   | 11   | 20      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 23   | 12   | 19      | 270       | 35.0 | 47.06      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 23   | 13   | 15      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 23   | 14   | 16      | 260       | 32.0 | 55.64      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 23   | 15   | 15      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 23   | 16   | 15      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 23   | 17   | 15      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 23   | 18   | 15      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 23   | 19   | 15      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 23   | 20   | 13      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 23   | 21   | 15      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 23   | 22   | 12      | 290       | 28.0 | 69.97      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 23   | 23   | 14      | 280       | 28.0 | 69.97      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 24   | 0    | 11      | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 24   | 1    | 10      | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 24   | 2    | 10      | 260       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 24   | 3    | 11      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 24   | 4    | 17      | 260       | 32.0 | 62.78      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 24   | 5    | 14      | 260       | 33.0 | 59.35      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 24   | 6    | 19      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 24   | 7    | 16      | 250       | 35.0 | 50         | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 24   | 8    | 19      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 24   | 9    | 15      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 24   | 10   | 18      | 260       | 35.0 | 50         | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 24   | 11   | 19      | 260       | 33.0 | 52.59      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 7     | 24   | 12   | 15      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 24   | 13   | 14      | 260       | 31.0 | 62.56      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 24   | 14   | 10      | 260       | 31.0 | 62.56      | 0.0      | 10.0  | 1004.064635 |



| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 24   | 15   | 10      | 250       | 30.0 | 62.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 24   | 16   | 13      | 260       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 24   | 17   | 11      | 260       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 24   | 18   | 14      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 24   | 19   | 11      | 260       | 30.0 | 66.24      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 24   | 20   | 13      | 260       | 29.0 | 70.16      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 24   | 21   | 13      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 24   | 22   | 15      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 24   | 23   | 9       | 280       | 29.0 | 66.03      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 25   | 0    | 10      | 260       | 29.0 | 66.03      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 25   | 1    | 11      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 25   | 2    | 13      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 25   | 3    | 14      | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 25   | 4    | 23      | 260       | 33.0 | 52.59      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 25   | 5    | 20      | 270       | 33.0 | 52.59      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 25   | 6    | 12      | 270       | 33.0 | 52.59      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 25   | 7    | 18      | 270       | 34.0 | 49.74      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 25   | 8    | 20      | 270       | 33.0 | 52.59      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 25   | 9    | 20      | 270       | 34.0 | 46.79      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 25   | 10   | 18      | 260       | 34.0 | 49.74      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 25   | 11   | 22      | 270       | 34.0 | 49.74      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 25   | 12   | 20      | 270       | 33.0 | 52.59      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 25   | 13   | 15      | 260       | 32.0 | 52.34      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 25   | 14   | 10      | 260       | 32.0 | 55.64      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 25   | 15   | 15      | 250       | 32.0 | 55.64      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 25   | 16   | 12      | 250       | 31.0 | 55.39      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 25   | 17   | 11      | 250       | 30.0 | 62.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 25   | 18   | 9       | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 25   | 19   | 10      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 25   | 20   | 10      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 25   | 21   | 10      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 25   | 22   | 12      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 25   | 23   | 14      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 26   | 0    | 15      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 26   | 1    | 10      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 26   | 2    | 12      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 26   | 3    | 10      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 26   | 4    | 10      | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 26   | 5    | 15      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 26   | 6    | 20      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 26   | 7    | 12      | 240       | 33.0 | 59.35      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 26   | 8    | 23      | 260       | 33.0 | 55.88      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 26   | 9    | 15      | 250       | 33.0 | 55.88      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 26   | 10   | 14      | 260       | 32.0 | 59.12      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 26   | 11   | 20      | 260       | 32.0 | 62.78      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 26   | 12   | 15      | 250       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 26   | 13   | 14      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 26   | 14   | 20      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 26   | 15   | 20      | 260       | 29.0 | 66.03      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 26   | 16   | 18      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 26   | 17   | 17      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 26   | 18   | 12      | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 26   | 19   | 11      | 280       | 28.0 | 69.97      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 26   | 20   | 9       | 290       | 28.0 | 69.97      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 26   | 21   | 6       | 290       | 27.0 | 78.81      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 26   | 22   | 6       | 290       | 27.0 | 78.81      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 26   | 23   | 5       | 270       | 27.0 | 78.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 27   | 0    | 5       | 290       | 27.0 | 78.81      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 27   | 1    | 7       | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 27   | 2    | 10      | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 27   | 3    | 13      | 250       | 31.0 | 70.53      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 27   | 4    | 10      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 27   | 5    | 10      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 27   | 6    | 20      | 270       | 34.0 | 56.13      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 27   | 7    | 16      | 280       | 35.0 | 50         | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 27   | 8    | 16      | 280       | 35.0 | 50         | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 27   | 9    | 9       | 280       | 36.0 | 47.33      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 27   | 10   | 16      | 280       | 35.0 | 47.06      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 27   | 11   | 15      | 280       | 36.0 | 44.54      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 27   | 12   | 12      | 270       | 33.0 | 52.59      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 27   | 13   | 10      | 270       | 32.0 | 55.64      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 27   | 14   | 13      | 280       | 32.0 | 59.12      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 27   | 15   | 10      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 27   | 16   | 10      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 27   | 17   | 14      | 260       | 30.0 | 66.24      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 27   | 18   | 12      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 27   | 19   | 13      | 260       | 29.0 | 70.16      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 27   | 20   | 11      | 260       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 27   | 21   | 11      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 27   | 22   | 12      | 260       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 27   | 23   | 12      | 260       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 28   | 0    | 11      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 28   | 1    | 8       | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 28   | 2    | 13      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 28   | 3    | 10      | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 28   | 4    | 10      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 28   | 5    | 8       | 270       | 34.0 | 52.85      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 28   | 6    | 14      | 280       | 35.0 | 44.27      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 28   | 7    | 13      | 290       | 36.0 | 41.9       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 28   | 8    | 14      | 280       | 37.0 | 37.3       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 28   | 9    | 11      | 290       | 37.0 | 42.18      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 28   | 10   | 12      | 270       | 37.0 | 44.81      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 28   | 11   | 10      | 290       | 37.0 | 42.18      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 28   | 12   | 10      | 270       | 36.0 | 44.54      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 28   | 13   | 12      | 270       | 35.0 | 47.06      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 28   | 14   | 13      | 270       | 33.0 | 52.59      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 28   | 15   | 12      | 270       | 32.0 | 55.64      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 28   | 16   | 11      | 260       | 32.0 | 55.64      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 28   | 17   | 11      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 28   | 18   | 10      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 28   | 19   | 11      | 260       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 28   | 20   | 9       | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 28   | 21   | 12      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 28   | 22   | 12      | 280       | 29.0 | 62.11      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 28   | 23   | 12      | 270       | 29.0 | 62.11      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 29   | 0    | 12      | 270       | 29.0 | 62.11      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 29   | 1    | 12      | 280       | 29.0 | 62.11      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 29   | 2    | 10      | 280       | 30.0 | 58.64      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 29   | 3    | 15      | 270       | 32.0 | 49.21      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 29   | 4    | 18      | 270       | 34.0 | 49.74      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 29   | 5    | 15      | 290       | 35.0 | 47.06      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 29   | 6    | 15      | 290       | 36.0 | 41.9       | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 29   | 7    | 15      | 290       | 36.0 | 44.54      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 29   | 8    | 18      | 270       | 38.0 | 39.95      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 29   | 9    | 15      | 270       | 38.0 | 39.95      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 29   | 10   | 13      | 280       | 38.0 | 39.95      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 29   | 11   | 10      | 280       | 38.0 | 39.95      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 29   | 12   | 12      | 270       | 36.0 | 44.54      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 29   | 13   | 14      | 260       | 34.0 | 52.85      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 29   | 14   | 10      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 29   | 15   | 12      | 270       | 32.0 | 55.64      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 29   | 16   | 16      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 29   | 17   | 13      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 29   | 18   | 12      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 7     | 29   | 19   | 10      | 260       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 29   | 20   | 12      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 29   | 21   | 8       | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 29   | 22   | 8       | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 29   | 23   | 6       | 260       | 28.0 | 69.97      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 30   | 0    | 5       | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 30   | 1    | 10      | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 30   | 2    | 12      | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 30   | 3    | 14      | 290       | 31.0 | 66.44      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 30   | 4    | 13      | 280       | 34.0 | 52.85      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 30   | 5    | 14      | 280       | 35.0 | 53.11      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 30   | 6    | 12      | 290       | 36.0 | 47.33      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 30   | 7    | 12      | 250       | 36.0 | 47.33      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 30   | 8    | 15      | 280       | 37.0 | 44.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 30   | 9    | 11      | 270       | 37.0 | 44.81      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 30   | 10   | 10      | 260       | 37.0 | 44.81      | 0.0      | 10.0  | 1004.064635 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 30   | 11   | 10      | 290       | 38.0 | 42.45      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 30   | 12   | 10      | 270       | 37.0 | 47.6       | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 30   | 13   | 10      | 260       | 35.0 | 50         | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 30   | 14   | 11      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 30   | 15   | 15      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 30   | 16   | 15      | 270       | 32.0 | 55.64      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 30   | 17   | 12      | 280       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 30   | 18   | 9       | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 30   | 19   | 9       | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 30   | 20   | 12      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 30   | 21   | 10      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 30   | 22   | 12      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 30   | 23   | 12      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 31   | 0    | 12      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 31   | 1    | 11      | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 31   | 2    | 12      | 280       | 29.0 | 74.51      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 31   | 3    | 11      | 270       | 31.0 | 70.53      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 31   | 4    | 15      | 280       | 33.0 | 63.01      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 31   | 5    | 11      | 280       | 35.0 | 56.38      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 31   | 6    | 10      | 280       | 36.0 | 53.36      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 31   | 7    | 9       | 290       | 37.0 | 47.6       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 31   | 8    | 12      | 290       | 38.0 | 42.45      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 31   | 9    | 13      | 290       | 38.0 | 42.45      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 31   | 10   | 12      | 300       | 39.0 | 40.23      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 31   | 11   | 9       | 280       | 38.0 | 42.45      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 7     | 31   | 12   | 10      | 290       | 38.0 | 42.45      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 7     | 31   | 13   | 11      | 250       | 36.0 | 50.27      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 31   | 14   | 15      | 270       | 34.0 | 56.13      | 0.0      | 10.0  | 1006.096469 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 7     | 31   | 15   | 10      | 280       | 33.0 | 59.35      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 31   | 16   | 6       | 270       | 32.0 | 62.78      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 31   | 17   | 6       | 320       | 31.0 | 66.44      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 31   | 18   | 3       | 20        | 29.0 | 79.1       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 7     | 31   | 19   | 4       | 300       | 29.0 | 79.1       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 7     | 31   | 20   | 9       | 290       | 29.0 | 74.51      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 31   | 21   | 10      | 290       | 29.0 | 74.51      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 7     | 31   | 22   | 12      | 280       | 29.0 | 74.51      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 7     | 31   | 23   | 8       | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 1    | 0    | 10      | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 1    | 1    | 9       | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 1    | 2    | 9       | 280       | 29.0 | 79.1       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 1    | 3    | 11      | 270       | 31.0 | 70.53      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 1    | 4    | 10      | 270       | 32.0 | 66.65      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 1    | 5    | 9       | 260       | 33.0 | 63.01      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 1    | 7    | 9       | 300       | 37.0 | 50.53      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 1    | 8    | 8       | 260       | 37.0 | 47.6       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 1    | 9    | 10      | 270       | 38.0 | 42.45      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 1    | 10   | 9       | 300       | 38.0 | 45.09      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 1    | 11   | 8       | 320       | 38.0 | 45.09      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 1    | 12   | 8       | 320       | 37.0 | 47.6       | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 1    | 13   | 8       | 300       | 36.0 | 50.27      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 1    | 14   | 9       | 280       | 33.0 | 59.35      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 1    | 15   | 4       | 230       | 32.0 | 62.78      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 1    | 16   | 9       | 200       | 30.0 | 70.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 1    | 17   | 7       | 200       | 29.0 | 74.51      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 1    | 18   | 4       | 180       | 29.0 | 74.51      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 1    | 19   | 2       | M         | 29.0 | 74.51      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 1    | 20   | 2       | M         | 28.0 | 78.96      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 1    | 21   | 2       | M         | 28.0 | 78.96      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 1    | 22   | 6       | 310       | 29.0 | 74.51      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 1    | 23   | 5       | 310       | 29.0 | 74.51      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 2    | 0    | 3       | M         | 28.0 | 78.96      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 2    | 1    | 3       | M         | 27.0 | 83.7       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 2    | 2    | 8       | 300       | 29.0 | 79.1       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 2    | 3    | 10      | 270       | 31.0 | 70.53      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 2    | 4    | 9       | 280       | 32.0 | 66.65      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 2    | 5    | 10      | 270       | 33.0 | 66.85      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 2    | 6    | 10      | 290       | 34.0 | 63.23      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 2    | 7    | 8       | 290       | 36.0 | 56.62      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 2    | 8    | 9       | 290       | 37.0 | 50.53      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 2    | 9    | 9       | 300       | 37.0 | 50.53      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 2    | 10   | 9       | 300       | 38.0 | 45.09      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 2    | 11   | 6       | 310       | 38.0 | 45.09      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 8     | 2    | 12   | 6       | 310       | 37.0 | 47.6       | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 2    | 14   | 19      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 2    | 15   | 8       | 150       | 26.0 | 83.59      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 2    | 16   | 9       | 200       | 26.0 | 88.78      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 2    | 17   | 4       | 210       | 25.0 | 94.2       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 2    | 18   | 5       | 250       | 26.0 | 88.78      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 2    | 19   | 4       | 250       | 26.0 | 94.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 2    | 20   | 6       | 250       | 26.0 | 94.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 2    | 21   | 5       | 250       | 26.0 | 94.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 2    | 22   | 4       | 320       | 26.0 | 94.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 2    | 23   | 4       | 320       | 26.0 | 94.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 3    | 0    | 8       | 320       | 26.0 | 88.78      | 0.0      | 10.0  | 1006.096469 |



| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 3    | 1    | 7       | 280       | 26.0 | 88.78      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 3    | 2    | 8       | 270       | 27.0 | 88.86      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 3    | 3    | 10      | 250       | 28.0 | 83.82      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 3    | 4    | 10      | 250       | 29.0 | 83.93      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 3    | 5    | 11      | 240       | 31.0 | 74.84      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 3    | 6    | 10      | 250       | 32.0 | 66.65      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 3    | 7    | 4       | 240       | 33.0 | 63.01      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 3    | 8    | 6       | 220       | 34.0 | 59.59      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 3    | 9    | 5       | 160       | 34.0 | 56.13      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 3    | 10   | 4       | 180       | 32.0 | 66.65      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 3    | 11   | 5       | 170       | 32.0 | 66.65      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 3    | 12   | 4       | 180       | 31.0 | 70.53      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 3    | 13   | 5       | 160       | 30.0 | 79.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 3    | 14   | 5       | 160       | 30.0 | 79.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 3    | 15   | 6       | 190       | 29.0 | 83.93      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 3    | 16   | 5       | 190       | 29.0 | 83.93      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 3    | 17   | 5       | 230       | 29.0 | 83.93      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 3    | 18   | 6       | 240       | 29.0 | 83.93      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 3    | 19   | 8       | 280       | 28.0 | 83.82      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 3    | 20   | 10      | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 3    | 21   | 12      | 290       | 27.0 | 83.7       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 3    | 22   | 9       | 280       | 27.0 | 83.7       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 3    | 23   | 10      | 290       | 27.0 | 83.7       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 4    | 0    | 10      | 290       | 27.0 | 83.7       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 4    | 1    | 14      | 270       | 27.0 | 83.7       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 4    | 2    | 10      | 280       | 27.0 | 83.7       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 4    | 3    | 10      | 270       | 28.0 | 83.82      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 4    | 4    | 11      | 290       | 30.0 | 79.24      | 0.0      | 10.0  | 1008.128303 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 4    | 5    | 8       | 280       | 32.0 | 70.72      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 4    | 6    | 12      | 270       | 33.0 | 66.85      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 4    | 7    | 8       | 260       | 34.0 | 63.23      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 4    | 8    | 6       | 280       | 35.0 | 56.38      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 4    | 9    | 6       | 270       | 37.0 | 50.53      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 4    | 10   | 3       | M         | 38.0 | 45.09      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 4    | 11   | 6       | 100       | 35.0 | 53.11      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 4    | 12   | 13      | 20        | 31.0 | 66.44      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 4    | 13   | 8       | 180       | 26.0 | 83.59      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 4    | 14   | 5       | 150       | 25.0 | 88.7       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 4    | 15   | 2       | M         | 26.0 | 88.78      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 4    | 17   | 1       | M         | 26.0 | 94.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 4    | 18   | 4       | 20        | 27.0 | 94.29      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 4    | 19   | 2       | M         | 26.0 | 94.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 4    | 20   | 1       | M         | 27.0 | 94.29      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 4    | 21   | 2       | M         | 26.0 | 94.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 4    | 22   | 0       | 0         | 26.0 | 94.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 4    | 23   | 2       | M         | 26.0 | 94.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 5    | 0    | 3       | 270       | 26.0 | 94.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 5    | 1    | 2       | M         | 26.0 | 94.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 5    | 2    | 6       | 260       | 27.0 | 94.29      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 5    | 3    | 6       | 270       | 27.0 | 94.29      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 5    | 4    | 8       | 270       | 28.0 | 88.94      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 5    | 5    | 8       | 270       | 30.0 | 84.04      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 5    | 6    | 8       | 270       | 30.0 | 84.04      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 5    | 7    | 8       | 270       | 32.0 | 79.52      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 5    | 8    | 5       | 270       | 34.0 | 71.09      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 5    | 9    | 5       | 230       | 35.0 | 67.26      | 0.0      | 10.0  | 1004.064635 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 5    | 10   | 6       | 70        | 34.0 | 71.09      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 5    | 11   | 5       | 70        | 34.0 | 67.06      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 5    | 12   | 15      | 250       | 27.0 | 78.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 5    | 13   | 10      | 250       | 24.0 | 94.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 5    | 14   | 4       | 110       | 25.0 | 88.7       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 5    | 15   | 2       | M         | 25.0 | 94.2       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 5    | 16   | 3       | M         | 25.0 | 94.2       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 5    | 17   | 6       | 270       | 25.0 | 94.2       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 5    | 18   | 6       | 270       | 25.0 | 94.2       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 5    | 19   | 8       | 270       | 25.0 | 94.2       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 5    | 20   | 8       | 270       | 25.0 | 94.2       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 5    | 21   | 6       | 270       | 25.0 | 94.2       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 5    | 22   | 9       | 280       | 25.0 | 94.2       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 5    | 23   | 9       | 290       | 25.0 | 94.2       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 6    | 0    | 8       | 290       | 25.0 | 94.2       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 6    | 1    | 8       | 280       | 25.0 | 94.2       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 6    | 2    | 12      | 280       | 26.0 | 94.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 6    | 3    | 12      | 270       | 28.0 | 88.94      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 6    | 4    | 11      | 270       | 30.0 | 89.1       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 6    | 5    | 9       | 270       | 32.0 | 79.52      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 6    | 6    | 10      | 290       | 33.0 | 75.17      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 6    | 7    | 7       | 280       | 34.0 | 67.06      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 6    | 8    | 13      | 260       | 35.0 | 59.82      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 6    | 9    | 12      | 270       | 36.0 | 56.62      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 6    | 10   | 10      | 290       | 37.0 | 53.61      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 6    | 11   | 10      | 250       | 37.0 | 50.53      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 6    | 12   | 10      | 250       | 36.0 | 50.27      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 6    | 13   | 8       | 250       | 34.0 | 56.13      | 0.0      | 10.0  | 1004.064635 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 6    | 14   | 8       | 160       | 32.0 | 66.65      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 6    | 15   | 6       | 180       | 30.0 | 79.24      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 6    | 16   | 5       | 200       | 30.0 | 79.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 6    | 17   | 4       | 230       | 29.0 | 83.93      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 6    | 18   | 2       | M         | 29.0 | 83.93      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 6    | 19   | 5       | 290       | 29.0 | 83.93      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 6    | 20   | 6       | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 6    | 21   | 8       | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 6    | 22   | 7       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 6    | 23   | 10      | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 7    | 0    | 8       | 290       | 27.0 | 78.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 7    | 1    | 12      | 280       | 27.0 | 78.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 7    | 2    | 10      | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 7    | 3    | 12      | 290       | 29.0 | 74.51      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 7    | 4    | 12      | 280       | 31.0 | 70.53      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 7    | 5    | 10      | 290       | 33.0 | 63.01      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 7    | 6    | 8       | 290       | 34.0 | 63.23      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 7    | 8    | 8       | 270       | 35.0 | 56.38      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 7    | 9    | 8       | 270       | 36.0 | 53.36      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 7    | 10   | 7       | 250       | 36.0 | 53.36      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 7    | 11   | 6       | 280       | 36.0 | 53.36      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 7    | 12   | 6       | 270       | 35.0 | 53.11      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 7    | 13   | 7       | 250       | 34.0 | 56.13      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 7    | 14   | 6       | 150       | 32.0 | 70.72      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 7    | 15   | 6       | 180       | 31.0 | 74.84      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 7    | 16   | 8       | 180       | 30.0 | 79.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 7    | 17   | 5       | 230       | 29.0 | 83.93      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 7    | 18   | 4       | 250       | 29.0 | 83.93      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 7    | 19   | 3       | 260       | 28.0 | 83.82      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 7    | 20   | 8       | 280       | 29.0 | 79.1       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 7    | 21   | 9       | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 7    | 22   | 8       | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 7    | 23   | 9       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 8    | 0    | 6       | 270       | 27.0 | 83.7       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 8    | 1    | 9       | 280       | 27.0 | 83.7       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 8    | 2    | 8       | 270       | 27.0 | 83.7       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 8    | 3    | 10      | 270       | 29.0 | 79.1       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 8    | 4    | 8       | 290       | 29.0 | 79.1       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 8    | 5    | 9       | 290       | 31.0 | 74.84      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 8    | 6    | 8       | 270       | 33.0 | 70.91      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 8    | 7    | 3       | 290       | 34.0 | 67.06      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 8    | 8    | 6       | 270       | 35.0 | 59.82      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 8    | 9    | 6       | 270       | 36.0 | 56.62      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 8    | 11   | 2       | M         | 38.0 | 50.79      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 8    | 12   | 3       | 250       | 35.0 | 56.38      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 8    | 13   | 3       | 100       | 34.0 | 59.59      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 8    | 14   | 8       | 120       | 32.0 | 70.72      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 8    | 15   | 10      | 230       | 30.0 | 79.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 8    | 16   | 12      | 260       | 25.0 | 88.7       | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 8    | 17   | 3       | 160       | 25.0 | 88.7       | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 8    | 18   | 5       | 20        | 26.0 | 88.78      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 8    | 19   | 2       | M         | 26.0 | 88.78      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 8    | 20   | 2       | M         | 25.0 | 94.2       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 8    | 21   | 3       | 90        | 25.0 | 94.2       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 8    | 22   | 5       | 20        | 25.0 | 94.2       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 8    | 23   | 4       | 80        | 24.0 | 94.16      | 0.0      | 10.0  | 1009.14422  |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 9    | 0    | 1       | M         | 24.0 | 94.16      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 9    | 2    | 3       | 270       | 25.0 | 94.2       | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 9    | 3    | 2       | M         | 26.0 | 94.24      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 9    | 4    | 2       | M         | 27.0 | 94.29      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 9    | 6    | 4       | 250       | 30.0 | 89.1       | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 9    | 7    | 5       | 220       | 32.0 | 84.26      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 9    | 9    | 4       | 230       | 33.0 | 79.66      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 9    | 10   | 5       | 160       | 33.0 | 79.66      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 9    | 11   | 6       | 150       | 33.0 | 75.17      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 9    | 12   | 6       | 140       | 32.0 | 75.01      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 9    | 13   | 4       | 160       | 31.0 | 79.38      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 9    | 14   | 3       | 240       | 30.0 | 79.24      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 9    | 15   | 9       | 320       | 27.0 | 78.81      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 9    | 16   | 3       | 230       | 27.0 | 83.7       | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 9    | 17   | 9       | 230       | 27.0 | 83.7       | 0.0      | 10.0  | 1010.837415 |
| 2025 | 8     | 9    | 18   | 3       | M         | 26.0 | 88.78      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 9    | 19   | 4       | 250       | 26.0 | 88.78      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 9    | 20   | 3       | M         | 26.0 | 88.78      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 9    | 21   | 5       | 270       | 26.0 | 88.78      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 9    | 22   | 1       | M         | 26.0 | 88.78      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 9    | 23   | 3       | 280       | 26.0 | 88.78      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 10   | 0    | 2       | M         | 26.0 | 94.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 10   | 1    | 5       | 270       | 26.0 | 94.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 10   | 2    | 5       | 260       | 27.0 | 94.29      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 10   | 3    | 8       | 250       | 28.0 | 88.94      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 10   | 5    | 11      | 280       | 32.0 | 79.52      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 10   | 6    | 10      | 290       | 33.0 | 75.17      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 10   | 7    | 8       | 240       | 34.0 | 67.06      | 0.0      | 10.0  | 1008.128303 |

| <b>Year</b> | <b>Month</b> | <b>Date</b> | <b>Hour</b> | <b>W_speed</b> | <b>W_dir</b>     | <b>Temp</b> | <b>R_humidity</b> | <b>Rainfall</b> | <b>Cloud</b> | <b>Stn_press</b> |
|-------------|--------------|-------------|-------------|----------------|------------------|-------------|-------------------|-----------------|--------------|------------------|
| <b>YYYY</b> | <b>MM</b>    | <b>DD</b>   | <b>HH</b>   | <b>m/s</b>     | <b>from Noth</b> | <b>oC</b>   | <b>%</b>          | <b>mm</b>       | <b>octas</b> | <b>mb</b>        |
| 2025        | 8            | 10          | 8           | 7              | 270              | 34.0        | 67.06             | 0.0             | 10.0         | 1007.112386      |
| 2025        | 8            | 10          | 9           | 10             | 270              | 35.0        | 59.82             | 0.0             | 10.0         | 1006.096469      |
| 2025        | 8            | 10          | 10          | 5              | 180              | 33.0        | 63.01             | 0.0             | 10.0         | 1005.080552      |
| 2025        | 8            | 10          | 11          | 8              | 160              | 30.0        | 70.35             | 0.0             | 10.0         | 1006.096469      |
| 2025        | 8            | 10          | 12          | 5              | 20               | 29.0        | 79.1              | 0.0             | 10.0         | 1006.096469      |
| 2025        | 8            | 10          | 13          | 8              | 110              | 27.0        | 83.7              | 0.0             | 10.0         | 1008.128303      |
| 2025        | 8            | 10          | 14          | 8              | 80               | 26.0        | 88.78             | 0.0             | 10.0         | 1008.128303      |
| 2025        | 8            | 10          | 15          | 2              | M                | 26.0        | 88.78             | 0.0             | 10.0         | 1009.14422       |
| 2025        | 8            | 10          | 16          | 2              | M                | 25.0        | 94.2              | 0.0             | 10.0         | 1009.14422       |
| 2025        | 8            | 10          | 17          | 6              | 10               | 26.0        | 88.78             | 0.0             | 10.0         | 1010.160137      |
| 2025        | 8            | 10          | 18          | 9              | 360              | 25.0        | 94.2              | 0.0             | 10.0         | 1010.160137      |
| 2025        | 8            | 10          | 19          | 3              | 10               | 25.0        | 94.2              | 0.0             | 10.0         | 1010.160137      |
| 2025        | 8            | 10          | 20          | 2              | M                | 25.0        | 94.2              | 0.0             | 10.0         | 1009.14422       |
| 2025        | 8            | 10          | 21          | 0              | 0                | 25.0        | 94.2              | 0.0             | 10.0         | 1008.128303      |
| 2025        | 8            | 10          | 22          | 0              | 0                | 25.0        | 94.2              | 0.0             | 10.0         | 1008.128303      |
| 2025        | 8            | 10          | 23          | 0              | 0                | 25.0        | 94.2              | 0.0             | 10.0         | 1007.112386      |
| 2025        | 8            | 11          | 0           | 0              | 0                | 25.0        | 94.2              | 0.0             | 10.0         | 1008.128303      |
| 2025        | 8            | 11          | 1           | 2              | M                | 25.0        | 100               | 0.0             | 10.0         | 1009.14422       |
| 2025        | 8            | 11          | 2           | 0              | 0                | 26.0        | 94.24             | 0.0             | 10.0         | 1010.160137      |
| 2025        | 8            | 11          | 3           | 4              | 200              | 26.0        | 94.24             | 0.0             | 10.0         | 1010.837415      |
| 2025        | 8            | 11          | 4           | 5              | 230              | 27.0        | 88.86             | 0.0             | 10.0         | 1010.837415      |
| 2025        | 8            | 11          | 5           | 8              | 230              | 28.0        | 94.33             | 0.0             | 10.0         | 1010.160137      |
| 2025        | 8            | 11          | 6           | 12             | 250              | 30.0        | 84.04             | 0.0             | 10.0         | 1010.160137      |
| 2025        | 8            | 11          | 7           | 8              | 250              | 31.0        | 79.38             | 0.0             | 10.0         | 1009.14422       |
| 2025        | 8            | 11          | 8           | 8              | 220              | 31.0        | 79.38             | 0.0             | 10.0         | 1008.128303      |
| 2025        | 8            | 11          | 9           | 3              | 180              | 31.0        | 84.15             | 0.0             | 10.0         | 1007.112386      |
| 2025        | 8            | 11          | 10          | 5              | 160              | 31.0        | 84.15             | 0.0             | 10.0         | 1006.096469      |
| 2025        | 8            | 11          | 11          | 5              | 190              | 31.0        | 84.15             | 0.0             | 10.0         | 1006.096469      |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 11   | 12   | 5       | 180       | 31.0 | 79.38      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 11   | 13   | 5       | 190       | 30.0 | 84.04      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 11   | 14   | 5       | 190       | 29.0 | 89.02      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 11   | 15   | 4       | 210       | 29.0 | 83.93      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 11   | 16   | 4       | 250       | 29.0 | 83.93      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 11   | 17   | 4       | 220       | 28.0 | 88.94      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 11   | 18   | 6       | 230       | 28.0 | 88.94      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 11   | 19   | 6       | 270       | 28.0 | 83.82      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 11   | 20   | 9       | 250       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 11   | 21   | 8       | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 11   | 22   | 8       | 260       | 27.0 | 83.7       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 11   | 23   | 11      | 270       | 27.0 | 78.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 12   | 0    | 11      | 270       | 27.0 | 83.7       | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 12   | 1    | 10      | 280       | 27.0 | 83.7       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 12   | 2    | 10      | 260       | 27.0 | 83.7       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 12   | 3    | 10      | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 12   | 5    | 8       | 270       | 30.0 | 74.68      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 12   | 6    | 10      | 270       | 31.0 | 70.53      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 12   | 7    | 8       | 260       | 31.0 | 70.53      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 12   | 8    | 9       | 260       | 32.0 | 66.65      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 12   | 9    | 7       | 320       | 33.0 | 63.01      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 12   | 10   | 8       | 320       | 32.0 | 66.65      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 12   | 13   | 3       | 230       | 31.0 | 66.44      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 12   | 14   | 2       | M         | 30.0 | 74.68      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 12   | 15   | 4       | 250       | 30.0 | 70.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 12   | 16   | 8       | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 12   | 17   | 12      | 280       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 12   | 18   | 9       | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |



| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 12   | 19   | 10      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 12   | 20   | 11      | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 12   | 21   | 12      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 12   | 22   | 10      | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 12   | 23   | 10      | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 13   | 1    | 14      | 280       | 27.0 | 78.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 13   | 2    | 10      | 280       | 27.0 | 78.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 13   | 3    | 12      | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 13   | 4    | 11      | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 13   | 5    | 13      | 270       | 31.0 | 66.44      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 13   | 6    | 11      | 270       | 31.0 | 66.44      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 13   | 7    | 11      | 270       | 32.0 | 66.65      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 13   | 8    | 11      | 280       | 33.0 | 63.01      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 13   | 9    | 11      | 290       | 33.0 | 63.01      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 13   | 10   | 13      | 270       | 34.0 | 59.59      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 13   | 11   | 11      | 250       | 33.0 | 59.35      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 13   | 12   | 12      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 13   | 13   | 9       | 250       | 31.0 | 62.56      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 13   | 14   | 5       | 240       | 30.0 | 66.24      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 13   | 15   | 4       | 230       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 13   | 16   | 8       | 280       | 29.0 | 74.51      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 13   | 17   | 10      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 13   | 18   | 8       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 13   | 19   | 11      | 260       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 13   | 20   | 12      | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 13   | 21   | 12      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 13   | 22   | 10      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 13   | 23   | 12      | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 14   | 0    | 8       | 250       | 27.0 | 78.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 14   | 1    | 6       | 240       | 27.0 | 78.81      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 14   | 2    | 8       | 260       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 14   | 3    | 9       | 270       | 30.0 | 70.35      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 14   | 4    | 9       | 250       | 31.0 | 70.53      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 14   | 5    | 8       | 250       | 33.0 | 63.01      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 14   | 7    | 12      | 280       | 35.0 | 56.38      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 14   | 8    | 6       | 230       | 34.0 | 56.13      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 14   | 9    | 5       | 180       | 35.0 | 56.38      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 14   | 10   | 13      | 270       | 35.0 | 53.11      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 14   | 11   | 10      | 280       | 34.0 | 56.13      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 14   | 12   | 6       | 200       | 33.0 | 63.01      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 14   | 13   | 5       | 230       | 31.0 | 66.44      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 14   | 14   | 12      | 280       | 31.0 | 66.44      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 14   | 15   | 8       | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 14   | 16   | 10      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 14   | 17   | 9       | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 14   | 18   | 8       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 14   | 19   | 8       | 260       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 14   | 20   | 8       | 260       | 27.0 | 78.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 14   | 21   | 10      | 260       | 27.0 | 78.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 14   | 22   | 9       | 270       | 27.0 | 78.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 14   | 23   | 10      | 260       | 27.0 | 78.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 15   | 0    | 8       | 260       | 27.0 | 78.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 15   | 1    | 8       | 250       | 27.0 | 78.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 15   | 2    | 8       | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 15   | 3    | 12      | 270       | 30.0 | 74.68      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 15   | 4    | 14      | 270       | 31.0 | 70.53      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 15   | 5    | 12      | 250       | 31.0 | 66.44      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 15   | 6    | 12      | 250       | 32.0 | 62.78      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 15   | 7    | 15      | 260       | 33.0 | 63.01      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 15   | 8    | 15      | 250       | 34.0 | 59.59      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 15   | 9    | 14      | 270       | 34.0 | 59.59      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 15   | 10   | 13      | 260       | 34.0 | 56.13      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 15   | 11   | 15      | 270       | 34.0 | 59.59      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 15   | 12   | 12      | 270       | 32.0 | 62.78      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 15   | 13   | 8       | 240       | 31.0 | 62.56      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 15   | 14   | 12      | 260       | 30.0 | 66.24      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 15   | 15   | 15      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 15   | 17   | 12      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 15   | 18   | 12      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 15   | 19   | 15      | 260       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 15   | 20   | 16      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 15   | 21   | 10      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 15   | 22   | 10      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 15   | 23   | 8       | 280       | 27.0 | 78.81      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 16   | 0    | 8       | 270       | 27.0 | 78.81      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 16   | 1    | 10      | 260       | 27.0 | 78.81      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 16   | 2    | 12      | 260       | 27.0 | 78.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 16   | 3    | 10      | 270       | 29.0 | 79.1       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 16   | 4    | 10      | 270       | 30.0 | 70.35      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 16   | 5    | 12      | 260       | 32.0 | 66.65      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 16   | 6    | 10      | 270       | 31.0 | 66.44      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 16   | 7    | 11      | 250       | 32.0 | 62.78      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 16   | 8    | 12      | 260       | 34.0 | 56.13      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 8     | 16   | 9    | 15      | 270       | 34.0 | 56.13      | 0.0      | 10.0  | 1002.032801 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 16   | 10   | 15      | 260       | 34.0 | 56.13      | 0.0      | 10.0  | 1001.016884 |
| 2025 | 8     | 16   | 11   | 14      | 260       | 34.0 | 56.13      | 0.0      | 10.0  | 1001.016884 |
| 2025 | 8     | 16   | 12   | 15      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1001.016884 |
| 2025 | 8     | 16   | 13   | 15      | 260       | 32.0 | 62.78      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 8     | 16   | 14   | 15      | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 16   | 15   | 12      | 260       | 30.0 | 66.24      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 16   | 16   | 14      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 16   | 17   | 10      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 16   | 18   | 10      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 16   | 19   | 12      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 16   | 20   | 10      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 16   | 21   | 12      | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 16   | 22   | 10      | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 16   | 23   | 12      | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 17   | 0    | 13      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 17   | 1    | 11      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 17   | 2    | 9       | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 17   | 3    | 8       | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 17   | 4    | 10      | 260       | 29.0 | 79.1       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 17   | 5    | 10      | 280       | 31.0 | 70.53      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 17   | 6    | 10      | 290       | 31.0 | 70.53      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 17   | 7    | 10      | 260       | 31.0 | 70.53      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 17   | 8    | 8       | 260       | 33.0 | 63.01      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 17   | 9    | 15      | 270       | 33.0 | 63.01      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 17   | 10   | 14      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 8     | 17   | 11   | 11      | 280       | 33.0 | 59.35      | 0.0      | 10.0  | 1002.032801 |
| 2025 | 8     | 17   | 12   | 15      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 17   | 13   | 13      | 280       | 31.0 | 62.56      | 0.0      | 10.0  | 1003.048718 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 17   | 14   | 15      | 260       | 30.0 | 66.24      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 17   | 15   | 10      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 17   | 16   | 10      | 260       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 17   | 17   | 11      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 17   | 18   | 12      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 17   | 19   | 12      | 260       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 17   | 20   | 10      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 17   | 21   | 12      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 17   | 22   | 12      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 17   | 23   | 12      | 260       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 18   | 0    | 8       | 270       | 27.0 | 78.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 18   | 1    | 10      | 270       | 27.0 | 78.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 18   | 2    | 6       | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 18   | 3    | 12      | 280       | 29.0 | 74.51      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 18   | 4    | 15      | 270       | 31.0 | 66.44      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 18   | 5    | 19      | 260       | 33.0 | 59.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 18   | 6    | 19      | 270       | 34.0 | 52.85      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 18   | 7    | 19      | 280       | 34.0 | 52.85      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 18   | 8    | 20      | 280       | 35.0 | 47.06      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 18   | 9    | 12      | 270       | 34.0 | 52.85      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 18   | 10   | 11      | 280       | 33.0 | 55.88      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 18   | 11   | 15      | 270       | 32.0 | 55.64      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 18   | 12   | 15      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 18   | 13   | 15      | 260       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 18   | 15   | 15      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 18   | 16   | 14      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 18   | 17   | 12      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 18   | 18   | 14      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 18   | 19   | 10      | 280       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 18   | 20   | 10      | 280       | 28.0 | 69.97      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 18   | 21   | 8       | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 18   | 22   | 12      | 270       | 28.0 | 65.82      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 18   | 23   | 6       | 250       | 27.0 | 69.77      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 19   | 0    | 6       | 250       | 27.0 | 69.77      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 19   | 1    | 5       | 240       | 27.0 | 69.77      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 19   | 2    | 8       | 260       | 29.0 | 62.11      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 19   | 3    | 14      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 19   | 4    | 14      | 270       | 33.0 | 52.59      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 19   | 5    | 14      | 270       | 34.0 | 49.74      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 19   | 6    | 18      | 270       | 35.0 | 47.06      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 19   | 7    | 14      | 270       | 36.0 | 44.54      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 19   | 8    | 15      | 280       | 36.0 | 41.9       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 19   | 9    | 15      | 270       | 37.0 | 42.18      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 19   | 10   | 14      | 270       | 36.0 | 41.9       | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 19   | 11   | 13      | 250       | 35.0 | 44.27      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 19   | 12   | 14      | 270       | 35.0 | 44.27      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 19   | 13   | 10      | 260       | 33.0 | 52.59      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 19   | 14   | 10      | 270       | 32.0 | 55.64      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 19   | 15   | 8       | 270       | 31.0 | 55.39      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 19   | 16   | 12      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 19   | 17   | 11      | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 19   | 19   | 13      | 280       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 19   | 20   | 8       | 280       | 28.0 | 69.97      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 19   | 21   | 11      | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 19   | 22   | 11      | 280       | 28.0 | 69.97      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 19   | 23   | 11      | 270       | 27.0 | 69.77      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 20   | 0    | 8       | 280       | 27.0 | 69.77      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 20   | 1    | 6       | 280       | 27.0 | 69.77      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 20   | 2    | 10      | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 20   | 3    | 8       | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 20   | 4    | 9       | 270       | 32.0 | 55.64      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 20   | 5    | 11      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 20   | 6    | 8       | 270       | 34.0 | 52.85      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 20   | 7    | 8       | 280       | 36.0 | 44.54      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 20   | 8    | 8       | 280       | 37.0 | 44.81      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 20   | 9    | 10      | 280       | 37.0 | 42.18      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 20   | 10   | 12      | 270       | 37.0 | 39.67      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 20   | 11   | 13      | 280       | 37.0 | 42.18      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 20   | 12   | 10      | 270       | 36.0 | 41.9       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 20   | 13   | 10      | 280       | 34.0 | 49.74      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 20   | 14   | 11      | 280       | 33.0 | 52.59      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 20   | 15   | 10      | 290       | 32.0 | 55.64      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 20   | 16   | 8       | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 20   | 17   | 6       | 250       | 30.0 | 58.64      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 20   | 18   | 8       | 270       | 29.0 | 62.11      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 20   | 19   | 8       | 280       | 29.0 | 62.11      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 20   | 20   | 6       | 280       | 28.0 | 65.82      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 20   | 21   | 6       | 270       | 27.0 | 69.77      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 20   | 22   | 8       | 280       | 27.0 | 69.77      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 20   | 23   | 8       | 290       | 27.0 | 69.77      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 21   | 0    | 6       | 270       | 26.0 | 74         | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 21   | 1    | 6       | 280       | 26.0 | 78.67      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 21   | 2    | 9       | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 21   | 3    | 12      | 270       | 30.0 | 70.35      | 0.0      | 10.0  | 1010.837415 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 21   | 4    | 10      | 280       | 31.0 | 66.44      | 0.0      | 10.0  | 1010.837415 |
| 2025 | 8     | 21   | 5    | 10      | 260       | 33.0 | 59.35      | 0.0      | 10.0  | 1010.837415 |
| 2025 | 8     | 21   | 6    | 9       | 290       | 34.0 | 56.13      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 21   | 7    | 10      | 280       | 35.0 | 53.11      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 21   | 8    | 8       | 320       | 36.0 | 47.33      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 21   | 9    | 6       | 300       | 37.0 | 42.18      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 21   | 10   | 5       | 320       | 38.0 | 39.95      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 21   | 11   | 5       | 310       | 38.0 | 39.95      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 21   | 12   | 5       | 320       | 37.0 | 39.67      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 21   | 13   | 3       | M         | 35.0 | 47.06      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 21   | 14   | 5       | 120       | 33.0 | 52.59      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 21   | 15   | 6       | 140       | 32.0 | 66.65      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 21   | 16   | 8       | 150       | 31.0 | 70.53      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 21   | 17   | 5       | 210       | 30.0 | 79.24      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 21   | 18   | 2       | M         | 30.0 | 79.24      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 21   | 19   | 11      | 290       | 28.0 | 74.34      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 21   | 20   | 4       | 300       | 28.0 | 78.96      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 21   | 21   | 3       | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 21   | 22   | 2       | M         | 28.0 | 83.82      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 21   | 23   | 5       | 260       | 27.0 | 88.86      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 22   | 0    | 2       | M         | 26.0 | 88.78      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 22   | 1    | 4       | 280       | 27.0 | 88.86      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 22   | 2    | 6       | 260       | 27.0 | 88.86      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 22   | 3    | 6       | 260       | 28.0 | 83.82      | 0.0      | 10.0  | 1010.837415 |
| 2025 | 8     | 22   | 4    | 6       | 270       | 28.0 | 88.94      | 0.0      | 10.0  | 1010.837415 |
| 2025 | 8     | 22   | 5    | 5       | 280       | 29.0 | 83.93      | 0.0      | 10.0  | 1010.837415 |
| 2025 | 8     | 22   | 6    | 6       | 280       | 29.0 | 83.93      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 22   | 7    | 5       | 260       | 30.0 | 79.24      | 0.0      | 10.0  | 1009.14422  |



| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 22   | 8    | 8       | 280       | 31.0 | 74.84      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 22   | 9    | 8       | 290       | 32.0 | 75.01      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 22   | 10   | 8       | 270       | 33.0 | 66.85      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 22   | 11   | 6       | 280       | 33.0 | 66.85      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 22   | 12   | 5       | 270       | 33.0 | 66.85      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 22   | 13   | 2       | M         | 32.0 | 66.65      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 22   | 14   | 2       | M         | 30.0 | 79.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 22   | 15   | 1       | M         | 30.0 | 79.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 22   | 16   | 0       | 0         | 29.0 | 83.93      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 22   | 17   | 1       | M         | 29.0 | 83.93      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 22   | 18   | 2       | M         | 29.0 | 83.93      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 22   | 19   | 4       | 230       | 29.0 | 83.93      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 22   | 20   | 5       | 290       | 28.0 | 88.94      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 22   | 21   | 8       | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 22   | 22   | 6       | 280       | 27.0 | 78.81      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 22   | 23   | 6       | 290       | 27.0 | 78.81      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 23   | 0    | 9       | 290       | 27.0 | 78.81      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 23   | 1    | 10      | 270       | 27.0 | 83.7       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 23   | 2    | 11      | 270       | 28.0 | 83.82      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 23   | 3    | 12      | 270       | 29.0 | 79.1       | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 23   | 4    | 10      | 270       | 30.0 | 79.24      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 23   | 5    | 10      | 290       | 31.0 | 74.84      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 23   | 6    | 8       | 290       | 32.0 | 66.65      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 23   | 7    | 8       | 290       | 32.0 | 66.65      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 23   | 8    | 8       | 320       | 33.0 | 63.01      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 23   | 9    | 6       | 320       | 33.0 | 66.85      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 23   | 10   | 10      | 310       | 34.0 | 63.23      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 23   | 11   | 6       | 330       | 34.0 | 59.59      | 0.0      | 10.0  | 1006.096469 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 23   | 12   | 5       | 290       | 34.0 | 59.59      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 23   | 13   | 5       | 290       | 32.0 | 62.78      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 23   | 14   | 4       | 250       | 31.0 | 66.44      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 23   | 15   | 10      | 180       | 30.0 | 70.35      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 23   | 16   | 6       | 210       | 29.0 | 74.51      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 23   | 17   | 3       | 220       | 29.0 | 74.51      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 23   | 18   | 5       | 200       | 28.0 | 78.96      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 23   | 19   | 5       | 210       | 28.0 | 78.96      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 23   | 20   | 4       | 230       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 23   | 21   | 4       | 240       | 27.0 | 78.81      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 23   | 22   | 6       | 260       | 27.0 | 78.81      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 23   | 23   | 6       | 280       | 27.0 | 78.81      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 24   | 0    | 4       | 290       | 26.0 | 78.67      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 24   | 1    | 8       | 280       | 26.0 | 83.59      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 24   | 2    | 8       | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 24   | 3    | 10      | 290       | 30.0 | 74.68      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 24   | 4    | 8       | 270       | 31.0 | 74.84      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 24   | 5    | 11      | 290       | 33.0 | 63.01      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 24   | 6    | 8       | 290       | 35.0 | 56.38      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 24   | 7    | 8       | 290       | 35.0 | 56.38      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 24   | 8    | 8       | 300       | 36.0 | 53.36      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 24   | 9    | 11      | 270       | 37.0 | 50.53      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 24   | 10   | 6       | 280       | 37.0 | 47.6       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 24   | 11   | 9       | 310       | 38.0 | 45.09      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 24   | 12   | 8       | 290       | 37.0 | 44.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 24   | 13   | 6       | 300       | 35.0 | 50         | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 24   | 14   | 6       | 150       | 34.0 | 52.85      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 24   | 15   | 10      | 180       | 32.0 | 70.72      | 0.0      | 10.0  | 1008.128303 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 24   | 16   | 6       | 200       | 31.0 | 74.84      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 24   | 17   | 5       | 170       | 31.0 | 70.53      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 24   | 18   | 8       | 300       | 30.0 | 70.35      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 24   | 19   | 2       | M         | 29.0 | 74.51      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 24   | 20   | 4       | 250       | 28.0 | 78.96      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 24   | 21   | 6       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 24   | 22   | 8       | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 24   | 23   | 8       | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 25   | 0    | 11      | 270       | 27.0 | 78.81      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 25   | 1    | 12      | 280       | 27.0 | 78.81      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 25   | 2    | 13      | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 25   | 3    | 11      | 270       | 30.0 | 74.68      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 25   | 4    | 8       | 290       | 31.0 | 74.84      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 25   | 5    | 9       | 290       | 33.0 | 66.85      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 25   | 6    | 10      | 270       | 33.0 | 63.01      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 25   | 7    | 9       | 270       | 35.0 | 56.38      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 25   | 8    | 8       | 300       | 34.0 | 52.85      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 25   | 9    | 8       | 290       | 36.0 | 44.54      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 25   | 10   | 8       | 280       | 37.0 | 39.67      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 25   | 11   | 8       | 300       | 38.0 | 37.58      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 25   | 12   | 10      | 270       | 37.0 | 35.06      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 25   | 13   | 6       | 280       | 35.0 | 39.12      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 25   | 14   | 5       | 280       | 33.0 | 49.47      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 25   | 15   | 1       | M         | 32.0 | 52.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 25   | 16   | 5       | 180       | 32.0 | 62.78      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 25   | 17   | 4       | 160       | 31.0 | 70.53      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 25   | 18   | 5       | 180       | 31.0 | 74.84      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 25   | 19   | 5       | 170       | 30.0 | 79.24      | 0.0      | 10.0  | 1008.128303 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 25   | 20   | 4       | 180       | 29.0 | 83.93      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 25   | 21   | 4       | 200       | 29.0 | 83.93      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 25   | 22   | 4       | 230       | 29.0 | 83.93      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 25   | 23   | 5       | 280       | 29.0 | 83.93      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 26   | 0    | 9       | 300       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 26   | 1    | 9       | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 26   | 2    | 11      | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 26   | 3    | 15      | 270       | 29.0 | 79.1       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 26   | 4    | 15      | 270       | 31.0 | 70.53      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 26   | 5    | 15      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 26   | 6    | 13      | 290       | 35.0 | 53.11      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 26   | 7    | 12      | 250       | 36.0 | 47.33      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 26   | 8    | 13      | 290       | 37.0 | 47.6       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 26   | 9    | 10      | 290       | 37.0 | 47.6       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 26   | 10   | 11      | 270       | 37.0 | 42.18      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 26   | 11   | 9       | 310       | 37.0 | 39.67      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 26   | 12   | 9       | 280       | 37.0 | 39.67      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 26   | 13   | 6       | 290       | 35.0 | 44.27      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 26   | 14   | 9       | 270       | 34.0 | 49.74      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 26   | 15   | 3       | 200       | 33.0 | 52.59      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 26   | 16   | 11      | 260       | 32.0 | 55.64      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 26   | 17   | 12      | 280       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 26   | 18   | 10      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 26   | 19   | 8       | 260       | 30.0 | 62.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 26   | 20   | 8       | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 26   | 21   | 10      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 26   | 22   | 12      | 280       | 29.0 | 66.03      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 26   | 23   | 14      | 280       | 28.0 | 69.97      | 0.0      | 10.0  | 1006.096469 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 27   | 0    | 12      | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 27   | 1    | 12      | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 27   | 2    | 10      | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 27   | 3    | 15      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 27   | 4    | 14      | 290       | 32.0 | 59.12      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 27   | 5    | 16      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 27   | 6    | 16      | 260       | 34.0 | 56.13      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 27   | 7    | 15      | 290       | 34.0 | 52.85      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 27   | 8    | 10      | 290       | 35.0 | 53.11      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 27   | 9    | 8       | 290       | 35.0 | 53.11      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 27   | 10   | 8       | 290       | 35.0 | 53.11      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 27   | 11   | 13      | 280       | 34.0 | 56.13      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 27   | 12   | 10      | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 27   | 13   | 10      | 290       | 33.0 | 55.88      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 27   | 14   | 10      | 280       | 32.0 | 59.12      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 27   | 15   | 10      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 27   | 16   | 11      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 27   | 17   | 11      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 27   | 18   | 8       | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 27   | 19   | 8       | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 27   | 20   | 12      | 260       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 27   | 21   | 12      | 250       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 27   | 22   | 10      | 260       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 27   | 23   | 9       | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 28   | 0    | 8       | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 28   | 1    | 8       | 250       | 28.0 | 74.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 28   | 2    | 6       | 260       | 28.0 | 74.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 28   | 3    | 10      | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1008.128303 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 28   | 4    | 8       | 260       | 30.0 | 74.68      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 28   | 5    | 10      | 260       | 31.0 | 70.53      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 28   | 6    | 8       | 270       | 33.0 | 63.01      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 28   | 7    | 8       | 240       | 36.0 | 56.62      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 28   | 8    | 10      | 270       | 36.0 | 53.36      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 28   | 9    | 8       | 270       | 36.0 | 50.27      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 28   | 10   | 8       | 280       | 35.0 | 53.11      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 28   | 11   | 10      | 270       | 34.0 | 56.13      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 8     | 28   | 12   | 8       | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 28   | 13   | 12      | 290       | 33.0 | 55.88      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 28   | 14   | 10      | 280       | 32.0 | 59.12      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 28   | 15   | 11      | 270       | 31.0 | 62.56      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 28   | 16   | 10      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 28   | 18   | 11      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 28   | 19   | 15      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 28   | 20   | 10      | 260       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 28   | 21   | 12      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 28   | 22   | 10      | 260       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 28   | 23   | 11      | 260       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 29   | 0    | 8       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 29   | 1    | 4       | 290       | 28.0 | 74.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 29   | 2    | 5       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 29   | 3    | 8       | 250       | 30.0 | 70.35      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 29   | 5    | 15      | 250       | 34.0 | 56.13      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 29   | 6    | 15      | 250       | 35.0 | 50         | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 29   | 7    | 13      | 240       | 36.0 | 47.33      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 29   | 9    | 8       | 270       | 37.0 | 42.18      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 29   | 10   | 10      | 280       | 38.0 | 42.45      | 0.0      | 10.0  | 1004.064635 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 29   | 11   | 10      | 280       | 37.0 | 44.81      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 29   | 13   | 12      | 280       | 34.0 | 52.85      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 29   | 14   | 5       | 180       | 32.0 | 66.65      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 29   | 15   | 5       | 150       | 31.0 | 66.44      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 29   | 16   | 2       | M         | 30.0 | 70.35      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 29   | 17   | 2       | M         | 29.0 | 79.1       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 29   | 18   | 5       | 290       | 30.0 | 74.68      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 29   | 19   | 10      | 280       | 29.0 | 74.51      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 29   | 20   | 10      | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 29   | 21   | 8       | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 29   | 22   | 8       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 29   | 23   | 8       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 30   | 0    | 8       | 270       | 27.0 | 78.81      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 30   | 1    | 8       | 280       | 27.0 | 83.7       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 30   | 2    | 10      | 260       | 28.0 | 83.82      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 30   | 3    | 10      | 270       | 30.0 | 74.68      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 30   | 4    | 12      | 270       | 32.0 | 70.72      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 30   | 5    | 12      | 270       | 34.0 | 63.23      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 30   | 6    | 9       | 250       | 35.0 | 56.38      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 30   | 7    | 11      | 280       | 37.0 | 50.53      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 30   | 8    | 13      | 280       | 39.0 | 45.36      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 30   | 9    | 12      | 290       | 39.0 | 40.23      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 30   | 10   | 12      | 270       | 39.0 | 42.73      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 30   | 11   | 15      | 270       | 38.0 | 42.45      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 30   | 12   | 6       | 230       | 35.0 | 53.11      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 30   | 13   | 10      | 260       | 33.0 | 59.35      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 30   | 14   | 6       | 200       | 30.0 | 70.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 30   | 15   | 14      | 260       | 32.0 | 62.78      | 0.0      | 10.0  | 1008.128303 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 30   | 16   | 9       | 280       | 31.0 | 66.44      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 30   | 17   | 12      | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 30   | 18   | 8       | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 30   | 19   | 13      | 280       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 30   | 20   | 12      | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 30   | 22   | 14      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 30   | 23   | 11      | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 31   | 0    | 10      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 31   | 1    | 10      | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 31   | 3    | 13      | 270       | 30.0 | 74.68      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 31   | 4    | 14      | 270       | 31.0 | 66.44      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 8     | 31   | 5    | 14      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 8     | 31   | 6    | 13      | 290       | 34.0 | 56.13      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 31   | 7    | 15      | 270       | 35.0 | 53.11      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 31   | 8    | 13      | 280       | 36.0 | 50.27      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 31   | 9    | 8       | 270       | 36.0 | 50.27      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 31   | 10   | 10      | 300       | 36.0 | 53.36      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 31   | 11   | 8       | 280       | 36.0 | 50.27      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 31   | 12   | 9       | 270       | 35.0 | 53.11      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 8     | 31   | 13   | 6       | 280       | 34.0 | 56.13      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 31   | 14   | 4       | 220       | 33.0 | 59.35      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 31   | 16   | 6       | 220       | 30.0 | 70.35      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 31   | 17   | 5       | 230       | 30.0 | 70.35      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 31   | 18   | 9       | 280       | 30.0 | 70.35      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 8     | 31   | 19   | 11      | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 8     | 31   | 20   | 9       | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 8     | 31   | 21   | 10      | 290       | 29.0 | 70.16      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 8     | 31   | 22   | 10      | 290       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |



| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 8     | 31   | 23   | 8       | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 1    | 0    | 10      | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 1    | 1    | 10      | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 1    | 2    | 9       | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 1    | 3    | 10      | 270       | 30.0 | 70.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 1    | 4    | 10      | 280       | 31.0 | 70.53      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 1    | 5    | 10      | 260       | 33.0 | 63.01      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 1    | 6    | 8       | 280       | 34.0 | 59.59      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 1    | 7    | 8       | 290       | 35.0 | 56.38      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 1    | 8    | 8       | 270       | 36.0 | 53.36      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 1    | 9    | 10      | 260       | 36.0 | 50.27      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 9     | 1    | 10   | 11      | 270       | 36.0 | 50.27      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 9     | 1    | 11   | 10      | 270       | 35.0 | 53.11      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 9     | 1    | 12   | 10      | 290       | 34.0 | 59.59      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 9     | 1    | 13   | 12      | 280       | 33.0 | 59.35      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 1    | 14   | 10      | 300       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 1    | 15   | 10      | 290       | 30.0 | 66.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 1    | 16   | 8       | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 1    | 17   | 5       | 290       | 28.0 | 74.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 1    | 18   | 10      | 290       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 1    | 19   | 8       | 290       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 1    | 20   | 8       | 290       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 1    | 21   | 9       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 1    | 22   | 12      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 1    | 23   | 8       | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 2    | 1    | 12      | 270       | 29.0 | 70.16      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 2    | 2    | 10      | 270       | 31.0 | 66.44      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 2    | 3    | 12      | 270       | 32.0 | 62.78      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 9     | 2    | 4    | 10      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 2    | 5    | 10      | 280       | 35.0 | 53.11      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 2    | 6    | 12      | 280       | 35.0 | 53.11      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 2    | 7    | 12      | 270       | 36.0 | 53.36      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 2    | 8    | 10      | 290       | 36.0 | 50.27      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 9     | 2    | 9    | 10      | 290       | 37.0 | 44.81      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 9     | 2    | 10   | 10      | 270       | 37.0 | 44.81      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 9     | 2    | 11   | 10      | 250       | 36.0 | 44.54      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 9     | 2    | 12   | 14      | 260       | 34.0 | 49.74      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 2    | 13   | 12      | 270       | 33.0 | 52.59      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 2    | 14   | 10      | 270       | 32.0 | 55.64      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 2    | 15   | 14      | 270       | 31.0 | 58.88      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 2    | 16   | 10      | 280       | 31.0 | 58.88      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 2    | 17   | 8       | 270       | 30.0 | 58.64      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 2    | 18   | 8       | 280       | 30.0 | 62.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 2    | 19   | 12      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 2    | 20   | 12      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 2    | 21   | 16      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 2    | 22   | 15      | 280       | 29.0 | 66.03      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 2    | 23   | 12      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 3    | 0    | 8       | 280       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 3    | 1    | 10      | 280       | 29.0 | 74.51      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 3    | 2    | 10      | 270       | 31.0 | 66.44      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 3    | 3    | 10      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 3    | 4    | 14      | 270       | 33.0 | 59.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 3    | 5    | 10      | 270       | 35.0 | 53.11      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 3    | 6    | 10      | 290       | 36.0 | 50.27      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 3    | 7    | 12      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1004.064635 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 9     | 3    | 8    | 10      | 270       | 37.0 | 44.81      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 3    | 9    | 10      | 270       | 36.0 | 50.27      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 9     | 3    | 10   | 10      | 270       | 36.0 | 47.33      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 9     | 3    | 11   | 8       | 270       | 35.0 | 50         | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 3    | 12   | 8       | 260       | 33.0 | 55.88      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 3    | 13   | 13      | 260       | 33.0 | 55.88      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 3    | 14   | 4       | 200       | 31.0 | 66.44      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 3    | 15   | 4       | 210       | 30.0 | 70.35      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 3    | 16   | 9       | 270       | 30.0 | 66.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 3    | 17   | 12      | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 3    | 18   | 10      | 280       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 3    | 19   | 12      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 3    | 20   | 10      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 3    | 21   | 12      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 3    | 22   | 11      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 3    | 23   | 11      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 4    | 0    | 11      | 280       | 27.0 | 78.81      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 4    | 1    | 8       | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 4    | 2    | 14      | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 4    | 3    | 15      | 280       | 32.0 | 66.65      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 4    | 4    | 14      | 290       | 34.0 | 59.59      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 4    | 6    | 18      | 270       | 35.0 | 50         | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 4    | 7    | 15      | 280       | 35.0 | 47.06      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 4    | 8    | 12      | 290       | 36.0 | 47.33      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 4    | 9    | 9       | 280       | 37.0 | 47.6       | 0.0      | 10.0  | 1003.048718 |
| 2025 | 9     | 4    | 10   | 10      | 270       | 37.0 | 44.81      | 0.0      | 10.0  | 1003.048718 |
| 2025 | 9     | 4    | 11   | 9       | 270       | 36.0 | 44.54      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 4    | 12   | 9       | 260       | 34.0 | 49.74      | 0.0      | 10.0  | 1004.064635 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 9     | 4    | 13   | 8       | 270       | 33.0 | 55.88      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 4    | 14   | 10      | 270       | 32.0 | 59.12      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 4    | 15   | 14      | 240       | 31.0 | 58.88      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 4    | 16   | 8       | 280       | 31.0 | 58.88      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 4    | 17   | 6       | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 4    | 18   | 11      | 270       | 30.0 | 62.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 4    | 19   | 8       | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 4    | 20   | 9       | 270       | 29.0 | 66.03      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 4    | 21   | 11      | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 4    | 22   | 10      | 270       | 28.0 | 69.97      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 4    | 23   | 10      | 270       | 28.0 | 74.34      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 5    | 0    | 10      | 280       | 27.0 | 74.17      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 5    | 1    | 11      | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 5    | 2    | 12      | 270       | 30.0 | 74.68      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 5    | 3    | 10      | 260       | 33.0 | 66.85      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 5    | 4    | 11      | 280       | 34.0 | 59.59      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 5    | 5    | 10      | 270       | 36.0 | 53.36      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 5    | 6    | 8       | 300       | 37.0 | 50.53      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 5    | 7    | 9       | 280       | 37.0 | 47.6       | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 5    | 8    | 10      | 270       | 38.0 | 45.09      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 5    | 9    | 10      | 280       | 39.0 | 40.23      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 5    | 10   | 6       | 180       | 35.0 | 53.11      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 5    | 11   | 6       | 180       | 33.0 | 63.01      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 5    | 12   | 6       | 170       | 32.0 | 62.78      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 5    | 13   | 6       | 190       | 31.0 | 70.53      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 5    | 14   | 10      | 180       | 30.0 | 70.35      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 5    | 15   | 8       | 210       | 29.0 | 79.1       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 5    | 16   | 5       | 210       | 29.0 | 79.1       | 0.0      | 10.0  | 1009.14422  |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 9     | 5    | 17   | 10      | 270       | 29.0 | 79.1       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 5    | 18   | 8       | 250       | 28.0 | 74.34      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 5    | 19   | 12      | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 5    | 20   | 7       | 290       | 29.0 | 74.51      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 5    | 21   | 10      | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 5    | 22   | 7       | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 5    | 23   | 10      | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 6    | 0    | 9       | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 6    | 1    | 10      | 280       | 29.0 | 74.51      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 6    | 2    | 12      | 270       | 30.0 | 74.68      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 6    | 3    | 12      | 290       | 33.0 | 66.85      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 6    | 4    | 10      | 290       | 33.0 | 63.01      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 6    | 5    | 8       | 290       | 35.0 | 59.82      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 6    | 6    | 8       | 290       | 36.0 | 53.36      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 6    | 7    | 6       | 270       | 37.0 | 53.61      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 6    | 8    | 8       | 270       | 38.0 | 45.09      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 6    | 9    | 5       | 230       | 38.0 | 45.09      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 6    | 10   | 5       | 290       | 39.0 | 40.23      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 6    | 11   | 2       | M         | 38.0 | 42.45      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 6    | 12   | 8       | 140       | 34.0 | 56.13      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 6    | 13   | 10      | 180       | 30.0 | 74.68      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 6    | 14   | 15      | 290       | 25.0 | 83.47      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 6    | 15   | 2       | M         | 25.0 | 88.7       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 6    | 16   | 2       | M         | 26.0 | 88.78      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 6    | 17   | 2       | M         | 26.0 | 94.24      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 6    | 18   | 4       | 280       | 27.0 | 88.86      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 6    | 19   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 6    | 20   | 6       | 290       | 27.0 | 88.86      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 9     | 6    | 21   | 6       | 280       | 27.0 | 88.86      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 6    | 22   | 8       | 290       | 27.0 | 88.86      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 6    | 23   | 6       | 290       | 27.0 | 88.86      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 7    | 0    | 9       | 270       | 27.0 | 88.86      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 7    | 1    | 8       | 290       | 28.0 | 83.82      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 7    | 2    | 12      | 270       | 30.0 | 79.24      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 7    | 3    | 10      | 290       | 32.0 | 75.01      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 7    | 4    | 10      | 290       | 34.0 | 63.23      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 7    | 6    | 10      | 300       | 35.0 | 59.82      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 7    | 7    | 9       | 330       | 36.0 | 56.62      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 7    | 8    | 8       | 320       | 37.0 | 53.61      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 7    | 9    | 9       | 300       | 37.0 | 50.53      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 7    | 10   | 6       | 300       | 36.0 | 53.36      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 7    | 11   | 6       | 320       | 36.0 | 53.36      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 7    | 12   | 5       | 40        | 34.0 | 59.59      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 7    | 13   | 12      | 320       | 30.0 | 70.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 7    | 14   | 6       | 160       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 7    | 15   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 7    | 16   | 4       | 80        | 27.0 | 88.86      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 7    | 17   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 7    | 18   | 3       | 180       | 27.0 | 88.86      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 7    | 19   | 3       | 210       | 27.0 | 88.86      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 7    | 20   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 7    | 21   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 7    | 22   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 7    | 23   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 8    | 0    | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 8    | 1    | 0       | 0         | 28.0 | 88.94      | 0.0      | 10.0  | 1009.14422  |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 9     | 8    | 2    | 8       | 290       | 29.0 | 89.02      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 8    | 3    | 8       | 280       | 31.0 | 84.15      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 8    | 4    | 10      | 290       | 33.0 | 70.91      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 8    | 5    | 8       | 270       | 34.0 | 63.23      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 8    | 6    | 8       | 290       | 35.0 | 56.38      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 8    | 7    | 10      | 300       | 36.0 | 53.36      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 8    | 8    | 8       | 290       | 37.0 | 47.6       | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 8    | 9    | 6       | 290       | 38.0 | 42.45      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 8    | 10   | 5       | 310       | 38.0 | 39.95      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 8    | 11   | 5       | 320       | 37.0 | 44.81      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 8    | 12   | 4       | 80        | 34.0 | 56.13      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 8    | 13   | 3       | 150       | 33.0 | 59.35      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 8    | 14   | 8       | 170       | 32.0 | 66.65      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 8    | 15   | 6       | 190       | 31.0 | 70.53      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 8    | 16   | 5       | 210       | 31.0 | 70.53      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 8    | 17   | 5       | 200       | 30.0 | 74.68      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 8    | 18   | 4       | 220       | 30.0 | 74.68      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 8    | 19   | 8       | 320       | 29.0 | 79.1       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 8    | 20   | 9       | 270       | 29.0 | 79.1       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 8    | 21   | 8       | 260       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 8    | 22   | 5       | 250       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 8    | 23   | 4       | 250       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 9    | 1    | 6       | 260       | 28.0 | 83.82      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 9    | 2    | 8       | 290       | 29.0 | 79.1       | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 9    | 3    | 10      | 280       | 31.0 | 74.84      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 9    | 4    | 6       | 270       | 31.0 | 74.84      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 9    | 5    | 5       | 270       | 34.0 | 67.06      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 9    | 6    | 4       | 270       | 35.0 | 59.82      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 9     | 9    | 7    | 4       | 260       | 36.0 | 56.62      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 9    | 8    | 2       | M         | 37.0 | 53.61      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 9    | 9    | 4       | 80        | 36.0 | 53.36      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 9    | 10   | 3       | 140       | 37.0 | 53.61      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 9    | 11   | 5       | 140       | 35.0 | 59.82      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 9    | 12   | 4       | 130       | 34.0 | 59.59      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 9    | 13   | 6       | 160       | 32.0 | 66.65      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 9    | 14   | 7       | 140       | 31.0 | 74.84      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 9    | 15   | 6       | 170       | 30.0 | 79.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 9    | 16   | 7       | 190       | 30.0 | 79.24      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 9    | 17   | 3       | 230       | 29.0 | 83.93      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 9    | 18   | 6       | 330       | 28.0 | 83.82      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 9    | 19   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 9    | 20   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 9    | 21   | 5       | 290       | 27.0 | 88.86      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 9    | 22   | 3       | 290       | 27.0 | 83.7       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 9    | 23   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 10   | 0    | 4       | 300       | 27.0 | 88.86      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 10   | 1    | 8       | 290       | 29.0 | 83.93      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 10   | 2    | 9       | 290       | 31.0 | 79.38      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 10   | 3    | 10      | 270       | 32.0 | 70.72      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 10   | 4    | 9       | 270       | 34.0 | 67.06      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 10   | 5    | 8       | 290       | 35.0 | 63.44      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 10   | 6    | 8       | 290       | 35.0 | 63.44      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 10   | 7    | 10      | 290       | 36.0 | 60.05      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 10   | 8    | 6       | 290       | 37.0 | 53.61      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 10   | 9    | 5       | 180       | 38.0 | 50.79      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 10   | 10   | 9       | 220       | 35.0 | 53.11      | 0.0      | 10.0  | 1004.064635 |



| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 9     | 10   | 11   | 12      | 240       | 29.0 | 70.16      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 10   | 13   | 8       | 320       | 25.0 | 83.47      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 10   | 14   | 14      | 320       | 25.0 | 88.7       | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 10   | 15   | 6       | 310       | 25.0 | 94.2       | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 10   | 16   | 6       | 300       | 25.0 | 94.2       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 10   | 17   | 4       | 270       | 25.0 | 94.2       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 10   | 18   | 8       | 280       | 25.0 | 94.2       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 10   | 19   | 6       | 280       | 25.0 | 94.2       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 10   | 20   | 8       | 250       | 25.0 | 94.2       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 10   | 21   | 11      | 270       | 26.0 | 94.24      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 10   | 22   | 10      | 270       | 25.0 | 100        | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 10   | 23   | 8       | 270       | 26.0 | 94.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 11   | 0    | 9       | 280       | 26.0 | 94.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 11   | 1    | 8       | 290       | 26.0 | 94.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 11   | 2    | 12      | 270       | 28.0 | 88.94      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 11   | 3    | 12      | 270       | 30.0 | 89.1       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 11   | 4    | 13      | 270       | 31.0 | 84.15      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 11   | 5    | 10      | 270       | 31.0 | 84.15      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 11   | 6    | 10      | 260       | 33.0 | 75.17      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 11   | 7    | 8       | 260       | 34.0 | 71.09      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 11   | 8    | 8       | 270       | 34.0 | 67.06      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 11   | 9    | 5       | 280       | 34.0 | 63.23      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 11   | 10   | 5       | 290       | 34.0 | 63.23      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 11   | 11   | 8       | 200       | 32.0 | 62.78      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 11   | 12   | 14      | 280       | 30.0 | 70.35      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 11   | 13   | 5       | 100       | 26.0 | 83.59      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 11   | 14   | 5       | 50        | 25.0 | 88.7       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 11   | 15   | 3       | 20        | 25.0 | 88.7       | 0.0      | 10.0  | 1009.14422  |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 9     | 11   | 16   | 2       | M         | 25.0 | 94.2       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 11   | 17   | 3       | 50        | 25.0 | 94.2       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 11   | 18   | 1       | M         | 26.0 | 88.78      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 11   | 20   | 0       | 0         | 26.0 | 88.78      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 11   | 21   | 0       | 0         | 26.0 | 94.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 11   | 22   | 2       | M         | 26.0 | 94.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 11   | 23   | 5       | 270       | 26.0 | 94.24      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 12   | 0    | 4       | 270       | 26.0 | 94.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 12   | 1    | 8       | 280       | 27.0 | 94.29      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 12   | 2    | 10      | 290       | 28.0 | 83.82      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 12   | 3    | 12      | 290       | 30.0 | 84.04      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 12   | 4    | 8       | 300       | 32.0 | 75.01      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 12   | 5    | 10      | 290       | 33.0 | 70.91      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 12   | 6    | 8       | 280       | 34.0 | 67.06      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 12   | 7    | 8       | 280       | 35.0 | 59.82      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 12   | 8    | 8       | 270       | 35.0 | 59.82      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 12   | 9    | 5       | 250       | 36.0 | 53.36      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 12   | 10   | 8       | 290       | 36.0 | 50.27      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 12   | 11   | 6       | 290       | 35.0 | 53.11      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 12   | 12   | 2       | M         | 33.0 | 59.35      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 12   | 13   | 2       | M         | 32.0 | 62.78      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 12   | 14   | 2       | M         | 31.0 | 70.53      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 12   | 15   | 8       | 170       | 30.0 | 79.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 12   | 17   | 8       | 200       | 30.0 | 84.04      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 12   | 18   | 6       | 210       | 30.0 | 84.04      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 12   | 19   | 4       | 210       | 29.0 | 83.93      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 12   | 20   | 5       | 270       | 28.0 | 88.94      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 12   | 21   | 8       | 290       | 28.0 | 83.82      | 0.0      | 10.0  | 1007.112386 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 9     | 12   | 22   | 10      | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 12   | 23   | 8       | 290       | 27.0 | 83.7       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 13   | 0    | 10      | 280       | 27.0 | 83.7       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 13   | 1    | 12      | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 13   | 2    | 12      | 270       | 29.0 | 74.51      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 13   | 3    | 12      | 280       | 30.0 | 74.68      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 13   | 4    | 12      | 270       | 31.0 | 70.53      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 13   | 5    | 12      | 270       | 32.0 | 66.65      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 13   | 6    | 10      | 290       | 34.0 | 59.59      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 13   | 7    | 8       | 310       | 35.0 | 56.38      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 13   | 8    | 6       | 320       | 35.0 | 56.38      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 13   | 9    | 5       | 310       | 35.0 | 56.38      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 13   | 10   | 4       | 320       | 34.0 | 59.59      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 13   | 11   | 2       | M         | 34.0 | 59.59      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 13   | 12   | 4       | 160       | 32.0 | 66.65      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 13   | 13   | 4       | 160       | 31.0 | 74.84      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 13   | 14   | 4       | 160       | 30.0 | 79.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 13   | 15   | 4       | 180       | 29.0 | 83.93      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 13   | 16   | 1       | M         | 29.0 | 83.93      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 13   | 17   | 2       | M         | 29.0 | 83.93      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 13   | 18   | 8       | 270       | 28.0 | 88.94      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 13   | 19   | 6       | 340       | 27.0 | 88.86      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 13   | 20   | 6       | 290       | 27.0 | 88.86      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 13   | 21   | 9       | 300       | 27.0 | 78.81      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 13   | 22   | 8       | 300       | 27.0 | 78.81      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 13   | 23   | 10      | 270       | 26.0 | 83.59      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 14   | 0    | 13      | 290       | 26.0 | 83.59      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 14   | 1    | 10      | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1009.14422  |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 9     | 14   | 2    | 13      | 280       | 31.0 | 74.84      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 14   | 4    | 9       | 270       | 32.0 | 70.72      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 14   | 5    | 11      | 270       | 33.0 | 66.85      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 14   | 6    | 8       | 270       | 34.0 | 59.59      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 14   | 7    | 6       | 250       | 35.0 | 56.38      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 14   | 8    | 8       | 280       | 36.0 | 50.27      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 14   | 9    | 4       | 310       | 37.0 | 44.81      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 14   | 11   | 3       | M         | 35.0 | 50         | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 14   | 12   | 8       | 160       | 33.0 | 59.35      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 14   | 13   | 8       | 160       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 14   | 14   | 6       | 180       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 14   | 15   | 4       | 180       | 29.0 | 79.1       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 14   | 16   | 4       | 210       | 28.0 | 83.82      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 14   | 17   | 2       | M         | 28.0 | 83.82      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 14   | 18   | 3       | 310       | 28.0 | 88.94      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 14   | 19   | 3       | 310       | 28.0 | 88.94      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 14   | 20   | 6       | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 14   | 21   | 12      | 290       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 14   | 22   | 11      | 270       | 27.0 | 78.81      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 14   | 23   | 12      | 270       | 27.0 | 78.81      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 15   | 0    | 10      | 280       | 28.0 | 78.96      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 15   | 2    | 14      | 280       | 29.0 | 74.51      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 15   | 3    | 12      | 270       | 31.0 | 70.53      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 15   | 4    | 10      | 270       | 33.0 | 63.01      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 15   | 5    | 9       | 280       | 34.0 | 59.59      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 15   | 6    | 9       | 280       | 34.0 | 59.59      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 15   | 7    | 8       | 320       | 35.0 | 56.38      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 15   | 8    | 8       | 320       | 36.0 | 53.36      | 0.0      | 10.0  | 1005.080552 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 9     | 15   | 9    | 10      | 320       | 36.0 | 53.36      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 15   | 10   | 8       | 320       | 36.0 | 50.27      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 15   | 11   | 8       | 290       | 35.0 | 53.11      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 15   | 12   | 6       | 150       | 33.0 | 59.35      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 15   | 13   | 6       | 160       | 31.0 | 70.53      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 15   | 14   | 8       | 180       | 30.0 | 79.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 15   | 15   | 8       | 190       | 28.0 | 78.96      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 15   | 16   | 4       | 250       | 27.0 | 78.81      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 15   | 17   | 5       | 230       | 27.0 | 83.7       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 15   | 18   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 15   | 19   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 15   | 20   | 4       | 230       | 26.0 | 88.78      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 15   | 21   | 8       | 270       | 28.0 | 78.96      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 15   | 22   | 8       | 270       | 27.0 | 83.7       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 15   | 23   | 5       | 260       | 27.0 | 83.7       | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 16   | 0    | 6       | 290       | 28.0 | 83.82      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 16   | 1    | 10      | 290       | 29.0 | 79.1       | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 16   | 2    | 10      | 280       | 31.0 | 74.84      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 16   | 3    | 11      | 280       | 33.0 | 66.85      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 16   | 4    | 8       | 270       | 34.0 | 63.23      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 16   | 5    | 6       | 250       | 35.0 | 59.82      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 16   | 6    | 6       | 270       | 36.0 | 53.36      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 16   | 7    | 4       | 320       | 36.0 | 53.36      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 16   | 8    | 6       | 340       | 35.0 | 56.38      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 16   | 9    | 5       | 300       | 35.0 | 56.38      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 16   | 10   | 2       | M         | 35.0 | 56.38      | 0.0      | 10.0  | 1004.064635 |
| 2025 | 9     | 16   | 11   | 6       | 190       | 30.0 | 63.01      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 16   | 12   | 8       | 200       | 30.0 | 74.68      | 0.0      | 10.0  | 1006.096469 |

| Year | Month | Date | Hour | W_speed | W_dir     | Temp | R_humidity | Rainfall | Cloud | Stn_press   |
|------|-------|------|------|---------|-----------|------|------------|----------|-------|-------------|
| YYYY | MM    | DD   | HH   | m/s     | from Noth | oC   | %          | mm       | octas | mb          |
| 2025 | 9     | 16   | 13   | 8       | 140       | 27.0 | 78.81      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 16   | 14   | 3       | 140       | 27.0 | 83.7       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 16   | 15   | 3       | 90        | 26.0 | 88.78      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 16   | 16   | 4       | 230       | 26.0 | 88.78      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 16   | 17   | 3       | 290       | 26.0 | 94.24      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 16   | 18   | 4       | 270       | 27.0 | 88.86      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 16   | 19   | 6       | 290       | 27.0 | 88.86      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 16   | 20   | 5       | 230       | 27.0 | 88.86      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 16   | 21   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 16   | 22   | 2       | M         | 27.0 | 88.86      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 16   | 23   | 4       | 250       | 27.0 | 88.86      | 0.0      | 10.0  | 1008.128303 |
| 2025 | 9     | 17   | 0    | 4       | 300       | 28.0 | 88.94      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 17   | 1    | 10      | 270       | 29.0 | 89.02      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 17   | 2    | 10      | 270       | 30.0 | 89.1       | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 17   | 3    | 9       | 290       | 31.0 | 79.38      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 17   | 4    | 6       | 270       | 33.0 | 75.17      | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 17   | 5    | 8       | 280       | 34.0 | 71.09      | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 17   | 6    | 4       | 270       | 35.0 | 63.44      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 17   | 7    | 9       | 280       | 35.0 | 59.82      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 17   | 8    | 5       | 280       | 35.0 | 59.82      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 17   | 9    | 8       | 140       | 28.0 | 74.34      | 0.0      | 10.0  | 1005.080552 |
| 2025 | 9     | 17   | 10   | 6       | 140       | 28.0 | 78.96      | 0.0      | 10.0  | 1006.096469 |
| 2025 | 9     | 17   | 11   | 4       | 180       | 27.0 | 83.7       | 0.0      | 10.0  | 1007.112386 |
| 2025 | 9     | 17   | 12   | 13      | 270       | 27.0 | 83.7       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 17   | 13   | 6       | 250       | 24.0 | 88.61      | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 17   | 14   | 8       | 200       | 25.0 | 88.7       | 0.0      | 10.0  | 1009.14422  |
| 2025 | 9     | 17   | 15   | 5       | 290       | 25.0 | 94.2       | 0.0      | 10.0  | 1010.160137 |
| 2025 | 9     | 17   | 16   | 4       | 290       | 25.0 | 94.2       | 0.0      | 10.0  | 1009.14422  |

| <b>Year</b> | <b>Month</b> | <b>Date</b> | <b>Hour</b> | <b>W_speed</b> | <b>W_dir</b>     | <b>Temp</b> | <b>R_humidity</b> | <b>Rainfall</b> | <b>Cloud</b> | <b>Stn_press</b> |
|-------------|--------------|-------------|-------------|----------------|------------------|-------------|-------------------|-----------------|--------------|------------------|
| <b>YYYY</b> | <b>MM</b>    | <b>DD</b>   | <b>HH</b>   | <b>m/s</b>     | <b>from Noth</b> | <b>oC</b>   | <b>%</b>          | <b>mm</b>       | <b>octas</b> | <b>mb</b>        |
| 2025        | 9            | 17          | 17          | 5              | 290              | 25.0        | 94.2              | 0.0             | 10.0         | 1009.14422       |
| 2025        | 9            | 17          | 18          | 4              | 270              | 25.0        | 94.2              | 0.0             | 10.0         | 1008.128303      |
| 2025        | 9            | 17          | 19          | 4              | 270              | 25.0        | 94.2              | 0.0             | 10.0         | 1007.112386      |
| 2025        | 9            | 17          | 20          | 7              | 260              | 26.0        | 88.78             | 0.0             | 10.0         | 1007.112386      |
| 2025        | 9            | 17          | 21          | 7              | 260              | 26.0        | 88.78             | 0.0             | 10.0         | 1007.112386      |

# **Annexure 6**

## **Compliance of BMW Rules 2016**



**BIO MEDICAL WASTE (MANAGEMENT AND HANDLING) RULES, 2016 AND ITS  
COMPLIANCE  
(Covered Related to Facility Operator)**

| Section                                                                                     | Clause / Rules | Condition                                                                                                                                                                                                                                                                                                                                                                             | Compliance                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Duties of the operator of a common bio-medical waste treatment and disposal facility</b> | a              | 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 these rules and guidelines issued by the Central Government or, as the case may be, the central pollution control board from time to time. | M/s. Navabuddha Agencies Pvt. Ltd. is proposing a new Common Bio-Medical Waste Treatment Facility (CBMWTF) in accordance with the guidelines issued by the Central Pollution Control Board (CPCB).<br><br>Details related to transportation, storage, treatment and relevant pollutionrelated measures are covered in the EIA report. |
|                                                                                             | b              | Ensure timely collection of bio-medical waste from the occupier as prescribed under the rules.                                                                                                                                                                                                                                                                                        | Bio-medical waste generated will be collected, treated and disposed of within 48 hours as stipulated under the BMWM Rules.<br><br>Same has been incorporated in section 2.7.1 on Page no. 2.12 of Chapter 2 in EIA report.                                                                                                            |
|                                                                                             | c              | Establish bar coding and global positioning system for handling of bio- medical waste within one year.                                                                                                                                                                                                                                                                                | GPS tracking system Will be installed in the vehicles dedicated for CBMWTF.<br><br>Barcoding system for waste is incorporated in project as per CPCB guideline. Same has been covered under section 2.7.1.2 on Page no. 2.12 in chapter 2 of EIA report.                                                                              |
|                                                                                             | d              | Inform the prescribed authority immediately regarding the occupiers which are not handing over the segregated bio-medical waste in accordance with these rules;                                                                                                                                                                                                                       | Agreed to Comply.<br><br>The same condition will be complied during the operation of plant. Details is provided in the Section 10.9 on Page no. 10.25 in Chapter 10 of EIA report.                                                                                                                                                    |
|                                                                                             | e              | Provide training for all its workers                                                                                                                                                                                                                                                                                                                                                  | Proposed new facility will ensure                                                                                                                                                                                                                                                                                                     |

|  |   |                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                             |
|--|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |   | involved in handling of bio-medical waste at the time of induction and at least once a year thereafter.                                                                                                                                                                                                                                             | that all workers involved in handling bio-medical waste receive training at the time of induction and at least once annually thereafter.<br><br>Condition will be complied as proposed and point related to training to be provided to all workers is covered in EMP under Section 10.3.2 on Page no. 10.3 in Chapter 10 of the EIA report. |
|  | f | Assist the occupier in training conducted by them for bio-medical waste management;                                                                                                                                                                                                                                                                 | Noted and Agreed to Comply.<br><br>Monthly training program will be arranged through medical associations in different area by the facility operator. Said information is covered under Section 10.3.2 on Page no. 10.3 in Chapter 10 of the EIA report.                                                                                    |
|  | g | 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; | Agree to comply.<br><br>Medical examination and immunization of workers handling bio-medical waste shall be carried out as per applicable regulations, and relevant records shall be maintained.<br><br>However same has been mentioned in section 10.7 on Page no. 10.19 in Chapter 10 of the EIA report.                                  |
|  | h | ensure occupational safety of all its workers involved in handling of bio-medical waste by providing appropriate and adequate personal protective equipment;                                                                                                                                                                                        | Agree to comply.<br><br>Adequate PPE shall be provided to all personnel handling bio-medical waste and occupational safety measures shall be implemented.<br><br>The occupational health and safety                                                                                                                                         |

|  |   |                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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|  |   |                                                                                                                                                                                                                                                                                   | program, including PPE provisions, is detailed in section 10.7 on Page no. 10.19 in Chapter 10 of the EIA report.                                                                                                                                                                                                                                                                                                                            |
|  | i | 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; | <p>Agree to comply.</p> <p>Major accidents, if any, shall be reported to the prescribed authority in the prescribed format, and relevant records including nil reports shall be maintained and submitted with the annual report.</p> <p>This condition will be strictly complied after expansion also. An Emergency Preparedness Plan, outlining preventive measures and response protocols, is provided in Chapter 7 of the EIA Report.</p> |
|  | j | 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;                                                                                       | <p>Agree to comply.</p> <p>Log books for treatment equipment shall be maintained as per the Bio-Medical Waste Management Rules, recording operational and waste treatment details.</p> <p>Same is incorporated in section 10.9 on Page no. 10.25 of EIA report.</p>                                                                                                                                                                          |
|  | k | Allow occupier, who are giving waste for treatment to the operator, to see whether the treatment is carried out as per the rules;                                                                                                                                                 | <p>Agree to comply.</p> <p>Necessary access and transparency shall be provided to occupiers to verify compliance with the Bio-Medical Waste Management Rules during waste treatment and disposal.</p> <p>This information is covered in EMP under section 10.8 on Page no. 10.22 in Chapter 10 of EIA report.</p>                                                                                                                            |

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|  |   |                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                   |
|  | l | Shall display details of authorization, treatment, annual report etc. on its web-site.                                                                                                                                                                                                                                                                                   | <p>Agree to comply.</p> <p>Details of authorization, treatment facilities, annual reports, and other statutory information shall be displayed on the website as per applicable regulatory requirements.</p> <p>This information is provided under section 10.9 on Page no. 10.25 in Chapter 10 of EIA report.</p> |
|  | m | 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; | <p>Agree to comply.</p> <p>Hazardous waste management information is provided under Section 2.9.3 on Page no. 2.56 in Chapter 2 of EIA report.</p>                                                                                                                                                                |
|  | n | supply non-chlorinated plastic coloured bags to the occupier on chargeable basis, if required;                                                                                                                                                                                                                                                                           | <p>Agree to comply.</p> <p>Non-chlorinated plastic bags will be provided on chargeable basis and this information is provided in Section 10.9 on Page no. 10.25 in Chapter 10 of EIA report.</p>                                                                                                                  |
|  | o | common bio-medical waste treatment facility shall ensure collection of biomedical waste on holidays also;                                                                                                                                                                                                                                                                | <p>Agree to comply.</p> <p>Bio-medical waste shall be collected on all days, including holidays and this information is provided in Chapter 10 of EIA report.</p>                                                                                                                                                 |
|  | p | maintain all record for operation of incineration, hydro or autoclaving for a period of five years.                                                                                                                                                                                                                                                                      | <p>Agree to comply.</p> <p>Records related to the operation of</p>                                                                                                                                                                                                                                                |

|                                  |   |                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                  |   |                                                                                                                                                                                                                                                                                                 | incinerator, hydroclave, autoclave, and other treatment equipment shall be maintained and preserved for a period of five years and same is incorporated in Chapter 10 of EIA report.                                                                                                                                                                                                                                                                                                                           |
|                                  | q | upgrade existing incinerators to achieve the standards for retention time in secondary chamber and Dioxin and Furans within two years from the date of this notification.                                                                                                                       | Agree to comply.<br><br>However, M/s. Navabuddha Agencies Pvt. Ltd. is proposing a new Common Bio-Medical Waste Treatment Facility (CBMWTF) which proposed incinerator will be designed based on CPCB criteria of operation and design.                                                                                                                                                                                                                                                                        |
| <b>7. Treatment and disposal</b> | 1 | Bio-medical waste shall be treated and disposed of in accordance with Schedule I, and in compliance with the standards provided in Schedule-II by the health care facilities and common bio-medical waste treatment facility.                                                                   | Bio-medical waste shall be treated and disposed of in accordance with Schedule I, and in compliance with the standards provided in Schedule II by the health care facilities and the common bio-medical waste treatment facility. Adequate treatment units are already in place as part of the existing setup. As part of the proposed expansion, additional treatment capacity will be incorporated to ensure continued compliance with the said rules. Details are mentioned in Chapter 2 of the EIA report. |
|                                  | 2 | Occupier shall hand over segregated waste as per the Schedule-I to common bio-medical waste treatment facility for treatment, processing and final disposal:<br><br>Provided that the lab and highly infectious bio-medical waste generated shall be pre-treated by equipment like autoclave or | Agree to comply.<br><br>The Unit will remain adhere to the said condition.<br><br>Additionally, trainings will also be provided to workers and nearby HCFs.                                                                                                                                                                                                                                                                                                                                                    |

|  |   |                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                              |
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|  |   | microwave.                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                              |
|  | 3 | No occupier shall establish on-site treatment and disposal facility, if a service of common biomedical waste treatment facility is available at a distance of seventy-five kilometers.                                                                                                                                       | <p>Not Applicable.</p> <p>This provision is applicable to occupiers (healthcare facilities). The project is a Common Bio-Medical Waste Treatment Facility (CBWTF) established for collection, treatment, and disposal of bio-medical waste from member healthcare units.</p>                                 |
|  | 4 | In cases where service of the common bio-medical waste treatment facility is not available, the Occupiers shall set up requisite biomedical waste treatment equipment like incinerator, autoclave or microwave, shredder prior to commencement of its operation, as per the authorization given by the prescribed authority. | <p>Not Applicable.</p> <p>This provision is applicable to occupiers generating bio-medical waste in areas where a Common Bio-Medical Waste Treatment Facility (CBWTF) is not available. The proposed project itself is a CBWTF established for collection, treatment, and disposal of bio-medical waste.</p> |
|  | 5 | Any person including an occupier or operator of a common bio medical waste treatment facility, intending to use new technologies for treatment of bio medical waste other than those listed in Schedule I shall request the Central Government for laying down the standards or operating parameters.                        | Noted.                                                                                                                                                                                                                                                                                                       |
|  | 6 | On receipt of a request referred to in sub-rule (5), the Central Government may determine the standards and operating parameters for new technology which may be published in Gazette by the Central Government.                                                                                                             | Noted.                                                                                                                                                                                                                                                                                                       |
|  | 7 | Every operator of common bio-medical waste treatment facility shall set up requisite biomedical waste treatment equipments like incinerator, autoclave or                                                                                                                                                                    | <p>Noted.</p> <p>The unit have proposed waste treatment equipment's like incinerator, autoclave or</p>                                                                                                                                                                                                       |

|  |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                   |
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|  |    | microwave, shredder and effluent treatment plant as a part of treatment, prior to commencement of its operation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | microwave, shredder and effluent treatment plant as a part of treatment.                                                                                          |
|  | 8  | Every occupier shall phase out use of non-chlorinated plastic bags within two years from the date of publication of these rules and after two years from such publication of these rules, the chlorinated plastic bags shall not be used for storing and transporting of bio-medical waste and the occupier or operator of a common bio-medical waste treatment facility shall not dispose of such plastics by incineration and the bags used for storing and transporting biomedical waste shall be in compliance with the Bureau of Indian Standards. Till the Standards are published, the carry bags shall be as per the Plastic Waste Management Rules, 2011. | Noted.<br><br>Only non-chlorinated plastic shall be supplied to occupier and occupier will be regularly informed to abide by use of non-chlorinated plastic only. |
|  | 9  | 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 such recyclers having valid authorization or registration from the respective prescribed authority.                                                                                                                                                                                                                                                                                                                                          | Noted.<br><br>All recyclable waste after autoclaving and shredding will be sent to authorized recyclers only as mentioned in EIA report.                          |
|  | 10 | The Occupier or Operator of a common bio-medical waste treatment facility shall maintain a record of recyclable wastes referred to in sub-rule (9) which are auctioned or sold and the same shall be submitted to the prescribed authority as part of its annual report. The record shall be open for inspection by the prescribed authorities.                                                                                                                                                                                                                                                                                                                    | Noted.<br><br>Log book will be maintained and this information is covered in Section 10.9 on Page no. 10.25 in Chapter 10 of EIA report.                          |

|                                                              |    |                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                     |
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|                                                              | 11 | The handling and disposal of all the mercury waste and lead waste shall be in accordance with the respective rules and regulations.                                                                                                                                        | Noted and same condition shall be complied.                                                                                                                                                                                                         |
| <b>8. Segregation, packaging, transportation and storage</b> | 1  | No untreated bio-medical waste shall be mixed with other wastes.                                                                                                                                                                                                           | Agree to comply.<br><br>All different type of bio medical waste will be stored in dedicated area only and taken for treatment thereafter.                                                                                                           |
|                                                              | 2  | The bio-medical waste shall be segregated into containers or bags at the point of generation in accordance with Schedule I prior to its storage, transportation, treatment and disposal.                                                                                   | Agree to comply.<br><br>A separate color coded bags will be provided to the generator and treated according to the categories of wastes. Bar coding system shall be incorporated.                                                                   |
|                                                              | 3  | The containers or bags referred to in sub-rule (2) shall be labeled as specified in Schedule IV.                                                                                                                                                                           | Agree to comply.<br><br>This provision is incorporated in Section 2.7.1.2 on Page no. 2.12 in Chapter 2 of EIA report.                                                                                                                              |
|                                                              | 4  | Bar code and global positioning system shall be added by the Occupier and common bio-medical waste treatment facility in one year time.                                                                                                                                    | Agree to comply.<br><br>GPS tracking system shall be installed in vehicle.<br><br>Barcoding system for waste is incorporated in project as per CPCB guideline. Same is incorporated in section 2.7.1.2 on Page no. 2.12 in Chapter 2 of EIA report. |
|                                                              | 5  | The operator of common bio-medical waste treatment facility shall transport the bio-medical waste from the premises of an occupier to any off-site bio-medical waste treatment facility only in the vehicles having label as provided in part 'A' of the Schedule IV along | Agree to comply.<br><br>This provision is mentioned in EMP under Section 10.9 on Page no. 10.25 in Chapter 10 of EIA report.                                                                                                                        |



|                                        |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                          |
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|                                        |   | with necessary information as specified in part 'B' of the Schedule IV.                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                          |
|                                        | 6 | The vehicles used for transportation of bio-medical waste shall comply with the conditions if any stipulated by the State Pollution Control Board or Pollution Control Committee in addition to the requirement contained in the Motor Vehicles Act, 1988 (59 of 1988), if any or the rules made there under for transportation of such infectious waste.                                                                                                                                | The mentioned condition will be complied after during operation.                                                                                                                                                                                                                                                                                                         |
|                                        | 7 | <p>Untreated human anatomical waste, animal anatomical waste, soiled waste and, biotechnology waste shall not be stored beyond a period of forty – eight hours:</p> <p>Provided that in case for any reason it becomes necessary to store such waste beyond such a period, the occupier shall take appropriate measures to ensure that the waste does not adversely affect human health and the environment and inform the prescribed authority along with the reasons for doing so.</p> | <p>Biomedical waste including untreated anatomical, soiled, and biotechnology waste will not be stored beyond 48 hours unless necessary, in which case appropriate safeguards must be taken and the prescribed authority informed with reasons.</p> <p>This provision is mentioned in Chapter 10 of EIA report. Occupier will be instructed and trained accordingly.</p> |
|                                        | 8 | Microbiology waste and all other clinical laboratory waste shall be pre-treated by sterilization to Log 6 or disinfection to Log 4, as per the World Health Organization guidelines before packing and sending to the common bio-medical waste treatment facility.                                                                                                                                                                                                                       | <p>Noted and agree to comply.</p> <p>Microbiology and clinical laboratory waste shall be pre-treated as per the Bio-Medical Waste Management Rules and WHO guidelines prior to disposal through the authorized CBWTF.</p>                                                                                                                                                |
| <b>10. Procedure for authorization</b> |   | Every occupier or operator handling bio-medical waste, irrespective of the quantity shall make an application in Form II to the prescribed authority i.e. State Pollution Control Board and Pollution Control Committee, as the                                                                                                                                                                                                                                                          | <p>Noted and agree to comply.</p> <p>Necessary authorization under the Bio-Medical Waste Management Rules shall be obtained from the concerned SPCB/PCC prior to commencement of operations. The</p>                                                                                                                                                                     |

|  |   |                                                                                                                                                                                                                                                                                                               |                                                                                          |
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|  |   | case may be, for grant of authorization and the prescribed authority shall grant the provisional authorization in Form III and the validity of such authorization for bedded health care facility and operator of a common facility shall be synchronized with the validity of the consents.                  | authorization shall be renewed and maintained as per applicable regulatory requirements. |
|  | 1 | The authorization shall be one time for non-bedded occupiers and the authorization in such cases shall be deemed to have been granted, if not objected by the prescribed authority within a period of ninety days from the date of receipt of duly completed application along with such necessary documents. | Noted.                                                                                   |
|  | 2 | In case of refusal of renewal, cancellation or suspension of the authorization by the prescribed authority, the reasons shall be recorded in writing:<br><br>Provided that the prescribed authority shall give an opportunity of being heard to the applicant before such refusal of the authorization.       | Noted.                                                                                   |
|  | 3 | Every application for authorization shall be disposed of by the prescribed authority within a period of ninety days from the date of receipt of duly completed application along with such necessary documents, failing which it shall be deemed that the authorization is granted under these rules.         | Noted.                                                                                   |
|  | 4 | In case of any change in the bio-medical waste generation, handling, treatment and disposal for which authorization was earlier granted, the occupier or operator shall intimate to the prescribed                                                                                                            | Noted and Agree to comply.                                                               |

|                                   |   |                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                  |
|-----------------------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   |   | authority about the change or variation in the activity and shall submit a fresh application in Form II for modification of the conditions of authorization.                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                  |
| <b>13. Annual report</b>          | 1 | Every occupier or operator of common bio-medical waste treatment facility shall submit an annual report to the prescribed authority in Form-IV, on or before the 30 <sup>th</sup> June of every year.                                                                                                                                                                           | Agree to comply after establishment of proposed new Common Bio-Medical Waste Treatment Facility (CBMWTF).<br><br>Noted and point is covered in Chapter 10 of EIA report.                                                                         |
|                                   | 2 | The prescribed authority shall compile, review and analyze the information received and send this information to the Central Pollution Control Board on or before the 31 <sup>st</sup> July of every year.                                                                                                                                                                      | Agree to comply after establishment of proposed new Common Bio-Medical Waste Treatment Facility (CBMWTF).                                                                                                                                        |
|                                   | 3 | The Central Pollution Control Board shall compile, review and analyse the information received and send this information, along with its comments or suggestions or observations to the Ministry of Environment, Forest and Climate Change on or before 31 <sup>st</sup> August every year.                                                                                     | Noted.                                                                                                                                                                                                                                           |
|                                   | 4 | The Annual Reports shall also be available online on the websites of Occupiers, State Pollution Control Boards and Central Pollution Control Board.                                                                                                                                                                                                                             | Agree to comply.<br><br>Annual Report will be uploaded after establishment of proposed new Common Bio-Medical Waste Treatment Facility (CBMWTF).                                                                                                 |
| <b>14. Maintenance of records</b> | 1 | Every authorized person shall maintain records related to the generation, collection, reception, storage, transportation, treatment, disposal or any other form of handling of bio-medical waste, for a period of five years, in accordance with these rules and guidelines issued by the Central Government or the Central Pollution Control Board or the prescribed authority | Agree to comply.<br><br>The mentioned condition will be complied for proposing a new Common Bio-Medical Waste Treatment Facility (CBMWTF).<br><br>Provision for same is mentioned in section 10.8 on Page no. 10.22 in Chapter 10 of EIA report. |

|                                                                              |   |                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                              |   | as the case may be.                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                     |
|                                                                              | 2 | All records shall be subject to inspection and verification by the prescribed authority or the Ministry of Environment, Forest and Climate Change at any time.                                                                                                                                                           | Noted.                                                                                                                                                                                                                                                                              |
| <b>15. Accident reporting</b>                                                | 1 | In case of any major accident at any institution or facility or any other site while handling bio-medical waste, the authorized person shall intimate immediately to the prescribed authority about such accident and forward a report within twenty-four hours in writing regarding the remedial steps taken in Form I. | Reporting Procedure in case of major accident is mentioned in Chapter 7 in EIA report the same will be followed in case of any Major Accident.                                                                                                                                      |
|                                                                              | 2 | Information regarding all other accidents and remedial steps taken shall be provided in the annual report in accordance with rule 13 by the occupier.                                                                                                                                                                    | Agreed to Comply<br><br>It is covered in EMP as section 10.8 on Page no. 10.22 in Chapter 10 of EIA report.                                                                                                                                                                         |
| <b>16. Appeal</b>                                                            |   | As per BMW 2016 rule.<br>Sub points 1 to 4                                                                                                                                                                                                                                                                               | Not Applicable to facility.                                                                                                                                                                                                                                                         |
| <b>17. Site for common bio-medical waste treatment and disposal facility</b> | 1 | Without prejudice to rule 5 of these rules, the department in the business allocation of land assignment shall be responsible for providing suitable site for setting up of common biomedical waste treatment and disposal facility in the State Government or Union territory Administration.                           | Not Applicable.                                                                                                                                                                                                                                                                     |
|                                                                              | 2 | 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 Ministry of Environment, Forest and Climate Change or Central Pollution Control Board.                                          | M/s. Navabuddha Agencies Pvt. Ltd. is proposing a new Common Bio-Medical Waste Treatment Facility (CBMWTF) at S.F. No. 248/1 & 246/3A at Kallai Village, Kulithalai Taluk, Karur District, Tamil Nadu – 639110, which complies with the CPCB guidelines for CBMWTF siting criteria. |

# **Annexure 7**

## **Compliance of CPCB Siting Criteria**

**Compliance of CPCB siting Criteria as per revised guidelines for Common Bio-Medical Waste Treatment Facility (CBMWTF)**

| <b>Sr. No.</b> | <b>Parameter</b>                                           | <b>Criteria</b>                           | <b>Remarks</b>                                                                                                 |
|----------------|------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 1              | Preferable distance from Human Habitation (km)             | Preferably should not be within 500 m     | Kallai village at distance of around 1.09 km.                                                                  |
| 2              | Distance from Highway (km)                                 | Ease of access to road for transportation | Ease of access to Kulithalai-Manapparai Road (7.19 km in W), main road directly connected with the Road        |
| 3              | Land Requirement                                           | 1 Acre = 4046.8 m <sup>2</sup>            | Total Area: 47,696.91 m <sup>2</sup>                                                                           |
| 4              | Presence of monuments / Religious structures               | Not suitable                              | None within study area                                                                                         |
| 5              | Protected Area / Sanctuaries / Ecologically Sensitive Area | Should not be Present within study area   | There is no Protected Area / Sanctuaries / Ecologically Sensitive Area are present within study area of 10 km. |

# **Annexure 8**

## **GAP Analysis Report**

# **A Gap Analysis Report**

on

Bio Medical Waste Generation

V/S

Treatment Facility Available and Future Waste  
Projection for Karur Districts

Prepared For

**M/s. NAVA BUDDHA AGENCIES PRIVATE LIMITED**

Survey No. 248/1 & 246/3A, Village: Kallai, Taluka:  
Kulithalai, District: Karur, State: Tamil Nadu



## INDEX

| Sr.No. | Description                                                                                        | Page Number |
|--------|----------------------------------------------------------------------------------------------------|-------------|
| 1      | Background                                                                                         | 1           |
| 2      | Population and Healthcare Facilities                                                               | 1           |
| 3      | Existing Common Bio-Medical Waste Treatment Facilities within 75 km from the proposed project site | 2           |
| 4      | Projection of BMW generation in upcoming 12 years                                                  | 4           |
| 5      | Conclusion                                                                                         | 5           |

### → Annexure

1. Annual Bio-Medical Waste Report for Tamil Nadu, 2023

## 1 Background:

Tamil Nadu is a state in southern India that is known for its art, architecture, and cuisine. Tamil Nadu is the tenth largest Indian state by area and the sixth largest by population, Tamil Nadu is the home of the Tamil people, who speak the Tamil language which is state's official language and one of the longest surviving classical languages of the world. The capital and largest city is Chennai.

Tamil Nadu has a diversified manufacturing sector and features among the leaders in several industries like automobiles and auto components, engineering, pharmaceuticals, garments, textiles, leather, chemicals, plastics, etc. It ranks first among the states in terms of the number of factories and industrial workers.

Tamil Nadu Industrial Development Corporation Ltd (TIDCO), State Industries Promotion Corporation of Tamil Nadu (SIPCOT), Tamil Nadu Industrial Investment Corporation Limited (TIIC), and Tamil Nadu Small Industries Development Corporation Limited (TANSIDCO) are jointly developing industrial infrastructure in the state.

## 2 Population and Healthcare Facilities:

Decade wise population growth for the Tamil Nadu is provided in the table below:

**TABLE 1 - DECADE WISE POPULATION GROWTH FOR THE TAMIL NADU STATE**

| Year                          | Population | % Growth rate |
|-------------------------------|------------|---------------|
| 1981                          | 48408077   | -             |
| 1991                          | 55858946   | 15.39%        |
| 2001                          | 62405679   | 11.72%        |
| 2011                          | 72147030   | 15.61%        |
| <b>Average decadal Growth</b> |            | 14.24%        |
| 2021                          | 82420767   | -             |

Source: **CENSUS 2011**

\*Expected population considering average decadal growth rate.

A prediction on rate of increase of HCFs and number of beds for Karur, Thanjavur, Trichy, Pudukottai, Sivagangai, Ariyalur, Perambalur, Namakkal, Erode & Dindigul district can be summarised based on authenticated details available for the entire Tamil Nadu state.

The details of Health care facilities along with number of beds available in Tamil Nadu state in year wise manner is provided in the table below

M/s. NAVA BUDDHA AGENCIES PRIVATE LIMITED  
Survey No. 248/1 & 246/3A, Village: Kallai, Taluka: Kulithalai, District: Karur,  
State: Tamil Nadu

**TABLE 2 - THE DETAILS OF HEATH CARE FACILITIES AND NUMBER OF BEDS FOR TAMIL NADU STATE IN YEAR WISE MANNER**

| Year                         | Total No. of HCF | % increment in HCF | Total No. of Beds | % increment in Beds |
|------------------------------|------------------|--------------------|-------------------|---------------------|
| 2019                         | 23277            | --                 | 179190            | --                  |
| 2020                         | 25026            | 7.5                | 184598            | 3.0                 |
| 2021                         | 26597            | 6.3                | 145848            | -21.0               |
| 2022                         | 27603            | 3.8                | 191114            | 31.0                |
| 2023                         | 30230            | 9.5                |                   | 7.1                 |
| <b>Average Yearly Growth</b> | <b>--</b>        | <b>6.8</b>         | <b>--</b>         | <b>5.0</b>          |

Source: TNPCB BMW Annual Reports

M/s. NAVA BUDHHA AGENCIES PVT. LTD. is proposing new project of Common Bio-Medical Waste Treatment Facility (CBMWTF) at survey no. 248/1 & 246/3A, Village: Kallai, Taluka: Kulithalai, District: Karur, State: Tamil Nadu. The proposed project site is situated at Latitude: 10°47'50.90"N, Longitude: 78°27'36.35"E.

### 3 Existing Common Bio-Medical Waste Treatment Facilities within 75 km from the proposed project site



M/s. NAVA BUDDHA AGENCIES PRIVATE LIMITED  
Survey No. 248/1 & 246/3A, Village: Kallai, Taluka: Kulithalai, District: Karur,  
State: Tamil Nadu

|                                                                                   |                                                                                                   |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
|  | Proposed New CBMWTF                                                                               |
|  | Existing Facility of M/s. Ramky Energy and Environment Ltd.                                       |
|  | Existing Facility of M/s. Medicare Enviro System                                                  |
|  | Jurisdiction Allocated to M/s. Ramky Energy and Environment Ltd. for collecting Bio-Medical Waste |
|  | Jurisdiction Allocated to M/s. Medicare Enviro System for collecting Bio-Medical Waste            |

As per the above image, it is to be interpreted that following districts are covered in 75 km radius of proposed project site.

**TABLE 3 - LIST OF DISTRICTS**

| Sr. No. | Name of District | Coverage in 75 km radius |
|---------|------------------|--------------------------|
| 1       | Karur            | Fully covered            |
| 2       | Thanjavur        | Part of district covered |
| 3       | Trichy           | Fully covered            |
| 4       | Pudukottai       | Part of district covered |
| 5       | Sivagangai       | Part of district covered |
| 6       | Ariyalur         | Part of district covered |
| 7       | Perambalur       | Part of district covered |
| 8       | Namakkal         | Part of district covered |
| 9       | Erode            | Part of district covered |
| 10      | Dindigul         | Part of district covered |

As per the BMW Annual Report 2023 published by Tamil Nadu Pollution Control Board (TNPCB), there is only one existing facility i.e. M/s. Medicare Enviro System exists within the 75 km radius which covers around 31153 beds from Thanjavur, Trichy, Pudukottai, Sivagangai, Ariyalur, Perambalur, Nagapatinam & Tiruvarur districts. Additionally, one more facility i.e. M/s. Ramky Energy and Environment Ltd. is located outside the radius of 75 km and covers around 25810 beds from Karur, Namakkal, Erode & Salaem districts.

Thus, within 75 km radius of proposed project site, the existing facilities are covering more than 55000 beds.

As per the Revised Guidelines for Common Bio-Medical Waste Treatment and Disposal Facilities – 2016, 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 in compliance to various provisions notified under the Environment (Protection) Act, 1986, to cater services only to such additional bed strength of the HCFs located.

**TABLE 4 - DETAILS OF EXISTING TWO FACILITIES NEAR TO THE PROPOSED NEW CBMWTF PROJECT SITE**

| Sr. No.      | Details of the Existing Facility       | Districts covered by the Facility                                                           | Total Number of beds covered |
|--------------|----------------------------------------|---------------------------------------------------------------------------------------------|------------------------------|
| 1            | M/s. Medicare Enviro System            | Thanjavur, Trichy, Pudukottai, Sivagangai, Nagapatinam, Thiruvarur, Ariyalur and Perambalur | 31115                        |
| 2            | M/s. Ramky Energy and Environment Ltd. | Salem, Namakkal, Karur and Erode                                                            | 25810                        |
| <b>Total</b> |                                        |                                                                                             | <b>56963</b>                 |

**Source: TNPCB Annual BMW Report, 2023**

In view to above, there are sufficient number of beds available in the region & to comply the condition of BMW Rules, 2016 it is proposed to establish a new Common Bio-Medical Waste Treatment Facility in that region.

**TABLE 5 - GAP ANALYSIS: PRESENT BMW GENERATION VS AVAILABLE FACILITIES**

| Particular                             | Additional Beds covered by Existing Facilities | Waste generation estimation @ 0.30 kg/day/bed |
|----------------------------------------|------------------------------------------------|-----------------------------------------------|
| Number of beds from proposed districts | 36963                                          | 11089 kg/day                                  |

| Existing Facility                      | Beds Covered as per TNPCB | Waste quantum considering 0.25 kg/day/bed | Waste quantum considering 0.30 kg/day/bed | Total Waste collected by Existing Facility as per TNPCB kg/day | Gap in Waste Kg/Day |
|----------------------------------------|---------------------------|-------------------------------------------|-------------------------------------------|----------------------------------------------------------------|---------------------|
| M/s. Medicare Enviro System            | 31153                     | 7788                                      | 9346                                      | 6536.625                                                       | 2809                |
| M/s. Ramky Energy and Environment Ltd. | 25810                     | 6453                                      | 7743                                      | 2093                                                           | 5650                |
| <b>Total</b>                           | <b>56963</b>              | <b>14241</b>                              | <b>17089</b>                              | <b>8630</b>                                                    | <b>8459</b>         |

#### **4 Projection of BMW generation in upcoming 12 years:**

Considering projection for next 10-12 years and considering development in infrastructure and HCFs, it is expected to increase the number of Beds by 5% each year. In view of 0.3 kg/bed/day, Waste quantum will also increase by 5 % each year. Waste projection is presented as under in Table 6:

**TABLE 6 - PROJECTION BIOMEDICAL WASTE GENERATION DURING NEXT 12 YEARS**

| Year | Waste quantity<br>in kg/bed/day | Waste quantum<br>considering 5%<br>increment each year | Installed capacity of<br>incinerator at Existing<br>facilities kg/day | Gap in<br>kg/day |
|------|---------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------|------------------|
| 2025 | 0.3                             | 17089                                                  | 8630                                                                  | 8459             |
| 2026 |                                 | 17943                                                  |                                                                       | 9314             |
| 2027 |                                 | 18841                                                  |                                                                       | 10211            |
| 2028 |                                 | 19783                                                  |                                                                       | 11153            |
| 2029 |                                 | 20772                                                  |                                                                       | 12142            |
| 2030 |                                 | 21810                                                  |                                                                       | 13181            |
| 2031 |                                 | 22901                                                  |                                                                       | 14271            |
| 2032 |                                 | 24046                                                  |                                                                       | 15416            |
| 2033 |                                 | 25248                                                  |                                                                       | 16618            |
| 2034 |                                 | 26510                                                  |                                                                       | 17881            |
| 2035 |                                 | 27836                                                  |                                                                       | 19206            |
| 2036 |                                 | 29228                                                  |                                                                       | 20598            |
| 2037 |                                 | 30689                                                  |                                                                       | 22060            |

## 5 Conclusion:

Based on above details; followings are observed:

1. There is continuous growth in population at proposed districts which demands continuous development i.e. new infrastructure facilities.
2. Continuous development of the city demands a greater number of health care facilities which generates more quantum of Bio-Medical Waste. This waste required to be treated as per BMW Rules, 2016.
3. It is estimated to have more than 55000 number of beds in 75 km radius.
4. One operating facility in 75 km radius is already covering around 31000 beds & other beds are covered by another facility which is at more distance from our proposed facility i.e. around 106 km.
5. Thus, to comply with CPCB guidelines and to fulfill the requirement of future Bio-Medical Waste (BMW) load, there is a need to establish a new Common Bio-Medical Waste Treatment Facility (CBMWTF).

# **Annexure**



**LiFE**  
Lifestyle for  
Environment



## TAMIL NADU POLLUTION CONTROL BOARD



**From**

Thiru. R. Kannan, M.Tech.,  
Member Secretary,  
Tamil Nadu Pollution Control Board,  
76, Mount Road, Guindy,  
Chennai - 600 032

**To**

The Member Secretary,  
Central Pollution Control Board,  
Ministry of Environment, Forest & CC,  
Parivesh Bhawan, C.B.D.-cum-Office  
Complex, East Arjun Nagar, Shahdara,  
Delhi-110 032

**Lr No: T1/TNPCB/F-33728/BMWM/2024 Dated: 31 .07.2024**

Sir,

**Sub:** TNPCB-Bio-Medical Waste Management - Annual Report for the year 2023  
under BMWM Rules, 2016 as amended- Submitted-Reg.

**Ref:** Biomedical Waste Management Rules, 2016 as amended

\*\*\*\*\*

I invite kind attention to the reference cited and to enclose herewith the Annual Report on Bio-Medical Waste Management with respect to the State of Tamil Nadu in the prescribed Format of the CPCB (Form-IV A) for the year 2023 for information and necessary action.

**Encl.:** As above

*[Signature]*  
For Member Secretary

*[Signature]*  
31/7/24

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No. 76, MOUNT SALAI, GUINDY, CHENNAI - 600 032.

Tel : 044-22353134 - 139 Fax : 044-22353068

Email : tnpqb-chn@gov.in Web : tnpqb.gov.in

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**TAMIL NADU POLLUTION CONTROL BOARD**  
**Bio Medical Waste Management**  
**Annual Report – January to December 2023**  
**FORMAT – IV A**

Format for submission of the Annual Report Information on Bio-Medical Waste Management (to be submitted by the State Pollution Control Board or Pollution Control Committees and Director General Armed Forces Medical Services to Central Pollution Control Board on or before 31<sup>st</sup> July of every year for the period from January to December of the preceding calendar year 2023)

**Part –I (summary of Information)**

|      |                                                                           |   |                                                                                                               |
|------|---------------------------------------------------------------------------|---|---------------------------------------------------------------------------------------------------------------|
| 1    | <b>Name of the organization</b>                                           | : | Tamil Nadu Pollution Control Board                                                                            |
| 2    | <b>Name of the Nodal Officer with contact telephone number and e-mail</b> | : | <b>Er.K.Nalini,M.E, M.B.A,</b><br>Joint Chief Environmental Engineer,<br>80560 42209<br>Jcee5chn@tnpcb.gov.in |
| 3    | <b>Total No.of health care facilities/occupiers</b>                       | : | 30230                                                                                                         |
| I    | Bedded hospitals and nursing homes (bedded)                               | : | 8127                                                                                                          |
| ii   | Clinics dispensaries                                                      | : | 11228                                                                                                         |
| iii  | Veterinary institutions                                                   | : | 1411                                                                                                          |
| iv   | Animal beds                                                               | : | 112                                                                                                           |
| v    | Pathological laboratories                                                 | : | 2310                                                                                                          |
| vi   | Blood banks                                                               | : | 47                                                                                                            |
| vii  | Clinical establishment                                                    | : | 6846                                                                                                          |
| viii | Research Institutions                                                     | : | 28                                                                                                            |
| ix   | AYUSH                                                                     | : | 121                                                                                                           |
| 4    | <b>Total No.of beds</b>                                                   | : | 204717                                                                                                        |
| 5    | <b>Status of authorization</b>                                            | : |                                                                                                               |
| i    | Total number of occupiers applied for authorization                       | : | 30230                                                                                                         |
| ii   | Total number of occupiers granted authorization                           | : | 30163                                                                                                         |
| iii  | Total number of application under consideration                           | : | 67                                                                                                            |
| iv   | Total number of applications rejected                                     | : | Nil                                                                                                           |
| v    | Total number of occupiers in operation without applying for authorisation | : | Nil                                                                                                           |
| 6    | <b>Quantity of Bio Medical Waste generation (in kg/day)</b>               | : | 59261.04                                                                                                      |
| i    | Bio-medical waste generation by bedded hospitals (in kg/day)              | : | 50471.58                                                                                                      |
| ii   | Bio-medical waste generation by non-bedded hospitals (in kg/day)          | : | 8789.46                                                                                                       |
| iii  | Any other(in kg/day)                                                      | : | Nil                                                                                                           |
|      | <b>Total</b>                                                              | : |                                                                                                               |
| 7    | <b>Bio-medical waste treatment and disposal</b>                           | : |                                                                                                               |
| a    | By captive bio-medical waste                                              | : | Nil                                                                                                           |

|     |                                                                                        |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----|----------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | treatment and disposal by Health Care Facilities                                       |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| i   | Number of Health care facilities having captive treatment and disposal facilities      | : | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| ii  | Total bio medical waste treated and disposed by captive treatment facilities in kg/day | : | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| (b) | <b>Bio Medical Waste treatment&amp; disposed by CBMW facility as per Part- 4)</b>      | : | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| i   | No.of CBMW treatment facilities in operation                                           | : | 11 are in operation (Out of 13 CBMWTFs, two facilities at Nilgiris and Ramanathapuram were issued with closure direction for non compliance provisions of BMWM Rules, 2016). However, the BMW generated from the HCFs in the Nilgiris district are collected and handed over to the M/s.Koval Biowaste Management (P) Ltd, Coimbatore and from Ramanathapuram district are collected and handed over to the M/s Resustainability Health Care Ltd, Virudhunagar (Jan 2023), Aseptic Systems Bio Medical Management Company, Thirunelveli (Feb 2023) and Medicare Enviro Systems, Thanjavur (Mar to Dec 2023) for treatment and disposal). |
| ii  | No.of CBMW treatment facilities under construction                                     | : | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| iii | Total bio-medical waste treated in kg/day                                              | : | 59261.04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| iv  | Total treatedbio-medical waste disposed through authorized recyclers (in kg/day)       | : |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 8   | <b>Total No.of violation by</b>                                                        | : |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| i   | Health Care facilities (bedded and non-bedded)                                         | : | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| ii  | CBMW Treatment facilities                                                              | : | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| iii | Others (Please specify)                                                                | : | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 9   | <b>Show cause notice/direction issued to defaulter</b>                                 | : | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| i   | CBMW treatment facilities                                                              | : | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| ii  | Others                                                                                 | : | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 10  | <b>Any other relevant information</b>                                                  | : |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| I   | No.of workshop/trainings conducted during the year                                     | : | 234                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| ii  | No.of occupiers installed liquid waste treatment facility                              | : | 6248 Nos and other Occupiers<br>1. Discharge the effluent into public sewer after disinfection with sodium hypochloride solution/ UV sterilizer.<br>2. Discharge the effluent into combined STP after disinfection with sodium hypochloride solution/ UV sterilizer.<br>3. Discharge the effluent on land after disinfection with sodium hypochloride solution/ UV sterilizer.                                                                                                                                                                                                                                                           |
| iii | No.of captive incinerators                                                             | : | NIL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

|      |                                                                                                   |   |                                                                                                                                                                                                                              |
|------|---------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | complying to the norms                                                                            |   |                                                                                                                                                                                                                              |
| iv   | No.of occupiers organized trainings                                                               | : | 1117                                                                                                                                                                                                                         |
| v    | No.of occupiers constituted BMWM Committees                                                       | : | 1                                                                                                                                                                                                                            |
| vi   | No.of occupiers submitted Annual Report for the previous calendar year                            | : | 1158 Nos. Further the occupiers are uploading the BMW Annual report in their website as per BMWM Rules,2016.                                                                                                                 |
| vii  | No.of occupiers practicing pre-treatment of lab microbiology and Bio-technology waste             | : | All the bedded hospitals, pathological laboratories, blood banks and research institutions are practicing pre treatment of lab microbiology and bio-technology waste by disinfection before handling it over to the CBMWTFs. |
| viii | No.of CBMW Treatment Facilities that have installed Continuous Online Emission Monitoring Systems | : | 11                                                                                                                                                                                                                           |

**Part 2 District – wise Bio Medical Waste Generation (for the previous calendar year 2023)**

| S.No | Name of the State/ Union territory | Name of the District              | Bio-medical Waste Generation (in kg/day) | Existing total bio-medical waste treatment capacity (both captive and CBMWTF) in kg/day |              |
|------|------------------------------------|-----------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------|--------------|
|      | Tamil Nadu                         |                                   |                                          | <b>Equipment</b>                                                                        | <b>Total</b> |
| 1.   |                                    | Chengalpattu                      | 3707                                     | Incinerator                                                                             | 25300 kg/day |
| 2.   |                                    | Chennai , Chennai south ,Ambattur | 15763.23                                 | Autoclave                                                                               | 13800 kg/day |
| 3.   |                                    | Cuddalore                         | 1461                                     | Deep Burial                                                                             | Nil          |
| 4.   |                                    | Kancheepuram                      | 2221.9                                   |                                                                                         |              |
| 5.   |                                    | Tiruvallur & Gummidipoondi        | 2048.54                                  | Any other                                                                               | --           |
| 6.   |                                    | Villupuram                        | 882.05                                   |                                                                                         |              |
|      |                                    |                                   |                                          | <b>Equipment</b>                                                                        | <b>Total</b> |
| 7.   |                                    | Coimbatore                        | 10101.45                                 | Incinerator                                                                             | 11000 kg/day |
| 8.   |                                    | Tiruppur                          | 1481.46                                  | Autoclave                                                                               | 7400 kg/day  |
| 9.   |                                    | Nilgiris                          | 223.46                                   | Deep Burial                                                                             | Nil          |
|      |                                    |                                   |                                          | Any other                                                                               | --           |
|      |                                    |                                   |                                          | <b>Equipment</b>                                                                        | <b>Total</b> |
| 10.  |                                    | Dharmapuri                        | 485.51                                   | Incinerator                                                                             | 8100 kg/Day  |
| 11.  |                                    | Krishnagiri                       | 375                                      | Autoclave                                                                               | 7100 kg/Day  |
| 12.  |                                    | Karur                             | 349                                      | Deep Burial                                                                             | Nil          |
| 13.  |                                    | Erode & Perundurai                | 802.39                                   |                                                                                         |              |
| 14.  |                                    | Namakkal                          | 211.83                                   | Any other                                                                               | --           |
| 15.  |                                    | Salem & Kumarapalayam             | 813                                      |                                                                                         |              |
|      |                                    |                                   |                                          | <b>Equipment</b>                                                                        | <b>Total</b> |
| 16.  |                                    | Kanyakumari                       | 1874                                     | Incinerator                                                                             | 4400 kg/Day  |
|      |                                    |                                   |                                          | Autoclave                                                                               | 2400 kg/Day  |
| 17.  |                                    | Thoothukudi                       | 790                                      | Deep Burial                                                                             | Nil          |
| 18.  |                                    | Tirunelveli                       | 1622                                     | Any other                                                                               | --           |
|      |                                    |                                   |                                          | <b>Equipment</b>                                                                        | <b>Total</b> |
| 19.  |                                    | Madurai                           | 2108                                     | Incinerator                                                                             | 3300 kg/day  |
| 20.  |                                    | Dindigul                          | 659                                      | Autoclave                                                                               | 1600 kg/day  |
| 21.  |                                    | Theni                             | 386                                      | Deep Burial                                                                             | Nil          |
| 22.  |                                    | Ramanathapuram                    | 283.56                                   |                                                                                         |              |
| 23.  |                                    | Virudhunagar                      | 486                                      | Any other                                                                               | --           |
|      |                                    |                                   |                                          | <b>Equipment</b>                                                                        | <b>Total</b> |
| 24.  |                                    | Nagapatinam & Tiruvarur           | 458                                      | Incinerator                                                                             | 3300 kg/day  |
| 25.  |                                    | Thanjavur                         | 835                                      | Autoclave                                                                               | 2000 kg/day  |
| 26.  |                                    | Trichy                            | 1225                                     | Deep Burial                                                                             | Nil          |
| 27.  |                                    | Ariyalur &                        | 653.66                                   |                                                                                         |              |

|     |  |                                |      |                  |              |
|-----|--|--------------------------------|------|------------------|--------------|
|     |  | Perambalur                     |      |                  |              |
| 28. |  | Pudukottai                     | 392  | Any other        | --           |
| 29. |  | Sivagangai                     | 475  |                  |              |
|     |  |                                |      | <b>Equipment</b> | <b>Total</b> |
|     |  |                                |      | Incinerator      | 5300 kg/day  |
| 30. |  | Vellore, Ranipet & Vaniyambadi | 5564 | Autoclave        | 3600 kg/day  |
|     |  |                                |      | Deep Burial      | Nil          |
| 31. |  | Tiruvannamalai                 | 523  | Any other        | --           |

**Note:**

The entire quantity of Biomedical wastes generated is treated and disposed through 10 CBMWTFs presently in operation

No Health Care Facilities in Tamil Nadu have captive treatment facility

[illegible]

**Part 4 information on Common Bio medical waste treatment and disposal facilities (for the previous calendar year 2023)**

| S. No | Name and Address of the common bio Medical Waste treatment facilities with contact person name and telephone number                                   | GPS coordinates          | coverage Area in KMs | Name of the cities/ areas covered by CBMWTFs                                                                          | Total number of Health care facilities Being covered | Total number of beds covered | Total quantity of bio-medical waste Collected from member Health care facilities (in kg/day) | Capacity of treatment equipments installed by common bio medical waste treatment facilities |         |                                   | Total bio-medical waste treated in Kg/day | Method of disposal of treated wastes (Incineration ash/sharps /plastics)                                                              |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------|-----------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Equipment                                                                                   | Numbers | Total installed capacity (kg/day) |                                           |                                                                                                                                       |
| 1     | M/s. G.J Multiclave (India) Pvt Ltd, Thenmelpakkam, Chengalpattu Taluk, Chengalpattu District.<br><br>Mr. Siva Kumar<br>Mobile No: 98409196971        | 12.744490°<br>80.033245° | 80                   | Chengalpattu District, Parts of Chennai District. Parts of Kancheepuram District                                      | 5049                                                 | 24882                        | 15057                                                                                        | Incinerator                                                                                 | 2       | 9900 Kg/day                       | 15057                                     | 1. Incineration Ash disposed through TSDF<br><br>2. Waste sharps – Sharp pits<br><br>3. Plastics disposed through Authorised recycler |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Plasma Pyrolysis                                                                            |         |                                   |                                           |                                                                                                                                       |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Autoclave                                                                                   | 2       | 8000 Kg/day                       |                                           |                                                                                                                                       |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Hydroclave                                                                                  |         |                                   |                                           |                                                                                                                                       |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Microwave                                                                                   |         |                                   |                                           |                                                                                                                                       |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Shredder                                                                                    | 2       | 6000 kg/day                       |                                           |                                                                                                                                       |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Sharps encapsulation or concrete pit                                                        | 602     |                                   |                                           |                                                                                                                                       |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Deep burial pits                                                                            |         |                                   |                                           |                                                                                                                                       |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Any other equipment                                                                         |         |                                   |                                           |                                                                                                                                       |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Effluent treatment plant                                                                    | 1       | 25 KLD                            |                                           |                                                                                                                                       |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Sub-total                                                                                   |         |                                   |                                           |                                                                                                                                       |
| 2     | M/s.Tamilnadu waste management ltd, S.F No.29/2, 3, K.K.Pudur Road, Kinar village, Chengalpattu Dist.<br><br>Mr.Sridhar Reddy<br>Mobile No:9047011161 | 12.529987°<br>79.954009° | 105                  | Parts of Kancheepuram District, Thiruvallur District, Maduranthagam Taluk of Chengalpattu District, Parts of Cuddalor | 4149                                                 | 18962                        | 5610                                                                                         | Incinerator                                                                                 | 1       | 4500 Kg/day                       | 5610                                      | 1. Incineration Ash disposed through TSDF<br><br>2. Waste sharps – Sharp pits<br><br>3. Plastics disposed through Authorised recycler |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Plasma Pyrolysis                                                                            |         |                                   |                                           |                                                                                                                                       |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Autoclave                                                                                   | 1       | 3000 Kg/day                       |                                           |                                                                                                                                       |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Hydroclave                                                                                  |         |                                   |                                           |                                                                                                                                       |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Microwave                                                                                   |         |                                   |                                           |                                                                                                                                       |
|       |                                                                                                                                                       |                          |                      |                                                                                                                       |                                                      |                              |                                                                                              | Shredder                                                                                    | 2       | 80                                |                                           |                                                                                                                                       |



|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          |                                      |    |                                                                                                                       |          |                                             |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----|-----------------------------------------------------------------|------|-------|----------|--------------------------------------|----|-----------------------------------------------------------------------------------------------------------------------|----------|---------------------------------------------|
|   |                                                                                                                                                                       |                              |     | District and Villupuram Districts                               |      |       |          | Sharps encapsulation or concrete pit | 2  |                                                                                                                       |          |                                             |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Deep burial pits                     |    |                                                                                                                       |          |                                             |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Any other equipment                  |    |                                                                                                                       |          |                                             |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Effluent treatment plant             | 1  | 10 KLD                                                                                                                |          |                                             |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Sub-total                            |    |                                                                                                                       |          |                                             |
| 3 | M/s. Ken Biolinks Pvt Ltd,<br>1/150, SLRS Hospital Road,<br>Kandipadu Village,<br>Katpadi Taluk,<br>Vellore District.<br><br>Mr. SHIVA SUBRAMANIAN<br>+91-99623-11011 | 13.001681 N°<br>79.194363 E° | 75  | Vellore,<br>Tiruvannamalai,<br>Ranipet,<br>Tirupathur Districts | 848  | 9025  | 7722.869 | Incinerator                          | 1  | 5500 kg/day                                                                                                           | 7722.869 | 1. Incineration ash - disposed through TSDF |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Plasma Pyrolysis                     |    |                                                                                                                       |          | 2. Waste sharps – Sharp pits                |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Autoclave                            | 1  | 2240Kg/day                                                                                                            |          | 3. Plastics – Disposed through recyclers    |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Hydroclave                           |    |                                                                                                                       |          |                                             |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Microwave                            |    |                                                                                                                       |          |                                             |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Shredder                             | 2  | 2200-3300 kg/day                                                                                                      |          |                                             |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Sharps encapsulation or concrete pit | 8  | 3 in Operation                                                                                                        |          |                                             |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Deep burial pits                     |    |                                                                                                                       |          |                                             |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Any other equipment                  | 1  | ETP for liquid waste streams coming along with the wastes mixed along with plant effluent and treated 12 KLD capacity |          |                                             |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Effluent treatment plant             | 1  | 12 KLD                                                                                                                |          |                                             |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Sub-total                            |    |                                                                                                                       |          |                                             |
| 4 | M/s. Medicare Enviro System,<br>Sengipatti Village,                                                                                                                   | 10.7141° N<br>78.9557°E      | 140 | Thanjavur, Trichy,<br>Pudukottai,<br>Sivagangai,                | 4357 | 31153 | 6536.625 | Incinerator                          | 1  | 3300 Kg/day                                                                                                           | 6536.625 | 1. Incineration ash - disposed through TSDF |
|   |                                                                                                                                                                       |                              |     |                                                                 |      |       |          | Plasma                               | -- |                                                                                                                       |          |                                             |



|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         |                                            |    |                       |         |  |                                                |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----|-----------------------------------------------------------------------------------------------|------|-------|---------|--------------------------------------------|----|-----------------------|---------|--|------------------------------------------------|
|   | Thanjavur Taluk,<br>Thanjavur Dt.<br><br>Mr. K.Velmurugan,<br>9600288998                                                                      |                           |     | Nagapatinam,<br>Tiruvavur, Ariyalur<br>& Perambalur                                           |      |       |         | Pyrolysis                                  |    |                       |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Autoclave                                  | 1  | 2000 Kg/day           |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Hydroclave                                 |    |                       |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Microwave                                  |    |                       |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Shredder                                   | 1  | 1100 kg/day           |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Sharps<br>encapsulation or<br>concrete pit | 12 | -                     |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Deep burial pits                           | -- |                       |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Any other<br>equipment                     | -- |                       |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Effluent<br>treatment plant                | 1  | 1500 LPD              |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Sub-total                                  |    |                       |         |  |                                                |
| 5 | M/s. Ramky Energy &<br>Environment Ltd.,<br>Undrimikidikulam,<br>Aruppukottai Taluk,<br>Virudhunagar District.<br><br>Mr. Mohan<br>9677122723 | 9.69 N<br>79.24 E         | 250 | Madurai Dt.<br>Virudhunagar Dt.<br>Dindigul Dt.<br>Theni Dt. & Govt<br>Hospitals in<br>Ramnad | 2961 | 26810 | 3747.84 | Incinerator                                | 1  | 3300 Kg/day           | 3747.84 |  | 1. Incineration ash - disposed<br>through TSDF |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Plasma                                     | -- | --                    |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Pyrolysis                                  |    |                       |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Autoclave                                  | 1  | 1600 Kg/day           |         |  | 2. Waste sharps – Sharp pits                   |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Hydroclave                                 |    |                       |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Microwave                                  |    |                       |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Shredder                                   | 2  | 2200 & 1650<br>kg/day |         |  | 3. Plastics – Disposed through<br>recyclers    |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Sharps<br>encapsulation or<br>concrete pit | 2  | --                    |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Deep burial pits                           | -- | --                    |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Any other<br>equipment                     | -- | --                    |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Effluent<br>treatment plant                | 1  | 7 KLD                 |         |  |                                                |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Sub-total                                  |    |                       |         |  |                                                |
| 6 | M/s. Aseptic System Bio<br>Medical Waste                                                                                                      | 77.73575° N<br>8.47752° E | 100 | Tirunelveli Dt.<br>Tuticorin Dt.                                                              | 3316 | 23459 | 4161    | Incinerator                                | 1  | 4400 Kg/day           | 4161    |  | 1. Incineration ash - disposed<br>through TSDF |
|   |                                                                                                                                               |                           |     |                                                                                               |      |       |         | Plasma                                     |    |                       |         |  |                                                |

|   |                                                                                                                                         |                      |     |                                  |      |       |           |                                      |    |                                  |           |  |                                             |
|---|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----|----------------------------------|------|-------|-----------|--------------------------------------|----|----------------------------------|-----------|--|---------------------------------------------|
|   | Management Co.,<br>Pappankulam Village,<br>Nanguneri Taluk,<br>Tirunelveli District.<br><br>Mr. Murugan<br>7373715180                   |                      |     | Kanyakumari Dt.<br>& Tenkasi Dt. |      |       |           | Pyrolysis                            |    |                                  |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Autoclave                            | 1  | 2400 Kg/day                      |           |  | 2. Waste sharps – Sharp pits                |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Hydroclave                           |    |                                  |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Microwave                            |    |                                  |           |  | 3. Plastics – Disposed through recyclers    |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Shredder                             | 1  | 4400 kg/day                      |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Sharps encapsulation or concrete pit | 42 | -                                |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Deep burial pits                     |    |                                  |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Any other equipment                  |    |                                  |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Effluent treatment plant             | 1  | 15 KLD                           |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Sub-total                            |    |                                  |           |  |                                             |
| 7 | M/s.Teknotherm Industries, 183/1A, Orattukupai Village., Chettipalayam Village., Podanur, Coimbatore.<br><br>Mr. Sudhakar<br>9626822000 |                      | 75  | Coimbatore, & Tiruppur Districts | 1115 | 24345 | 10313.035 | Incinerator                          | 1  | 5500 Kg/day                      | 10313.035 |  | 1. Incineration ash - disposed through TSDF |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Plasma                               | -- | --                               |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Pyrolysis                            |    |                                  |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Autoclave                            | 1  | 4000 Kg/day                      |           |  | 2. Waste sharps – Sharp pits                |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Hydroclave                           | -- | --                               |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Microwave                            | -- | --                               |           |  | 3. Plastics – Disposed through recyclers    |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Shredder                             | 1  | 2200 kg/day                      |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Sharps encapsulation or concrete pit | 1  | --                               |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Deep burial pits                     | -- | -                                |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Any other equipment                  | 1  | Chemical disinfectant 2 Tons/day |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Effluent treatment plant             | 1  | 25 KLD                           |           |  |                                             |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Sub-total                            |    |                                  |           |  |                                             |
| 8 | M/s.Ramky Energy And Environment Ltd,                                                                                                   | 11.552937, 77.850794 | 100 | Salem Namakkal                   | 3127 | 25810 | 2093      | Incinerator                          | 1  | 3300 Kg/day                      | 2093      |  | 1. Incineration ash - disposed through TSDF |
|   |                                                                                                                                         |                      |     |                                  |      |       |           | Plasma                               | -  |                                  |           |  |                                             |

|    |                                                                                                                                          |                             |     |                |     |      |               |                                            |   |                                    |                                                                                                                                                                  |
|----|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----|----------------|-----|------|---------------|--------------------------------------------|---|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | No:10,Thangayur Village,<br>Edappadi Taluk,<br>Salem-Dist<br><br>M.D.Selvapandian,<br>Ph:9840939811,                                     |                             |     | Karur<br>Erode |     |      |               | Pyrolysis                                  |   |                                    | 2. Waste sharps – Sharp pits<br><br>3. Plastics – Disposed through<br>recyclers                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Autoclave                                  | 1 | 2600 Kg/day                        |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Hydroclave                                 | - |                                    |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Microwave                                  | - |                                    |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Shredder                                   | 2 | 1100 Kg/ day<br>and 2200<br>Kg/day |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Sharps<br>encapsulation or<br>concrete pit | 2 | -                                  |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Deep burial pits                           | - |                                    |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Any other<br>equipment                     | - |                                    |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Effluent<br>treatment plant                | 1 | 1.8 KLD                            |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Sub-total                                  |   |                                    |                                                                                                                                                                  |
| 9  | Society for Bio Medical<br>Waste Management<br>Ottupattarai Village,<br>Coonoor.<br>(IMA Nilgiris)<br><br>Dr. Muralidharan<br>9443475946 | --                          | --  | --             | 399 | 2363 | 223.46        | Incinerator                                | - | -                                  | The CBMWTF now under closure. All the waste<br>collected were handed over to M/s. Koval Bio Waste<br>Management P Ltd., Coimbatore for treatment and<br>disposal |
|    |                                                                                                                                          |                             |     |                |     |      |               | Plasma                                     |   |                                    |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Pyrolysis                                  |   |                                    |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Autoclave                                  | - | -                                  |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Hydroclave                                 |   |                                    |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Microwave                                  | - | -                                  |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Shredder                                   |   |                                    |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Sharps<br>encapsulation or<br>concrete pit | - | -                                  |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Deep burial pits                           | - | -                                  |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Any other<br>equipment                     |   |                                    |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Effluent<br>treatment plant                | - | -                                  |                                                                                                                                                                  |
|    |                                                                                                                                          |                             |     |                |     |      |               | Sub-total                                  |   |                                    |                                                                                                                                                                  |
| 10 | M/s Neat and Clean<br>Service Squad,                                                                                                     | 9°26'08.5"N<br>78°40'37.8"E | 150 | Ramanathapuram | 359 | 1382 | 174.72 Kg/day | Incinerator                                | - | -                                  | The CBMWTF now under closure. All the waste<br>collected were handed over to M/s Resustainability                                                                |
|    |                                                                                                                                          |                             |     |                |     |      |               | Plasma                                     | - | -                                  |                                                                                                                                                                  |

|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          |                                            |   |              |                                                                                                                                                                                                     |                                                |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----|------------------------------------------------|------|------|----------|--------------------------------------------|---|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
|    | Keelakottai Village,<br>Paramakudi Taluk,<br>Ramanathapuram<br>District<br><br>Mr. Pathy<br>8220013008                                                                      |                                     |     |                                                |      |      |          | Pyrolysis                                  |   |              | Health Care Ltd, Virudhunagar (Jan 2023), Aseptic Systems Bio Medical Management Company, Thirunelveli (Feb 2023) and Medicare Enviro Systems, Thanjavur(Mar to Dec 2023)for treatment and disposal |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Autoclave                                  | - | -            |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Hydroclave                                 |   |              |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Microwave                                  | - | -            |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Shredder                                   |   |              |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Sharps<br>encapsulation or<br>concrete pit | - | -            |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Deep burial pits                           |   |              |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Any other<br>equipment                     | - | -            |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Effluent<br>treatment plant                |   |              |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Sub-total                                  |   |              |                                                                                                                                                                                                     |                                                |
| 11 | M/s.Kovai Bio Waste<br>Management P Ltd.,<br>SF.No.87/2, Orattukupai<br>Village., Chettipalayam<br>Village., Podanur,<br>Coimbatore.<br><br>Tmt. Bhuvaneswari<br>9894012222 | Lat:10.936115<br>Long:<br>77.046635 | 150 | Tiruppur,<br>Coimbatore &<br>Nilgris Districts | 2329 | 3624 | 1301.551 | Incinerator                                | 1 | 5500 Kg/day  | 1301.551                                                                                                                                                                                            | 1. Incineration ash - disposed<br>through TSDF |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Plasma<br>Pyrolysis                        |   |              |                                                                                                                                                                                                     | 2. Waste sharps – Sharp pits                   |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Autoclave                                  |   | 4400 Kg/day  |                                                                                                                                                                                                     | 3. Plastics – Disposed through<br>recyclers    |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Hydroclave                                 |   |              |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Microwave                                  |   |              |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Shredder                                   | 1 | 2200 kg/day  |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Sharps<br>encapsulation or<br>concrete pit | 1 |              |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Deep burial pits                           |   |              |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Any other<br>equipment                     |   |              |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Effluent<br>treatment plant                |   |              |                                                                                                                                                                                                     |                                                |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Sub-total                                  |   |              |                                                                                                                                                                                                     |                                                |
| 12 | M/s. Pondicherry Solid<br>Waste Management                                                                                                                                  | Latit:11.517155<br>Long:79.196589   | 75  | Cuddalore,<br>Villupuram,<br>Kallakurichi,     | 922  | 5047 | 1632.655 | Incinerator                                | 1 | 10000 Kg/day | 1632.655                                                                                                                                                                                            | 1. Incineration ash - disposed<br>through TSDF |
|    |                                                                                                                                                                             |                                     |     |                                                |      |      |          | Plasma                                     |   |              |                                                                                                                                                                                                     |                                                |

|    |                                                                                                                                                                          |                        |     |                                  |      |      |     |                                      |          |                                   |     |  |                                             |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----|----------------------------------|------|------|-----|--------------------------------------|----------|-----------------------------------|-----|--|---------------------------------------------|
|    | Company Private Limited, S.F.NO.275/2, T. Pudalyur village, Virudhachalam Taluk, Cuddalore District                                                                      |                        |     | Ariyalur, Perambalur             |      |      |     | Pyrolysis                            |          |                                   |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Autoclave                            | 1        | 2560 Kg/day                       |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Hydroclave                           |          |                                   |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Microwave                            |          |                                   |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Shredder                             | 1        | 5500 Kg/day                       |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Sharps encapsulation or concrete pit |          | 1x1x0.85 m                        |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Deep burial pits                     |          |                                   |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Any other equipment                  |          |                                   |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Effluent treatment plant             | 1        | 10 KLD                            |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Sub-total                            |          |                                   |     |  |                                             |
| 13 | M/s. Tamil Nadu waste management limited Unit 3, S.F. No. Plot No.141 A, 142 and 143 /SF No. 726 (Part), BALETHOTTAM village, Pochampalli Taluk and Krishnagiri District | 12.3093857, 78.4025276 | 150 | Dharmapuri, Krishnagiri District | 1299 | 7855 | 862 | Equip ment                           | Num bers | Total installed capacity (kg/day) | 862 |  | 1. Incineration ash - disposed through TSDF |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Incinerator                          | 1        | 5500 kgs/Day                      |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Plasma Paralysis                     | -        | -                                 |     |  | 2. Waste sharps – Sharp pits                |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Autoclave                            | 1        | 5100 kg/day                       |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Hydroclave                           | -        | -                                 |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Microwave                            | -        | -                                 |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Shredded                             | 1        | 5500 Kgs/day                      |     |  | 3. Plastics – Disposed through recyclers    |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Sharps Encapsulation or concrete pit | 3        | 7000kg/Each one                   |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Deep burial pits                     | -        | -                                 |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Any other equipment                  | -        | -                                 |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Effluent Treatment Plant             | 1        | 8 KLD                             |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Sub-total                            |          |                                   |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Any other equipment                  | -        | -                                 |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Effluent Treatment Plant             | -        | -                                 |     |  |                                             |
|    |                                                                                                                                                                          |                        |     |                                  |      |      |     | Sub-total                            | -        | -                                 |     |  |                                             |

|    |                                                                                                                                                             |     |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| a. | Total number of transportation vehicle used for collection of bio-medical waste on daily basis by the common bio-medical waste treatment facilities         | 295 |
| b. | List of health care facilities not having membership with the common bio-medical waste treatment facilities and neither having captive treatment facilities | Nil |
| c. | Number of trainings organized by the common bio –medical waste treatment facility operators                                                                 | 501 |
| d. | Number of Accidents reported by the common bio medical waste treatment facilities                                                                           | Nil |

For Member Secretary

Joint Director of Health Services  
KARUR.